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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFSPC)
LOS ANGELES AIR FORCE BASE, CALIFORNIA

12 March 2014

Colonel Richard J. McDermott
SMC/JA
483 North Aviation Blvd
El Segundo CA 90245-2808

This is in response to your request under the Freedom of Information Act ("FOIA") received by the Space and Missile Systems Center ("SMC") on February 26, 2012. The FOIA control number for this case is SMC-2012-02680-F. You requested a copy of the "History of Space and Missile Systems Organization, October 1998 – September 2001, Volumes I & II. The Air Force is providing you a copy of Volume II and a redacted copy of Volume I.

Your request is partially denied. The majority of Volume I will be released to you; however, two redactions have been made of information that must be withheld under 5 U.S.C. § 552 (b)(1) (Exemption 1). Exemption 1 protects information that is properly and currently classified in the interest of national defense or foreign policy.

Although the documents you requested are unclassified, the Classification Authority has determined under the "mosaic" or compilation analysis that certain unclassified portions, if combined with other unclassified information, could cause serious damage to the national security. The courts have widely recognized that the compilation of unclassified information would reveal matters of national security even though not as sensitive in isolation. *Berman v. CIA*, 378 F.Supp. 2d 1209, 1215-17 (E.D.Cal. 2005); *Edmonds v. DOJ*, 405 F.Supp.2d 23, 33 (D.D.C. 2005). We give great deference to the classifier's judgment in deciding whether information is properly classified and are satisfied the classification decision was reasonably made and legally sound. See, e.g., *Taylor v. Dep't of the Army*, 684 F.2d 99, 109 (D.C. Cir. 1982) (according "utmost deference" to affidavits explaining classification decision). *Berman v. CIA*, 378 F. Supp. 2d 1209, 1219 (E.D. Cal. 2005).

Should you decide that an appeal of this decision is necessary, you must write to the Secretary of the Air Force within 60 days from the date of this letter. Address your letter as follows:

Secretary of the Air Force
THRU: SMC/PKC
483 North Aviation Blvd.
Los Angeles Air Force Base
El Segundo CA 90245-2808

Please include in the appeal your reasons for reconsideration and attach a copy of this letter.

Initial denial authority for FOIA requests arising at SMC has been delegated to the Staff Judge Advocate, HQ SMC/JA. AUTHORITY: DoD Regulation 5400-7/AFSup, AFSPC Sup 1, ¶ C1.4.5; AFSPC/CC letter, 3 Mar 2011; and SMC/CC letter 17 May 2011.

Sincerely

RICHARD J. MCDERMOTT
Colonel, USAF
Staff Judge Advocate

[redacted]

HISTORY

OF THE

SPACE AND MISSILE SYSTEMS CENTER

October 1998 - September 2001

VOLUME I

Assigned to

Headquarters Air Force Space Command

Stationed at

Los Angeles Air Force Base, California

HARRY N. WALDRON
Historian

WILLIAM MAIKISCH
Senior Executive Service
Executive Director

DATE SIGNED 23 FEB 07

OFFICE OF ORIGIN: SMC/HO

Ensure material is not FOUO and exempt under AFI 37-131 before making a public release.

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[redacted]

ADMINISTRATIVE CONTROLS

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HISTORY OF THE

SPACE AND MISSILE SYSTEMS CENTER

1 October 1998 – 30 September 2001

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CHRONOLOGY
FY 1998-2001

DATE	EVENT	PAGE
15 Oct 97	SMC added $62.447 million to the Defense Satellite Communications System (DSCS) Service Life Enhancement Program (SLEP) contract (F04701-96-C-0023) with Lockheed Martin Corporation to provide the SLEP modifications to the DSCS B11, B6, and A3 satellites.	**230**
24 Oct 97	The DSCS III B13 satellite was successfully launched into orbit on an Atlas IIA/Centaur from Cape Canaveral Air Station (AS), Florida.	**48, 231**
24 Oct 97	A classified National Reconnaissance Office (NRO) satellite was successfully launched into orbit on a Titan IVA from Vandenberg AFB.	**48, 68**
31 Oct 97	The SMC Phillips Laboratory was inactivated and realigned into a new, unified Air Force laboratory organization, designated the Air Force Research Laboratory (AFRL).	**6**
3 Nov 97	The acting Under Secretary of Defense for Acquisition and Technology, Noel Longuemare, approved the new acquisition strategy to have Boeing and Lockheed Martin develop two Evolved Expendable Launch Vehicle (EELV) systems. The government hoped to maintain competition and obtain lower individual launch costs throughout the program's life cycle with this approach.	**78**
5 Nov 97	The Global Positioning System (GPS) IIA-28 satellite was successfully launched into orbit on a Delta II from Cape Canaveral AS. This was the final launch of a GPS Block IIA.	**48,56, 59, 106**
8 Nov 97	A classified NRO satellite was successfully launched into orbit on a Titan IVA from Vandenberg AFB.	**48**
17 Nov 97	SMC awarded Hughes Information Systems an $84,760,754 cost plus award fee contract (F04701-97-C-0044) for the Global Broadcast Service (GBS) Phase II effort. Phase II extended the initial GBS capability to almost worldwide coverage using new space and ground components.	**239**

29 Jan 98	A classified NRO satellite was launched into orbit on a Titan IIA from Vandenberg AFB.	**48**
16 Mar 98	Cape Canaveral AS launched into orbit an Atlas IIA/Centaur transporting the F-8 Navy Ultra High Frequency (UHF) Follow-on (UFO) communications satellite that contained the first GBS payload. The SMC Military Satellite Communications (MILSATCOM) JPO streamlined the acquisition of GBS and delivered the payload into orbit only two years after the contract had been signed.	**48, 60, 239, 241**
1 May 98	SMC filed the required Final Environmental Impact Statement for the EELV with the Environmental Protection Agency.	**78**
9 May 98	A classified NRO satellite was launched into orbit on a Titan IVB from Vandenberg AFB.	**48**
29 May 98	An Integrated Program Office that reported to the National Oceanic and Atmospheric Administration assumed operational command and control of all government weather satellites, including DMSP.	**153, 168**
1 Jun 98	SMC activated Detachment 11 at Peterson AFB, Colorado.	**6-7**
5 Jun 98	The Air Force renamed Falcon AFB, Colorado to Schriever AFB.	**7**
8 Jun 98	Air Force Assistant Secretary for Science, Engineering and Technology signed a Record of Decision that permitted the development and launch of both Boeing and Lockheed Martin's proposed EELV vehicles.	**78**
11 Jun 98	AFSC's 6th Space Operations Squadron (SOPS) closed down the Multi-Purpose Satellite Operations Center (MPSOC) at Offutt AFB, Nebraska. The MPSOC generated commands for transmission to the DMSP satellites and processed telemetry received from them.	**168**
30 Jun 98	The 61st Air Base Group (ABG) redesignated the Security Forces Division to the 61st Security Forces Squadron (61 SFS).	**3-4**
27 Jul 98	Boeing announced plans to completely rebuild Space Launch Complex 37 (SLC-37) at Cape Canaveral AS as a launch facility for the Delta IV EELV.	**91**

31 Jul 98	SMC inactivated SMC Detachment 2 at Onizuka AS, California.	**8**
3 Aug 98	SMC published a notice in the Commerce Business Daily to provide an advance announcement of the future full and open competition Request for Proposal (RFP) to obtain qualified sources for the Spacelift Range System Contract (SLRSC). The SLRSC would modernize the SLRS by developing, procuring, and sustaining integrated, automated instrumentation assets at the Western and Eastern Launch Ranges.	**303**
12 Aug 98	Vandenberg AFB attempted to launch a Titan IVA transporting a classified NRO satellite. The Air Force destroyed the Titan IVA when it veered out of its planned trajectory. This was the first of the major launch vehicle failures that ultimately led to the Launch Broad Area Review (BAR).	**49, 51, 68, 70**
26 Aug 98	Cape Canaveral AS attempted to launch a Delta III transporting the commercial Galaxy 10 satellite. The launch failed.	**51**
8 Sep 98	SMC published a Request for Information (RFI) in the Commerce Business Daily requesting industry feedback on an acquisition strategy for the MILSATCOM Wideband Gapfiller Satellite (WGS).	**250**
1 Oct 98	The AFMC HQ reassigned the HQ 377th Air Base Wing at Kirtland AFB from SMC to the Air Armament Center at Eglin AFB, Florida.	**7-8**
16 Oct 98	A Congressional mandate (H.R.2401, 10 November 1993), as amended by the FY 1999 Defense Authorization Act, Section 215, Para (f), 16 October 1998, directed that all DoD aircraft, ships, armored vehicles, and indirect fire weapon systems be equipped with GPS by 30 September 2005.	**133**
16 Oct 98	SMC awarded four EELV Federal Acquisition Regulation (FAR) Part 12 commercial-type contracts. Boeing received a $500 million EELV development contract (F04701-98-9-0005) and Lockheed Martin received $500 million EELV development contract (F04701-98-9-0004), called Other Transaction Agreements (OTA). Boeing received a $1.38 billion contract (F04701-98-D-0002) and Lockheed Martin received a $649 million contract (F04701-98-D-0001) for the EELV Initial Launch Services (ILS).	**78, 79**

16 Oct 98	SMC awarded a contract (F04701-98-D-0002) to the Boeing Company to have the last two DSCS III SLEP satellites launched with the Delta IV Medium EELVs.	**233**
20 Oct 98	The UFO F9 satellite that contained the second GBS payload was successfully launched into orbit on an Atlas IIA/Centaur from Cape Canaveral AS.	**49, 241**
30 Nov 98	SMC awarded the Raytheon Systems Company a $167 million firm-fixed-price contract (F04701-98-D-0028) to produce the next generation Miniaturized Airborne GPS Receiver (MAGR) 2000 receiver. The MAGR 2000 would be the first navigation warfare-compatible avionics system.	**129**
1 Dec 98	Program Budget Decision 023 acknowledged the Air Force decision to delay the first Space Based Infrared System (SBIRS) High launch from 2002 to 2004.	**205-206**
25 Jan 99	Vice President Gore announced a $400 million GPS Modernization Initiative. This six-year plan would significantly improve GPS capabilities for both military and civilian users. The modernization would add two new civilian signals to future GPS satellites.	**111**
5 Feb 99	The Air Force terminated the contracts for the two SBIRS Low flight demonstration satellites (Flight Demonstration System [FDS] and the Low Altitude Demonstration System [LADS]) at the convenience of the government.	**213**
23 Feb 99	The ARGOS satellite was successfully launched into orbit on a Delta II from Vandenberg AFB.	**49, 56, 59**
25 Feb 99	SMC awarded Lockheed Martin a $70.7 million contract modification under the Atlas IIAS contract (F04701-96-C-0002) to produce the Atlas IIIB.	**65**
2 Mar 99	Darleen Druyun, Principal Deputy Assistant Secretary of the Air Force for Acquisition and Management (SAF/AQ), chartered a Joint Estimation Team (JET) to review the SBIRS High contract structure and determine the true cost of the restructured SBIRS High program.	**206**

24 Mar 99	NATO [North Atlantic Treaty Organization] and the United States launched Operation Allied Force against Serbia to halt the Serbian internal aggression against the ethnic Albanians in Kosovo.	**148, 174**
9 Apr 99	Cape Canaveral AS unsuccessfully launched a Titan IVB transporting the DSP F-19 satellite. This was the only launch failure in the DSP program's 31-year history.	**49, 51, 69, 70, 71, 73, 193, 194, 195**
27 Apr 99	Vandenberg AFB attempted to launch an Athena II transporting a commercial IKONOS satellite. The launch failed.	**51**
30 Apr 99	Cape Canaveral AS launched a Titan IVB/Centaur transporting the Milstar F-3 satellite. The Milstar was injected into an incorrect, useless orbit and became a total loss.	**49, 52, 70, 71, 267-268, 270, 271, 285**
4 May 99	The JET briefed its recommendations to restructure the SBIRS High program to the Secretary of the Air Force.	**206**
4 May 99	Cape Canaveral AS attempted to launch a Delta III transporting the commercial ORION III satellite. The launch failed.	**51**
7 May 99	The DMSP Program Office began work on the Integrated Weather Information Nephanalysis 64th Mesh (IWIN 64) effort to develop the capability to produce weather images with higher resolutions. The team improved the prototype, and the first products of this process were available in only 30 days.	**174**
8 May 99	The original GPS IIR-3 satellite (SV-10) had to be replaced (with SV-11) after being contaminated by rain at Cape Canaveral AS. This delayed the GPS Block IIR-3 launch until 7 October 1999.	**107**
19 May 99	President Clinton ordered an investigation of the six launch failures that occurred in 1998 and 1999.	**52**
3 Jun 99	Yugoslavian President Slobodan Milosevic capitulated and agreed to NATO's peace terms after Operation Allied Force's 78-day air campaign.	**150**

24 Jun 99	The Air Force posted a Request for Statements of Interest (RSI) for the Systems Acquisition Management Support (SAMS) Complex project. The SAMS project proposed trading Los Angeles AFB property (including the 41-acre Area A) to a private real estate developer in exchange for the construction of new, seismically-secure Air Force facilities in Area B.	**34**
22 Jul 99	The National Missile Defense Act of 1999 (Public Law 106-38) was signed into law. The law committed the US to deploying an effective National Missile Defense (NMD) system, as soon as technologically possible, that could defend the territory of the US against a limited ballistic missile attack. SBIRS Low would have an important role in the NMD system.	**209**
1 Aug 99	SMC redesignated the Manpower and Quality Office (SMC/MQ) to the Manpower Office (SMC/XPM). XPM became a three-letter office within the Directorate of Plans and Programs.	**5**
16 Aug 99	SMC awarded a $275 million firm fixed-price contract to the TRW Space and Electronics Group (F04701-99-C-0047), and a $275 million firm fixed-price contract to the to Spectrum Astro Incorporated (F04701-99-C-0048) to conduct the Program Definition and Risk Reduction (PDRR) effort for SBIRS Low.	**215-216**
21 Aug 99	The GPS system had a clock rollover similar to Y2K. The Air Force referred to this periodic GPS event as the End-of-Week (EOW) rollover. The Air Force had concerns that the EOW could create severe navigation problems if complications resulted from this first-ever GPS clock rollover. The GPS constellation and its ground support stations operating in Colorado continued to function normally both during and after the EOW. However, incompatibilities did occur between GPS receivers and the backup or alternate modes of some precision weapons and mission planning systems as a result of the rollover.	**145-146**
23 Aug 99	SMC awarded a competitive $44,499,925 firm fixed price contract (F04701-99-C-0027) to Lockheed Martin ($22,250,000) and Hughes Space and Communications Company (HSC) ($22,249,925) to develop the AEHF system requirements, architecture, and design concepts for the System Definition (SD) phase of the AEHF acquisition.	**280**
4 Oct 99	SMC published a notice in the <u>Commerce Business Daily</u> announcing the formal release of the Spacelift Range System Contract (SLRSC) RFP (F04701-99-R-0308).	**315**

7 Oct 99	The GPS IIR-3 satellite was successfully launched into orbit on a Delta II from Cape Canaveral AS.	**49, 106, 107**
15 Oct 99	Dr. Jacques Gansler, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)), concurred with the FAR Part 12 acquisition strategy for WGS. This would be the first time the DoD used FAR Part 12 to procure a major satellite system. The WGS acquisition would use commercial COMSAT market practices with commercial contract terms and conditions.	**252**
1 Nov 99	The Air Force Launch Broad Area Review (BAR) issued its report about the six launch failures during 1998-1999 in the form of a briefing and provided its 19 recommendations.	**52-55**
16 Nov 99	The United States and Canada signed a Memorandum of Understanding (MOU) for an AEHF partnership. AEHF would be the first jointly funded U.S./international MILSATCOM cooperative development project. The U.S. would enter into an international partnership with key allies to share the costs and the use of the AEHF system.	**283**
23 Nov 99	The UFO F10 satellite that contained the third GBS payload was successfully launched into orbit on an Atlas IIA/Centaur from Cape Canaveral AS. This would be the final GBS payload launched and it provided the DoD with near-global broadcast coverage.	**49, 242**
6 Dec 99	The Milstar II National Team (Lockheed Martin, TRW, and Hughes) sent a jointly approved letter to Darleen Druyun (Principal Deputy Assistant Secretary for Air Force Acquisitions and Management) proposing an acceleration of the first AEHF satellite (called "Pathfinder"). The letter proposed combining the efforts of the three companies competing for the AEHF contract into another National Team on a firm fixed price basis within the existing AEHF funding profile ($2.6 billion).	**285**
12 Dec 99	The DMSP F-15 satellite was successfully launched into orbit on a Titan II from Vandenberg AFB.	**49, 158, 168**
13 Dec 99	SMC awarded $20,650,000 contracts to Lockheed Martin (F04701-00-C-0501) and TRW (F04701-00-C-0500) for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Program Definition and Risk Reduction (PDRR) phase to define the system requirements.	**184**

1 Jan 00	The year 2000(Y2K) computer rollover occurred at 0000 hours. Computers that did not get modified to rollover their clocks from the year 1999 to 2000 could misinterpret the date as 1 January 1900 and potentially cause widespread computer failures for both individual computers and entire computer networks. The Air Force and SMC made significant efforts to avoid any Y2K computer failures.	**19, 25, 26-28, 148, 316**
20 Jan 00	The DSCS III B8 satellite was successfully launched into orbit on an Atlas IIA/Centaur from Cape Canaveral AS. B8 was the first of four DSCS III satellites that had the SLEP upgrade. The B8 satellite began the process of replacing the oldest DSCS III satellites in constellation.	**49, 61, 231**
4 Feb 00	Air Force Space Command redesignated all of its Air Stations within the United States to Air Force Stations. The redesignation affected: Cape Canaveral AFS, Cape Cod AFS in Massachusetts, Cavalier AFS in North Dakota, Cheyenne Mountain AFS in Colorado, Clear AFS in Alaska, New Boston AFS in New Hampshire, Onizuka AFS in California, El Dorado AFS in Texas, and Pillar Point AFS in California.	**8-9**
9 Feb 00	The Deputy Secretary of Defense approved the GPS Modernization Plan that would significantly upgrade the military and civilian Navstar system. The modernization of GPS would greatly improve the navigation accuracy and generate billions of dollars in civilian revenue.	**113**
23 Mar 00	The Joint Requirements Oversight Council (JROC) validated the accelerated AEHF Pathfinder satellite acquisition concept for mitigating the loss of Milstar F-3.	**285**
2 May 00	The GPS system stopped using Selective Availability (SA) - the intentional degradation of GPS signal accuracy. The Clinton administration halted SA in a continuing effort to be more responsive to the ongoing proliferation of civilian and commercial use of GPS worldwide.	**110**
8 May 00	The DSP F-20 satellite was successfully launched into orbit on a Titan IVB from Cape Canaveral AFS.	**49, 74, 194, 195**
10 May 00	The GPS IIR-4 satellite was successfully launched into orbit on a Delta II from Cape Canaveral AFS.	**50, 106**

24 May 00	Cape Canaveral AFS launched the first Atlas IIIA mission that transported a commercial satellite into orbit for the European Telecommunications Satellite Organization (Eutelsat).	**65-66**
25 May 00	The Air Force Associate Deputy Assistant Secretary for Acquisition signed the Record of Decision approving the addition of up to five solid rocket motors on the Atlas V medium-lift and Delta IV medium-lift vehicles.	**83**
30 May 00	SMC awarded Lockheed Martin, TRW, and HSC a firm fixed-price $98 million contract (F04701-99/C-0027, P00005) to create a National Team to perform the remaining effort associated with the SD phase of the AEHF system.	**286**
31 May 00	The Space-Based Laser (SBL) project office became a two-letter organization (SMC/TL). Previously, SBL had been a project within the Advanced Systems Directorate (SMC/AD).	**5**
1 Jun 00	The standup of the Commission to Assess United States National Security Space Management and Organization, commonly referred to as the "Space Commission." The Space Commission assessed the management and organization of space activities that supported U.S. national security.	**12**
6 Jun 00	SMC established the Human Resources Office (SMC/HR) from elements of the Directorate of Plans and Programs.	**5**
12 Jun 00	SMC issued an RFP (F04701-99-R-0065) that invited industry to submit proposals for the WGS contract. It included producing the satellites, the control suites, the training sustainment, and other needs.	**252**
16 Jul 00	The GPS IIR-5 satellite was successfully launched into orbit on a Delta II from Cape Canaveral AFS.	**50, 106**
28 Jul 00	The GBS JPO [part of the MILSATCOM JPO (MJPO)] transferred from SMC to the Electronic Systems Center (ESC) at Hanscom AFB, Massachusetts. The GBS JPO continued to report directly to the SMC MJPO after its relocation to Hanscom.	**235**
11 Aug 00	The GPS JPO issued an RFP (F04701-00-R-8031) for potential contractors to conduct an architecture study for the concept exploration phase of the GPS Block III satellite.	**117**

18 Aug 00	The Air Force awarded a $53 million contract (FO4701-00-C-0006) with the Lockheed Martin Missiles and Space Company to produce the modernized GPS Replenishment satellites (Block IIR-M). The GPS Modernization Plan would upgrade up to 12 of the 14 GPS Block IIR satellites in storage.	**114**
23 Aug 00	SMC awarded a $123 million modification to its GPS Block IIF contract (F04701-96-C-0025) with Boeing to modernize the original design of the Block IIF satellite.	**115**
1 Sep 00	The groundbreaking for the new Medical/Dental Clinic (Building 210) occurred in Area B of Los Angeles AFB.	**37-38**
30 Sep 00	The House and Senate Appropriations Committees terminated the Discoverer II Program for fiscal reasons.	**7**
12 Oct 00	SMC published a notice in the Commerce Business Daily that gave advanced notice of the full and open competition RFP for the Satellite Control Network Contract (SCNC) for the purpose of obtaining qualified sources. The SCNC would be the overall, consolidated support contract for the Air Force SCN (AFSCN) beginning in FY 2002. It would include the development, systems engineering, integration, and sustainment functions for the AFSCN.	**303**
19 Oct 00	The DSCS III B11 satellite was successfully launched into orbit by an Atlas IIA/Centaur from Cape Canaveral AFS. This was the last Atlas IIA launch. Pp.	**50, 232**
3 Nov 00	SMC awarded ITT Industries the 10.5-year, cost plus award fee Spacelift Range System Contract (SLSRC) (F04704-01-C-0001) that had an estimated total value of $1.5 billion.	**316**
13 Dec 00	SMC awarded Boeing a $141 million contract modification (F04701-98-9-0005) for the demonstration launch of Boeing's heavy-lift Delta IV EELV.	**88**
10 Nov 00	The GPS IIR-6 satellite was successfully launched into orbit on a Delta II from Cape Canaveral AFS.	**50, 59, 106, 108**
16 Nov 00	A ribbon-cutting ceremony took place for the opening of the new 24.4-acre Pacific Heights II Housing Area in San Pedro for the senior NCO families at Los Angeles AFB. The 71-unit family housing area began construction in May 1997 and it was completed within its $13.2 million budget.	**39**

20 Nov 00	SMC awarded Raytheon Systems Company a $297.6 million contract (F04701-01-C-0500) for the development of the NPOESS Visible/Infrared Imager Radiometer Suite (VIIRS) Phase II.	**182**
5 Dec 00	Cape Canaveral AFS launched the first DOD Atlas IIAS. It transported a classified NRO satellite into orbit.	**50, 63**
13 Dec 00	SMC added the demonstration launch of Boeing's heavy-lift Delta IV to the company's Other Transaction Agreements (OTA) contract (F04701-98-9-0005) for $141 million.	**88**
2 Jan 01	SMC awarded the firm fixed-price WGS contract (F04701-00/C-0011) to Boeing Satellite Systems (BSS). It took only 14 months for WGS to proceed from concept to contract award.	**255**
6 Jan 01	The Directorate of Plans and Programs (SMC/XP) became a two-letter organization. SMC/XP first appeared as a two-letter organization on the January 1999 SMC organization chart, but the official the stand up date did not occur until 2001.	**4**
11 Jan 01	The Space Commission submitted its assessment to Congress in the *Report of the Commission To Assess United States National Security Space Management And Organization*.	**13**
26 Jan 01	SMC awarded contracts to four companies to conduct the research and development of the handheld Defense Advanced GPS Receiver (DAGR) that would replace the PLGR.	**132, 143**
30 Jan 01	The GPS IIR-7 satellite was successfully launched into orbit on a Delta II from Cape Canaveral AFS. The Air Force successfully launched two GPS Block IIR satellites (GPS IIR-6 and the GPS IIR-7) in a record-breaking 82-day window.	**50, 106, 108**
27 Feb 01	The Milstar F-4 satellite was launched into orbit on a Titan IVB/Centaur from Cape Canaveral AFS. This was the first Milstar satellite to include a medium-data-rate (MDR) communications payload that greatly increased the ability of tactical forces to communicate within and across theater boundaries.	**50, 272**
16 Mar 01	SMC awarded Lockheed, TRW, and Boeing an $86 million fixed-price contract (F04701-99-C-0027-P00010) modification for additional preliminary design efforts and extended the SD phase of the AEHF acquisition.	**280**

30 Mar 01	SMC awarded a $110,170,885 modification to the GPS Block IIR-M contract (FO4701-00-C-0006, P00006) with Lockheed Martin to produce the GPS Block IIR-M.	**114**
19 May 01	Lt Gen Stephen Plummer (Principle Deputy SAF/AQ) presented the annual John J. Welch, Jr. Award to the WGS team for its pioneering acquisition strategy at the SAF/AQ Annual Awards Banquet. The award recognized the WGS team as the best-managed Air Force acquisition team of 2000.	**260**
29 Jun 01	SMC Detachment 12 at Kirtland AFB was activated.	**9**
29 Jun 01	The NT revised its May 2000 "firm commitment" to the price, performance, and schedule of producing the AEHF satellites. The NT agreed to a $2.6 billion commitment in May 2000 to produce AEHF, but the NT declared that the cost had risen to $3.3 billion.	**287-288**
25 Jul 01	The Air Force issued Phase I of the RFP for the SAMS project.	**34**
30 Jul 01	SMC awarded Raytheon Systems Company a $298 million contract (F04701-01-C-0502) for the development of the NPOESS Conical-scanning Microwave Imager Sounder (CMIS) Phase II.	**181**
6 Aug 01	The DSP F-21 satellite was launched into orbit on a Titan IVB from Cape Canaveral AFS.	**50, 74, 194, 195**
8 Sep 01	A classified NRO satellite was launched into orbit on the first DOD Atlas IIAS launch from the west coast at Vandenberg AFB.	**50, 64**
11 Sep 01	Al Qaeda terrorists attacked the United States by hijacking four airliners and crashing two of them into the World Trade Center buildings in New York, one into the Pentagon, and the fourth airliner crashed in Pennsylvania. In response, President Bush launched the War on Terrorism.	**110, 246**
25 Sep 01	The first Delta IV first-stage common booster core (CBC) production unit was rolled out of the factory.	**89-91**
1 Oct 2001	The program management of the SBIRS Low program was transferred from the Air Force at SMC to the Ballistic Missile Defense Organization (BMDO).	**222**

CHAPTER 1

MISSION AND ORGANIZATION

During the period fiscal year (FY) 1998 through FY 2001, the Space and Missile Systems Center (SMC) at Los Angeles Air Force Base (AFB), California had been a component of the Air Force Materiel Command (AFMC). The mission of the SMC headquarters was to design and acquire the Air Force, and most of the Department of Defense's, military space systems. SMC also had the responsibility to oversee launches and complete on-orbit checkouts. From the beginning of the military space program in the 1950s, these space systems included satellites for such purposes as communications, navigation, surveillance and weather reporting; launch vehicles to transport the satellites into orbit; and control systems to command them in orbit.[1]

At the beginning of the reporting period, two major field units reported to HQ SMC: the Phillips Laboratory and the 377th Air Base Wing (ABW). The 377th ABW was the host wing at Kirtland AFB, New Mexico, where the Phillips Laboratory headquarters had also been located. However, both of these units at Kirtland ended their association with SMC as will be discussed below.[2]

ORGANIZATION

SMC Headquarters

At the beginning of FY 1998, the SMC headquarters carried out its mission through 10 two-letter program offices that developed and acquired space systems. Four of these organizations managed major programs and reported to the Air Force Program Executive Officer (PEO) for Space at the Pentagon. A fifth major program, the Airborne Laser (ABL) System program, reported to the Air Force PEO for Weapons. Five organizations managed non-major programs and reported to the Designated Acquisition

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[1] Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, (Doc 1-1); E-mail, SMC/CCX CC's Action Office to SMC/CCX All et al., "SMC Unit Mission Description," 24 December 1998, (Doc 1-2); Internet Document, SMC/PA, "Our Mission," 8 February 2000, http://www.losangeles.af.mil/SMC/PA/mission.htm (Doc 1-3); Fact Sheet, AFMC, "Air Force Materiel Command," printed 23 June 2000, http://www.af.mil/news/Air_Force_Materiel_Command.html (Doc 1-4); Robert Mulcahy, "Los Angeles Air Force Base," Private Pilot Magazine, February 2000, pp. 84-85, 89 (Doc 1-5); Document, William Evans (SMC/AXRX), "SMC Acquisition Programs," December 1997, (Doc 1-6).

[2] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 1.

Commander (DAC) who was the SMC commander. The major PEO programs included: Launch Programs (office symbol, SMC/CL), the Evolved Expendable Launch Vehicle (EELV) program (SMC/MV), the Military Satellite Communications (MILSATCOM) (SMC/MC) Joint Program Office (JPO), the Space-Based Infrared System (SBIRS) program (SMC/MT), and the ABL System Program (SMC/TM).[3] The five DAC programs included: the Advanced Systems Directorate (SMC/AD), the Meteorological Satellite program (SMC/CI), the Satellite and Launch Control program (SMC/CW), the NAVSTAR Global Positioning System (GPS) JPO (SMC/CZ), and the Space and Missile Test and Evaluation Directorate (SMC/TE).[4]

At the beginning of FY 1998, the organizations responsible for acquiring space hardware received support from four functional organizations: Systems Acquisition (SMC/AX), Comptroller (SMC/FM), Contracting (SMC/PK), and Developmental Planning (SMC/XR). Eight staff offices also provided support: Small Business Office (SMC/BC), History Office (SMC/HO), Inspector General (SMC/IG), Intelligence Office (SMC/IN), Staff Judge Advocate (SMC/JA), Manpower and Quality Office (SMC/MQ), Public Affairs Office (SMC/PA), and the Safety Office (SMC/SE) in addition to the 61st Air Base Group (ABG). For a complete list of these support organizations, see the organization charts in Appendix D of this history. For descriptions of the missions as well as the organizational relationships of the program and staff offices, see the 1998 edition of the "Organization and Mission Chart Book" produced by the SMC Manpower and Quality Office numbered as a supporting document in the footnote below.[5]

By the end of FY 2001, SMC altered its organizational and reporting structures. Four SMC organizations reported to the PEO for Space: the GPS JPO, the MILSATCOM JPO (including DSCS, Milstar and WGS), the SBIRS program (including DSP), and the EELV program. The SMC ABL System program reported to the PEO for Weapons. The supporting functional and staff organizations also had some changes, as will be discussed later in the chapter.[6]

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[3] The Milstar, DSCS, GBS, WGS, and AEHF satellite programs were managed under the MILSATCOM JPO, and the DSP program was managed under the Space-Based Infrared Systems Program Office.

[4] Organization Chart, SMC/MQ, "Space and Missile Systems Center Directory," October 1997, (Doc 1-7); Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, (Doc 1-1).

[5] Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, (Doc 1-1).

[6] Organization Chart, "Space and Missile Systems Center Directory," October 2001, (Doc 1-8); Organization Chart, "61 Air Base Group Organization Chart," October 2001, (Doc 1-9).

Larger Field Units

The Phillips Laboratory (headquartered at Kirtland AFB) had directorates at Hanscom AFB, Massachusetts and Edwards AFB, California. The Phillips Laboratory supervised and coordinated the activities of six directorates—Geophysics, Propulsion, Space Experiments, Space and Missile Technology, Lasers and Imaging, and Advanced Weapons and Survivability.[7]

The 377th ABW (who reported directly to SMC) was the host organization that maintained and operated Kirtland AFB.[8] For the internal organization and activities of the 377th ABW, see the histories produced by the 377th ABW History Office.

Organizational Changes at SMC Headquarters

The SMC headquarters had several organizational changes during the period FY 1998 through FY 2001. The most significant change realigned SMC from AFMC to the Air Force Space Command (AFSPC). This narrative cannot describe all the organizational changes, but it will mention the more significant realignments involving the creation, extinction, redesignation, or reassignment of two-letter offices.

On 30 June 1998, the Security Forces Division of the 61st ABG redesignated its organization title to the "61st Security Forces Squadron (61 SFS)." The squadron also changed its security personnel from contractors to Department of Defense (DoD) police officers. A 1997 memo from AFMC stated that the HQ AFMC/IG rated the Los Angeles AFB security forces' contract operation as "Unsatisfactory" due to conflicts with the California Business and Professions Code that sharply restricted the activities of private security contractors. The JA offices of both AFMC and SMC stated that a contractor could not legally conduct the Performance Work Statement without violating California state law. The JA offices concluded that the law enforcement duties at Los Angeles AFB were inherently government functions and could not be contracted out. Unlike the contractor security forces, the state of California recognized the DoD police personnel as peace officers with the authority to arrest civilians committing crimes in and adjacent to the property of the base. The local crime rate in Los Angeles (especially in San Pedro where Fort MacArthur was located) contributed in the decision to convert to a DoD police force. The contract for the contractor security forces expired on 30 June 1998, and it did not get renewed or recompeted. Special Order GA-7 activated the 61st Security Forces Squadron on 1 July 1998.[9]

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[7] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 5.

[8] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 5.

[9] Memo, AFMC/CV to HQ USAF/XP, "Los Angeles AFB Security Forces Contract," Faxed 15 October 1997, (Doc 1-10); Memo, SMC/CC to AFMC/CV, "Los Angeles AFB Security Forces Contract (HQ AFMC/XP SSS, 10 Oct 1997)," 17 Oct 1997, (Doc 1-11);

The Directorate of Plans and Programs (SMC/XP) first appeared as a two-letter organization on the January 1999 SMC organization chart. The XP mission provided strategic direction and center integration of all business areas that enabled the Commander to effectively manage the mission. XP included several support organizations: Manpower and Quality Division, the Programs Division, the Plans Division, the Commander's Action Group and the Protocol Office. The realignment of the XP took place as part of an AFMC reorganization plan. SMC/XP eventually received approval to become a two-letter organization on 25 September 2000, and the stand up date occurred on 6 January 2001.[10]

The Manpower and Quality Office (SMC/MQ) had its title redesignated and it became a three-letter office. On 22 July 1999, HQ USAF announced its decision to rename all of its "Manpower and Quality Offices" at all levels. The Air Force removed the word "quality" from all the Manpower organization titles on 1 August 1999, because all Air Force organizations should be considered "quality" not just Manpower. MQ

Memo, SMC/CC to HQ AFMC et al., "Request for Law Enforcement Officer (LEO) Coverage and Special Pay Pursuant to the Federal Law Enforcement Pay Reform Act of 1990," 18 May 1998, (Doc 1-12); John Ryan, SMC/PA, "Los Angeles AFB to reactivate 61st Security Forces Squadron July 1," Astro News, 19 July 1998, p. 1 (Doc 1-13); Special Order, HQ AFMC, "Special Order GA-7," 30 June 1998, (Doc 1-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO, p. 17.

[10] Organization Chart, "Space and Missile Systems Center Directory," January 1999, (Doc 1-15); SMC/PA, "XP becomes two-letter" Astro News, 15 January 1999, p. 3 (Doc 1-16); Staff Summary Sheet, SMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate," 19 March 1999, with attachment Memo, SMC/CC to HQ AFMC/XPM, "Establishment of SMC Plans and Programs Directorate (SMC/XP)," 6 September 2000, (Doc 1-17); Memo, HQ AFMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate (SMC/XP) (Your Memorandum, 6 Sep 00)," 25 September 2000, (Doc 1-18); E-mail, Alicia Hale (SMC/XPM) to Robert Mulcahy (SMC/HO), "History Report FY00," 24 January 2002, (Doc 1-19); Briefing charts, "SMC/XP Stand Up Activities," No date, (Doc 1-19-1); Memo, HQ AFMC/XPM to SMC/CD et al., "Proposal to Establish a Plans and Programs Directorate (XP) (HQ AFMC/XP Memo, 12 Jan 98)," 14 October 1998, (Doc 1-19-2); Memo, HQ AFMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate (SMC/XP)," No date, with attachment, Document, "Plans and Programs Directorate Proposed Organization," No date, with attachment, Document, "SMC/XP Mission Statements," No date, with attachment, Colonel Position Description, "Director, Plans and Programs," No date, (Doc 1-19-3); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO, pp. 17-18.

became a part of the Directorate of Plans and Programs, and it was designated the "Manpower Office" (SMC/XPM).[11]

On 31 May 2000, the Space-Based Laser (SBL) project office (SMC/TL) became a two-letter organization. Previously, SBL had been a project within the Advanced Systems Directorate (SMC/AD) on base. SMC gave SBL increased priority to produce a national missile defense system. The SBL project separated from AD because it had progressed to the level where SBL needed to be recognized as a separate project office. Detachment 12 at Kirtland AFB also had an SBL office.[12]

The Human Resources Office (SMC/HR) was created from elements of the Directorate of Plans and Programs on 6 June 2000. SMC established SMC/HR to ensure an integrated corporate approach to managing resources at SMC. This structure provided a link between the center's priorities and the management of personnel resources. The organization provided a focal point for resource issues, it reduced processing time, and it had a more focused approach to meeting senior management goals and objectives.[13]

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[11] Organization Chart, "Space and Missile Systems Center Directory," July 1999, (Doc 1-20); E-mail, Alicia Hale (SMC/XPM) to Robert Mulcahy (SMC/HO), "History Report FY00," 24 January 2002, (Doc 1-19); History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is not FOUO), HQ AFMC/HO, pp. 22-23.

[12] Staff Summary Sheet, SMC/XPM to SMC/CC, "Establish a Space Based Laser (SBL) Project Management Office," no date, with attachment Memo, SMC/XPM to HQ AFMC/XPM, "Establish a Space Based Laser (SBL) Project Management Office," 25 January 2000, (Doc 1-21); SMC/PA, "SMC/TL, new 2-letter, stands up May 1," Astro News, 31 March 2000, p. 3 (Doc 1-22).

[13] Memo, HQ AFMC/XPM to SMC/CC, "Establishment of HR at SMC (Your Memorandum, 15 May 00)," 6 June 2000, with attachment Memo, SMC/CC to HQ AFMC/XPM, "Organization Change Request – Establishment of Human Resources Office (SMC/HR)," 15 May 2000, (Doc 1-23); History of Air Force Materiel Command 1 October 1999 – 30 September 2000 (FOUO, extract is not FOUO), HQ AFMC/HO, p. 15.

SMC's Realignment to Air Force Space Command (AFSPC)

Following the recommendations of the Space Commission, Air Force Special Order GD-019 (dated 22 August 2001) relieved SMC and the 61st ABG from their assignments to AFMC and reassigned the two organizations to AFSPC effective 1 October 2001. See below for the reasons for the reorganization. This reassignment to AFSPC included SMC Detachments 3, 8, 9, 11 and 12. It also included all of the squadrons of the 61st ABG: 61st Communications Squadron, 61st Medical Squadron, 61st Mission Support Squadron and the 61st Security Forces Squadron.[14]

Organizational Changes in the Field

The SMC Phillips Laboratory was inactivated on 31 October 1997. Phillips Laboratory developed technology for military space systems. SMC Phillips Laboratory realigned into a new, unified Air Force laboratory organization that included the Armstrong Laboratory at Brooks AFB, Texas, Rome Laboratory at Rome, New York, and Wright Laboratory at Wright-Patterson AFB, Ohio. The newly aligned organization was designated the "Air Force Research Laboratory (AFRL)." The Air Force created the AFRL to streamline the organizational structure of the laboratories, to merge the resources and accountability of the laboratories, to reduce technology fragmentation, and to bring about a more focused laboratory mission.[15]

The AFMC Space Systems Support Group (SSSG) at Peterson AFB, Colorado was divided into two separate detachments (Detachments 5 and 11) in order to integrate the space systems between SMC and the Electronic Systems Center (ESC) based at Hanscom AFB. The AFMC commander ordered a review of the SSSG alignment in September 1997 because he "... felt this FOA [field operating agency] was not performing headquarters activities."[16] Special Order GA-5 activated SMC Detachment 11 and ESC Detachment 5 on 1 June 1998. The mission of Detachment 11 was to

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[14] SMC/PA, "SMC to realign under AFSPC," Astro News, 18 May 2001, pp. 1, 3 (Doc 1-24); E-mail, Donna Jay (SMC/XPM) to distribution, "Special Orders for SMC realignment to AFSPC," 6 September 2001, with attachments Orders, HQ USAF to AFMC/CC and AFSPC/CC, "Reassignment of Certain Air Force Materiel Command Units," 16 August 2001, and Special Order, HQ AFSPC, "Special Order GD-019," 22 August 2001, (Doc 1-25); Peggy Hodge, SMC/PA, "'It's official!' AFSPC welcomes SMC into family," Astro News, 5 October 2001, p. 1 (Doc 1-26).

[15] Special Order, HQ AFMC, "Special Order GA-2," 29 October 1997, (Doc 1-27); History of the Air Force Research Laboratory October 1997 – September 1998 (FOUO, extracts are not FOUO), AFRL/HO, pp. xxxv (Executive Summary) 8-9.

[16] Staff Summary Sheet, HQ AFMC/DRS to SMC/CC, "Space Systems Support Group (SSSG) Inactivation," 8 April 1998, (Doc 1-28).

acquire and sustain Air Force satellite ground systems for SBIRs, DMSP, Milstar, GPS, the Satellite Control Network (AFSCN), and the Space Launch Range (SLR). Detachment 11 also acted as the AFMC command liaison to the AFSPC commander and HQ AFSPC.[17]

The Discoverer II (also known as "Space-Based Radar") JPO was a joint Air Force, Defense Advanced Research Projects Agency (DARPA), and National Reconnaissance Office (NRO) program that had been established in February 1998. The three organizations signed a Memorandum of Agreement to work in a partnership to produce and fund the project. The Discoverer II JPO was located in Arlington, Virginia and reported to the PEO for Weapons. The JPO planned to develop, fabricate, and launch two research and development, surveillance satellites in 2005. In July 2000, the House and Senate Appropriations Committees decided to terminate the Discoverer II program for fiscal reasons effective 30 September 2000.[18]

Falcon AFB, Colorado (which provided the command and control for DoD military satellites) was renamed "Schriever AFB" on 5 June 1998. The Air Force renamed the base in honor of Gen Bernard A. Schriever who is considered the "father of the U.S. Air Force's space and missile program."[19]

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[17] Special Order, HQ AFMC, "Special Order GA-5," 20 April 1998, (Doc 1-29); Staff Summary Sheet, SMC/MQ to SMC/CC, "Activation of SMC Detachment 11," 13 May 1998, with attachment Memo, HQ AFSPC to SMC/CC, "Activation of Space and Missile Systems Center (SMC) Detachment (Det) 11," 8 June 1998, (Doc 1-30); Chris McGiveney, "Detachment 11 becomes part of Team SMC," Astro News, 2 July 1998, p. 3 (Doc 1-31); Staff Summary Sheet, SMC/AXL to SMC/CC, "AFMC Liaison MOA," 2 December 1998, with attachment Memorandum of Agreement, "Memorandum of Agreement Between the Director of Requirements (HQ AFSPC/DR), the Director of Plans and Programs (HQ AFSPC/XP), the Commander, Space and Missile Systems Center (SMC/CC), and the Director of Requirements (HQ AFMC/DR) For the AFMC Liaison (SMC Det 11/CC) Supporting Air Force Space Command," latest signature dated 24 December 1998, (Doc 1-32); Internet Document, SMC, "Welcome to SMC Det 11," printed August 2000, http://www.cisf.af.mil/det11/focus/default.htm (Doc 1-33).

[18] Internet Document, Federation of American Scientists, "Discoverer II (DII) Starlite," 24 January 2000, http://sun00781.dn.net/spp/military/program/imint/starlight.htm (Doc 1-34); John Ryan, SMC/PA, "Discoverer II Touts Improved Surveillance," Astro News, 31 March 2000, p. 18 (Doc 1-35); Internet Document, InsideDefense.com, "Conferees Terminate Space-Based Radar Project," 14 July 2000, http://www.insidedefense.com/secu.../dalert_sam_reader.asp?FN=DefAlert01.ask&docnum=Dalert2000_36 (Doc 1-36).

[19] Internet Document, Air Force, "Schriever AFB," printed 18 March 2002, http://www.airforceallotment.com/afbases.html (Doc 1-37).

The AFMC HQ relieved the HQ 377 ABW at Kirtland AFB from its assignment to SMC on 1 October 1998 by Special Order GA-19. The 377th was reassigned with four other units to the Air Armament Center located at Eglin AFB, Florida. The reassignment took place so the Air Force could have one central point for Air Force armament issues. No personnel changes or location moves took place during the transfer of the 377 ABW.[20]

The AFMC HQ inactivated SMC Detachment 2 at Onizuka Air Station (AS), California effective 31 July 1998. The detachment's mission (engineering support for satellite control) at Onizuka continued and remained the same, only the organization's name was changed. Detachment 2 was redesignated as the "SMC Operating Location (AO)."[21]

The 1995 Base Realignment and Closure Commission (BRAC) directed the 750th Space Group (750 SG) at Onizuka AS to inactivate, and to either relocate its functions or to end them. The 750 SG had been a component of the 50th Space Wing of AFSPC. The BRAC required Onizuka AS to realign its organization - not to close the facilities or end its operation. The inactivation of the 750 SG took place on 25 June 1999. The realignment of the 21st Space Operations Squadron (SOPS) of AFSPC made the 21 SOPS the new host organization, and it assumed all of the Onizuka AS mission responsibilities on 25 June 1999. Various space missions and responsibilities transferred from Onizuka to Schriever AFB between 1999-2001. The 21 SOPS completed all the realignment activities at Onizuka as of 13 July 2001.[22]

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[20] Special Order, HQ AFMC, "Special Order GA-19," 17 September 1998, (Doc 1-38); Leigh Anne Redovian, "Air Force announces realignments," Astro News, 25 September 1998, p. 3 (Doc 1-39); E-mail, MSgt James Gildea (377 ABW/HO) to Robert Mulcahy (SMC/HO), "Transfer of 377 ABW from SMC," 11 December 2001, (Doc 1-40); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO, p. 14.

[21] Special Order, HQ AFMC, "Special Order GA-12," 27 July 1998, (Doc 1-41); A1C Elaine Tarello, "SMC Det. 2 inactivated," Astro News, 14 August 1998, p. 5 (Doc 1-42).

[22] Internet Document, Federation of American Scientists, "Onizuka Air Station, California," printed on 30 November 2001, http://www.fas.org/spp/starwars/offdocs/950301o.htm (Doc 1-43); Internet Document, California Economic Diversification and Revitalization, "Onizuka Air Station (Realignment)," printed on 30 November 2001, http://www.cedar.ca.gov/military/currentreuse/onizuka.htm (Doc 1-44); Internet Document, Western Disaster Center, "Why Onizuka?," printed on 30 November 2001, http://www.ndin. net/whyonizuka.htm (Doc 1-45); E-mail, Valerie Joseph (21SOPS/PA) to Robert Mulcahy (SMC/HO), "Onizuka BRAC," 18 March 2002, (Doc 1-46).

On 4 February 2000, AFSPC redesignated all of its "Air Stations" located within the United States to "Air Force Stations." AFSPC changed the designations so it would clearly identify the facilities as Air Force sites. The redesignation affected: Cape Canaveral AFS, Florida, Cape Cod AFS, Massachusetts, Cavalier AFS, North Dakota, Cheyenne Mountain AFS, Colorado, Clear AFS, Alaska, New Boston AFS, New Hampshire, Onizuka AFS, California, El Dorado AFS, Texas, and Pillar Point AFS, California.[23]

SMC Detachment 12 at Kirtland AFB became activated on 29 June 2001. The activation of Detachment 12 joined several SMC subordinate units under one local command in preparation for the 1 October 2001 realignment of SMC to AFSPC. The newly aligned programs included the SMC Test and Evaluation (SMC/TE) program, the Rocket Systems Launch (RSLP) program, the DoD Space Test (STP) program, the Research and Development Space and Missile Operations (RDSMO) program, and the SBL program.[24] The mission of SMC Detachment 12 was "to serve as the primary provider of launch capability, space flight, and on-orbit operations for the entire DoD space research, development, test, and evaluation community."[25]

SPACE COMMISSION

Congress established the "Commission to Assess United States National Security Space Management and Organization," referred to as the "Space Commission," in compliance with Public Law 106-65, National Defense Authorization Act (NDAA) for FY 2000, Section 1622. The purpose of the Space Commission was to make an assessment of the management and organization of space activities that supported U.S. national security. This narrative cannot describe all the details of the Space Commission and its recommendations, bnt it will cite the most significant ones.[26]

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[23] Internet Document, Air Force News, "Air Force Space Command stateside air stations redesignated," 4 February 2000, http://www.af.mil/news/Feb2000/n20000204000163.html (Doc 1-46-1).

[24] Special Order, HQ AFMC, "Special Order GA-14," 29 May 2001, (Doc 1-47); Peggy Hodge, SMC/PA, "Det. 12 activates as SMC moves closer to realignment," Astro News, 13 July 2001, p. 1 (Doc 1-48); Internet Document, SMC, "History of Detachment 12," printed 30 November 2001, http://www.te.plk.af.mil/history.html (Doc 1-49).

[25] Internet Document, SMC, "Detachment 12 Mission," printed 1 February 2002, http://www.te.plk.af.mil/det12.html (Doc 1-50).

[26] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 1-2 (Doc 1-51); HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, pp. 3, 16 (Doc 1-52); E-mail, Col William G. Gardner (SMC/XR) to SMC Deputies; SMC Directors; SMC XOs, "Need Your Help!!!!!," 24 May 2000, (Doc 1-53).

By mandate, the Space Commission assessed several space-related proposals that had been designed to strengthen national security. Their report included the following topics. It described how military space assets could be used to support U.S. military operations. It reviewed the interagency coordination process for the operation of national security space assets. They assessed the relationships between intelligence and nonintelligence organizations in national security space, including the possibility of a partial or complete merger of the programs, projects, or activities. The Commission also addressed the military's space training approaches.[27]

The mandate also required the Space Commission to determine the probable benefits and costs of instituting several proposals. The proposals included the following topics. The Commission researched the possibility of instituting an independent military space department and service. It assessed the concept of forming a corps within the Air Force assigned to the national security space mission. The Commission reviewed the necessity to institute a position as the Assistant Secretary of Defense for Space within the Office of the Secretary of the Defense. It analyzed the merits of establishing a major force program to manage national security space funding within the DoD. The Commission also researched various changes in the organizational structure of the DoD for national security space management and organization.[28]

Col William G. Gardner (director of SMC Developmental Planning in 2002) was the SMC point of contact for the Space Commission. The SMC History Office interviewed Colonel Gardner in January 2002. Colonel Gardner described the necessity for the Space Commission.

> "Space is broken, and it has been for a very long time. There are many "stovepipes" [different programs not coordinating with each other which leads to similar independent programs and inefficiency], many fiefdoms. Basically, the space business was run by many, many people and it was very fragmented. In Congress, it was not something that occurred overnight. Space has been that way for a long, long time. Congress had asked the Department of Defense to take a look at the management structure and organization of the space business within the Department of Defense. The Commission was asked to take a look at this structure under various sets of guidance by way of the Authorization Bill. The Commission was to come back with the recommendations... The focus of the Commission was purely on the management of space and on how we're organized."[29]

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[27] HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p.16 (Doc 1-52).

[28] *Ibid.*, p. 17.

[29] Interview, Col William G. Gardner (SMC/XR) with Robert Mulcahy (SMC/HO) about the Space Commission, 16 January and 1 February 2002, pp. 2-3 (Doc 1-54).

Several government officials appointed the members of the Space Commission. The government officials included the chairman of the Committee on Armed Services of the U.S. House of Representatives, the chairman of the Committee on Armed Services of the U.S. Senate, the ranking minority members of the Committee on Armed Services of the U.S. House of Representatives, the Committee on Armed Services of the U.S. Senate, and the Secretary of Defense in consultation with the Director of Central Intelligence.[30]

The Space Commission had 12 members and a chairman. The chairman was Donald H. Rumsfeld. The members of the Space Commission included Duane P. Andrews, Robert V. Davis, Air Force (USAF) Gen Howell M. Estes III (retired), USAF Gen Ronald R. Fogleman (retired), Army (USA) Lt Gen Jay M. Garner (retired), William R. Graham, USAF Gen Charles A. Homer (retired), Navy Admiral David E. Jeremiah (retired), USAF Gen Thomas A. Moorman Jr. (retired), Douglas H. Necessary, USA Gen Glenn K. Otis (retired), and Senator Malcolm S. Wallop (retired). See the 11 January 2001 *Executive Summary of the Report of the Commission To Assess United States National Security Space Management and Organization* for the resumes of the Space Commission members.[31]

Colonel Gardner described his assessment about the qualifications of the Space Commission's members.

> "There perhaps couldn't have been any finer group of folks pulled together to take a look at this business. They have each brought to the Commission, unique backgrounds with respect to space. Many had already been observed as extremely influential within the space business, both when they were on active duty or in influential civil service positions. Most currently occupy key consultant roles today and continue to be very heavily involved with space. Essentially, the best possible set of minds and intellectual capacity had been assembled."[32]

The final appointments for the Space Commission were completed in late May 2000. The official standup of the Space Commission occurred on 1 June 2000, and the Commission bad its first meeting on 11 July 2000.[33] On 28 December 2000, Rumsfeld

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[30] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, Executive Summary (no page number) (Doc 1-51).

[31] *Ibid*, p. Attachment A.

[32] Interview, Col William G. Gardner (SMC/XR) with Robert Mulcahy (SMC/HO) about the Space Commission, 16 January and 1 February 2002, p. 4 (Doc 1-54).

[33] HQ USAF, "Air Force Response Plan to the Space Commission Report,"

resigned as the Space Commission chairman when President-elect George W. Bush nominated him as the Secretary of Defense. David E. Jeremiah became the acting chairman of the Space Commission after Rumsfeld's resignation.[34]

Prior to 2001, SMC had a major interest in the Space Commission because of SMC's military space-orientated mission. The Space Commission's proposals could have vast, long-term affects to the organization and management of SMC and to the Air Force Space Command (AFSPC), particularly if the proposals recommended a separate, new military space service. The Air Force wanted to continue its role as the central DoD organization in charge of the nation's military space mission.[35] As of January 2001, the Air Force had "more than 85% of the DoD personnel, budget, assets, and infrastructure dedicated to space-related assets. On a daily basis, all U.S. military forces depend on the full set of space assets acquired and operated by the Air Force."[36] The Air Force welcomed proposals to improve its space organization and priority, but it also wanted to continue its dominant military role in space.[37]

The Space Commission consulted with senior government leaders while making its assessment. In the DoD, this included the Secretary of Defense and the Deputy Secretary of Defense. Senior military leaders were consulted, including the military Commanders in Chief or their representatives, the Vice Chairman, the Joint Chiefs of Staff and the Chief of Staff of the Air Force. Meetings were conducted to gain the input of the directors of the Central Intelligence Agency, the National Security Agency, the National Reconnaissance Office (NRO), the National Imagery and Mapping Agency, and the Administrator of the National Aeronautics and Space Administration (NASA). Leaders in industry and previous senior government officials were also consulted. The Space Commissioners had access to classified space information during their research that the DoD and the NRO made available.[38]

After six months of evaluating, the Space Commission submitted its assessment to Congress in the *Report of the Commission To Assess United States National Security Space Management And Organization*, on 11 January 2001. The report included the

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11 January 2001, p.17 (Doc 1-52).

[34] *Ibid.*, p. 17.

[35] *Ibid.*, pp. 3, 10, 28.

[36] *Ibid.*, p. 10.

[37] *Ibid.*, p. 3.

[38] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 6 (Doc 1-51).

Space Commission's recommendations for the role of space in future national security affairs. It also stated the challenges the U.S. would likely meet with its commercial, civil, defense, and intelligence interests in space. The objectives assessed the advancement of U.S. interests in space by encouraging the development of policies, technologies, operations, and the personnel needed to maintain U.S leadership. The Space Commission recommended alternative approaches to the organization and management of U.S. agencies involved in national security space, to include the DoD and the Intelligence Community.[39]

The Space Commission unanimously agreed on five central conclusions to improve DoD space organization, leadership, and priority. The first major proposal recommended naming the president as the final authority in setting the national space policy. At the time of the report, the responsibility and accountability for space had been widely distributed throughout the government, and it did not provide the needed attention for space matters. The Commission recommended that the president should have the authority to provide specific direction and guidance to senior government officials concerning space policies, and to make space interests a top national security priority. This would allow the president to have the authority to ensure the cooperation of all the space sectors, including commercial, civil, defense, and intelligence.[40]

The second central conclusion recommended realigning various space organizations (especially within the DoD and the Intelligence Community) to meet future national security space requirements. The report emphasized the need to restructure the space organizations within the Air Force. With America's increased dependence on space, more focus was required for national security in this area. The Commission recommended that several different space activities should be joined, chains of command modified, lines of communication opened, and policies adjusted to gain greater responsibility and accountability. The Commission believed that this would lead to better management and prioritization of DoD space.[41]

The Space Commission determined that it would be preferable to restructure the Air Force's space organizations rather than create a new military space department.[42] The report stated that the Air Force was the best organization for implementing future national security space requirements. "… a realigned, rechartered Air Force is best suited to organize, train and equip space forces."[43] At the time of the report, the Air Force

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[39] *Ibid.*, pp. 6-7.

[40] *Ibid.*, pp. 49-50, 99.

[41] *Ibid.*, pp. 89-90, 99.

[42] *Ibid.*, pp. 80-81.

[43] *Ibid.*, p. 89.

provided most of the bases and facilities for the DoD space missions, it developed and acquired most of the DoD space assets, it launched most of the national security space systems, and it operated most of the DoD space assets.[44] The NRO continued to be an exception, because it had the responsibility for developing, acquiring, and operating reconnaissance satellites.[45] Creating a space department did not get recommended, because, "There is not yet a critical mass of qualified personnel, budget, requirements or missions sufficient to establish a new department."[46]

The third conclusion recommended that the Secretary of Defense and the Director of Central Intelligence work more closely and cooperatively together with the space programs that support national security. These two officials had the primary responsibility for the space programs that supported the president in times of war, crises, and peace. If this working partnership could be more successful, the Commission believed it would resolve the disputes that occurred between the two bureaucracies, and it would help provide a more efficient system for gaining national security information.[47]

The fourth conclusion proposed developing a defense against future attacks to U.S. space systems. America depended on space more than any other nation, but its defense of these systems lacked in priority. The loss of its space systems would drastically affect the manner in which the U.S. military could conduct operations and gain intelligence. Potential attacks might destroy satellites, ground stations, or launch capabilities. Other hostile actions could include disrupting satellite functions with jamming equipment or sabotaging computer systems. The report regarded a future attack against space systems as inevitable. To maintain America's dominance in space, the capability to deter or defend against this potential aggression should be a high priority.[48]

The fifth and final central conclusion stated that the U.S. needed to invest in science and technology expertise in order to maintain its space superiority. More military space professionals would be required in the future to develop and master highly complex technology. An improved cadre of space experts needed to be developed with additional

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[44] HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, pp.10, 27 (Doc 1-52).

[45] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 55 (Doc 1-51).

[46] *Ibid*, p. 80.

[47] *Ibid*, pp. 51, 100.

[48] *Ibid*, pp. 17-25, 100; HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p. 9 (Doc 1-52).

focus on education, training, and career development in the field. The Commission stressed that the U.S. government had to take an active role in expanding the pool of military and civilian talent in the areas of engineering, science, and systems operations. The increasing requirement for engineers and scientists should be a national priority. The report stated that the Air Force had to increase its number of officers with space career backgrounds, retain more of its officers who specialized in space, improve space training, and provide better career development in space.[49]

The Space Commission proposed several organization changes in its second conclusion. Among the most significant of these proposals, the Commission recommended that the Air Force should consolidate its space organizations within one command, the AFSPC. This included transferring SMC (space acquisition) from AFMC and realigning it to AFSPC (space operations). The realignment would make AFSPC the single organization to determine and implement the Air Force's space priorities. AFSPC would then gain the responsibility for both space acquisition and operations in a "cradle-to-grave" management system of the Air Force space programs. The Commission believed this realignment would allow space acquisition specialists to gain knowledge and experience in space operations and vice-versa. It would help streamline the space acquisition process by enabling the Air Force to develop and incorporate future space systems in less time. AFSPC would also manage the space career field, and develop a cadre of space professionals who would establish doctrines and accomplish the DoD space requirements. To help make space a greater priority, the Commission also recommended assigning a four-star general to command AFSPC.[50]

The Space Commission recommended designating the Air Force as the DoD Executive Agent for Space, responsible for meeting the space requirements for all of the armed forces. The report stated, "… the Secretary of Defense [should] designate the Air Force formally as the Executive Agent for Space, with department-wide responsibility for planning, programming and acquisition of space systems."[51] The Air Force carried most

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[49] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 42-47, 100 (Doc 1-51).

[50] *Ibid.*, pp. 88-90, 93; SMC/PA, "SMC to realign under AFSPC," Astro News, 18 May 2001, pp. 1, 3 (Doc 1-24); SSgt A.J. Bosker, "Commission calls for single space organization," Air Force Link, 12 January 2001, pp. 1-3, http://www.af.mil/news (Doc 1-55); No author, "Air Force begins the transformation of space," Air Force Link, 9 May 2001, pp. 1-3, http://www.af.mil/news/May2001/n20010509_0629.shtml (Doc 1-56).

[51] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 89, 92-93 (Doc 1-51).

of the burden for providing and financing the necessary space assets for all of the armed forces while lacking the formal Title 10 United States Code (USC) authority of them.[52] "... although the Army and the Navy represent DoD's largest users of space products and capabilities, their budget activities consistently fail to reflect the importance of space. Their rationale is that space technology projects should be funded by the Air Force."[53]

The Space Commission recommended that the Army and Navy continue to develop and fund space programs that met their unique requirements, and submit them to the Executive Agent to be included in the joint space program. Making the Air Force the Executive Agent for Space was expected to improve the organization of DoD space programs, improve the budgeting and planning for space, plus increase the priority of space within the Air Force.[54]

The Space Commission made additional significant recommendations for leadership positions and responsibilities in DoD space. The Under Secretary of the Air Force should be designated as both the Air Force Acquisition Executive for Space and as the Director of the NRO - responsible for both Air Force and NRO space acquisition. The Commission recommended that the Air Force should receive the responsibility under Title 10 USC to organize, train, and equip for space. The Commission made several additional leadership recommendations for space that can be found in their report.[55]

The Space Commission proposed that the Air Force and the NRO should align their space programs. "The Department of Defense and the Intelligence Community would benefit from the appointment of a single official within the Air Force with authority for the acquisition of space systems for the Air Force and the NRO based on the "best practices" of each organization. Assign the Under Secretary of the Air Force as the

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[52] *Ibid.*, pp. 55, 75-76; HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p.10 (Doc 1-52); SSgt Jason Tudor, "Space doctrine starts from the ground up," Space Observer, 17 August 2001, pp. 1, 3 (Doc 1-57).

[53] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 76 (Doc 1-51).

[54] *Ibid.*, p. 93.

[55] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 90-92 (Doc 1-51); Memo, Secretary of the Air Force to ASD/C3I, "Air Force Input to SecDef Response to Space Commission Report," 23 February 2001, pp. 1-5, 90-91, (Doc 1-58).

Director of the National Reconnaissance Office."[56] The Air Force considered the merger proposal with the NRO "conceivable," but not in the near future.[57]

The Air Force reviewed the Space Commission's report, and agreed with its proposals about how to improve national defense in space and give it the necessary priority.[58] The Acting Secretary of the Air Force, Lawrence J. Delaney, stated in a 23 February 2001 memorandum, "After a thorough review of the Report, the Air Force fully supports all findings and recommendations."[59]

The Space Commission report would significantly affect SMC in the near future as the recommendations are implemented. To begin with, the Air Force realigned SMC from AFMC to AFSPC on 1 October 2001. The organization, training, education, acquisition, and priority for DoD space activities should all be affected as the Space Commission proposals are implemented.[60]

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[56] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 90 (Doc 1-51).

[57] HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p. 35 (Doc 1-52).

[58] SSgt A.J. Bosker, "Space Commission calls for consolidation," Air Force Link, 22 January 2001, p. 1, http://www.spacecom.af.mil/hqafspc/news/news_asp/nws_tmp.asp?storyid=01-07 (Doc 1-59); SSgt A.J. Bosker, "Air Force welcomes Space Commission's recommendations," Air Force Link, 8 February 2001, pp. 1-2, http://www.af.mil/news/Feb2001/n20010208_0185.shtml (Doc 1-60).

[59] Memo, Secretary of the Air Force to ASD/C3I, "Air Force Input to SecDef Response to Space Commission Report," 23 February 2001, (Doc 1-58).

[60] SMC/PA, "SMC to realign under AFSPC," Astro News, 18 May 2001, pp. 1, 3 (Doc 1-24); Peggy Hodge, SMC/PA, "'It's official!' AFSPC welcomes SMC into family," Astro News, 5 October 2001, p. 1 (Doc 1-26); Gerry Gilmore, "SPACECOM chief: Space must be top national priority," Astro News, 20 April 2001, pp. 1, 2 (Doc 1-61); Tim Dougherty, "SMC commander talks realignment, addresses concerns at town hall," Astro News, 27 July 2001, pp. 1, 3 (Doc 1-62); Cleota Drysdale, SMC/PA, "New career cross-flow between space ops and acquisitions," Astro News, 16 November 2001, pp. 1, 3 (Doc 1-63).

CHAPTER 2
RESOURCES

Year 2000 (Y2K) Computer Rollover

Until the 1990s, the computer industry used only the last two digits (from 00 to 99) to count the current year when they programmed their memory chips. The programmers hard-coded the first two numbers (designating the century) as "19" (as in the 20th century) without a rollover to "20" for the 21st century. Many programmers were shortsighted and did not expect the software programs they produced to continue being used into the 21st century. Witb this assumption, the programmers did not adjust the time systems to go beyond 1999. At 0000 hours on 1 January 2000, the computers that did not get modified to rollover to the year 2000 (Y2K) would misinterpret the date as 1 January 1900, and potentially cause widespread computer failures for both individual computers and entire computer networks. In the early 1990s, the Y2K situation became a widely publicized concern, as computer experts acknowledged the potential crises and worked to remedy the situation. The Y2K-type concerns also existed for the leap year rollover on 29 February to 1 March 2000, and the rollover from 31 December 2000 to 1 January 2001.[1]

To maintain their operational statuses, every Air Force mission depended on its computer systems. The Air Force could potentially have had computer failures for its nuclear weapons systems, space systems, communications networks, command and control infrastructure, and its support systems, among several other disastrous possibilities if Y2K failures became a widespread reality. The Air Force also had concerns about the threat of information warfare by terrorists or foreign governments who might gain military intelligence if potential Y2K problems left the security of Department of Defense (DoD) computer systems vulnerable to espionage.[2]

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[1] 1Lt Yolanda Dozier, "Y2K is coming – what can you do to prepare at home?," Astro News, 23 April 1999, p. 7 (Doc 2-1); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, pp. 5-6 and 14 (Doc 2-2); Charter (FOUO, info used not FOUO), SMC/AXEC, "AFMC Year 2000 (Y2K) Issue IPTS Charter," no date (Doc 2-3).

[2] Dean J. Scouloukas, "Y2K computer glitch to trigger major global crises," USA Today, 30 July 1998, p. 11A (Doc 2-4); Associated Press, "Pentagon feels confident Y2K bug will be tamed," Gazette Telegraph, 15 January 1999, p. A7 (Doc 2-5); Memo, HQ AFMC/SC to SMC/CC et al., "Year 2000-Continuity of Operations Readiness Planning," 2 February 1999, (Doc 2-6); John Diedrich, "Russians get first look at missile warning center," The Gazette, 22 September 1998, p. 2 (Doc 2-7); Memo (FOUO, info used not FOUO), HQ AFMC/CC to SMC/CC et al., "Homestretch to Year 2000 (Y2K)," 24 November 1999, p. 7 (Doc 2-8); History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is U), HQ AFMC/HO, p. 210.

The Air Force made it a top priority to ensure its computer systems became Y2K-compliant prior to 2000. In June 1997, Gen Ronald R. Fogleman, the Chief of Staff of the Air Force, made fixing the Y2K problem the Air Force's top software sustainment issue. The Air Force Communications Agency (AFCA) became the overall focal point for the Y2K resolution effort throughout the Air Force. The HQ Air Force Materiel Command (AFMC) became the Y2K focal point for all AFMC units as it supported AFCA in the Y2K effort. SMC reported its Y2K assessments and compliance to HQ AFMC.[3]

The Air Force established Y2K Working Groups to provide information and directions about Y2K to the various Air Force commands and program offices. These groups assessed the Y2K problems, and relayed instructions about attaining Y2K compliance. The Directorate of Systems Acquisition (SMC/AXE) initiated the Y2K Working Group for SMC in October 1995.[4]

Eric Shulman (SMC/AXEC), a civilian software engineer for the Air Force, managed the Y2K Working Group at SMC. The Directorate of Systems Acquisition assigned him to be the project officer for Y2K issues at SMC from October 1995 until December 1999. A 1997 memorandum initially estimated that SMC managed 50 systems that required a thorough assessment for potential Y2K impacts. In a document he wrote in February 1997, Shulman described the Y2K problems that SMC faced. His introduction provided an informative background of the Y2K issue.[5]

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[3] E-mail, Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K Working Groups," 26 February 2001, (Doc 2-9); Memo (FOUO, info used not FOUO), AFAA Area Audit Office to SMC/CC and AFMC/CC, "(Draft)… System Assessments for the Year 2000 Program, Space and Missile Systems Center…," November 1997, (Doc 2-10); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, pp. 202-203, 210-212.

[4] E-mail, Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K Working Groups," 26 February 2001, (Doc 2-9); Letter, SMC/CC to SMC/AX, "… thanks for the outstanding support Mr Eric Shulman," 28 January 2000, (Doc 2-11); Charter (FOUO, info used not FOUO), SMC/AXEC, "Charter For SMC Year 2000 Working Group," no date, (Doc 2-12).

[5] Letter, SMC/CC to SMC/AX, "… thanks for the outstanding support Mr Eric Shulman," 28 January 2000, (Doc 2-11); Memo, SMC/AX and SMC/PK to Distribution, "SMC Guidance for Y2K Compliance," 30 September 1998, (Doc 2-13); Memo (FOUO, info used not FOUO), AFAA Area Audit Office to SMC/CC and AFMC/CC, "(Draft)… System Assessments for the Year 2000 Program, Space and Missile Systems Center…," November 1997, (Doc 2-10); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, (Doc 2-2); Document (FOUO, info used not FOUO),

> "Y2K is a serious problem. How did we get here? Most of the software that drives SMC and MWSSS [Missile Warning Space Surveillance Sensors] systems was written starting in the [19]70s and was rewritten, fixed, modified, and in some cases replaced. But this was always based on existing code. New systems were brought on line even in the [19]90s without incorporating compliant code. While date processing was critical to the operation of our systems, poor programming practices, reliance on old code, and assumptions that 'the system won't be around in the year 2000' led to a number of date processing problems to include Y2K. Thus, a time bomb had been planted. Complicating the environment is the wide variety of high order languages, such as C, Ada, COBOL, Fortran, Jovial, and PASCAL and real time languages used to support the missions. System specific assembly code such as MAC50, COMPASS, and RTL were used to meet time requirements.
>
> "How real is the problem? A majority of the systems that have been analyzed and tested to date have shown significant Y2K impacts. Some of the systems have 'compliant code' where compliant code means the YYYYMMDD [year, month, day] eight-digit date code is used. In all fairness the six digit YYMMDD was mandated by Federal Information Processing Standards beginning in 1970."[6]

The Y2K Working Group provided compliance strategies and instructions from higher headquarters in addition to information from the computer industry. It also established and maintained a Y2K web site for the latest information and directions. SMC utilized a Y2K database to record the Y2K status for the program offices.[7]

The Y2K Working Group at SMC instituted the Air Force's "Weapon System Strategy for Year 2000." SMC used this five-phase strategy (Y2K awareness, assessment, renovation, validation, and implementation) as a guide to assess its Y2K issues, and the steps it would take to make the computer systems Y2K compliant. Phase

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Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, p. 19 (Doc 2-14).

[6] Document (FOUO, info used not FOUO), Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, p. 2 (Doc 2-14).

[7] Charter (FOUO, info used not FOUO), SMC/AXEC, "Charter For SMC Year 2000 Working Group," no date, (Doc 2-12); Memo (FOUO, info used not FOUO), Lt Gen Otto Guenther to distribution, "Use of the Year 2000 (Y2K) Compliance Checklist," circa June 1997, (Doc 2-15); E-mail (FOUO, info used not FOUO), 61 CS Comm Center Image to SMC/CCA, "AF Year 2000 Database Data Quality," 4 September 1998, (Doc 2-16).

One focused on promoting Y2K awareness and developing a Y2K Action Plan so an organized Y2K process could be established. The plan directed the two-letter offices to designate a Y2K point of contact for coordinating the Y2K program. Among other objectives, the Action Plan determined the activities that had to be accomplished, a time estimate of the activities, established goals and objectives, and it provided guidance for the formal testing of the software. Phase One had an AFMC completion deadline of June 1997.[8]

Phase Two consisted of a Y2K assessment of each computer system and its software. The Y2K Action Plan required three-letter programs to prepare and maintain an inventory of their computer systems and software that might have Y2K issues. The Y2K problems first had to be identified, then as the programmer investigated each occurrence, the programmer filtered out the problems until he identified the core problems. Scanning through the source code proved to be the most direct way of identifying Y2K problems. Eric Shulman stated, "Testing is really an iterative process. 'Test a little – Code a little' proved to be a very effective way of analyzing the software and prototypes. As each problem was encountered, a prototype was developed to allow further testing of the system."[9] A document called the "Y2K Scorecard" provided a summary of the Y2K status at SMC. The SMC program offices had to produce their Y2K status to AXEC on a monthly basis so the information could be incorporated into the Y2K Scorecard to help determine the Y2K priorities and the criticality of the mission. Phase Two had an AFMC completion deadline of October 1997.[10]

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[8] Memo (FOUO, info used not FOUO), AFAA Area Audit Office to SMC/CC and AFMC/CC, "(Draft)… System Assessments for the Year 2000 Program, Space and Missile Systems Center…," November 1997, p. 2 (Doc 2-10); Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000,"11 August 1997, pp. 1-2 (Doc 2-17); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, pp. 8-9 (Doc 2-2); Document (FOUO, info used not FOUO), Eric Shulman (SMC/AXEC), "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, pp. 4-5 (Doc 2-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 September 1996, p. 9 (Doc 2-18).

[9] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, pp. 8 and 11 (Doc 2-2).

[10] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, p. 8 (Doc 2-2); Charter (FOUO, info used not FOUO), SMC/AXEC, "Charter For SMC Year 2000 Working Group," no date, (Doc 2-12); Lt Col King (FOUO), "CW Year 2000 (Y2K) Action Plan (Draft)," 15 December 1996, (Doc 2-19); Document (FOUO), Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, pp. 3-8 (Doc 2-14); History of

Phase Three renovated the computer systems. This phase involved the actual "fixing" of non-compliant system components. Determinations were made about the process of achieving Y2K compliance. After the process was resolved, then the planning, accomplishing, and verifying the corrective actions would be undertaken. The computers had their times forwarded to the Y2K-sensitive dates to test their reactions. If the systems could not be removed from dedicated operation, the programmers simulated the system's operation using an alternate platform for the testing; this alternative had serious drawbacks because questions remained about whether simulated testing could rigorously test the systems. Phase Three had an AFMC completion deadline of June 1998.[11]

Phase Four verified and certified the systems for Y2K compliance. The renovated computer systems would be tested prior to putting them into operation. A manager had to sign a document stating that everything in the Y2K certification checklist had been completed. The certification stated that the system would function in an acceptable manner, whether fully Y2K compliant or non-compliant. Phase Four had an AFMC completion deadline of September 1998.[12]

Phase Five implemented the computer systems. This was the final phase of the Y2K compliance strategy. It focused on placing the Y2K compliant systems into operation after they completed all the Y2K tests and had all the Y2K certifications. Phase Five had an AFMC completion deadline of December 1998.[13]

Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 September 1996, p. 9 (Doc 2-18).

[11] Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000," 11 August 1997, p. 2 (Doc 2-17); Document (FOUO, info used not FOUO), Eric Shulman (SMC/AXEC), "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, pp. 8-10 (Doc 2-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 September 1996, p. 9 (Doc 2-18).

[12] Memo (FOUO, info used not FOUO), Lt Gen Otto Guenther to distribution, "Use of the Year 2000 (Y2K) Compliance Checklist," circa June 1997, (Doc 2-15); Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000,"11 August 1997, p. 2 (Doc 2-17); Document (FOUO, info used not FOUO), Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, p. 7 (Doc 2-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 Sep 1996, p. 9 (Doc 2-18).

Y2K compliance within the classified programs at SMC proved to be a problem for the Y2K Working Group. If a program determined that its data was classified, the program could withhold the status of their Y2K compliance from the Y2K database. These programs reported their Y2K status to the SMC commander. At times this situation proved to be difficult for the Y2K experts when they made their overall assessments of the Y2K status at SMC. Out of necessity, the classified programs limited the access to their computer systems, but this sometimes hindered the Y2K experts in their progress to update the classified systems to Y2K compliance.[14]

Some of the space programs did not meet the various Y2K-compliance deadlines. Delays were sometimes caused by limited resources, technical difficulties, and the vast amounts of software and code that had to be renovated. The program offices wrote a contingency plan (Continuity of Operations Plan [COOP]) for their mission critical systems that provided alternative measures that could be used to ensure the continuity of their operations in case the Y2K fixes did not get completed or proved to be ineffective. These contingency plans had to be completed by 26 March 1999 and exercised by 30 June 1999.[15]

SMC had 60 total systems to make Y2K-compliant, 42 of them were mission critical/essential systems. As of 5 January 1999, 24 of the 42 mission essential systems completed the Y2K processing, one was in decommission, two were in renovation, five were in validation, four were in implementation, and six were in development. The Air

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[13] Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000,"11 August 1997, p. 2 (Doc 2-17); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 Sep 1996, p. 9 (Doc 2-18).

[14] Document (FOUO, info used not FOUO), AFAA to SMC/AXEC, "Y2K Audit Review Comments," 1997, (Doc 2-20); E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K edits," 9 April 2001, (Doc 2-21).

[15] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC, "SMC Systems Missing Year 2000 Renovation Date," 29 July 1998, (Doc 2-22); E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K info," 15 March 2001, (Doc 2-23); E-mail, IMAGE to SMC/CCA et al., "Contingency Plans," 8 January 1998, (Doc 2-24); Plan (FOUO, info used not FOUO), 61 ABG/CC, "Los Angeles Air Force Base Continuity of Operations Plan," 30 March 1999, (Doc 2-25); Memo, HQ AFMC/SC to SMC/CC et al., "Year 2000-Continuity of Operations Readiness Planning," 2 February 1999, (Doc 2-6); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extracts are not FOUO), HQ AFMC/HO, pp. 207, 214-217; E-mail (FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K edits," 9 April 2001, (Doc 2-21).

Force considered a computer system "Y2K compliant" after it finished all of the Y2K processes; the "Y2K completion date" was when the computer system had finished all of the Y2K processes and had completed the administrative requirements.[16]

All the AFMC centers required battle staffs on a 24-hour basis beginning 30 December 1999 in case a Y2K emergency took place. The battle staff operations originally had schedules to continue operations until 15 January 2000, because Y2K problems might have taken several days to develop, depending on when the computer system ran.[17]

SMC completed most of its Y2K-compliance renovations prior to 1 January 2000. Two space systems did not complete the Y2K processes. The Titan IV Solid Rocket Motor Upgrade (SRMU) did not finish processing their computer systems by 2000, because the Air Force did not schedule their next launch until June 2000, so they had no urgency to complete it. The Titan IV SRMU computers completed their Y2K compliance prior to June and did not have any problems.[18]

The Air Force Satellite Control Network's (AFSCN) Orbital Analysis System (OAS) at Schriever AFB, Colorado did not complete the needed Y2K procedures by 1 January 2000. Development on the AFSCN OAS began in 1998; it was a new capability that had been minimally addressed by other hardware systems. The 50th Space Wing (SW) began developing the OAS prior to Y2K and intended it to accomplish the following tasks: carry out conjunction assessments that warned satellite operators if two satellites were getting too close together; to help determine satellite visibility angels; and to determine if satellites in orbit were in line with each other. During the OAS development, the 50 SW continued to use its baseline systems. Some of the Y2K

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[16] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC, "SMC Y2K Status Update," 14 December 1999, p. 9 (Doc 2-26); Document (FOUO, info used not FOUO), "Background Paper On SMC Year 2000 (Y2K) Status," 21 January 1999, (Doc 2-27); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, with Robert Mulcahy, SMC/HO, "Y2K Compliancy Date and Y2K Completion Date," 8 May 2002.

[17] Memo, HQ AFMC/XP to ALHQCTR/CC et al., "Y2K Critical Event-CY1999-CY2000 Rollover," 3 December 1999, (Doc 2-28); SSgt Cynthia Miller, Air Force News, "Air Force continues close watch on Y2K," 4 January 2000, http://www.af.mil/news/Jan2000/n20000104_000006 (Doc 2-29).

[18] E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "Y2K info," 15 March 2001, (Doc 2-23); E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K edits," 9 April 2001, (Doc 2-21); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Space systems that did not complete the Y2K process," 8 May 2002; E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "FW: Y2K," 20 May 2002, (Doc 2-33).

procedure deadlines for the OAS did not get completed on schedule due to: DoD policy delays; problems integrating several Commercial, Off-The-Shelf (COTS) hardware and software products; and due to the Base Realignment and Closure Commission (BRAC) of Onizuka Air Station, California. Several Onizuka missions moved to Schriever AFB and displaced units of the 22nd Space Operations Squadron from their main operations building where they created the OAS orbital products. The OAS development team identified a schedule slip in August-September 1999 for completing the Y2K processing.[19]

The AFSCN OAS became Y2K compliant on 10 September 1999, but the Air Force did not expect the Y2K completion date until March 2000. AFSCN then required the assistance of the 1st Command and Control Squadron (1 CACS) (redesignated the 1st Space Control Squadron on 1 October 2001) of the Cheyenne Mountain Operations Center (CMOC) at Peterson AFB, Colorado. The Air Force established procedures for requesting conjunction assessments on a limited basis beginning 1 January 2000 until the AFSCN OAS had "turned over" (completed development and declared operationally viable) and had accomplished its Y2K completion. The 50 SW practiced the procedures at Schriever AFB in late 1999.[20]

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[19] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC, "SMC Year 2000 Update to AFSPC/CV," 19 May 1999, pp. 16-18 (Doc 2-30); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "HQ AFMC/CC Year 2000 Update," 27 September 1999, (Doc 2-31); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "AFSPC/CC Year 2000 Update," 29 September 1999, pp. 6-8 (Doc 2-32); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Space systems that did not complete the Y2K process," 8 May 2002; E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "FW: Y2K," 20 May 2002, (Doc 2-33); E-mail, Capt Wesley Turner, SMC/Det11/ CWSNC, to Robert Mulcahy, SMC/HO, "RE: Y2K," 28 May 2002, (Doc 2-34); E-mail, Capt Wesley Turner, SMC/Det 11/CWSNC, to Robert Mulcahy, SMC/HO, "Clarification," 29 May 2002, (Doc 2-35); E-mail, Capt Wesley Turner, SMC/Det 11/ CWSNC, to Robert Mulcahy, SMC/HO, "Another clarification," 29 May 2002, (Doc 2-36).

[20] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "HQ AFMC/CC Year 2000 Update," 27 September 1999, (Doc 2-31); Briefing Charts (FOUO, info used not FOUO), SMC/CW to AFMC/CC, "SMC Systems Late in Completing Y2K," 1 March 1999, pp. 12-14 (Doc 2-37); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "Final Year 2000 Review," 20 December 1999, p. 8 (Doc 2-38); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "AFMC/CC Year 2000 Update," 17 December 1999, (Doc 2-39); Fact Sheet, Peterson AFB, "1st Space Control Squadron," printed 22 May 2002, http://www.peterson.af.mil/21sw/library/fact_sheets/1cacs.htm (Doc 2-40); E-mail, SSgt Trisha Morgan, SW/HO, to Robert Mulcahy, SMC/HO, "1st Space Control Squadron," 28 May 2002, (Doc 2-41); E-mail, Capt Wesley Turner, SMC/Det 11/CWSNC, to Robert Mulcahy, SMC/HO, "RE: Y2K," 28 May 2002, (Doc 2-34).

On 1 January 2000, the AFSCN implemented the Y2K Contingency Plan for the OAS. The CMOC orbital analysis workshop (a computer operations center) used their OAS computers to do collision avoidance calculations on a limited basis and provided 10 percent to 20 percent of the 50 SW's projected need. The 50 SW continued to use its baseline systems, and it telephoned into the CMOC orbital workshop during business hours. Around April 2000, the AFSCN OAS accomplished its Y2K completion, finished the turnover, and garnered a fully operational status.[21]

A classified reconnaissance satellite system experienced a Y2K failure during the 1 January 2000 rollover. On 4 January 2000, the Deputy Secretary of Defense, John Hamre, announced the failure of a "significant" reconnaissance satellite system to the media. Hamre declined to identify the intelligence system that failed, how many satellite(s) failed, or which government organization (probably the National Reconnaissance Office) operated the system. The space system had been successfully Y2K tested in segments prior to 2000, but it could not be tested altogether because of its operational necessity to national defense. The system crashed after the rollover occurred simultaneously to the entire space system on 2000. It took about four hours for the space operators to determine what happened to the failed system. The operators had control over the satellite(s) after the failure, but they could not process or receive any information from the ground. An unnamed, backup reconnaissance system took over operations for the failed space system after several hours had passed, and provided the majority of the information supplied by the failed space system. Hamre stated that the failure had an "insignificant impact" to national intelligence capabilities, because of the use of the backup system. The failed reconnaissance space system rapidly received repairs for its Y2K problems, and became fully operational again on the afternoon of 2 January 2000.[22]

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[21] Briefing Charts (FOUO, info used not FOUO), SMC/CW, "Year 2000 Emergency Response Team Plan," 17 December 1999, (Doc 2-42); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Space systems that did not complete the Y2K process," 8 May 2002; E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "FW: Y2K," 20 May 2002, (Doc 2-33); E-mail, Capt Wesley Turner, SMC/Det 11/ CWSNC, to Robert Mulcahy, SMC/HO, "RE: Y2K," 28 May 2002, (Doc 2-34); E-mail, Capt Wesley Turner, SMC/Det 11/CWSNC, to Robert Mulcahy, SMC/HO, "[Y2K] Completion Date," 30 May 2002, (Doc 2-43); E-mail, Capt Wesley Turner, SMC/Det 11 /CWSNC, to Robert Mulcahy, SMC/HO, "OAS Summary," 31 May 2002, (Doc 2-44).

[22] Internet Document, DefenseLink, "DoD News Briefing [Deputy Secretary of Defense John J. Hamre]," 4 January 2000, http://www.defenselink.mil/news/Jan2000/t01042000_t0104asd.html (Doc 2-45); Internet Document, Paul Stone, "DoD Stands Down Y2K Operations Center," 5 January 2000, http://www.defenselink.mil/news/Jan2000/n01052000_20001052.html (Doc 2-46).

Los Angeles AFB did not have any serious Y2K problems. The commander of the 61st Air Base Group (Col David Price) summarized the results of the Y2K effort on base in the 28 January 2000 issue of *Astro News*.

> "Base organizations were well prepared for the year 2000 rollover, and it passed without incident. Our communications squadron worked hard to ensure that the base's comm/computer infrastructure was 100 percent ready-and it was! Nevertheless, the command post, civil engineers and communication squadron had people on duty around the clock over the New Year's weekend just in case a Y2K emergency surprised us. The senior battle staff was also on-call Dec. 31 through New Year's Day-just in case. Thanks to a comprehensive base wide planning effort and thorough system testing by our communications squadron, the calendar change we experienced was truly a non-event. Great job everyone!"[23]

SMC shut down its Y2K offices in February 2000.[24] Eric Shulman summarized the seriousness of Y2K at SMC.

> "If SMC had not conducted any Y2K fixes, or had not completed the most important Y2K fixes in time, Y2K at SMC probably would have resulted in several system operational degradations and perhaps failures. As an example, if the IBM 4381s [mainframes] used by DSP, the Ranges, and GPS had not been replaced/patched, the systems would have had some serious problems. If the telephone system at SMC was not replaced, you would have been without phones after December 31, 1999."[25]

The DoD spent $3.5 billion and used thousands of people to prepare the DoD computer systems for Y2K. AFMC had the responsibility of making 2,356 computer systems Y2K compliant, and all but one of them accomplished this goal; the Y2K turnover had almost no effect to AFMC. Overall, the DoD had minimal Y2K problems according to Deputy Secretary of Defense John Hamre.[26]

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[23] Col David Price, "Los Angeles AFB begins the new century," Astro News, 28 January 2000, p. 2 (Doc 2-47).

[24] E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K info," 15 March 2001, (Doc 2-23); E-mail, Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "RE: Y2K Nice Job," 12 August 2002, (Doc 2-49).

[25] E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "Re: IBM 4381," 13 March 2002, (Doc 2-48).

[26] Internet Document, SSgt Kathleen T. Rhem, "Computer Security, Y2K Effort Top Hamre Accomplishments," 22 March 2000, p. 2 (Doc 2-50); Internet Document, Paul Stone, "DoD Stands Down Y2K Operations Center," 5 January 2000, http://www.defenselink.mil/news/Jan2000/n01052000_20001052.html (Doc 2-46); History of Air Force Materiel Command 1 October 1999 – 30 September 2000 (FOUO, info used not FOUO), HQ AFMC/HO, pp. 177-179.

LAND and FACILITIES

Systems Acquisition Management Support (SAMS) Complex

By the fall of 1997, the Air Force began evaluating a facility modernization initiative for Los Angeles AFB that it designated the "Systems Acquisition Management Support (SAMS) Complex" project. The SAMS project proposed trading base property (including the 41-acre Area A) to a private real estate developer in exchange for the construction of new, seismically-secure Air Force facilities in Area B.[27]

In 2001, Area A consisted of six two-story buildings and one six-story building (constructed between 1956 and 1959) totaling approximately 835,000 square feet. The Air Force purchased the complex from the Ramo-Wooldridge Corporation in 1960. The older buildings at Area B (mainly built in the mid-1950s) originally supported aircraft production by the Douglas Aircraft Company. Largely due to the numerous base closure evaluations that had been conducted on Los Angeles AFB since the 1970s, no major renovations had been completed on the base facilities since their construction. The outdated buildings at Los Angeles AFB had numerous structural and deterioration problems in 2001. They were particularly susceptible to potential earthquake damage that placed personnel at significant risk.[28] Col Dieter Barnes (61 Air Base Group [ABG] Commander) organized and led the "Area A Integrated Product Team (IPT)" that included eight members of SMC/AXF and one from the 61 ABG Civil Engineering. The IPT produced a document on 25 July 1997 entitled, *Area "A" Facilities Assessment* that described the facility conditions on base and initiated SAMS project.[29]

Area "A" Facilities Assessment outlined the many defects within the Area A facilities. The main problem was the facilities' failure to meet earthquake safety design

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[27] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, p. 1, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

[28] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, p. 1, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51); Document, Area A Integrated Product Team (FOUO, info used not FOUO), "Area "A" Facilities Assessment," 25 July 1997, pp. 1 and 5 (Doc 2-52); E-mail, Peggy Hodge, SMC/PA, to Robert Mulcahy, SMC/HO, "RE: SAMS History Review [this E-mail clears the entire eight-page description of SAMS in this SMC History 1998-2001 for public release]," 18 February 2004, (Doc 2-52-1); Internet Document, SMC, "Facilities to be Demolished," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/section3.htm (Doc 2-53).

[29] Area A Integrated Product Team (FOUO, info used not FOUO), "Area "A" Facilities Assessment," 25 July 1997, (Doc 2-52).

standards for Los Angeles County. On 1 December 1994, President Clinton approved Executive Order 12941 that set the minimum seismic safety standards for existing federally owned or leased buildings. The Interagency Committee on Seismic Safety in Construction established the seismic safety standards. The Air Force Civil Engineering headquarters at the Pentagon issued a memorandum on 18 May 1995 that required Air Force compliance with Executive Order 12941 and directed "... the Air Force to assess the seismic safety of existing buildings constructed without adequate seismic standards and to estimate the cost of mitigation."[30]

The Area A facilities had two seismic safety evaluations during the 1990s. The first evaluation was completed prior to Executive Order 12941. Wheeler & Gray, Inc. Consulting Engineers accomplished an earthquake evaluation on Buildings 100, 105 and 110 in February 1990. In accordance with the Uniform Building Code (UBC) of 1988, the three buildings were determined to be "structurally inadequate to resist lateral forces." The report stated that shear walls of concrete needed to be added to the facilities, and that seismic bracing should be constructed for the plumbing, air-ducts, and electrical wiring.[31]

In July 1996, the URS Consultants of San Francisco conducted a "rapid" seismic evaluation of Buildings 100, 105 and 120. This analysis determined the ability of the facilities to withstand an earthquake and evaluated their risk to human safety. Buildings 110, 115 and 125 had similar construction to Building 100, so URS Consultants assumed they had the same seismic safety conditions. The evaluation assessed all six buildings to be inadequate for seismic safety both structurally and non-structurally (partition, ceiling, light fixtures, cladding/glazing, mechanical & electrical, piping, and duct). The facilities did not meet the earthquake safety standards stated in the 1994 UBC. To comply with seismic life-safety, the Area A buildings needed to infill the shear walls, construct additional new shear walls, have building columns wrapped to support the floor slabs, and brace the interior subsystems.[32]

The facilities within Area A also did not meet the fire protection standards. The guidelines were listed in the Military Handbook (dated 29 April 1994) *Fire Protection for Facilities, Engineering, Design, and Construction* (MIL-HDBK-1008B), the *National Fire Codes* published by the National Fire Protection Association, and sections of the 1994 UBC. The buildings met the fire safety regulations until the mid-1990s; after that, the fire sprinklers and egress capabilities in the Area A buildings did not meet the existing standards.[33]

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[30] *Ibid* (FOUO, info used not FOUO), pp. 8 and 39-40.

[31] *Ibid* (FOUO, info used not FOUO), pp. 6-8 and 30.

[32] *Ibid* (FOUO, info used not FOUO), pp. 9-11.

[33] *Ibid* (FOUO, extract is not FOUO), p. 13; Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, p. 2, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

By 2001, the Area A facilities were over 40 years old and had numerous deficiencies that the 1997 *Area "A" Facilities Assessment* described. The aging electrical systems in the buildings became a problem to maintain and repair largely due to the insufficient spare parts. The electric wiring continued to deteriorate with age and should have been replaced.[34] "The current telephone management system is old, unreliable, and [has a] a Single Point of Failure should it fail."[35] Most of the heating, ventilation, and air conditioning (HVAC) units and their controls continued to deteriorate and should have been replaced. Major renovation work was recommended for the interior ductwork, the ceilings, and the lighting. Asbestos and lead paint could be found throughout the Area A facilities, but a comprehensive survey had not been accomplished in the buildings. The dominant office layout in the Area A facilities had each person in an individual office, rather than the current Air Force preference for open-bay, cubicles.[36] The Executive Summary in the 1997 *Area "A" Facilities Assessment* concluded by stating, "... due to their [Area A facilities] age and lack of previous funding for major renovations, these facilities currently do not provide a quality work environment for Air Force and civilian personnel."[37]

The predicted cost to bring Area A into safety compliance was prohibitive. An executive summary (dated 3 May 1999) estimated the cost of modernizing the base and bringing Area A up to safety compliance standards. "Fire safety and seismic upgrades alone are estimated to cost $69 million. Another $117 million would be required for necessary modernization projects. The cost of new facilities for the SMC work force would be well in excess of $100 million."[38]

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[34] Area A Integrated Product Team (FOUO, extract is not FOUO), "Area "A" Facilities Assessment," 25 July 1997, pp. 7 and 14 (Doc 2-52).

[35] *Ibid* (FOUO, extract is not FOUO), p. 14.

[36] *Ibid* (FOUO, extract is not FOUO), pp. 7, 15-16, 32-33, 37, 57; Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54).

[37] Area A Integrated Product Team (FOUO), "Area "A" Facilities Assessment," 25 July 1997, p. 1 (Doc 2-52).

[38] Staff Summary Sheet, SMC/PK to SMC/CC, "Letter of Transmittal to AFMC, Acquisition Management and Support (SAMS) Complex Legislation," 3 May 1999, with four attachments: Memo, SMC/CC to AFMC/CE, "Los Angeles Air Force Base Modernization Project Draft Legislation," 12 May 1999, and Executive Summary, "Proposed Legislation: 'Los Angeles Air Force Base Modernization,'" no date, and Draft Legislation, "Sec.__. Los Angeles Air Force Base Modernization," 3 May 1999, and

Illustration 2-1 Area A of Los Angeles AFB

The SAMS project proposed that the Air Force trade up to 57 acres of Los Angeles AFB real property to a private real estate developer in exchange for the construction of new, seismically-secure Air Force facilities (totaling approximately 580,000 square feet) within Area B. The Air Force intended to use the best commercial policies in the implementation of the SAMS project. The proposed land the Air Force could exchange included Area A, the 13-acre Lawndale Annex (30,000-square feet) in Hawthorne, California on the east side of Aviation Boulevard between Rosecrans Avenue and Marine Avenue, and the 3.7-acre former Armed Forces Radio and Television Service facility (59,600-square feet) located at 10888 Latuna Canyon Road in Sun Valley, California. Upon the completion of the new facilities in Area B, Los Angeles AFB would relocate all of its personnel from the exchanged sites (Area A and the Lawndale Annex). The real estate contractor would likely demolish the buildings at Area A and have new commercial buildings constructed in their place.[39]

Sectional Analysis For Proposed Legislation, "Los Angeles Air Force Base Modernization," 3 May 1999, (Doc 2-55).

[39] Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/

The SAMS project included the option of a real estate developer offering alternative, local locations for the entirety of Los Angeles AFB. The real estate developer could construct an entirely new Los Angeles AFB, or existing facilities could be provided for the base. The alternate location for a new base had to be within five miles of the Aerospace Corporation's headquarters in El Segundo. The Area B support facilities (medical clinic, fitness center, commissary, base exchange, etc.) would also have to be duplicated at the alternate location. The real estate developer could receive both Area A and Area B from the Air Force if this proposal option was implemented. This alternative had to be cost effective, provide adequate office space, and insure the quality of life for the Air Force.[40]

Los Angeles AFB would gain numerous benefits with the implementation of the SAMS project. The base would have modern facilities that would meet the Los Angeles County seismic safety codes. The government could save an estimated $100 million if it did not have to fund the construction of new base facilities. Up to 1.1 million square feet of substandard base facilities could be disposed of. Annual maintenance and operating costs for the base could be reduced by millions of dollars. The SAMS project would consolidate all the base personnel in one location (Area B) rather than continuing to split them between Area A, Area B, and the Lawndale Annex. The quality of life for the base personnel would also be improved with the relocation to new facilities.[41]

If the Air Force accomplishes the SAMS project and new facilities are constructed in Area B, a new office layout could be implemented for the base personnel in accordance with the Air Force's current standard. The dominant office layout in the Area A facilities in 2001 had most of the personnel in individual offices with floor-to-ceiling walls and a door. This situation provided privacy, security, and reduced noise for the employee. The 1997 *Area "A" Facilities Assessment* stressed the Air Force's current standard of using open-bay, cubicle layouts as working spaces for its military and civilian personnel. This design would decrease the amount of office space required and reduce

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Special_Interest/SAMS/rsi.html (Doc 2-54); Internet Document, SMC, "Request for Proposal (RFP)," 9 August 2001, pp. 1-2 http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-56); Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

[40] Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54); Memo, SMC/CC to HQ AFMC/CE, "Proposed Enabling Language, Systems Acquisition Management & Support (SAMS) Complex," 18 October 1999, (Doc 2-57).

[41] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

costs. The document also suggested that this office layout could increase productivity while promoting "creativity and innovation" as a result of the communal working areas.[42]

The Air Force posted a Request for Statements of Interest (RSI) on 24 June 1999 that summarized the SAMS project and solicited the potential interest of real estate developers. The real estate developers who had an interest in the SAMS proposal had to respond to the RSI by the 20 August 1999 deadline. The RSI generated a favorable response from the real estate community.[43]

On 25 July 2001, the Air Force issued Phase I of the Request for Proposal (RFP) soliciting the formal interest of real estate developers for the SAMS project. The Air Force planned to down-select to no more than five fully qualified developers from the RFP respondents. Submittals for the RFP from the interested developers had a deadline of 10 September 2001 to respond. The 25 July RFP was later amended by a 9 August 2001 RFP.[44]

The method the Air Force used for the SAMS source selection consisted of three phases that were outlined in the RFP. In Phase I the Air Force would evaluate and then choose no more than five fully qualified developers as the finalists for the SAMS project by the end of 2001. In Phase II the selected developers would provide the Air Force with business proposals detailing their plans to conduct the SAMS project. "Phase III consists of resolution of the project's administrative details and the closing."[45]

The SMC Directorate of Plans and Programs evaluated the developers for SAMS with members and advisors from the Staff Judge Advocate, Comptroller, Directorate of Contracting, Directorate of Systems Acquisition, and Civil Engineering. These organizations provided the SMC commander, Lieutenant General Arnold, with their recommendations. General Arnold would then give his recommendations to the AFMC headquarters.[46]

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[42] Area A Integrated Product Team (FOUO, extract is not FOUO), "Area "A" Facilities Assessment," 25 July 1997, pp. 15-16, 31, 33, 57 (Doc 2-52).

[43] Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54); E-mail, SMC/XPB to 61 ABG/CED, "Congressman Kuykendall's Briefing," 7 July 1999, (Doc 2-58); Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

[44] Internet Document, SMC, "Request for Proposal (RFP)," 9 August 2001, pp. 1-2 http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-56).

[45] *Ibid*, p. 3.

The 5 September 2001 SAMS timeline provided a tentative schedule for the construction phase of the project. The construction of the new buildings at Area B should begin in July 2003. The first building should be complete in July 2004, and the second building should be complete in July 2005.[47]

In 2001, the SAMS concept had the endorsement of SMC, AFSPC, AFMC, the Pentagon and the local communities of Hawthorne and El Segundo, California. SAMS was not subject to Federal Acquisition Regulations, so enabling legislation from the United States Congress was a necessity for concept approval.[48] Congress approved the authorizing legislation (Public Law 106-398, Defense Authorization Act for FY 2001, Section 2861) to proceed with the SAMS project in September 2000.[49]

By the end of FY 2001, the SAMS project had not become an absolute certainty of being approved and accomplished, but the process continued to proceed as planned. In October 2001, the Phase I evaluation of the developers had been completed, but the Phase I final down-select to the best-qualified developers remained ongoing.[50]

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[46] Conversation and E-mail, 2Lt Paige Henning, SMC/XPM, to Robert Mulcahy, SMC/HO, "SAMS History," 18 December 2001, (Doc 2-59).

[47] Internet Document, SMC, "Estimated SAMS Timeline," 5 September 2001, http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-60).

[48] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51); Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54); Conversation and E-mail, 2Lt Paige Henning, SMC/XPM, to Robert Mulcahy, SMC/HO, "SAMS History," 18 December 2001, (Doc 2-59); Otto Kreisher, "Air Force land swap moves ahead in Senate," Daily Breeze, 20 June 2000, p. A3 (Doc 2-61).

[49] Internet Document, SMC, "SAMS Enabling Congressional Language," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/language.html (Doc 2-62); Internet Document, SMC, "Request for Proposal (RFP)," 9 August 2001, Appendix F http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-56); E-mail, 2Lt Paige Henning, SMC/XPM to Robert Mulcahy, SMC/HO, "SAMS," 18 December 2001, (Doc 2-63).

[50] Conversation and E-mail, 2Lt Paige Henning, SMC/XPM to Robert Mulcahy, SMC/HO, "SAMS History," 18 December 2001, (Doc 2-59).

BASE REAL ESTATE

Los Angeles AFB had an unusual layout compared to the other Air Force bases in the United States. The base was located within a major urban area, it did not have any flight line facilities or airplanes, and it had separate locations for its program offices, support facilities, and its housing areas. Using various organizational names over the years, the SMC headquarters occupied the same land and buildings in El Segundo, California since 1964. Between 1964 and 1987, the Air Force property had been designated as Los Angeles Air Force Station. In August 1987 the Air Force redesignated the property to Los Angeles AFB.[51]

Los Angeles AFB measured 95 acres within its two El Segundo locations at the intersection of El Segundo Boulevard and Aviation Boulevard. The divided base had two separate sections, Area A and Area B. Area A (41 acres), at the southeastern corner of the intersection, contained seven office buildings occupied primarily by program offices and staff offices. Area B (54 acres), at the northwestern corner of the intersection, contained buildings occupied primarily by support facilities such as the Medical/Dental Clinic (Buildings 200, 201, 202, 209), the Commissary (Building 251), the Base Exchange (Building 244), the Child Development Center (Buildings 207 and 208), the Fitness Center (Building 242) and the automobile Gas Station (Building 235).[52]

The base started a program of replacing its aging facilities. Two of the old buildings at Area B were demolished in 2001 and would later be replaced with new facilities. Area A did not demolish or construct any buildings at this time. The Fitness Center at Building 205 (17,455 square feet) and Building 206 (2,400 square feet) were demolished in January and February 2001. The two buildings had been located at the western central section of Area B where Building 210 would later be built. The Navy constructed Building 205 in 1959. The Air Force used the facility as a fitness center from 1964-2000. Building 206 had been constructed by the Air Force in 1978. The Fitness Center equipment was transferred to Building 242 in Area B. A new Fitness Center (Building 286) at Area B would be constructed at the northwest section of the base, and it would have its groundbreaking on 11 October 2001.[53]

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[51] Timothy Hanley and Harry Waldron, Historical Overview Space and Missile Systems Center 1954-1995, June 1997, p. 4 (Doc 2-64); SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 1, 18-20, and 26-27 (Doc 2-65).

[52] SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 1, 18-20, and 26-27 (Doc 2-65); E-mail, Elaine Jewell, 61 ABG/CEZER, to Robert Mulcahy, SMC/HO, "Base Acreage," 30 June 2000, (Doc 2-66).

[53] Discussion, Elaine Jewell, 61 ABG/CEZER, with Robert Mulcahy, SMC/HO, "Square Feet of Buildings 205 and 206," 2 October 2002; Internet Document, SMC, "Facilities to be Demolished," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/section3.htm (Doc 2-53); Staff Summary Sheet, SMC/AXF to

Illustration 2-2 Area B of Los Angeles AFB in 2001

On 1 September 2000, the groundbreaking for a new Medical/Dental Clinic (Building 210) took place in Area B. The new facility would be located adjacent to the north side of the current Medical Clinic (Building 200) at the western central section of the base. The new 47,967-square foot clinic would cost about $12.7 million to construct, and it would replace the old clinic that had been built in 1959. The Air Force used Building 200 as the base medical clinic since June of 1980. The new clinic would be the first significant facility construction on base since the completion of the Child

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SMC/CC, "Proposed AFMC FY 02-05 Military Construction (MILCON) Future Years Defense Program (FYDP)," 28 October 1998, with attachment: Memo, SMC/CC to AFMC/CE, "Proposed AFMC FY 02-05 Military Construction Future Years Defense Program (FYDP)," 9 November 1998, (Doc 2-67); E-mail, 1Lt Michael Plumb, 61ABG/CEM, to Robert Mulcahy, SMC/HO, "RE: Buildings 205 and 206," 7 September 2002, (Doc 2-68); No Author, "A ground-breaking workout," Astro News, 19 October 2001, p. 3 (Doc 2-69).

Development Center (Building 207) in 1987 and the Commissary (Building 251) in 1983. Building 210 would be completed in the summer/fall of 2002.[54]

Los Angeles AFB also controlled two annexes, Annex 2 and Annex 3. The Lawndale Facility (Annex 3) measured 13 acres, and it was located a few blocks south of Los Angeles AFB, on Aviation Boulevard between Rosecrans and Marine Avenues in the city of Hawthorne. It had a 19,454-square foot office building (Building 80), a parking lot, and a softball field. Personnel and contractors from the Space-Based Laser Project (SMC/TL) were the main occupiers of Building 80 at this time.[55]

Los Angeles AFB used Fort MacArthur (Annex 2) as a housing area for its military personnel. The fort had been an Army installation since its authorization in 1914, and it was transferred to the Air Force on 1 October 1982. Fort MacArthur measured 96 acres, and it was located on the southwest intersection of Pacific Avenue and West 22nd Street in the city of San Pedro, California (approximately 18 miles southwest of Los Angeles AFB). Fort MacArthur contained housing for officer families, enlisted families, and unaccompanied military personnel. It included 402 housing units (including 34 original structures with historical value), and various support facilities such as a chapel, community center, youth center, child development center, temporary quarters, shoppette, and a gym. The single enlisted personnel had three dormitories (81 units), but no dining facility. Dormitories did not exist for single officers.[56]

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[54] John Ryan, "Pardon our dust: Clinic construction starts," Astro News, 8 September 2000, p. 1 (Doc 2-70); Discussion, Elaine Jewell, 61 ABG/CEZER with Robert Mulcahy, SMC/HO, "Base construction dates, and the building number for the new medical clinic," 11 September 2002; Internet Document, SMC, "Facilities to be Demolished," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/ section3.htm (Doc 2-53).

[55] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 21; E-mail, Elaine Jewell, 61 ABG/CEZER, to Robert Mulcahy, SMC/HO, "RE: Lawndale Facility, Building 80," 11 September 2002, (Doc 2-71); Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet .html (Doc 2-51).

[56] SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 16-17 (Doc 2-65); Internet Document, Fort MacArthur Museum Association, "A Brief History of Fort MacArthur," printed 30 June 2000, http://www.ftmac.org.Fmhist.htm (Doc 2-72); Internet Document, SMC, "Historical Sketch of Los Angeles AFB and Fort MacArthur," printed 1 February 2002, http://www.te.plk.af.mil/ABG/history.htm (Doc 2-73); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: AF Housing units," 26 September 2002, (Doc 2-74); E-mail, Gabina Perez, 61 ABG/CEH to Robert Mulcahy, SMC/HO, "RE: Officer & enlisted housing," 26 September 2002, (Doc 2-75).

In addition to Fort MacArthur, the Air Force had officer family housing at the Pacific Crest (22 acres) and Pacific Heights (12 acres) Housing Areas in San Pedro, located about one mile northwest of Fort MacArthur. Pacific Crest had 91 housing units and Pacific Heights had 79 housing units. Pacific Heights was located southwest of the intersection of West 25th Street and South Western Avenue, and Pacific Crest was located across the street on the north side of 25th Street. The construction of the two housing areas was completed in 1989.[57]

On 7 November 2000, construction was completed on the 24.4-acre Pacific Heights II Housing Area in San Pedro for the senior NCO families at Los Angeles AFB. The 71-unit family housing area began construction in May 1997, and it was completed within its $13.2 million budget. A ribbon-cutting ceremony took place for the opening of the new housing on 16 November 2000. Gen Lester Lyles (commander of AFMC) and Lt Gen Eugene Tattini (SMC) presided over the ceremony. SMC acquired the site in 1997 from the Navy who formerly called it "White's Point Naval Housing." The name of the housing area was changed by SMC to the "White Point Housing Area" in February 2001. Within in a year, SMC changed the name of the White Point Housing Area to the "Pacific Heights II" Housing Area. At the end of 2001, the Air Force had a combined total of 643 family housing units for the personnel at Los Angeles AFB.[58]

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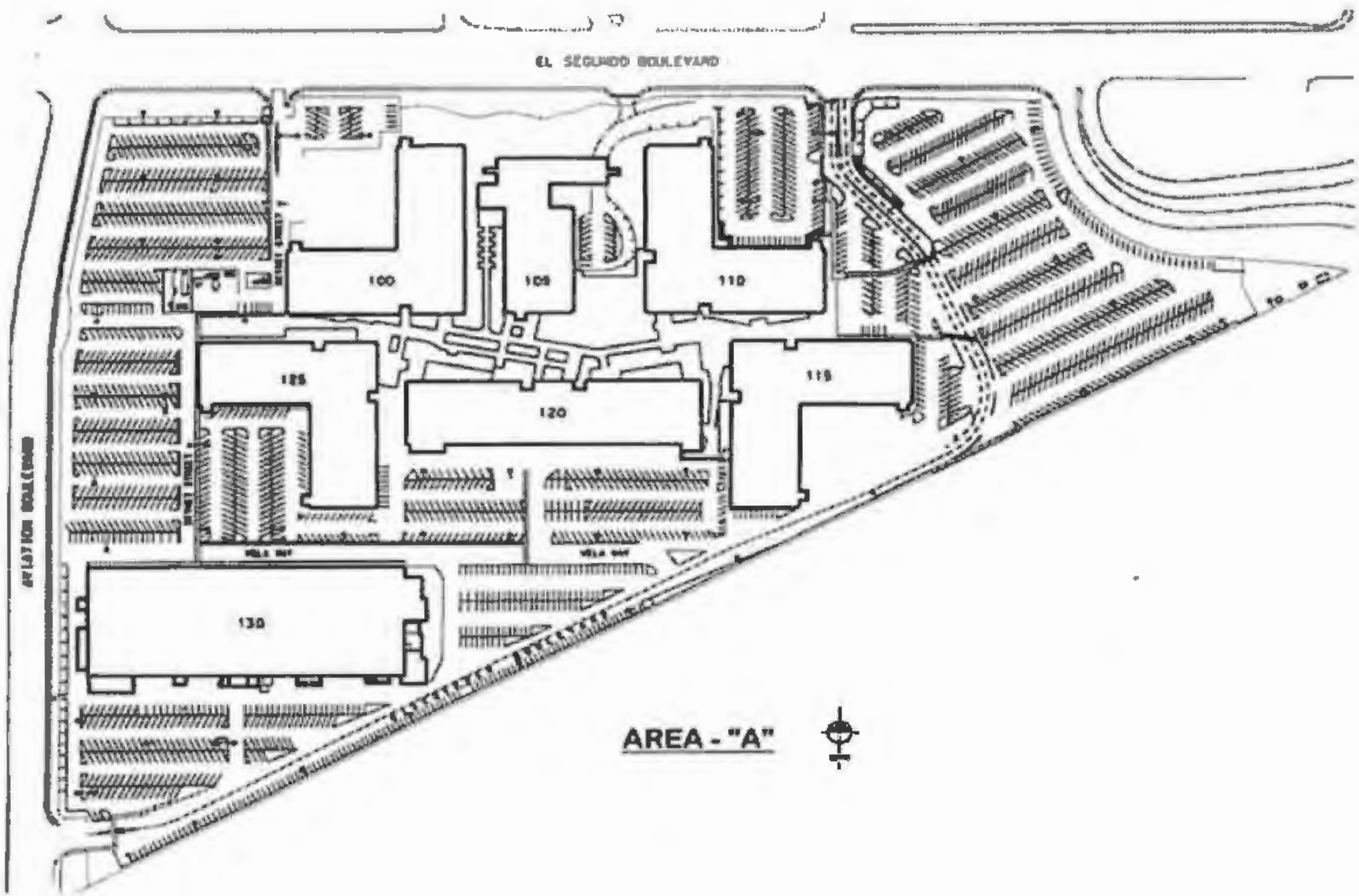
[57] E-mail, Elaine Jewell, 61 ABG/CEZER to Robert Mulcahy, SMC/HO, "Base Acreage," 30 June 2000, (Doc 2-66); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: AF Housing units," 26 September 2002, (Doc 2-74); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: Officer & enlisted housing," 26 September 2002, (Doc 2-75).

[58] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 21; SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 16-17 (Doc 2-65); E-mail, Elaine Jewell, 61 ABG/CEZER, to Robert Mulcahy, SMC/HO, "Base Acreage," 30 June 2000, (Doc 2-66); E-mail, Gabina Perez, 61 ABG/ CEH, to Robert Mulcahy, SMC/HO, "RE: AF Housing units," 26 September 2002, (Doc 2-74); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: Officer & enlisted housing," 26 September 2002, (Doc 2-75); Summary, Robert Mulcahy, SMC/HO, for Brig Gen William Wilson, SMC/CV, "Housing at White Point," 23 February 2001, (Doc 2-76); John Ryan, "Base opens new military housing," Astro News, 17 November 2000, p. 3 (Doc 2-77); Script, 61 CS/SCSV, "Space and Missile Systems Center Today," January 2001, pp. 20-21 (Doc 2-78).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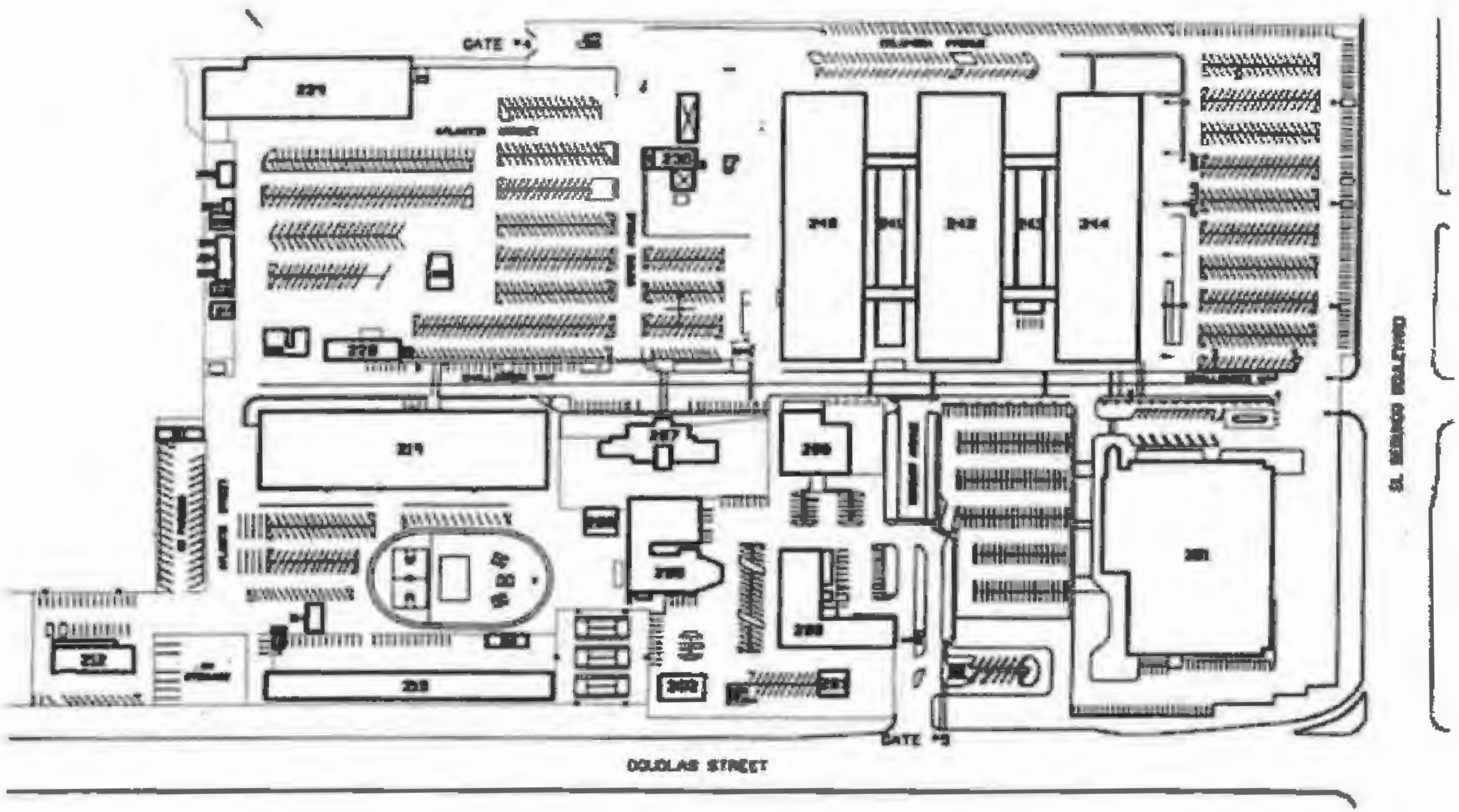
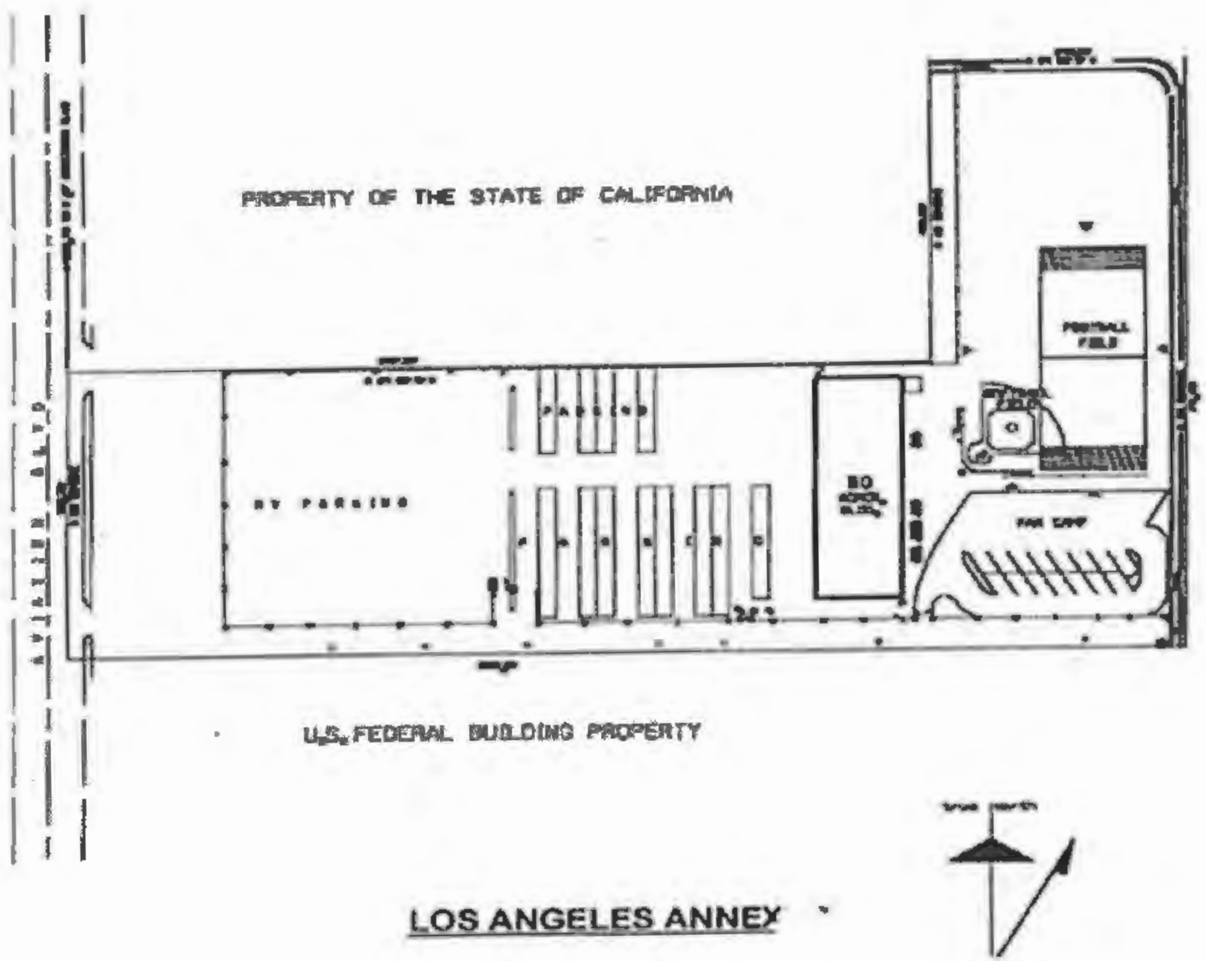
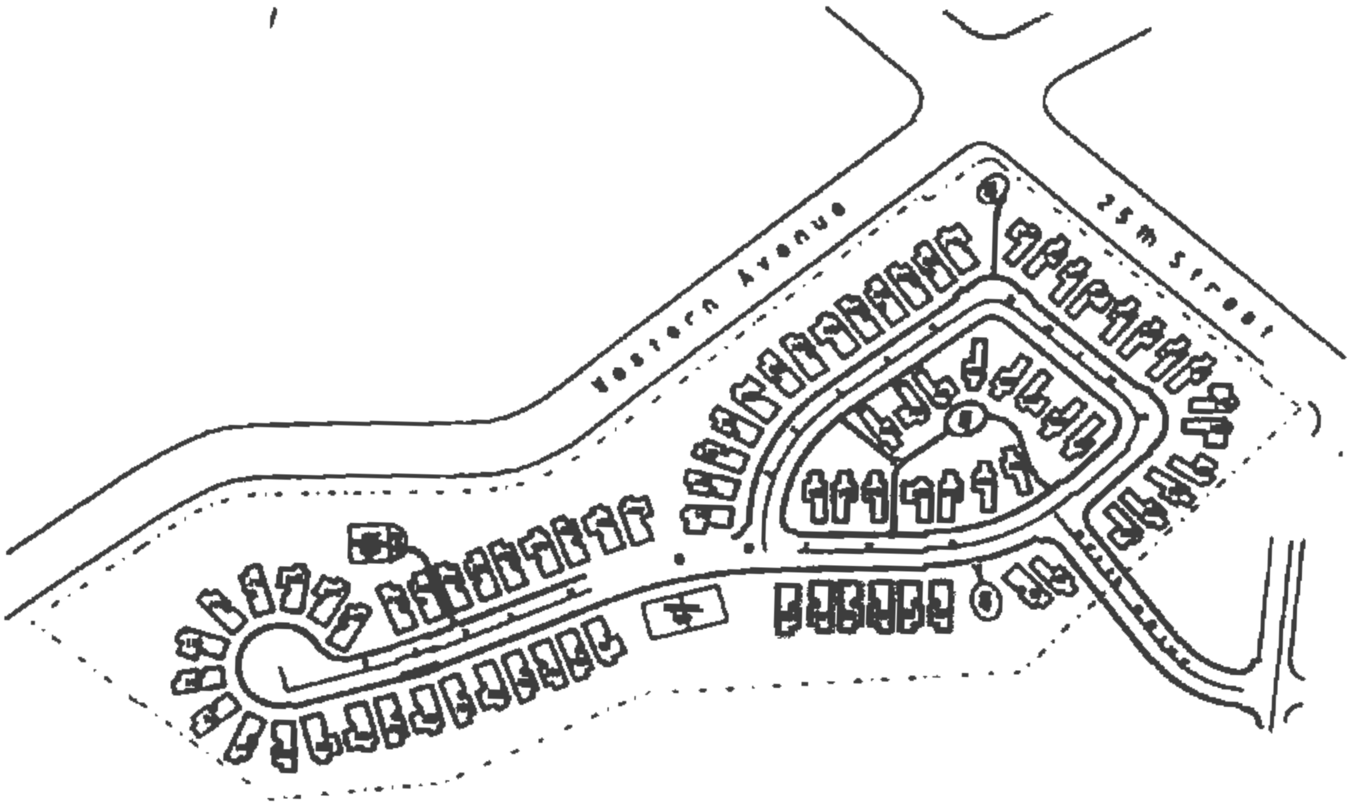
AREA - "A"



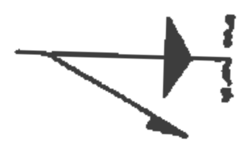
AREA - "B"

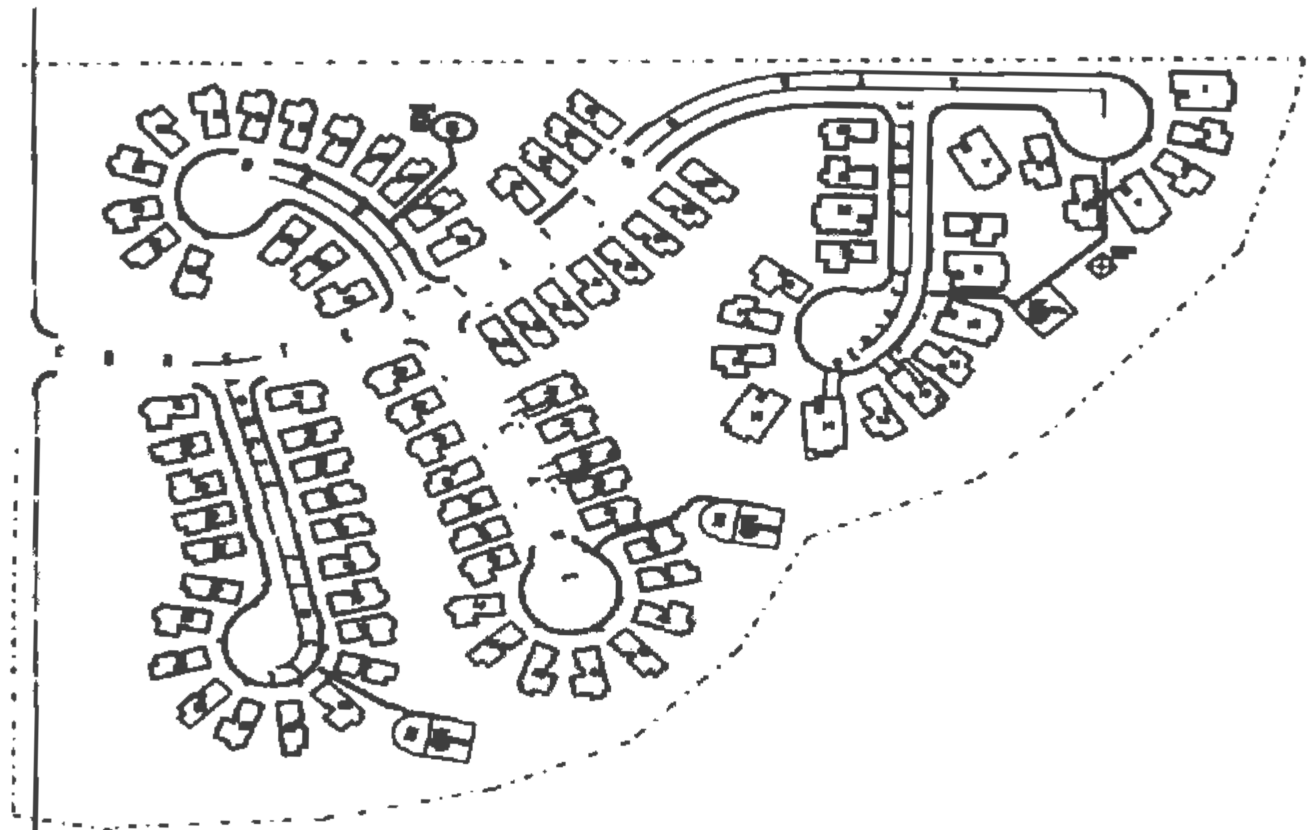


LOS ANGELES ANNEX

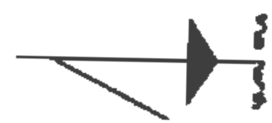


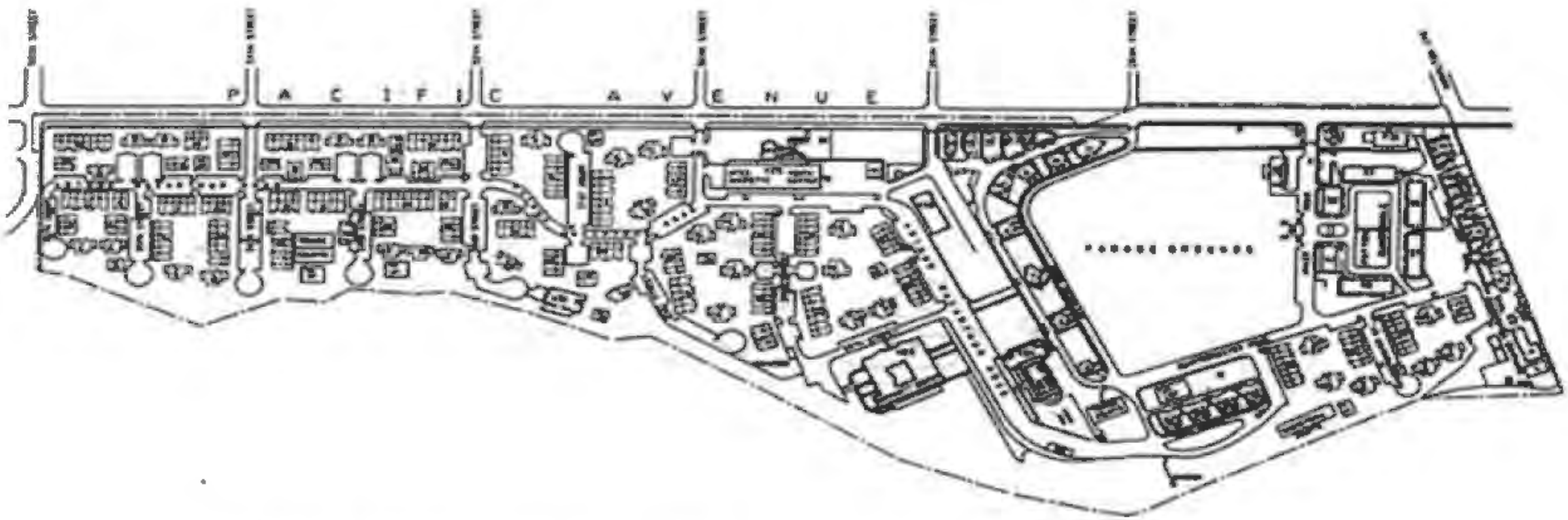
PACIFIC HEIGHTS ANNEX





PACIFIC CREST ANNEX





Fort MacArthur Family Housing

Data about SMC's other resources at Los Angeles AFB during fiscal years 1998 through 2001 can be found in the appendices to this history. Appendix F contains SMC's budget by year and program element. Appendix C contains personnel statistics by six-month intervals about assigned and authorized manning and personnel reductions by office, rank, and specialty. Appendix E contains descriptions by fiscal year of SMC's construction projects at Los Angeles AFB and elsewhere. Information about new contracts issued during this period has been tabulated in Appendix I.

CHAPTER 3

LAUNCH VEHICLES

During FY 1998 through FY 2001, SMC's Launch Programs office was managing the acquisition of four major kinds of launch vehicles for SMC's medium and heavy payloads as well as payloads from other agencies. Those vehicles were the Atlas II, the Delta II, the Titan II, and the Titan IV. The organization also managed the acquisition of upper stages such as the Centaur and the Inertial Upper Stage (IUS) for those vehicles. SMC's Space Test and Experimentation Program (STEP) also manifested relatively small, experimental payloads on NASA's Space Shuttle and on small launchers such as the Pegasus, the Taurus, and the Minotaur.[1]

The table below lists Air Force launches of military payloads on these systems during the period under consideration. Air Force Space Command was responsible for launching operational boosters. SMC was responsible for developing, acquiring, and modifying the launch systems, certifying their readiness for launch, and providing technical assistance.[2]

The pace of launch activities during this period was very rapid, approaching the most rapid U.S. launch activity on record, that of the early and middle 1960s. Indeed, the frequency of military launches from 15 October to 7 November 1997 was the highest for such a short span of time since 1962. During those 23 days, the Air Force launched three Titan IV rockets, an Atlas IIA, and a Delta II, each of which carried a military payload of major importance.[3]

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[1] The Pegasus was a commercially developed, air-launched, three-stage booster which could place about 400 to 600 pounds into a low orbit. The Taurus was a ground-launched booster consisting of the Pegasus added to the first stage of a Peacekeeper missile, and it could place about 1,000 pounds into a low polar orbit. The Minotaur was a ground-launched booster consisting of modified first and second stage segments of Minuteman II missiles added to Pegasus upper stages and avionics. It could place about 1,400 pounds into a low orbit.

[2] Program Management Directive (FOUO), SAF/AQS, "PMD 2138(47)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 15 March 2000 (information used not FOUO) (Doc 3-1); Program Management Directive (FOUO), SAF/AQS, "PMD 2138(48)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 18 September 2001 (information used not FOUO) (Doc 3-2).

[3] News Release (U), SMC/PA, "Air Force Closes 1997 With Space Launch Frenzy," 15 January 1998 (Doc 3-3).

Table 3-1
Space Payloads Launched for DOD During FY 1998 - 2001[4]

DATE	SITE	VEHICLE	PAYLOAD	LAUNCHER PERFORMANCE
22 Oct 97	Air-launched	Pegasus XL F-18	STEP M4 (USAF)	success
24 Oct 97	VAFB SLC-4E	Titan IVA 403 4A-18/K-18 NUS	classified (NRO)	success
24 Oct 97	CCAFS SLC-36A	Atlas IIA AC-131	DSCS IIIB-13 (USAF)	success
5 Nov 97	CCAFS SLC-17A	Delta II 7925 D-249	GPS IIA-28 SVN-38 [last Block IIA] (USAF)	success
8 Nov 97	CCAFS SLC-41	Titan IVA 401 4A-17/K-20 + Centaur TC-16	classified (NRO)	success
29 Jan 98	CCAFS SLC-36A	Atlas IIA AC-109	classified (NRO)	success
16 Mar 98	CCAFS SLC-36A	Atlas II AC-132 [last launch of original Atlas II]	UHF Follow-On F-8 (USN)	success
9 May 98	CCAFS SLC-40	Titan IVB 401 4B-25/K-25 + Centaur TC-18 + Centaur	classified (NRO)	success

[4] Abbreviations: ARGOS = Advanced Research and Global Observation Satellite; AteX = Advanced Tether Experiment; CCAFS = Cape Canaveral Air Force Station; DSP=Defense Support Program; DMSP=Defense Meteorological Satellite Program; DSCS = Defense Satellite Communications System; GPS=Global Positioning System; LC = Launch Complex; NRO = National Reconnaissance Office; NUS=no upper stage; SLC = Space Launch Complex; STEX = Space Technology Experiments; STEP=Space Test Experiments Platform; STP = Space Test Program; UHF FO= UltraHigh Frequency Follow-On; USAF = U.S. Air Force; USN = U.S. Navy; VAFB = Vandenberg Air Force Base.

Sources: Jonathan McDowell, Master Launch Log, August 2001, accessible from http://hea-www.harvard.edu/~jcm/space/; Mark Wade, Encyclopedia Astronautica, accessible from http://www.astronautix.com/; The Aerospace Corporation, "Table of All Launches," accessible from http://ax.losangeles.af.mil/~gowerj/ssed/corporatelaunchlog/corpll.html.

DATE	SITE	VEHICLE	PAYLOAD	LAUNCHER PERFORMANCE
12 Aug 98	CCAFS SLC-41	Titan IVA 401 4A-20/K-17 + Centaur TC-9	classified (NRO)	failure [Titan wiring. See note 36 below.]
2 Oct 98	VAFB SLC-576E	Taurus F3 1110-2	STEX + AteX [DARPA experiments]	success
20 Oct 98	CCAFS SLC-36A	Atlas IIA AC-130	UHF Follow-on F-9	success
29 Oct 98	CCAFS SLC-17A	Space Shuttle STS-88	Mightysat I [4 USAF experiments]	success
23 Feb 99	VAFB SLC-2W	Delta II 7920-10 D-267	ARGOS (STP P91-1) (USAF)	success
9 Apr 99	CCAFS SLC-41	Titan IVB 402 4B-27/45K-32 + IUS-21	DSP F-19 (USAF)	failure [IUS]
30 Apr 99	CCAFS SLC-40	Titan IVB 401 4B-32/45K-26 + Centaur TC-14	Milstar II F-1 [aka Milstar-3] (USAF)	failure [Centaur]
22 May 99	VAFB SLC-4E	Titan IVB 404 4B-12/45K-26 NUS	classified (NRO)	success
7 Oct 99	CCAFS SLC-17A	Delta II 7925 D-275	GPS IIR-3 SVN-46 (USAF)	success
23 Nov 99	CCAFS SLC-36B	Atlas IIA AC-136	UHF Follow-On F-10 (USN)	success
12 Dec 99	VAFB SLC-4W	Titan II 23G-8	DMSP Block 5D-3 S-15 (USAF)	success
20 Jan 00	CCAFS SLC-36A	Atlas IIA AC-138	DSCS III B-8 (USAF)	success
27 Jan 00	VAFB CLF	Minotaur [Minuteman II and Pegasus stages; 1st flight]	JAWSAT [10 experiments, including Picosat 1 and 2 comm. tether by Aerospace Corp.]	success
12 Mar 00		Taurus F5 1110-3	Multispectral Thermal Imager experiment	success
8 May 00	CCAFS SLC-40	Titan IVB 402 4B-29/45K-28 + IUS-22	DSP F-20 (USAF)	success

DATE	SITE	VEHICLE	PAYLOAD	LAUNCHER PERFORMANCE
10 May 00	CCAFS SLC-17A	Delta II 7925 D-278	GPS IIR-4 SVN-51 (USAF)	success
7 Jun 00	VAFB RW30/1	Pegasus XL F29 M029	TSX-5 + STEP M5 (BMDO + USAF)	success
16 Jul 00	CCAFS LC-17A	Delta II 7925 D-279	GPS IIR-5 SVN-48 (USAF)	success
19 Jul 00	VAFB CLF	Minotaur F3	Mightysat 2.1 + (DARPA/Aerospace Corp. Picosat tether experiment)	success
17 Aug 00	VAFB SLC-4E	Titan IVB 403 4B-28/45K-29 NUS	classified (NRO)	success
19 Oct 00	CCAFS LC-36A	Atlas IIA AC-140 [Last USAF Atlas IIA launched]	DSCS III B-11 + IABS-8 (USAF)	success
10 Nov 00	CCAFS LC-17A	Delta II 7925 D-281	GPS IIR-6 SVN-41 (USAF)	success
5 Dec 00	CCAFS LC-36A	Atlas IIAS AC-157 [First DOD Atlas IIAS launched]	classified (NRO)	success
30 Jan 01	CCAFS LC-17A	Delta II 7925 D-283	GPS IIR-7 SVN-54 (USAF)	success
27 Feb 01	CCAFS LC-40	Titan IVB 401 4B-41/K-30 + Centaur TC-22	Milstar 2 F-2 [aka Milstar-4] (USAF)	success
18 May 01	CCAFS LC-17B	Delta II 7925 D-285	GeoLITE experiment (NRO)	success
6 Aug 01	CCAFS LC-40	Titan IVB 402 4B-31 + IUS-16	DSP F-21 (USAF)	success
8 Sep 01	VAFB SLC-3E	Atlas IIAS AC-160 [First DOD Atlas IIAS from west coast]	classified (NRO)	success

Launch Broad Area Review

Just before this period, the Delta II launch vehicle suffered its first ever launch failure with a military payload on 17 January 1997. During 1998 and 1999, U.S. space programs experienced a series of additional launch failures with their most powerful and hitherto most reliable launch vehicles. The Titan IV launch vehicle and its upper stages failed during three attempted launches of important military satellites, causing an estimated loss of over $3 billion. The Delta III launch vehicle, based on the Delta II used by the Air Force, failed in two attempts to launch commercial satellites during the same period, and the less-commonly-used Athena II also failed in a commercial launch. The table below provides more details about these launch attempts.

Table 3-2
Launch Failures Leading to Broad Area Review[5]

Date of Failure	Launch Vehicle	Payload	Failure Mode
12 August 1998	Titan IVA-20	Classified (NRO)	Electrical cable short
26 August 1998	Delta III	Galaxy 10 (commercial)	Vehicle roll instability
9 April 1999	Titan IVB-27/ IUS-21	DSP 19 (USAF)	IUS Stage 1-2 separation
27 April 1999	Athena II	IKONOS (commercial)	Fairing failure to separate
30 April 1999	Titan IVB-32/ Centaur 14	Milstar II F-1 (USAF)	Centaur guidance software
4 May 1999	Delta III	ORION III (commercial)	RL10-B2 engine system

The accident investigation boards for the launch failures identified some specific failure modes and hardware deficiencies, but none that were common to more than one of the failures. They did identify a number of technical and process changes to make in manufacturing and preparing the vehicles for launch to lessen the chances of future anomalies.[6]

The prime contractor for the Delta—Boeing Space and Communications—and the prime contractor for the Titan—Lockheed Martin Corporation—began independent investigations of the anomalies that had affected their respective launchers. Boeing's review was chaired by Dr. Sheila Widnall, former Secretary of the Air Force, and

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[5] Briefing Charts (U), "Enhancing Launch Mission Assurance," 18 October 1999 (Doc 3-4).

[6] Briefing Charts (U), Gen Les Lyles (Vice CSAF), "DoD Assessment of Space Launch Failures," no date (Doc 3-5).

Lockheed Martin's review was cochaired by Thomas Young, former CEO of the corporation, and retired General Thomas Moorman, former Air Force Vice Chief of Staff.[7]

The government reacted to the launch failures on several levels. Congress' Conference Committee for FY 2000 Authorizations directed Secretary of Defense Cohen to submit a report on the launch failures to the President and to a number of Congressional oversight committees. President Clinton on 19 May 1999 directed Secretary Cohen to investigate the failures and to issue reports on their causes and the actions necessary to ensure access to space in the future. Secretary Cohen delegated the investigation to Acting Secretary of the Air Force Whitten Peters and Air Force Chief of Staff General Michael Ryan. General Ryan directed Air Force Space Command and the National Reconnaissance Office to jointly conduct a "broad area review" of the causes of the failures and to recommend changes in practices, procedures, and operations.[8]

The Air Force had already formally begun its Launch Broad Area Review (BAR) under a charter issued by its headquarters on 3 May 1999. It set up a Senior Steering Group for the review chaired by retired General Larry Welch, former Air Force Chief of Staff, and consisting of major figures in the space launch industry from both government and private industry. The BAR examined a wide range of concerns, but it concentrated on two "overarching issues." It defined the first of those issues as "mission success in fly-out of current (Atlas, Delta, Titan) systems—approximately $20 billion in launch vehicle and spacecraft assets—includes critical systems with no spares." It defined the second overarching issue as "transition to the future system—Evolved Expendable Launch Vehicle (EELV)—building confidence in launch success." The BAR issued its report and recommendations in the form of a briefing on 1 November 1999. Its 19 major recommendations, arranged under the two overarching issues, are summarized below.[9]

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[7] Briefing Charts (U), Gen Les Lyles (Vice CSAF), "DoD Assessment of Space Launch Failures," no date
(Doc 3-5).

[8] Briefing Charts (U), Gen Les Lyles (Vice CSAF), "DoD Assessment of Space Launch Failures," no date (Doc 3-5); Report (U), no author, "Department of Defense Assessment of Space Launch Failures: Executive Summary," no date (Doc 3-6), accessible at http://www.af.mil/lib/misc/spacebar99b.htm on 25 January 2000.

[9] Briefing Charts (U), "Space Launch Vehicles Broad Area Review Report," 1 November 1999 (Doc 3-7); Letter (U), CSAF to AFMC/CC, AFSPC/CC, and Distribution C, "Launch Broad Area Review Follow-on Actions," 18 November 1999, with attachment: "Launch Broad Area Review (BAR) Recommendations and Action Assignments" (Doc 3-8).

SUMMARY OF LAUNCH BAR RECOMMENDATIONS[10]

Fly-Out Programs

1. Air Force track contractor actions to focus program management on disciplined systems engineering and processes and to implement corrective actions resulting from failures and Contractor Independent Reviews.
2. SECAF and CSAF assign clear responsibility, accountability and authority to the acquisition command for all launch vehicle activities through delivery of spacecraft on orbit (separation from the launch vehicle).
   –Make Space and Missile Systems Center (SMC) responsible for assembly and certifying readiness to launch (on the pad)—engineering responsibility retained through delivery on orbit. (SMC/CC names Mission Director for DoD missions; DNRO names mission director for NRO missions.)
   –AFSPACECOM supports SMC in launch base activities and retains launch decision authority, safety, and range responsibilities—conducts the launch after SMC certification.SECAF direct that AFSPACECOM and SMC produce a realistic launch schedule and funding profile.
4. Air Force institutionalize a formal launch risk management program.
   –Develop and manage a risk management plan for all fly-out systems.
   –Emphasize identifying and mitigating risks.
   –Formalize systoms engineering and quality policies, practices and procedures.
   –Re-institute a comprehensive post-flight analysis program.
5. Air Force make SMC/CC responsible for timely, formalized mechanism to capture and disseminate lessons learned across programs and contractors.Reverse the draw-down in engineering support now.
   –SMC/CC identify engineering support needs (SPO, FFRDC, DCMC), consistent with the realities of the special nature of the fly-out programs and report requirements to the SECAF within 30 days.
   –SMC/CC return to full Independent Reviews vice current approach of sampling identified risk areas.
7. Air Force request DCMC increase in-plant technical support.Air Force increase launch base technical manpower commensurate with fly-out risk and maintain through transition period of EELV program.
9. SECAF direct SMC/CC to identify remaining opportunities and resources needed for value added government Independent Review.
10. Use straightforward mission performance incentives designed to properly balance the pervasive cost pressures.**Transition to EELV**
11. SECAF assign clear government responsibility, accountability and authority to SMC/CC for delivery of spacecraft on orbit.
    –Maintain an empowered program office with a clear reporting chain.
    –Ensure adequate engineering resources are made available.

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[10] Briefing Charts (U), "Space Launch Vehicles Broad Area Review Report," 1 November 1999 (Doc 3-7): Appendix A: Summary of Recommendations.

12. Air Force complete and widely disseminate an end state and transition plan that lays out the management approach and the approach to building confidence on the front end of the EELV program.
    –Ensure lessons learned from heritage programs are applied to EELV.
13. SAF/AQ and AFMC program resources, including engineering and other support staff to meet needs of transition.SECAF provide direction to develop and implement a joint government-industry plan for a "value-added" government role as a smart and involved customer that addresses:
    –Technical participation during the development of EELV configurations.
    –Building confidence in launch reliability.
15. SECAF direct SMC/CC to identify opportunities and resources needed for value added government Independent Review.
16. Air Force formulate a formal EELV launch risk management program.
    –Develop and manage a risk management plan for EELV systems.
    –Formalize systems engineering and quality policies, practices and procedures.
    –Develop and implement an improved mission assurance process based on the best attributes of SMC, NASA and NRO mission assurance practices.SECAF ensure robust engineering support until launch reliability is demonstrated.
    –Task SMC/CC to provide a revised estimate of government engineering support requirements within 30 days.
18. USD(A&T) and SECAF consider investment to accommodate needed reliability confidence-building (both contractors) to provide:
    –Added launch vehicle redundancy and built-in-test diagnostics.
    –Heavily instrumented early verification flights of medium and heavy lift configurations to verify models and simulations.
    –Use new micro-technologies to enhance instrumentation.
    –Government verification of qualification levels and design analyses at the component level for early launches.
    –Additional system level testing to reduce "qualification by similarity" and interaction risks.
    –Captive test firing of appropriate EELV configurations.SECAF direct a reassessment of the EELV contracts for benefit of:
    –Adding provisions (incentives or penalties) for mission success.
    –Early use of options for performance guarantee and mission assurance add-ons.
    –Examine the benefit of incorporating a cost-plus feature for the reliability confidence building investment.

In addition to its 19 recommendations, the Launch BAR defined five "BAR Bottom Lines" toward which the recommendations were directed.[11] They are listed below.

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[11] Briefing Charts (U), "Space Launch Vehicles Broad Area Review Report," 1 November 1999 (Doc 3-7): Appendix A: Summary of Recommendations.

1. Government ensure industry acts to correct causes of recent failures and improve systems engineering and process discipline.
2. Government establish clear accountability for mission success for fly-out systems and transition to EELV.
3. Enhance government-industry partnership with needed management, engineering support and emphasis on mission success.
4. Provide a well-defined, coordinated, disseminated transition plan to EELV.
5. Government invest to build confidence in EELV reliability with enhancements and increased oversight.

It is apparent from the details of the Launch BAR's 19 recommendations that increased oversight and authority for SMC's commander was a large part of the solution as far as the members of the BAR were concerned. Some of the recommendations were aimed at broadening SMC's responsibility for each launch from the acquisition of the hardware through delivery of the spacecraft on orbit. Although Air Force Space Command was to retain responsibility for conducting the launch, SMC's responsibility for certifying that the hardware was ready for launch and for exercising engineering responsibility throughout the launch were to be made clear, explicit, and formal. Some other recommendations were aimed at obtaining enough engineering support for SMC so that it could adequately exercise its increased responsibilities.

Delta II

SMC (then named Space Division) awarded a contract (FO4701-87-C-0005) to McDonnell Douglas in January 1987 for an upgraded version of the Delta booster. The new version was called the Delta II. It was developed primarily to launch the Global Positioning System's NAVSTAR Block II satellites, and it successfully launched 18 of them under this first contract, the last (NAVSTAR II-18) on 3 February 1993.

During the period under discussion (FY 1998-2001), the Delta II was manufactured in a variety of configurations to fit a variety of missions, both military and commercial. The newer configurations were known collectively as the 7900 series. The types most used by the Air Force were the 7925 configuration for GPS launches from the east coast and the 7920-10 configuration for launches from the west coast.[12] The 7925 configuration had three stages, and the 7920-10 had two stages. (An earlier series, known as the 6925 configuration, was used to launch the first nine GPS Block II satellites.) Vehicles in the 7925 series were 125.9 feet long and weighed 511,190 pounds at lift-off. The first stage was powered by one Rocketdyne RS-27A main engine and two LR-101-NA-11 vernier engines for roll and attitude control. At lift-off, the first stage was

[12] Each digit in the numerical desgnations referred to an element of the Delta's basic configuration: 1st digit 7 = RS-27A first-stage engine with strap-on solid rocket motors; 2nd digit 9 = nine solid rocket motors; 3rd digit 2 = Aerojet AJ 10-11 second-stage engine; 4th digit 5 = Star-48B third-stage motor; suffix -10 = payload fairing 10 feet in diameter and 29.1 feet in length. (The Boeing Company, Delta II Payload Planner's Guide, October 2000)

surrounded by a cluster of nine solid-fuel, graphite-epoxy motors (GEMs) made by Alliant Techsystems. The entire vehicle generated 699,250 pounds of thrust at lift-off. The second stage used a restartable, liquid-fuel Aerojet AJ 10-11 8K engine. The optional third stage used a Star-48B solid rocket motor deployed from a spin table. Air Force Space Command's 45th Space Wing managed the launch operations for the Delta II at Cape Canaveral Air Station, Florida, using Launch Complexes 17A and 17B. Space Command's 30th Space Wing managed the launches from Vandenberg AFB, California, using Space Launch Complex 2W.[13]

The contract for the follow-on procurement (FO4701-91-C-0031) was awarded to McDonnell Douglas in August 1991. It provided launches for the next 14 GPS Block IIA satellites, including the launch that provided a fully operational constellation of 24 GPS satellites on 9 March 1994. The last of these launches occurred on 5 November 1997, when GPS IIA-28 was placed into a nominal orbit. The contract also included production of the launch vehicle for the Space Test Program's ARGOS satellite, which was delayed many times and finally launched successfully on 23 February 1999. The contract therefore remained active until the end of February 1999.

On 9 April 1993, SMC awarded a contract (FO4701-93-C-0004) to McDonnell Douglas for the third procurement of Delta IIs. This contract was also known as the MLV III procurement. The newest Delta IIs had to satisfy a threshold payload-weight requirement of 4,480 pounds to the GPS transfer orbit (10,988 by 100 nautical miles), with an objective of 4,704 pounds. The MLV III contract ran from 1993 through FY 2002, and it provided for a maximum of 36 launches through six annual procurement options, each of which could buy from one to six launches. SMC exercised the last production option in January 1999 for five more Delta II boosters. After these were expended, GPS satellites would be launched on one of the varieties of Evolved Expendable Launch Vehicle (EELV) under development.[14]

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[13] National Security Space Road Map, "Delta II," 5 November 1997, accessible at http://fas.org/ spp/military/program/nssrm/iniitiatives/deltaii.htm (Doc 3-9); The Boeing Company, "Delta" [and related web pages], 2002 (Doc 3-10); Fact Sheets (U), SMC/PA, AFSPC/PA, and HQ USAF/PA, "Delta II,"
(Doc 3-11).

[14] Briefing Charts (U), Lt Col Scott Swanson (SMC/CL) to SMC/CC, "Delta Program Management Review," 30 October 2001; Staff Summary Sheet (U), SMC/CLPM to SMC/CC, "Request Reviewing Official Signature for Delta Program Contractor Performance Assessment Report (CPAR)," 2 June 1999 (Doc 3-12); RDT&E Budget Item Justification Sheet (U), HQ USAF/AQS, "305119F Medium Launch Vehicles," February 2000 (Doc 3-13).

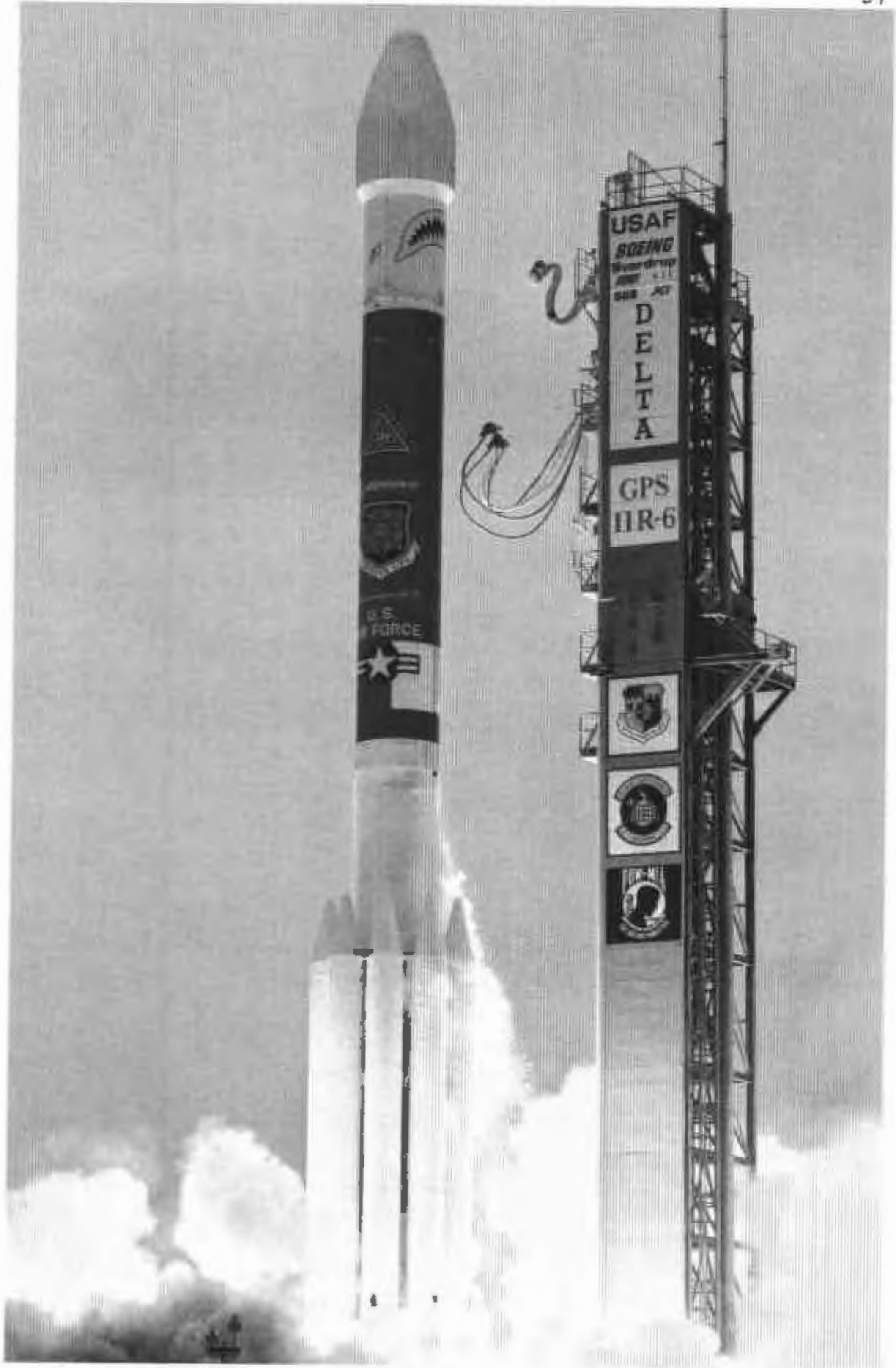

Illustration 3-1: Launch of GPS IIR-6 on 10 November 2000
(Photo Courtesy The Boeing Company)

Twenty-one of the launches on this contract were for GPS replenishment (Block IIR) satellites, for which Boeing would provide both hardware and launch services. (The launch services for the ARGOS satellite, though not the production of the Delta II, were also provided under this contract.[15]) Launching the replenishment satellites involved a basic change in planning and timing. The first 24 GPS satellites were launched according to a schedule designed to build the operational constellation rapidly but safely. After that, the replenishment satellites had to be launched only when GPS satellites failed or were about to fail. The new launch requirement was called Launch on Need (LON). A contractual modification to the MLV III contract required McDonnell Douglas to provide launches for GPS replenishment satellites within 40 days of a launch call from Air Force Space Command. They had to be provided at a rate of four launches, plus or minus two, per year.[16]

By early 2000, it was becoming obvious that GPS satellites were even healthier than launch planners had expected and that their Delta II launch vehicles therefore were not being expended as fast as they were being produced. To deal with the problem, SMC first issued a modification to Boeing's Delta II production contract (F04701-93-C-0004) on 28 September 2000. The modification provided for long-term storage of the waiting Delta II vehicles during 2001-2002. The modification was valued at $10,651,480. A longer-term solution would involve extending the Delta II contract from FY 2002 to FY 2006, but the unbudgeted costs of launch operations, spares, sustainment and obsolescence would create budget shortfalls for those years. SMC issued a request for proposal (RFP) for the extension in August 2001 while continuing to request the additional funding.[17]

SMC awarded only one major new Delta II contract during this period. On 23 June 1998, it issued a firm-fixed-price commercial contract (F04701-98-C-0012) to Boeing to provide for the launch of the National Reconnaissance Office's Geosynchronous Lightweight Technology Experiment (GeoLITE) satellite on a Delta 7925 vehicle. The launch took place successfully on 18 May 2001.[18]

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[15] See note 14 above.

[16] National Security Space Road Map, "Delta II," 5 November 1997, accessible at http://fas.org/spp/ military/program/nssrm/iniitiatives/deltaii.htm (Doc 3-9); The Boeing Company, "Delta" [and related web pages], 2002 (Doc 3-10); Fact Sheets (U), SMC/PA, AFSPC/PA, and HQ USAF/PA, "Delta II,"
(Doc 3-11).

[17] News Release (U), Office of the Assistant Secretary of Defense (Public Afffairs), "Contracts," 28 September 2000 (Doc 3-14); Monthly Activity Reports (U), SMC/CL, "Delta II Monthly Activity Report" [package of avilable FY 98-01 reports], October 1997-March 2001 (Doc 3-15). See especially portions of activity reports entitled "Delta (ACAT II—P/S)" (FOUO), 3 April 2000, 31 March 2001, 30 June 2001 (information used not FOUO).

The Delta II was heavily employed by both military and civilian payload organizations during this period (FY 1998-2001). It successfully launched eight military satellites. Six of these were GPS satellites provided by SMC's Global Positioning System Joint Program Office. On 23 February 1999, a Delta II 7920-10 successfully launched the Space Test Program's ARGOS satellite from Vandenberg AFB. On 18 May 2001, a Delta II 7925 vehicle successfully launched the GeoLITE experiment from Cape Canaveral AFS for the National Reconnaissance Office. Delta launches contributed to some additional significant milestones. On 5 November 1997, Delta II-249 successfully launched the last GPS Block IIA satellite. During 1999, the Delta set a new record for the largest number of satellites (both military and civilian) launched within the shortest period of time (68 days).[19]

Atlas

Atlas rockets had been used to launch space payloads since 18 December 1958. The first Atlas boosters were ICBMs, and excessed or retired Atlas ICBMs were used as space launchers for over 36 years. The last Atlas space launch to use a refurbished ICBM occurred on 24 March 1995. Over the years, the Atlas had also been modified into a wide variety of vehicles that were especially configured for space launches. During the period under consideration (FY 1998-2001), four recent varieties of Atlas boosters were used for space launches: the Atlas II, Atlas IIA, Atlas IIAS, and Atlas III. The prime contractor for all Atlas boosters during this period was Lockheed Martin Space Systems Company, which acquired General Dynamics, the original Atlas manufacturer, in December 1993. Some of the major subcontractors for the Atlas are listed below.[20]

- Rocketdyne: MA-5A booster and sustainer engines for Atlas IIA and IIAS
- Pratt & Whitney: liquid rocket engines for Centaur RL10A-4 upper stage
- Thiokol Propulsion Division of Cordant Technologies, Inc.: solid rocket motors for IIAS
- Honeywell: inertial navigation unit
- BF Goodrich: digital acquisition system
- NPO Energomash: RD-180 main engines for Atlas III
- SAAB: payload adapter separation systems
- Marconi Integrated Systems, Inc.: avionics boxes

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[18] Report (U), SMC/CL, "Launch Programs Monthly Acquisition Report, June 1998," 9 July 1998 (included in Doc 3-15); SMC/PK, List of New Contracts Issued During FY 1998-2001, attached to this history as Appendix I. The acquisition was funded by the National Reconnaissance Office.

[19] See Table 3-1 above. See also The Boeing Company, "Delta" [and related web pages], 2002 (Doc 3-10).

[20] Lockheed Martin, "Atlas Facts," copyright 2000, accessible at http://www.ast.lmco.com/ launch_atlasFacts.shtml on 11 March 2002 (Doc 3-16).

Like the older Atlas/Centaur boosters on which its design was based, the Atlas II launch vehicle was configured with a version of the Centaur upper stage.[21] The Atlas vehicle as a whole was modified by lengthening the propellant tanks a total of 12 feet, replacing the MA-5 main engines built by Rocketdyne with the larger MA-5A engines also built by Rocketdyne, eliminating the booster's vernier engines and substituting a roll-control module fueled by hydrazine, insulating the Centaur's tanks of cryogenic propellants (liquid hydrogen and liquid oxygen) with a fixed layer of foam, and improving the booster's avionics and guidance systems, pre-eminently by adding a technologically advanced inertial navigation unit. The unmodified, basic Atlas II could place a payload weighing 6,050 pounds into a geosynchronous transfer orbit.[22]

During the period under consideration, acquisition and launch of Atlas rockets was authorized by the Air Staff's Program Management Directives for Medium Launch Vehicles, which dealt with the acquisition programs known as MLV I, II, and III. The Atlas II was the product of a procurement originally known as the Medium Launch Vehicle II (MLV II), the earlier procurement of the Delta II being considered the MLV I, and the later procurement of the Delta II being considered the MLV III. The primary mission of the new vehicle was to place satellites of the Air Force's Defense Satellite Communications System (DSCS) and the Navy's UHF Follow-On (UFO) satellite system into their correct orbits. The program achieved initial launch capability from the east coast on 28 October 1991, when modifications to SLC-36A at Cape Canaveral AFS were completed. The first Atlas II vehicle was actually launched from SLC-36A on 10 February 1992.[23]

In 1995, SMC began using a further modification of the Atlas II known as the Atlas IIA, which had already begun to launch commercial satellites in 1992. The major difference was an upgraded RL-10 Pratt & Whitney engine for the Centaur upper

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[21] Standardized Atlas space boosters, built specifically for space application rather than as ICBMs, had been in use since the early 1960s. The Atlas/Centaur series was launched during 1962-1989. The Atlas I, a modification, was launched during 1990-1997. See Fact Sheets (U), Atlas/Centaur, Atlas I, and Atlas General Fact Sheets.

[22]Briefing Charts (U), SMC/CL (Maj Chuck Williamson) to SMC/CC, "Atlas Program Management Review," 30 October 2001; Fact Sheets (U), Atlas II Fact Sheets (Doc 3-17).

[23] Program Management Directive (FOUO), SAF/AQS, "PMD 2138(47)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 15 March 2000 (information used not FOUO) (Doc 3-1); Program Management Directive (FOUO), SAF/AQS, "PMD 2138(48)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 18 September 2001 (information used not FOUO) (Doc 3-2). The Navy used the last vehicle of the Atlas II configuration on 16 March 1998 to launch a UFO satellite. The Navy procured this launch through its own satellite contractor. For other information about Atlas launches, see Table 3-1 below.

Illustration 3-2: Atlas IIA Launch of DSCS III B-8 on 20 January 2000
(Photo Courtesy Lockheed Martin Corporation)

stage, allowing the Atlas IIA to place a payload of about 6,125 pounds into a geosynchronous ransfer orbit.[24] Lockheed Martin also developed—originally for the commercial market—another modification, known as the Atlas IIAS, that added four strap-on solid rocket motors, firing two at a time, to raise the vehicle's actual performance payload weight to geosynchronous orbit to about 8,075 pounds.[25] The first commercial payload for the IIAS was launched at the end of 1993.

As a result of the source selection known as MLV II, SMC awarded a firm-fixed-price contract (F04701-88-C-0042) for Atlas II launches to General Dynamics Corporation's Space Systems Division in June 1988. This contract covered the procurement and launch of nine Atlas II and IIA vehicles for Air Force payloads, primarily satellites of the Defense Satellite Communications System (DSCS). Two of these were primary vehicles, and seven were contractual options, all of which were exercised. The contract was originally scheduled to end in December 1997, but SMC extended the MLV II contract in March 1997 because DSCS satellites, which were one of the primary payloads for Atlas II, were lasting longer on orbit than expected. Some Atlas launches to replenish the DSCS constellation therefore were delayed. The contract now covered launches through the year 2000. The Atlas vehicles and associated hardware had to be stored, and the contractor's services at the launch site (SLC-36A) were reduced or changed until the required launch dates. The contract ended on 1 July 2000 with a final value of about $550 million.[26]

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[24] The Atlas IIA was therefore operating slightly above its required performance threshold of 6,025 pounds to geosynchronous transfer orbit. See Briefing Charts (U), SMC/CL (Maj Chuck Williamson) to SMC/CC, "Atlas Program Management Review," 30 October 2001. See also International Launch Services, "Atlas Launch System Mission Planner's Guide," December 1998 (filed in archives of SMC/HO); and International Launch Services, "Atlas Launch System Mission Planner's Guide," September 2001 (filed in archives of SMC/HO).

[25] The Atlas IIAS was therefore operating considerably above its required performance threshold of 7,000 pounds to geosynchronous transfer orbit. See Briefing Charts (U), SMC/CL (Maj Chuck Williamson) to SMC/CC, "Atlas Program Management Review," 30 October 2001. See also Lockheed Martin Fact Sheets (U), Atlas IIA and Atlas IIAS Fact Sheets (Doc 3-16); and Atlas mission planner's guides cited in note 24 above.

[26] Staff Summary Sheet (U), SMC/CLM to SMC/CC, "1999 Atlas Contractor Performance Assessment Reports," 29 November 1999, with attachments (FOUO) (information used not FOUO) (Doc 3-18); Staff Summary Sheet (U), SMC/CLM to SMC/CC, "Request Reviewing Official Signature for Atlas Program Contractor Performance Assessment Report (CPAR)," 18 February 1999, with attachment (FOUO) (information used not FOUO) (Doc 3-19); Briefing Charts (U), SMC/CL to SAF/AQ, "DAC Portfolio Review," 10 February 2000 (Doc 3-20).

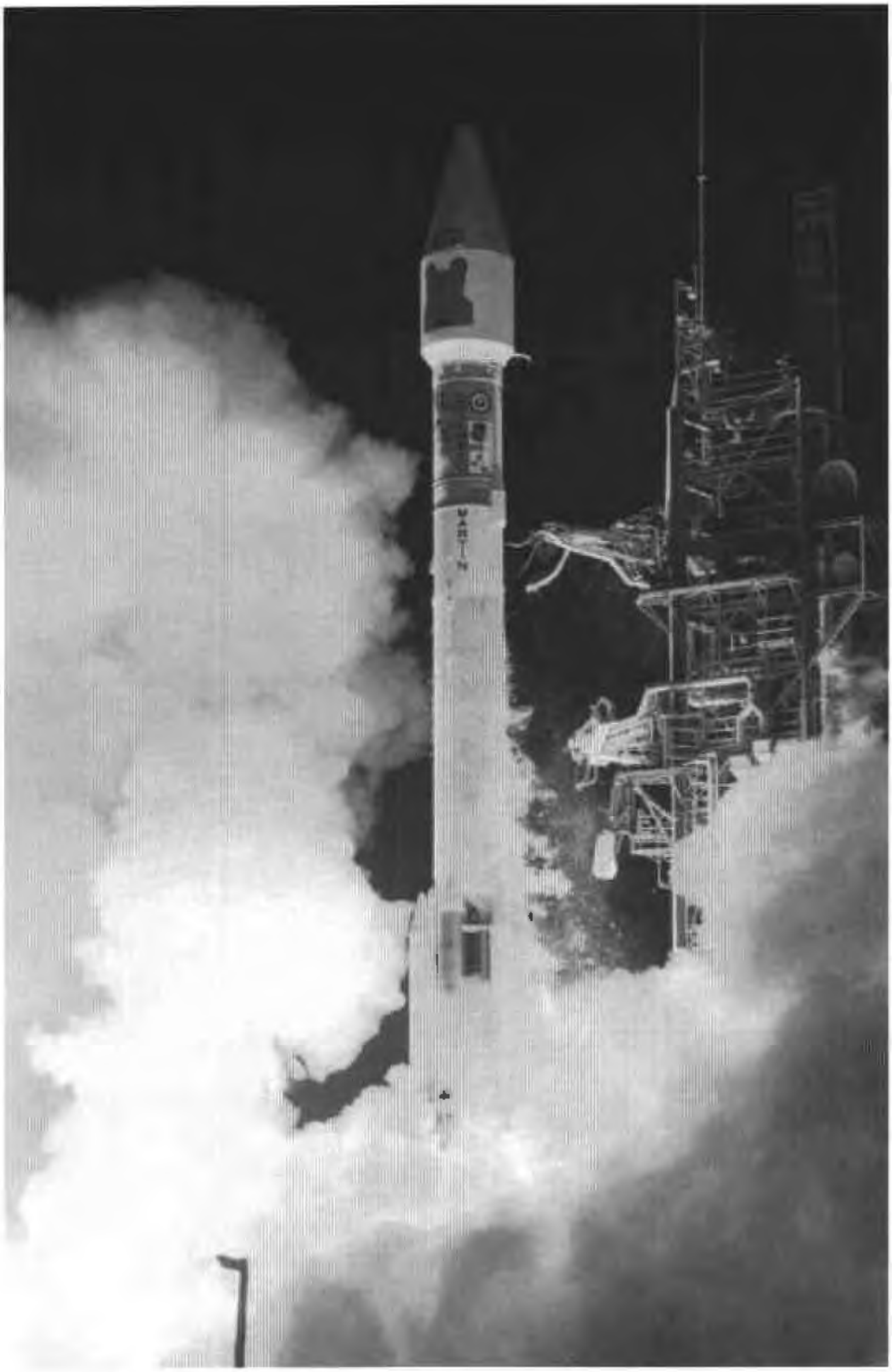

Illustration 3-3: Atlas IIAS Launch on 5 December 2000
(Photo Courtesy Lockheed Martin Corporation)

SMC also undertook a new procurement to add Atlas IIAS launches for DOD payloads from both Cape Canaveral AS and Vandenberg AFB beginning in 1998. Originally, the procurement was to consist of one firm Atlas IIAS launch with options for five more. During 1998, however, one of the options was dropped (see paragraphs below). The contract now covered five Atlas IIAS launch vehicles with associated storage, logistics, and management of non-commercial launches. Launches from Cape Canaveral would be conducted under commercial launch procedures, and launches from Vandenberg would be non-commercial. The actual launch operations at Vandenberg (that is, non-commercial launches), however, were removed from the provisions of the new contract and combined instead with the follow-on contract (F04701-95-C-0012) for Titan launch operations to form a new Launch Base Operations contract discussed below in the section dealing with the Titan IV. The new Atlas IIAS procurement contract (FO4701-96-C-0002) was awarded to Lockheed Martin Commercial Launch Services on 30 August 1996. The first and second DoD payloads for the IIAS—both of them classified spacecraft from the National Reconnaissance 0ffice (NRO)—were launched on 6 December 2000 (see Illustration 3-3) and 8 September 2001.[27]

In 1998 and 1999, SMC and the NRO both placed orders with Lockheed Martin for a newer type of Atlas booster known as the Atlas III. Lockheed Martin had developed it for the commercial market in two variations, known as the IIIA and the IIIB. Both of these variations departed from the traditional Atlas stage-and-a-balf configuration by using a more powerful, two-chamber liquid rocket engine known as the RD-180 as the single-stage main propulsion unit. The RD-180 engine was a throttleable engine using liquid oxygen and kerosene propellants. It was designed and built by the Russian firm of NPO Energomash. The Atlas IIIA used a new Centaur upper stage with dual RL-10A engines, and the Atlas IIIB used a new Centaur with a single RL-10Aengine. The Atlas IIIA was 170.2 feet in total length with a large payload fairing, and the IIIB was 174.2 feet in total length with a large payload fairing. Both retained the Atlas' traditional diameter of 10 feet. The Atlas IIIA could place a payload weighing 9,200 pounds into a geosynchronous transfer orbit, and the IIIB could do the same with a payload weighing 9,920 pounds.[28]

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[27] See Table 3-1 below. See also note 7 above and Staff Summary Sheet (U), SMC/CLM to SMC/CC, "Request Reviewing Official Signature for Atlas Program Contractor Performance Assessment Report (CPAR)," 27 January 1999, with attachment (FOUO) (information used not FOUO) (Doc 3-21).

[28] Lockheed Martin, "Atlas Facts," copyright 2000, accessible at http://www.ast.lmco.com/ launchatlasFacts.shtml on 11 March 2002; International Launch Services, "Atlas Launch System Mission Planner's Guide," September 2001 (filed in archives of SMC/HO); Briefing Charts (U), SMC/CL, "Atlas Program Management Review," 15 July 1999; Press Release (U), Lockheed Martin, "Lockheed Martin Unveils New Atlas III Launch Vehicle Family," 8 April 1998, accessible at http://www.lmco.com/ILS/ txtnews/n980408a.htm (Doc 3-22). The payload weights for the Atlas IIIA and IIIB in the last sentence of this paragraph were corrected from the weights provided in the original version of this history.

The six vehicles originally planned for procurement under the IIAS contract (FO4701-96-C-0002) were numbered MLV-10 through MLV-15. Early in 1998, the NRO notified SMC that it would not exercise the option for MLV-13. To replace MLV-13, the NRO entered directly (without SMC's involvement) into a commercial type of contract with Lockheed Martin to buy on-orbit delivery of its classified payload using an Atlas IIIA launch vehicle. The NRO's Atlas IIIA mission had not yet been launched at the end of FY 2001. However, the very first Atlas IIIA mission, a commercial launch of a satellite for the European Telecommunications Satellite Organization (Eutelsat), took place successfully at Cape Canaveral on 24 May 2000.[29]

SMC purchased the second Atlas III launch vehicle to be used for a military payload in February 1999, but it contracted for the more powerful configuration, the Atlas IIIB. SMC procured the new vehicle under the Atlas IIAS contract (F04701-96-C-0002) in place of MLV-15. Therefore, the contract still covered five vehicles (four Atlas II-AS and one Atlas IIIB). On 25 February 1999, SMC awarded the additional work to Lockheed Martin for an additional value of $70.7 million on the contract. At the end of September 2001, the Air Force's launch of its first Atlas IIIB was scheduled to take place in September 2003.[30]

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[29] Press Release (U), NRO, "National Reconnaissance Office Awards Launch Contract," 11 June 1998 (Doc 3-23); Press Release (U), Lockheed Martin, "NRO Selects Atlas III For Satellite Launch," 11 June 1998 (Doc 3-24); Internet Document (U), Lockheed Martin, "Launch Archives," no date [after 8 March 2002], accessible at http://www.ilslaunch.com/launches/prebody.html; Mark Wade, "Atlas IIIA," Encyclopedia Astronautica, accessible at http://www.astronautix.com/lvs/atlsiiia.htm.

[30] Press Release (U), OSD/PA, "Contracts: Air Force," 25 February 1999 (Doc 3-25); Briefing Charts (U), SMC/CL to SMC/CC, "SMC Launch Programs DAC Program Manager Review," 9 March 2000; Briefing Charts (U), SMC/CL to SMC/CC, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001; Monthly Activity Reports (FOUO), SMC/CL, "Atlas IIA/IIAS Monthly Activity Report" [package of available FY98-01 reports], October 1997 - June 2000 (information used not FOUO) (Doc 3-26).

Illustration 3-4: First Atlas III Launch, 24 May 2000
(Photo Courtesy Lockheed Martin Corporation)

Titan

Two major varieties of Titan launch vehicles were in use during FY 1998-2001: the Titan II and the Titan IV. Titan II launch vehicles were inactivated Titan II ICBMs, individually refurbished and modified to launch space payloads. They were capable of placing 4200 pounds into a low earth orbit and were therefore classed as medium launch vehicles. Titan IIs had been used during the 1960s as launch vehicles for the Gemini Program, but the most recent program to modify obsolete Titan II missiles had launched its first space payload in September 1988.

Lockheed Martin refurbished, modified, and launched the vehicles under SMC's contract F04701-85-C-0085. The seventh, eighth, ninth, and tenth launches of these Titan IIs took place during the period FY 1998-2001. The ninth launch successfully placed the first Block 5D-3 satellite (F-15) of SMC's Defense Meteorological Satellite Program into a nominal suborbital trajectory from which the Star 37S upper stage inserted the satellite into its correct operational orbit. The seventh and tenth launches successfully placed civilian weather satellites from the National Oceanic and Atmospheric Administration (NOAA) into their proper orbits. The seventh was the first time that NOAA used the Titan II. The eighth launch carried a satellite (QuickScat) for NASA to track ocean winds.[31]

As the reader may infer, the primary customers of the Titan II were meteorological satellites. However, the Air Staff's last official program directive for this period called for funding for Titan II launches to end on 30 September 2002. The remaining Titan II ICBMs would be returned to storage.[32] At the end of FY 2001, there were 38 Titan II first stages and 39 second stages in storage in the Aerospace Maintenance and Regeneration Center (AMARC) at Davis Monthan AFB, Arizona. The only existing plan

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[31] For further information about launches, see Table 3-1 earlier in this chapter. See also Fact Sheet (U), SMC/PA, "Titan II," March 1997 (Doc 3-27); Fact Sheet (U), National Security Space Road Map, "Titan II," 4 November 1997, http://fas.org/spp/military/program/nssrm/initiatives/titanii.htm (Doc 3-28); Mark Wade, "Titan II," Encyclopedia Astronautica, accessible from http://www.astronautix.com/ (Doc 3-29); Table (U), NASA, "Worldwide Space Launches" tables for 1998-2001, accessible from http://www.hq.nasa.gov/osf/.

[32] Program Management Directive (FOUO), SAF/AQ, "PMD 0938(8)/PE 35144F, Program Management Directive (PMD for Titan Space Launch Vehicle Program," 18 September 2001 (information used not FOUO) (Doc 3-30). See also Program Management Directive (FOUO), SAF/AQ, "PMD 0938(7)/PE 35144F, Program Management Directive (PMD for Titan Space Launch Vehicle Program," 15 March 2000 (information used not FOUO) (Doc 3-31).

for using the missiles was as spare parts for Lockheed Martin's Titan integrated logistics and Titan IV production contracts (see below).[33]

The Titan IV was the largest and most powerful expendable launch vehicle produced in the United States since the Saturn family of boosters used in the Apollo program. In design, it was fundamentally an enlargement of the Titan III (34)D vehicles, the last of which was launched in September 1989. Compared to the dimensions of the 34D, the Titan IV's first stage was a few feet longer (86.5 feet compared to 78.6 feet), its second stage was a little shorter (32.6 feet compared to 37.0 feet), its strap-on solid rocket motors were considerably longer (seven segments or 112.9 feet compared to five and a half segments or 90.4 feet), and its payload fairing was much wider (16.7 feet in diameter compared to 9.5 feet in diameter). In its original design, known as the Titan IVA, it was capable of placing 39,100 pounds into a low-Earth orbir from the Eastern Test Range without an upper stage, 10,000 pounds into geosynchronous orbit (22,300 nautical miles at the equator) using the Centaur upper stage, and 38,780 pounds into low earth orbit (5,200 nautical miles) using the Inertial Upper Stage. The Titan IVA was developed and manufactured by Lockheed Martin Corporation. The vehicle was launched from Cape Canaveral AFS's Launch Complexes 40 and 41 by the 5th Space Launch Squadron of Air Force Space Command's 45th Space Wing. It was launched from Vandenberg AFB's Space Launch Complex 4E by the 4th Space Launch Squadron of Space Command's 30th Space Wing. The first Titan IV launch took place on 14 June 1989 from Cape Canaveral, and its first launch with a Centaur upper stage took place on 7 February 1994 from Cape Canaveral.[34]

The Titan IVA was launched three more times during this period, all of them carrying classified payloads for the National Reconnaissance Office (NRO). The first two of these launches—on 24 October and 8 November 1997—helped to set a new record for the most rapid rate of Titan launches when added to the launch of NASA's Cassini mission on a Titan IVB on 15 October 1997.[35] Unfortunately, the last IVA launch, that of

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[33] Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

[34] Fact Sheet (U), SMC/PA, "Titan IV," September 1995 (Doc 3-32); Lockheed Martin, "Titan IV Facts," copyright 2000, accessible at http://www.ast.lmco.com/launch_titan.shtml on 11 March 2002 (Doc 3-33); National Security Space Road Map, "Titan IVA," 23 October 1997 (Doc 3-34); Mark Wade, "Titan 4," Encyclopedia Astronautica, accessible from http://www.astronautix.com/ (Doc 3-35).

[35] The new record, therefore, was three Titan launches within a span of only 23 days. See Howard Antelis, "Air Force Rewrites Record Book with Five Successful Payload Launches in 23 Days," *Astro News*, 14 November 1997, p. 1; "Three Launches in 23 Days Sets New Record," *Space and Missile Times*, 14 November 1997, p. 4. The first two of these launches, combined with an Atlas IIA launch on 25 October 1997, also contributed to a new record for rapidity of mixed vehicle launches: three launches within

Illustration 3-5: Attempted Launch of Titan IVB-27 on 9 April 1999
(Photo Courtesy of Lockheed Martin Corporation)

Titan IVA-20 on 12 August 1998, failed to reach orbit and was the first of the major launch vehicle failures which ultimately led to the Launch Broad Area Review (BAR). (For the Launch BAR, see the earlier section in this chapter.) Titan IVA-20 was destroyed by internal self-destruct mechanisms as well as the range safety officer's destruct command when it veered out of its planned trajectory. Investigators finally decided that the cause was electrical shorts in the wiring for the second stage power supply which affected the vehicle's guidance computer and inertial measurement unit. The root cause of the electrical shorts was nicks in the wire harness. There were no more scheduled launches of the Titan IVA after this one.[36]

SMC and Lockheed Martin also developed an upgraded version of the Titan IV known as the Titan IVB. Using the lighter and more powerful solid-rocket motors developed by the Solid-Rocket Motor Upgrade (SRMU) program, the Titan IVB used with a Centaur could place 12,700 pounds into geosynchronous orbit. The IVB also featured improved guidance and avionics as well as shorter processing times. The first Titan IVB successfully launched a satellite for SMC's Defense Support Program on 23 February 1997 from Cape Canaveral.[37]

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10 days. See Howard Antelis, "Launch Programs Helps Meet Hectic Spacelift Schedule," *Astro News*, 31 October 1997, p. 1.

[36] "Remarks by Maj Gen Robert C. Hinson, Accident Investigation Board President" at Press Conference, Cape Canaveral AS, Florida, 2 September 1998, available at http://www.fas.org/spp/military/program/ launch/nr98-09-02.htm (Doc 3-40); "Titan IVA-20 Accident Investigation Board Summary," 15 January 1999, available at http://www.fas.org/spp/military/program/launch/titan_iv-20_sum.htm (Doc 3-41); Janene Scully, "Report: Frayed Wire Led to Billion-Dollar Titan 4A Mishap," Los Angeles Times, 16 January 1999 (Doc 3-42); David Atkinson, "Air Force Blames Titan IVA Explosion on Faulty Wiring," Defense Daily, 19 January 1999 (Doc 3-43); Air Force News Service, "Titan IVA-20 Accident Investigation Board Releases Results," 19 January 1999 (Doc 3-44); Air Force News Service, "Air Force Clears Way for Titan Rockets to Return to Flight," 2 February 1999 (Doc 3-45); E-mail, William M. Evans to SMC Directors, et
al., "RE: CSAF/SecAF Media Breakfast – 26 Apr 99," 21 April 1999, with attachment (Briefing Charts: "What is the status of the Titan IV A-20 failure investigation and its impact on the Titan program? (AQS)")
(Doc 3-46). See also remarks written by the program office for a review of this history during March 2005: "The root cause of the failure was nicks in the wire harness. This condition impacted the guidance system, but the guidance system was not the root cause."

[37] Fact Sheet (U), SMC/PA, "Titan IVB Launch Vehicle," April 1999 (Doc 3-36); Fact Sheet (U), SAF/PA, "Titan IV Expendable Launch Vehicle," 20 July 2001 (Doc 3-37); Fact Sheet (U), SAF/PA, "Titan IVB," March 2002 (Doc 3-38); National Security Space Road Map, "Titan IVB," 12 July 1999 (Doc 3-39).

Nine more Titan IVBs were launched during FY 1998-2001, and all but one of these (NASA's Cassini mission to Saturn) carried DoD payloads: three classified payloads for the National Reconnaissance Office (NRO), three for SMC's Defense Support Program (DSP), and two for SMC's Milstar satellite communications program. Unfortunately, the DSP launch attempt on 9 April 1999 and the Milstar launch attempt on 30 April 1999 were failures that led directly to the Launch Broad Area Review of 1999. Ultimately, both failures were attributed to the upper stages rather than the Titan IVB's core stages. The launch failure involving DSP 19 on 9 April 1999 was caused by the failure of the second stage of the Inertial Upper Stage (IUS) to separate from its first stage. The launch anomaly of 30 April 1999, which placed the Milstar II F-1 satellite into an unusable orbit, was caused by software errors in the Centaur upper stage.[38]

SMC (then called Space Division) awarded the development contract (F04701-85-C-0019) for the Titan IV to Martin Marietta Denver Aerospace on 28 February 1985. Beginning in 1989, the contract also provided for the production of 41 Titan IV vehicles. However, it was restructured in 1993 because of declining launch requirements and the resulting necessity of slowing down the rate of production and stretching out the period of production. In 1996, the program office carried out a sweeping contractual restructuring intended to achieve efficiencies by combining the Titan II and Titan IV contracts and dividing the contractor's responsibilities by function. SMC closed out the original development and production contract and phased in a new contract with Lockheed Martin (F04701-95-C-0012) for Titan II and IV launch operations and integrated logistics. The Center awarded a new contract (F04701-96-C-0001) for production and a new contract (F04701-96-C-0035) covering new research and development as well as resolution of major anomalies to Lockheed Martin. Finally, it awarded a new Unified Payload Integration Follow-on (UPIF) contract (F04701-98-C-0005) for Titan II and IV payloads on 1 October 1997. (For a description of these contracts as of October 2001, see the table below.)[39]

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[38] For the Launch Broad Area Review, see the section with that title earlier in this Titan section. For more details about Titan launches and failures, see Table 3-1 and Table 3-2 earlier in this section. For published details about launch failures, see Marc Strass, "Next Titan IVB Launch Hits Snag Due to Flight Stability Concerns," Defense Daily, 9 November 1999 (Doc 3-47); "Milstar Accident Board Results," Astro News, 30 July 1999, p.4 (Doc 3-48); "Lockheed May Face Penalty Over Launch," Baltimore Sun, 23 July 1999 (Doc 3-49); Aaron Renenger, "Wayward Milstar II Satellite Challenges SMC Controllers," Astro News, 2 July 1999, p. 1 (Doc 3-50); "Milstar Launch a Mission Failure," Astro News, 7 May 1999, p. 1 (Doc 3-51).

[39] History of SMC, October 1994-September 1997, p. 40; Briefing Charts (U), SMC/CL to SMC/CC, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

Table 3-3
Titan Contracts in Effect During October 1997 – September 2001[40]

Contract	Contractor	Period	Value	Purpose
F04701-96-C-0001	Lockheed Martin Co.	1 Oct 95 – 30 Sep 02	$2.7 B	Titan IV production, storage, final assembly
F04701-95-C-0012	Lockheed Martin Co.	1 Oct 95 – 30 Sep 02	$2.0 B	Titan launch operations, integrated logistics
F04701-96-C-0035	Lockheed Martin Co.	1 Jul 96 – 30 Sep 02	$255 M	Research and development, studies, anomalies
F04701-98-C-0005	Lockheed Martin Co.	1 Oct 97 – 30 Sep 02	$321 M	Payload Integration Follow-on

The new Titan contracts were based on production of only 40 Titan core vehicles and the actual launching of only 39 missions. Program management direction from the Air Staff continued to specify that remaining Titan IVB launches would be limited to 39 launches, and that subsequent payloads in the Titan IV class would move to the Evolved Expendable Launch Vehicle (EELV—see below). At the end of September 2001, SMC was planning to complete the assembly of the last Titan IVB core vehicles by April 2002. Seven potential missions remained. They consisted of four launches for the National Reconnaissance Office (NRO), two launches of SMC's Milstar communications satellites, and one launch for SMC's Defense Support Program (DSP).[41]

Inertial Upper Stage and Centaur

Two varieties of upper stages were used with the Titan IV to transfer payloads to higher orbits: the Centaur and the Inertial Upper Stage (IUS). The Centaur upper stage was used in fourteen launches of military payloads during FY 1998 – 2001. In nine of those launches it was used with an Atlas II or IIA, and in five it was used with a Titan IVA or IVB. However, it was considered to be the cause of failure in the attempted launch of Milstar II F-1 on 30 April 1999. The IUS was used in three Titan launches of

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[40] Briefing Charts (U), SMC/CL, "DAC Portfolio Review," 10 February 2000; Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

[41] Program Management Directive (FOUO), SAF/AQ, "PMD 0938(8)/PE 35144F, Program Management Directive (PMD for Titan Space Launch Vehicle Program," 18 September 2001 (information used not FOUO) (Doc 3-30); Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

military payloads during that period, and it was considered to be the cause of failure in the attempted launch of DSP F-19 on 9 April 1999.[42]

The Centaur was manufactured by Lockheed Martin under its Titan and Atlas production contracts. Each Centaur was driven by two RL10 liquid rocket engines manufactured by Pratt and Whitney. These engines used liquid hydrogen and liquid oxygen as propellant and were capable of multiple restarts in space. Earlier versions of the Centaur were used on Atlas and Titan boosters, and newer versions were used with the Atlas II and Titan IV boosters. The Centaur configurations used with the Atlas II were called Centaur II and IIA, and the configuration used with the Titan IV was called the Titan IV Centaur. Their characteristics are given in the table below.[43]

Table 3-4
Types of Centaur Upper Stages In Use During October 1997 – September 2001[44]

Configuration	Length	Diameter	Engines	Total Thrust
Centaur II	33 feet	10 feet	two RL 10A-3A	41,000 pounds
Centaur IIA and IIAS	33 feet	10 feet	two RL 10A-4-1	44,600 pounds
Titan IV Centaur	29.1 feet	14.2 feet	two RL 10A-4 or two RL 10A-4-1	41,600 pounds 44,600 pounds

The IUS could be used as an upper stage on either the Titan IV or the Space Shuttle. It was a two-stage, solid propellant vehicle manufactured by Boeing Space and Communications. The solid motors were manufactured by Chemical Systems Division and developed thrusts of 45,600 lbs (first stage) and 18,500 lbs (second stage). It was capable of placing payloads weighing up to 5,300 pounds into geosynchronous orbit from either the Titan IV or the Space Shuttle. It featured totally redundant avionics and was therefore considered one of the most reliable space vehicles ever developed. Unfortunately, it failed to deliver its payload to a useable orbit on 9 April 1999, when its first and second stages failed to separate properly. Fortunately, it successfully launched

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[42] See the section entitled Launch Broad Area Review earlier in this chapter. See also Table 3-1 earlier in this chapter.

[43] National Security Space Road Map, "Inertial Upper Stage (IUS)" (U), accessible at http://fas.org/spp/ military/program/nssrm/initiatiatives/ius.htm on 30 May 2002; Fact Sheet (U), SMC/CL, "Titan IV Centaur Upper Stage," accessible at http://www.laafb.af.mil/SMC/CL/cltcent.htm on 1 February 1999.

[44] See note above.

the next two DSP satellites, F-20 and F-21, from Titan IVB boosters on 8 May 2000 and 6 August 2001.[45]

Table 3-5
IUS Contracts in Effect During October 1997 – September 2001[46]

Contract	Contractor	Period	Value	Purpose
F04701-91-C-0011	Boeing Co.	1 Oct 91 – 31 Dec 99	$191.3 M	Fourth IUS production contract (23 vehicles)
F04701-97-C-0004	Boeing Co.	1 Jul 97 – 30 Sep 03	$207.7 M	IUS Integration and launch support
F04701-97-C-0038	Lockheed Martin Co.	1 Jun 97 – 31 Dec 01	$12.8 M	Independent validation and verification

Contractual activity in the IUS program during this period was primarily involved with closing out the last production cycle, integration, and launch activity. The fourth and last IUS production contract (F04701-91-C-0011) was closed out at the end of 1999 after producing 23 IUS vehicles. After the launch of DSP F-21 on 6 August 2001, only two IUS vehicles remained in the inventory. One of these (IUS-10) was scheduled to launch another DSP satellite in 2003. The remaining one (IUS-23) was requested by NASA for an interplanetary mission, but it might be needed for yet another DSP satellite. In 1999, the Air Staff placed all of the remaining funding for the IUS under the Titan program element, and the IUS was thereafter managed by the Titan program office.[47]

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[45] See Table 3-1 earlier in this chapter. See also Fact Sheet (U), USAF, "The Inertial Upper Stage," 20 July 2001; Fact Sheet, SMC/CL, "Titan IV Inertial Upper Stage (IUS)," accessible at http://www.laafb.af.mil/ SMC/CL/cltius.htm on 1 February 1999; Fact Sheet (U), Boeing Space Systems, "Inertial Upper Stage," accessible at http://ww.boeing.com/defense-space/space/ius/ on 22 September 1998.

[46] Briefing Charts (U), SMC/CL, "DAC Portfolio Review," 10 February 2000 (Doc 3-20); Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

[47] Staff Summary Sheet (U), SMC/CLTO to SMC/CV, "IUS-23 Requirements From NASA," 18 August 1999, with attachment (Doc 3-52); Briefing Charts (U), SMC/CLTO, "Program Management Review: Inertial Upper Stage," 22 September 1999; FY98 USAF Military Space RDDS, "0305138F Upper Stage Space Vehicles (Space)," accessible at http://www.fas.org/spp/military/budget/peds_98f/0305138f.htm on 1 February 1999; Briefing Charts (U), SMC/CL, "DAC Portfolio Review," 10 February 2000; Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

CHAPTER 4

EVOLVED EXPENDABLE LAUNCH VEHICLE (EELV) PROGRAM

The National Defense Authorization Act for Fiscal Year 1994 directed the Secretary of Defense to develop and submit to Congress a plan for the "modernization of space launch capabilities for the Department of Defense (DoD) or, if appropriate, for the government as a whole." In response, the Air Force initiated the Space Launch Modernization Plan, commonly known as the "Moorman Study," which identified options for modernizing the current fleet of expendable launch vehicles, milestones for each option, and associated development and operations costs.[1] President Clinton issued a National Space Transportation Policy on 5 August 1994, based on one of those options. It directed that "the Department of Defense will be the launch agent for the national security sector and will maintain the capability to evolve and operate those space transportation systems, infrastructure, and support activities necessary to meet national security requirements."[2] DoD's objective was to improve and evolve current expendable launch vehicles to reduce costs while improving reliability, operability, responsiveness, and safety.[3]

EELV Acquisition

The initial phase of the EELV program was known as Low Cost Concept Validation (LCCV). For this first phase, SMC awarded four 15-month study contracts, each with a face value of $30 million, for preliminary design, trade analyses, and risk reduction demonstrations of an EELV concept. (See table 4-2 below.) The first phase

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[1] DoD, "Space Launch Modernization Plan: Executive Summary," April 1994 (SMC historical archives).

[2] National Science and Technology Council, "National Space Transportation Policy (NSTC-4)," signed by William J. Clinton, President of the United States, 5 August 1994, http://www.au.af.mil/au/awc/awcgate/ nstc4.htm.

[3] History of SMC (U), 1994-1997, pp. 45-50. For other descriptions of the program's goals, see Program Management Directive (FOUO), SAF/AQ, "Program Management Directive (PMD) for the Evolved Expendable Launch Vehicle (EELV) Program," 30 May 2000 (information used is not FOUO) (Doc 4-2); SMC/MV, "EELV Strategic Plan," November 2000, http://www.losangeles.af.mil/SMC/MV/eelvhome. htm (Doc 4-3); Fact Sheets (FOUO), Office of the National Security Space Architect, "Evolved Expendable Launch Vehicle (EELV) Medium Lift Vehicle (MLV)," 24 September 1997, and "Evolved Expendable Launch Vehicle (EELV) Heavy Lift Vehicle (HLV)," 24 September 1997, accessible from http://www.wslfweb.org/docs/roadmap/irm/initlist. htm (information used is not FOUO) (Doc 4-4); Fact Sheet (U), AFSPC/PA, "Evolved Expendable Launch Vehicle," no date [2000] (Doc 4-6); Peter L. Portanova (Doc 4-4); Fact Sheet (U), SMC/PA, "Evolved Expendable Launch Vehicle," October 1998 (Doc 4-5); Peter L. Portanova (Aerospace Corporation), "Evolved Expendable Launch Vehicles (EELV)," no date [October 2001] (Doc 4-7).

was successfully completed in November 1996. After receiving Milestone I approval from the Defense Acquisition Executive in November 1996, SMC awarded two 17-month Pre-Engineering and Manufacturing Development (Pre-EMD) contracts for the second phase on 20 December 1996, one to Lockheed Martin and the other to McDonnell Douglas. (McDonnell Douglas was later acquired by The Boeing Company.) Each contract was valued at $60 million. This phase involved refining the concepts developed in Phase One, producing detailed system designs, and preparing for the next phase, Engineering and Manufacturing Development (EMD).[4]

The original acquisition strategy called for awarding one cost-type contract for EMD, worth about $1.6 billion, to the winner of the Pre-EMD competition. During the third and final phase, the winning contractor would complete full-scale engineering and development, leading up to two demonstration flights. The medium-lift EELV was to have a first launch in 2001, and the heavy-lift EELV was to be launched in 2003. The EELV was to reach full operational capability (FOC) in 2004.[5]

In 1997, representatives of the Air Force, the Department of Transportation, and private industry conducted a six-month cooperative review of the program's objectives and the potential market. The review found that the commercial satellite market was projected to grow much faster than had been expected when the EELV's acquisition plan was written early in 1995, based on the recommendations of the SLMP. Instead of dominating the launch market during the EELV's first decade of operation, government payloads would be outnumbered by commercial payloads at an estimated ratio of three to one. The U.S. market, therefore, would be large enough to support two EELV providers instead of one. Those providers could diversify their customer base and be competitive in the international market place by capitalizing on their EELV development efforts with the same government investment that was originally planned for just one.[6]

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[4] History of SMC (U), 1994-1997, pp. 48-49.

[5] History of SMC (U), 1994-1997, pp. 49-50.

[6] Peter L. Portanova (Aerospace Corporation), "Evolved Expendable Launch Vehicles (EELV)," no date [October 2001] (Doc 4-7); News Release, SAF/PA, "New Acquisition Strategy for Evolved Expendable Launch Vehicle," 6 November 1997 (Doc 4-9); Chet DelSignore, "New EELV Strategy: A Significant Change," Astron News, 26 November 1997; SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc 4-10); Col Richard W. McKinney, Peter L. Portanova, et al., "EELV Meets CAIV," Aerospace America, May 1999, pp. 68-74 (Doc 4-11); R.W. McKinney, P.L. Portanova, et al., "Evolved Expendable Launch Vehicle: The Competitive New Launcher," 49th International Astronautical Congress, September 28-October 2 (Doc 4-12); J Knauf, L. Drake, and P. Portanova, "Evolved Expendable Launch Vehicle System: The Next Step in Affordable Space Transportation," 52nd International Astronautical Congress, 1-5 October 2001 (Doc 4-13).

The EELV Program Office was thus in a position to negotiate and place both Boeing and Lockheed Martin under contract for a lower combined price than it had originally estimated for only one contractor. By developing two EELV systems, the government would be able to maintain competition and obtain lower individual launch costs throughout the program's life cycle. This new approach was anticipated to reduce the government's overall launch costs by 25 percent or more. In addition, DoD could simply buy launch services from the contractors without ever having to acquire the hardware.[7] The program office contrasted the original and new acquisition strategies as in table 4-1.

Table 4-1
Change in Acquisition Strategy for EELV EMD Phase[8]

1995 Strategy	1997 Strategy
Cost-type contract for EMD phase	Fixed government investment for development in addition to contractor investment
Two system flight tests	No system flight tests
Down-select to one contractor for EMD phase	Two contractors compete over the life of the program
Government pays for production effort	Government pays for launch services only

The innovative features and mutual advantages of this procurement were striking. The EELV Program Office and its contracting contingent won several prestigious acquisition and technical awards for their work. The awards included the 1998 John Welch Award for Excellence in Acquisition Management, the 1998 Secretary of the Air Force and Air Force Materiel Command Strategic Acquisition Reform Awards for Contracting Excellence, the 1999 Defense Standardization Program National Honorary

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[7] Briefing Charts (U), SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Program Overview," 20 November 1997 (Doc 4-8a); Briefing Charts (U), "Evolved Expendable Launch Vehicle (EELV) Briefing to 1998 National Space Symposium, Catching a Ride to Orbit Session," no date [1998] (Doc 4-8b); Peter L. Portanova (Aerospace Corporation), "Evolved Expendable Launch Vehicles (EELV)," no date [October 2001] (Doc 4-7); News Release, SAF/PA, "New Acquisition Strategy for Evolved Expendable Launch Vehicle," 6 November 1997 (Doc 4-9); SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc 4-10).

[8] Briefing Charts (U), SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Program Overview," 20 November 1997 (Doc 4-7); Briefing Charts (U), "Evolved Expendable Launch Vehicle (EELV) Briefing to 1998 National Space Symposium, Catching a Ride to Orbit Session," no date [1998] (Doc 4-8).

Award, the 1999 David Packard Excellence in Acquisition Award, the 1999 DOD Value Engineering Achievement Award, and many others.[9]

The acting Under Secretary of Defense for Acquisition and Technology, Noel Longuemare, approved the new acquisition strategy on 3 November 1997.[10] Boeing and Lockheed Martin completed the Pre-EMD contracts in May 1998. SMC filed the required Final Environmental Impact Statement for the EELV with the Environmental Protection Agency on 1 May 1998, and the Air Force's Assistant Secretary for Science, Engineering and Technology signed a Record of Decision on 8 June 1998 that permitted the development and launch of both contractors' proposed vehicles. SMC issued a final request for proposals (F04701-97-R-0008) on 14 July 1998. On 16 October 1998, SMC awarded four EELV Federal Acquisition Regulation (FAR) Part 12 commercial-type contracts, two development agreements, called Other Transaction Agreements (OTA), and two contracts for the Initial Launch Services (ILS). They are described at the bottom of Table 4-2.[11]

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[9] SMC/MV, "Evolved Expendable Launch Vehicle System Program Office Achievements," no date, accessible at http://www.losangeles.af.mil/SMC/MV/intro_files/public/awards/ awards.htm on 5 July 2002; SSgt Jeff Capenos, "EELV Garners Air Force Awards," Astro News, 18 June 1999, p. 1; News Release, SMC/PA (1st Lt Tonya Summerall), "EELV Program Saves Billions, Honored With Top Award," 3 July 2000, accessible at http://www.af.mil/news/Jul2000/n20000703_001010.html on 12 July 2002; Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives).

[10] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc 4-10); News Release, SAF/PA, "New Acquisition Strategy for Evolved Expendable Launch Vehicle," 6 November 1997 (Doc 4-9); Chet DelSignore, "New EELV Strategy: A Significant Change," Astro News, 26 November 1997.

[11] Memo (U), SMC/MVK to All Potential Offerors, "RFP F04701-97-R-0008, Request for Proposal (RFP) F04701-97-R-0008, Evolved Expendable Launch Vehicle (EELV) – Development and Initial Launch Services (ILS) Amendment 0003," 14 July 1998, with attachment; News Release, SMC/PA, "EELV Gets the Environmental Green Light," 8 June 1998 (Doc 4-14); Record of Decision, Air Force Acting Deputy Assistant Secretary (Science, Technology and Engineering), "Evolved Expendable Launch Vehicle (EELV)," 8 June 1998 (Doc 4-15); Finding of No Practicable Alternative, Deputy Assistant Secretary of the Air Force (Environmental, Safety and Occupational Health), "Evolved Expendable Launch Vehicle Program," 10 June 1998 (Doc 4-16); Final Environmental Impact Statement, HQ USAF/ILEVP, "Evolved Expendable Launch Vehicle Program," 30 April 1998.

Table 4-2
Major EELV Contracts Through FY 2001[12]

Contractor	Contract	Award Date	End Date at Award	Value at Award
Preliminary Design, Trade Analyses, and Risk Reduction				
Alliant Techsystems, Inc.	F04701-95-C-0032	24 Aug 1995	6 Feb 1997	$30 M
The Boeing Company	F04701-95-C-0033	24 Aug 1995	10 Jun 1997	$30 M
Lockheed Martin Corp.	F04701-95-C-0034	24 Aug 1995	24 Nov 1996	$30 M
McDonnell Douglas Corp.	F04701-95-C-0035	24 Aug 1995	17 Jan 1997	$30 M
Pre-Engineering and Manufacturing Development				
Lockheed Martin Corp.	F04701-97-C-0003	20 Dec 1996	May 1998	$60 M
McDonnell Douglas Corp.	F04701-97-C-0005	20 Dec 1996	May 1998	$60 M
Engineering and Manufacturing Development				
Lockheed Martin Corp.	F04701-98-9-0004	16 Oct 1998	30 Sep 2002	$500 M
The Boeing Company	F04701-98-9-0005	16 Oct 1998	30 Sep 2002	$500 M
Initial Launch Services				
Lockheed Martin Corp.	F04701-98-D-0001	16 Oct 1998	30 Sep 2006	$649 M
Boeing Launch Services	F04701-98-D-0002	16 Oct 1998	30 Sep 2006	$1,378 M

The OTA contracts, which awarded $500 million each to both Boeing and Lockheed Martin for the EMD phase, required each contractor to make large capital investments which they were expected to recover in profits from launch services for both DoD and commercial companies. Launch services were awarded to the ILS contractors competitively for launches expected during the period FY 1999-FY 2006. Boeing's Delta IV launch vehicle won 19 missions worth $1.38 billion, while Lockheed Martin's Atlas V won 9 missions worth $650 million. Additional competitions would be held for future government payloads.

The OTA contracts included the key performance parameters and other operational requirements laid out by Air Force Space Command in its Operational Requirements Document (ORD) of 15 September 1998, the most important features of which are reproduced in table 4-3.

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[12] Office of Assistant Secretary of Defense (Public Affairs), news releases dealing with contracts, 18 May 1998 (No. 685-96), 18 May 1998 (No. 469-95), 6 April 1998 (No. 054-M), 16 October 1998 (No. 538-98), 16 October 1998 (No. 536-98), 13 December 2000 (No. 742-00), 14 December 2000 (No. 745-00), accessible at http://www.defenselink.mil/news/archive.html (Doc 4-1).

Table 4-3
EELV Operational Requirements Document of 15 September 1998[13]

REQUIREMENT	THRESHOLD	OBJECTIVE
MASS TO LEO*	17,000 LBS	+15%
MASS TO POLAR 1*	4,400-7,000 LBS	+15%
MASS TO POLAR 2*	41,000 LBS	+5%
MASS TO SEMI-SYNC*	2,500-4,725 LBS	+15%
MASS TO GTO*	6,100-8,500 LBS	+15%
MASS TO MOLNIYA*	7,000 LBS	+15%
MASS TO GEO*	13,500 LBS	+5%
VEHICLE DESIGN RELIABILITY *	98%	>98%
STANDARD LAUNCH PADS*	ABLE TO LAUNCH ALL CONFIGURATIONS	SAME
STANDARD PAYLOAD INTERFACE *	STANDARD PAYLOAD INTERFACE FOR EACH VEHICLE CLASS	ONE STANDARD PAYLOAD INTERFACE
COST SAVINGS: REDUCTION OVER CURRENT SYSTEMS	25%	50%
TIMELINESS: PROBABILITY OF LAUNCH WITHIN 10 DAYS	80%	90%
RESPONSIVENESS	45 DAYS (MLV) 90 DAYS (HLV)	30 DAYS (MLV) 60 DAYS (HLV)
LAUNCH RATE DURING A 12 MONTH PERIOD	14	26

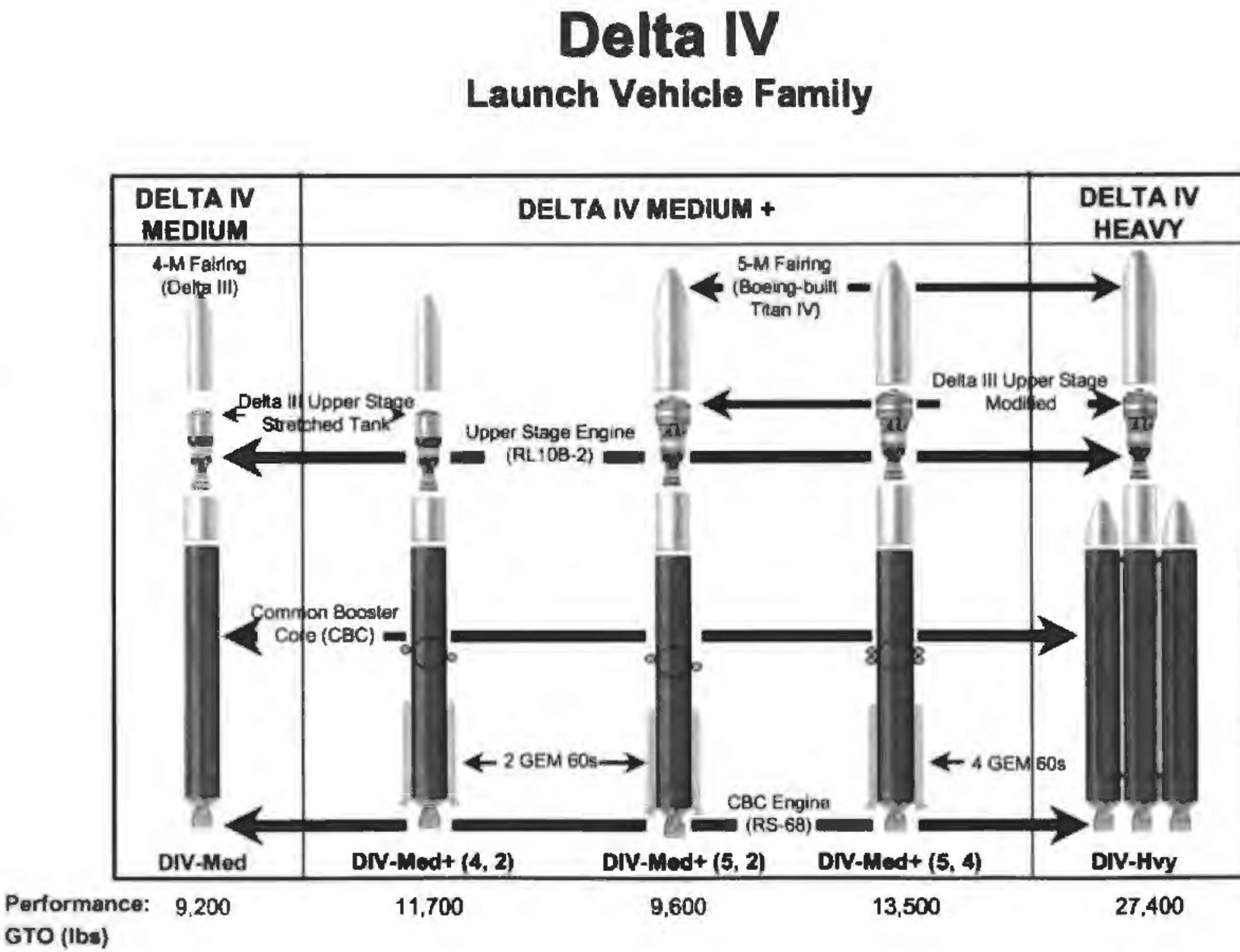
* DENOTES KEY PERFORMANCE PARAMETERS

EELV Configurations

Both contractors originally planned to develop a small-, medium-, and heavy-lift version of their EELVs in response to SMC's mission requirements as identified in the request for proposals for the OTA and ILS contracts. These original concepts would have used common core liquid boosters to meet all the government mission requirements and no solid-rocket motors for government launches, although Boeing's concept included small solid-rocket motors for some commercial launches. However, between October

[13] AFSPC/DRSV, "Air Force Space Command Operational Requirements Document (ORD) II, AFSPC 002-93-II, for the Evolved Expendable Launch Vehicle (EELV) System," 15 September 1998, SMC historical archives.

Illustration 4-1
Delta IV EELV Family of Vehicles as of June 2000



Atlas V

System Capability

	400	500	500	500	500	500	500	Heavy
GTO	11.0	9.0	10.8	13.2	15.2	16.7	18.0	29.0
GSO	–	3.3	3.9	4.9	6.6	7.5	8.2	14.0
LEO Polar[2]	20.0[1]	20.0	22.5	26.1	32.2	35.0	37.4	42.0[1]

1 - Additional Capability with Mission Unique Accommodations up to 23,700lb on 402, 53,000 on HLV
2 - DEC except HLV

Illustration 4-2
Atlas V EELV Family of Vehicles as of June 2000

1998 and April 1999, both contractors proposed adding large solid-rocket auxiliary motors to their medium-lift core vehicles to create an intermediate (also referred to as a "medium-plus") class of EELVs, and to eliminate the need for a small system. These proposals responded to forecast increasing demand for launch vehicles in this payload range from both the commercial and government sectors. The augmented versions of the medium-lift vehicles would enhance flexibility and be less expensive than the heavy-lift versions. Environmental studies for EELV had been based on the earlier concepts; therefore additional studies were conducted, and the results were published in a supplemental environmental impact statement in March 2000. The Air Force Associate Deputy Assistant Secretary for Acquisition signed the Record of Decision on 25 May 2000, approving the addition of up to five solid rocket motors on the Atlas V medium-lift and Delta IV medium-lift vehicles. By early 2000, therefore, the new concepts and their capabilities looked like illustrations 4-1 and 4-2.[14]

DELTA IV

Boeing's concept for the Delta IV family of launch vehicles used a first-stage common booster core (CBC) and a cryogenic second-stage for each configuration. The CBC was 16.4 feet in diameter and about 173 feet in length. It included a structurally stable airframe, propellant tanks, and a main engine known as the RS-68. The RS-68 was a new engine developed and manufactured by Rocketdyne, now a division of The Boeing Company. The engine, based on Rocketdyne's Space Shuttle expertise, used liquid hydrogen and liquid oxygen to produce a thrust of 650,000 pounds. Rocketdyne had designed it to be environmentally friendly (producing few waste products besides water), easier to manufacture with fewer parts, and 30 percent more efficient than the liquid oxygen and kerosene engines used in earlier Delta vehicles.[15]

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[14] SMC/MV, "Final Supplemental Environmental Impact Statement for the Evolved Expendable Launch Vehicle Program," March 2000, accessible from http://ax.losangeles.af.mil/axf/eaapgs/eis.htm on 1 July 2002; Record of Decision, HQ USAF/AQR, "Final Supplemental Environmental Impact Statement (FSEIS) for the Evolved Expendable Launch Vehicle (EELV), May 2000," signed 25 May 2000 (Doc 4-20); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives).

[15] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc IV-10); Boeing Launch Services, "Delta IV Launch Vehicles" and associated world-wide web pages, copyright 2002, accessible from http://www.boeing.com/defense-space/space/delta/delta4/ delta4.htm on 2 July 2002 (Doc IV-21); Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000; The Boeing Company, "Delta IV Payload Planner's Guide," October 2000 (SMC historical archives).

The Delta IV medium-lift configuration consisted of one CBC plus a second-stage, payload accommodations, and payload fairing. The second-stage engine for the medium-lift and medium-plus versions of the Delta IV was Pratt & Whitney's restartable RL-10B-2 cryogenic liquid oxygen/liquid hydrogen engine—the same engine used in the second-stage of the Delta III, but with longer fuel tanks. (It was a variant of the RL-10 engine used in the Centaur upper stage for Titan IV and Atlas systems.) The RL-10B-2 could produce a thrust of 24,750 pounds for 700 seconds. Together, the first- and second-stages of the medium-lift configuration could place a payload of about 9,200 pounds into a geosynchronous transfer orbit (GTO). The payload fairing was 13.1 feet in diameter.[16]

By the year 2000, Boeing was developing three configurations of the medium-plus Delta IV, distinguished primarily by the number of solid-rocket motors employed at liftoff. Boeing referred to these motors as graphite-epoxy motors (GEMs). The first medium-plus variant employed a 4-meter (13.1-foot) diameter payload fairing with two GEMs, and hence was designated the "Delta IV medium-plus 4,2." It could place a payload weighing about 11,700 pounds into GTO. The second variant employed a 5-meter (16.7-foot) fairing with 2 GEMs and was designated the "5,2." It could launch 9,600 pounds to GTO. The third variant employed a 5-meter (16.7-foot) fairing with 4 GEMs and was designated the "5,4." It could launch 13,500 pounds to GTO. The 5,2 and the 5,4 also had larger second-stage fuel and oxidizer tanks.[17]

The Delta IV heavy-lift vehicle had three CBCs mated together. The center CBC was mated to the same RL-10B-2 second stage engine—but with larger tanks than the medium 5,2 and 5,4 variants had—and employed a 5-meter (16.7-foot) diameter payload fairing. It could place a payload weighing about 27,400 pounds into GTO.[18]

ATLAS V

Lockheed Martin's Atlas V family of launch vehicles also used a first-stage common core booster (CCB) and a second-stage. The CCB was 12.5 feet in diameter by 106.6 feet in length. It included a structurally stable airframe, propellant tanks, and a main engine known as the RD-180. The RD-180 engine was developed and manufactured by NPO Energomash of Khimky, Russia. This engine was also used on the Atlas III commercial launch vehicle, which was first launched in May 2000. The RD-180 had two thrust chambers and could be throttled in flight. It used liquid kerosene (RP-1)

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[16] See note above.

[17] See note above.

[18] See note above.

as a fuel and liquid oxygen as an oxidizer to generate 860,200 pounds of thrust at sea level with relatively little environmental contamination.[19]

The Atlas V medium-lift vehicle design, which was also known as the Atlas V 400 series, was almost identical to the Atlas III. It consisted of the CCB plus a Centaur second stage. The Centaur could be configured with either one or two RL-10A-4-2 engines from Pratt & Whitney. Each of the restartable, cryogenic liquid oxygen/ liquid hydrogen Centaur engines could generate 22,300 pounds of thrust. The performance of the medium-lift vehicle could be further tailored to the payload by adding from one to three solid rocket boosters (SRBs), each of which generated about 306,000 pounds of thrust. The various configurations of the Atlas 400 series could place payloads weighing about 11,000 to 13,200 pounds into GTO. The payload fairings, which were also used on the Atlas II and III, could accommodate payloads up to 13.2 feet in diameter and 17.7 feet in length.[20]

The other Atlas V intermediate configuration was known as the Atlas V 500 series. It consisted of the CCB plus the dual-engine Centaur second stage and up to five solid rocket boosters. The payload fairings for the Atlas 500 series were developed and manufactured by Contraves Space of Zurich, Switzerland. They were 5 meters (16.4 feet) in diameter and 68 or 77 feet in length, enclosing both the Centaur and the payload. The 500 series could launch about 15,200 pounds (using three SRBs) to 18,000 pounds (using five SRBs) to GTO.[21]

The Atlas V heavy-lift vehicle design consisted of three CCBs mated together. The center CCB was mated to the dual-engine Centaur second stage. It used a longer Contraves fairing, 5.4 meters (17.7 feet) in diameter and 26.4 meters (86.6 feet) in length, enclosing both the Centaur and the payload. The Atlas V heavy-lift vehicle could launch approximately 29,000 pounds to GTO.[22]

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[19] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc IV-10); Lockheed Martin Space Systems Company, "Atlas" and associated world-wide web pages, copyright 2000, accessible from http://www.ast.lmco.com/launch_atlas.shtml on 2 July 2002 (Doc IV-22); Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); International Launch Services, "Atlas Launch System Mission Planner's Guide, Atlas V Addendum (AVMPG)," Rev 8, December 1999 (Doc IV-24).

[20] See note 19 above.

[21] See note 19 above.

[22] See note 19 above.

EELV Launch Services and Facilities

The OTA contract covered not only launch vehicle development, but also the development of new launch pads, satellite interfaces, and other support infrastructure, and demonstrations that the launch systems satisfied all of the government's requirements. A key requirement was the standard payload interfaces for each EELV launch vehicle class. This included mechanical connections, services, ground support equipment, and environmental conditions. The payloads and approximate launch periods for the two EELV systems at first looked like the estimates in table 4-4 below.

Table 4-4
Launches Awarded Under Launch Services Contracts in October 1998[23]

	FY02	FY03	FY04	FY05	FY06	FY07
Boeing 19 missions	DSCS	DSP A/B-1 DSCS SBR/MTI GPS IIF	A/B-4 Mission C WGF SBR/MTI GPS IIF (2)	WGF GPS IIF STP (TSX)	SBIRS-G GPS IIF (3)	
Lockheed Martin 9 missions		DMSP GPS IIF	A/B-2 SBIRS-G GPS IIF	DMSP WGF SBIRS-G GPS IIF		

However, as new satellite programs encountered development issues, the launch profile covered by the ILS contracts gradually changed also, until by February 2000 it resembled the estimates in table 4-5.

[23] Acronyms: DSCS = Defense Satellite Communications System; DSP = Defense Support Program; SBR/MTI = Space-Based Radar/Moving Target Indicator; GPS = Global Positioning System; WGF = Wideband Gap-Filler; STP = Space Test Program; SBIRS = Space-Based Infrared System; DMSP = Defense Meteorological Satellite Program. Table 4-4 is taken from Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives).

Table 4-5
Launches Under Launch Services Contracts in February 2000[24]

	FY02	FY03	FY04	FY05	FY06	FY07
Boeing 19 missions	DSCS	DSP A/B-1 DSCS	A/B-4 Mission C WGF	WGF GPS IIF STP (TSX) SBR/MTI	SBIRS-G GPS IIF (2)	
Lockheed Martin 9 missions		DMSP	A/B-2 SBIRS-G	DMSP WGF SBIRS-G	GPS IIF (2)	GPS IIF

The original contracts were modified in late 2000 when Lockheed Martin requested a change in scope to relieve them from their west coast Atlas V launch capability requirement. With a limited number of west coast missions, two launch providers were no longer needed. Furthermore, commercial market demand was far below the anticipated robust levels. In December 1999, a team of government experts examined the alternatives for restructuring the contracts. The team decided that Lockheed Martin's remaining west coast launches, which consisted of two satellites for the Defense Meteorological Satellite Program (DMSP), could be shifted to Boeing's Delta IV, eliminating the need for Lockheed Martin to construct a launch pad on the west coast. The Atlas V would launch only from the east coast. Lockheed Martin would have to bring the development of a heavy-lift version of their vehicle only to a Critical Design Review until a launch order was made. Boeing's ILS contract was revised to add the missions cited above, and the OTA contract was changed to include funding for a demonstration launch of their heavy-lift variant.[25]

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[24] Six additional GPS IIF missions were delayed to FY09 and FY10. Acronyms: DSCS = Defense Satellite Communications System; DSP = Defense Support Program; SBR/MTI = Space-Based Radar/Moving Target Indicator; GPS = Global Positioning System; WGF = Wideband Gap-Filler; STP = Space Test Program; SBIRS = Space-Based Infrared System; DMSP = Defense Meteorological Satellite Program. Table 4-5 is taken from Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives).

[25] SMC/MV, "EELV Program Overview & Status," November 2000, accessible at http://www.losangeles. af.mil/SMC/MV/eelvhome.htm on 28 June 2002 (Doc IV-17); "De Leon: EELV Restructure Is Complete, Congress Has Been Notified," Inside the Air Force, 22 September 2000, accessible from http://www. insidedefense.com/secure/ on 31 October 2000 (Doc IV-18); Frank Sietzen, Jr., "Spacelift Washington: Air Force Will Buy Test Flight of First Heavy Lift EELV," SpaceRef.Com, 8 October 2000, accessible at http://www.spaceref.com/news/viewnews.html on 13 June 2002 (Doc IV-19); Briefing Charts (U), SMC/MV, "EELV Update to General Lyles," 9 June 2000 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives).

By early June 2000, the EELV Program Office had completed and negotiated the contractual modifications and had written the Justification and Approval statement for the Air Force's Assistant Secretary for Acquisition to approve the changes. In September 2000, after approving the revised acquisition strategy, Assistant Secretary of Defense Rudy de Leon announced the restructuring of the contracts. The demonstration launch of Boeing's heavy-lift Delta IV was added to the company's OTA contract (F04701-98-9-0005) on 13 December 2000 for $141 million.[26]

Technical Progress FY 1998 – FY 2001

DELTA IV

Development efforts and launch preparations were driven by the projected launch schedules. By the end of the period under discussion, the first government payload for Boeing's Delta IV, Defense Satellite Communications System (DSCS) III B-6 was scheduled to launch from the east coast in June 2002. It had also contracted for its first commercial payload for the Delta IV, a telecommunications satellite for Eutelsat S.A. of France, to be launched from the east coast in April 2002. After the contractual amendment of December 2000, the demonstration launch of its Delta IV heavy-lift configuration from the east coast was planned for late 2002.[27]

Boeing's greatest challenges in meeting this schedule were the development and qualification of the Delta IV's RS-68 main engine, the construction of its two launch complexes, and the delivery of the flight hardware. The Rocketdyne RS-68 liquid oxygen/liquid hydrogen engine was the first large, liquid-fueled rocket engine to be developed in the U.S. since the Space Shuttle Main Engine, which Rocketdyne also developed. It required a significant amount of testing to achieve flight certification, first as an independent subsystem and then integrated with a CBC test article. Development testing for the engine started in January 1998 at the Air Force Research Laboratory's test site.[28]

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[26] Briefing Charts (U), SMC/MV, "EELV Update to General Lyles," 9 June 2000 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); News Release, OASD/PA, "No. 742-00, Contracts: Air Force," 13 December 2000 (Doc IV-24).

[27] Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); "U.S. Air Force Funds First Evolved Expendable Launch Vehicle Mission," SpaceDaily, 11 June 2000, SMC historical archives; "Boeing Delta IV Stands Ready On Launch Pad," SpaceDaily, 6 May 2002, accessible from http://www.spacedaily.com on 6 July 2002; "Boeing Delta IV Program Progresses On West Coast," SpaceDaily, 17 October 2001, accessible from http://www.spacedaily.com on 6 July 2002.

[28] Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); News Release, Boeing, "Boeing Rocketdyne RS-68 Engine

By April 2001, three test engines had accumulated 11,639 seconds of static firing. Despite the engine's encountering some significant delays in its development schedule related to its turbo machinery, its first commercial and military launches had slipped only a few months by the end of FY 2001. At that time, the development testing was scheduled to end with certification of the engine in December 2001.[29]

While the development testing of the RS-68 was under way, the first CBC was assembled at Boeing's factory in Decatur, Alabama. From there, the CBC frame went to NASA's Stennis Space Center, Mississippi, where an RS-68 main engine was integrated with the CBC, and the whole core stage was prepared for hot-fire qualification. The first test occurred on 17 March 2001, when the CBC was successfully fired for 15 seconds. During the third test, on 3 April 2001, the engine was fired for 145 seconds and tested various operations, including depletion of its hydrogen fuel, gimbaling of the engine, and manipulation of the throttle settings from 58 to 101 percent of power. The final hot fire test of the CBC occurred on 6 May 2001 and simulated a Delta IV heavy-lift mission for 303 seconds. All of the integrated CBC tests were successful.[30]

Having successfully completed qualification testing, the CBC was transported from Decatur to Florida on the Delta Mariner (a custom designed cargo ship), to be used as a pathfinder in testing the newly constructed Delta IV launch processing facilities at Space Launch Complex 37 (SLC-37). On 25 September 2001, the first CBC production

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Triumphs In 10K Run," 23 April 2001, accessible at http://www.boeing.com/news/releases/2001/q2/news_release_010423s.html on 2 July 2002.

[29] A program schedule for the Delta IV from September 1999 shows development engine testing as originally scheduled to end with certification in about June 2000, but as having already slipped about four months. See Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives). See also Briefing Charts (U), SMC/MV to HQ USAF, "Evolved Expendable Launch Vehicle (EELV)," 14 September 2001 (SMC historical archives). According to this briefing, the RS-68's "turbo machinery issues slipped development schedule 18 mos;" however, those "issues now resolved; on track for Apr 02 first launch." This proved to be optimistic: halfway through FY 2002, the first (commercial) launch was scheduled for August 2002, although the additional delay was not necessarily the fault of the RS-68 ("U.S. Air Force Funds First Evolved Expendable Launch Vehicle Mission," SpaceDaily, 11 June 2000, accessible from http://www.spacedaily. com on 6 July 2002). See also News Release, Boeing, "Rocketdyne RS-68 Engine Certified for Boeing Delta IV,"19 December 2001, accessible at http://www.boeing.com/news/releases/2001/q4/ nr_011219s.html on 2 July 2002.

[30] News Release, Boeing, "Boeing Delta IV Solid Rocket Motor Qualification Testing Completed," 23 June 2000, accessible at http://www.boeing.com/news/releases/2000/news_release_000622h.html on 2 July 2002.

Illustration 4-3

A Delta IV CBC is removed from test stand at Stennis Space Flight Center, Mississippi, in May 2001 (Boeing Company photograph) unit was rolled out of the factory. At the end of the fiscal year, it was in transit to the launch processing facilities to be prepared for the first launch of the Delta IV, the Eutelsat commercial communications satellite.[31]

Other major components had already completed qualification testing. The solid rocket motors, known as graphite epoxy motors (GEMs) because of their lightweight casings, were built by Alliant Techsystems. GEMs were manufactured in various sizes for various configurations of Delta launch vehicles. The GEM motors to be used with the Delta IV Medium-Plus EELVs were 60 inches in diameter (the largest manufactured) and therefore were called GEM-60s. The GEM-60 successfully completed its qualification testing on 22 June 2000 at Alliant Techsystems' facilities in Utah.[32]

As mentioned previously, Boeing was under contract to develop launch facilities and conduct launches for the Delta IV at both major coastal launch sites: Vandenberg AFB for polar launches and Cape Canaveral AFS for geosynchronous and other easterly launches. Since the first Delta IV launches would take place from Cape Canaveral, those facilities were started earlier. On 27 July 1998, Boeing announced plans to completely rebuild the existing, inactive, Space Launch Complex 37 (SLC-37) at Cape Canaveral AFS.[33] Boeing awarded a subcontract for the effort to Raytheon Engineers & Constructors, a subdivision of Raytheon Company, on 30 September 1998.[34] Some of the major facilities under construction were the launch pad, the fuel tanks for liquid oxygen and liquid hydrogen, the Mobile Service Tower (MST), the Horizontal Integration Facility (HIF), the Delta IV Operations Center, Hangar E, and the Common Support Building.[35] Boeing and Raytheon completed the construction of the MST on 2 March

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[31] News Release, Boeing, "First Flight Delta IV Heads to Launch Site," 26 September 2001, accessible at http://www.boeing.com/news/releases/2001/photorelease/q3/pr_010926h.html on 2 July 2002.

[32] See note 30 above.

[33] SLC-37 had been built in 1962 to launch the earlier, unmanned Apollo missions using Saturn 1 launch vehicles. See Wayne Tomkins, "Boeing Lays Out Its Plan to Resurrect Complex 37 for Delta 4 Rocket," Florida Today Space Online, 28 July 1998, accessible at http://www.flatoday.com/space/explore/ stories/1998b/072898f.htm on 11 July 2002; and News Release, Boeing, "Boeing Unveils Plan to Develop Delta IV Launch Facilities," 27 July 1998, accessible at http://www.boeing.com/news/releases/1998/news release_980727a.html on 2 July 2002.

[34] News Release, Raytheon, "Raytheon Engineers & Constructors Awarded Turnkey Contract by Boeing," 30 September 1998, accessible at http://www.raytheon.com/press/1998/sep/eelv3.html on 11 July 2002.

[35] For detailed descriptions of these facilities, see The Boeing Company, "Delta IV Payload Planner's Guide," October 2000, SMC historical archives, and updated

2000. At the end of September 2001 (the end of the period under discussion), Air Force and Boeing officials were preparing for a ceremony to be held on 9 October 2001 to mark the completion of construction on the whole launch complex.[36]

The most innovative component of these facilities was the HIF, where prelaunch integration and testing for Delta IV launches would take place. It would be a six-story building of 75,000 square feet, including two processing bays measuring 250 feet by 100 feet. The HIF would enable the contractors to assemble and test Delta IV vehicles horizontally, then transport them a short distance to the launch pad, rather than assembling them vertically on the pad, as with earlier vehicles and launch facilities. This improvement would reduce processing time, and therefore costs, a great deal. Boeing estimated that Delta IV vehicles could be completely assembled within 30 days after arrival from the factory. With other efficiencies built into the launch complex, the vehicles' time on the pad could be reduced to 10 days. On 28 January 1999, Boeing announced that it had signed an agreement with the Spaceport Florida Authority by the terms of which the State of Florida would finance and build the HIF, then allow Boeing to operate it under a long-term lease. The construction of the HIF was completed in September 2000, and it was dedicated in a ceremony on 11 September 2000.[37]

Boeing also had to construct launch facilities at Vandenberg AFB—the only EELV launch facilities at Vandenberg—to support the government's mission manifest. It

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descriptions in The Boeing Company, "Delta IV Payload Planner's Guide Update," April 2002, SMC historical archives.

[36] News Release, Boeing, "Boeing, Raytheon Top Off Nation's Newest Launch Tower," 2 March 2000, accessible at http://www.boeing.com/news/releases/2000/news_release_000302h.html on 2 July 2002; News Release, 45th SW/PA (2nd Lt Eric Badger), "Cape Completes New Launch Facility," 15 October 2001, accessible at http://www.af.mil/news/Oct2001/n20011015_1465.shtml on 28 June 2002.

[37] News Release, 45th SW/PA (2nd Lt Eric Badger), "Cape Completes New Launch Facility," 15 October 2001, accessible at http://www.af.mil/news/Oct2001/n20011015_1465.shtml on 28 June 2002; News Release, Boeing, "Boeing Signs Agreement for Delta IV Integration Facility," 28 January 1999, accessible at http://www.boeing.com/news/releases/1999/news_release_990128b.html on 2 July 2002; News Release, Florida Space Authority, "State Completes Delta IV Facility for Boeing," 12 September 2000, accessible at http://www.spaceportflorida.com/ NewsReleases3qtr2000.html on 11 July 2002. The Florida Space Authority was a state government space agency created by Florida in 1989 to support and regulate space industry within the state (Internet document, Spaceport Florida Authority, "Background," no date, accessible at http://www.spaceportflorida.com/ Background.html on 11 July 2002.

Illustration 4-4
Launch Complex 37 under construction at Cape Canaveral, February 2001, Delta IV Launch Tower at center (Boeing Company photograph)

planned to modify the old SLC-6 launch facilities[38] on Vandenberg, adding a Horizontal Integration Facility (HIF) similar in design and operation to the HIF at Cape Canaveral. Construction began on some of these facilities before the end of FY 2001. In October 2000, Boeing placed The Clark Construction Group, Incorporated, under contract to retrofit SLC-6, and completion of the launch complex was scheduled for about March 2002. An enormous new launch table, weighing 65 tons and measuring 86 feet by 46 feet, was scheduled for arrival by ocean-going barge in the middle of October 2001. Other alterations to SLC-6 involved enlarging the existing Mobile Service Tower. The HIF was placed under contract to A.J. Diani Construction Company, which completed the design in May 2001.[39]

ATLAS V

At the end of FY 2001, Lockheed Martin's Atlas V was scheduled to launch its first government payload in 2005. However, it was also designated as the backup vehicle for the launch of DSCS III B-6 on the Delta IV in June 2002. The Atlas V's first commercial launch was to be Eutelsat's Hot Bird 6 TV and data broadcasting satellite, then scheduled for May 2002. Its next commercial launch, Telesat Canada's Nimiq 2 TV broadcasting satellite, was scheduled for later in 2002.[40]

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[38] Space Launch Complex 6 had been constructed in the late 1960s to launch the Manned Orbiting Laboratory (MOL) on the Titan IIIM launch vehicle. Neither the MOL nor the Titan IIIM had been completed, however, and SLC-6 had been mothballed until the early 1980s, when it was heavily modified to launch the Space Shuttle into polar orbits. This purpose had also been rendered obsolete by design changes in the Space Shuttle following the Challenger disaster in 1986, and the launch complex had been mothballed again. (See SMC History Office, "Historical Overview of the Space and Missile Systems Center, 1954-2003," 2003, p. 27.)

[39] News Release, Boeing, "Boeing Delta IV Program Progresses on West Coast," 17 October 2001, accessible at http://www.boeing.com/news/releases/2001/q4/ nr_011017h.html on 6 July 2002; News Release, 30th SW/PA (SSgt Andrew Leonhard), "New Launch Table Arrives at Vandenberg," 29 October 2001, accessible at http://www.af.mil/news/Oct2001/n20011029_1544.shtml on 28 June 2002; News Release, Boeing, "NASA Orders Additional Launch from Boeing Delta Rocket Program Anniversary Year of Achievements, Orders, Launches Paves the Way for Boeing Delta IV," 21 December 2000, accessible at http://www.pressi.com/ us/release/24902.html on 12 July 2002; News Release, Clark Construction Group, "Clark Construction Awarded Contract for Boeing's New Space Launch Complex," 27 October 2000, accessible at http://www.clarkus.com/wn_reel/001030h.shtml on 12 July 2002; Newsletter, Diani Construction Co., "Building Division Highlights," July 2001, accessible from http://www.diani.com/ newsletter.htm on 12 July 2002.

[40] News Release, International Launch Services, "Air Force Funds ILS & Lockheed Martin to Plan for First EELV Launch," 27 March 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/ rec150/ on 12 July 2002; News

Like Boeing's Delta IV, the Atlas V was constrained in its progress toward launch primarily by the development and qualification of a new main engine—in this case the Russian-developed and -built RD-180 rocket engine—the construction of a launch site at Cape Canaveral, and the delivery of the flight hardware. The RD-180 was also the main engine for Lockheed Martin's Atlas III launch vehicle, a commercial variant that was scheduled for a first launch during FY 2000. If the Atlas III launch were successful, the RD-180 could be considered flight-qualified two years before the first Atlas V launch was attempted. The engine was the first variable-thrust (i.e., throttleable) main engine ever used in a U.S. launcher, a capability that a series of static firing tests were designed to thoroughly verify.[41]

During 1996-2001, the RD-180 underwent a lengthy series of development, qualification, and certification firing tests in Khimky, Russia, at the facilities of NPO Energomash. The first development firing was conducted on 15 November 1996, and the last certification firing on 6 December 2001. By then, the engine had completed 91 tests

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Release, International Launch Services, "ILS Adds Telesat's Nimiq 2 Launch to Atlas V Roster," 28 June 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec157/ on 12 July 2002; News Release, International Launch Services, "Inmarsat, ILS Sign Contract for Atlas V to Launch Inmarsat I-4 Satellite," 25 July 2001, accessible at http://www.ilslaunch. com/newsarchives/newsreleases/rec159/; News Release, International Launch Services, "Lockheed Martin's First Atlas V Rocket Stacked Vertically, Capping Period of Highly Successful Milestones On the Way to First Launch," 27 March 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec167/ on 12 July 2002.

[41] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc IV-10); Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); News Release, Lockheed Martin, "Lockheed Martin Tests Russian Rocket Engine at NASA Facility in Ala.," 30 July 1998, accessible at http://www.fas.org/spp/mi;itary/program/ launch/980730-eelv.htm on 12 July 2002; News Release, Lockheed Martin, "RD-180 Rocket Engine Launches Into Another Milestone," 27 March 1998, accessible at http://www.fas.org/spp/military/program/launch/980327-astro-180.htm on 12 July 2002; News Release, Lockheed Martin, "Atlas III RD-180 Successful Test Firing," 29 July 1998, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/ rec77/prebody.html on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Receives Three More RD-180 Engines for Atlas III Rockets," 7 January 2000, accessible at http://www.ast.lmco.com/2000pressReleases/den001.shtml on 12 July 2002; News Release, Lockheed Martin, "First Atlas V Flight Engine Arrives at Lockheed Martin," 30 November 2000, accessible at http://www.ast.lmco.com/ 2000pressReleases/den001.shtml on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin's Atlas V RD-180 Engine Successfully Completes Testing Proigram," 19 December 2001 http://www.ast.lmco.com/2001pressReleases/den031.html on 12 July 2002.

Illustration 4-5

The RD-180 engine undergoes a static firing test for the Atlas IIIA at Marshall Space Flight Center, November 1998 (Lockheed Martin photograph) designed to replicate the flight regime and power levels of an Atlas III, 30 designed for an Atlas V medium-lift launch vehicle, and 14 for an Atlas V heavy-lift vehicle. During the total 25,449 seconds of firing tests, the engine performed well. It also performed well during the first Atlas IIIA (AC-201) launch, which placed the Eutelsat W4 satellite into a nominal orbit on 24 May 2000.[42]

Lockheed Martin awarded the subcontract for the solid rocket motors (SRMs) to Aerojet on 4 February 1999. Three SRBs would be added to the Atlas V 400 series, and up to five SRBs would be added to the Atlas V 500 series to launch increasingly heavier payloads with the Atlas V medium-lift vehicle. Aerojet began its qualification test firings of the new 67-foot-long motors on 30 August 2001, achieving thrust levels for the motor of 285,000 to 390,000 pounds. At the end of the reporting period (30 September 2001), more static firing tests were scheduled for FY 2002.[43]

By the terms of the contract restructuring of September 2000, Lockheed Martin agreed to build launch facilities for the Atlas V at only the east coast launch site. The company announced on 9 June 1998, even before the EMD contracts were awarded, that its east coast launch site would be Launch Complex 41, then used for Titan IV launches and earlier used for Titan III launches. One of the first steps in the new construction was to lay a large concrete foundation for the vertical integration facility (VIF) on 27 March 1999. The last beam in the VIF structure was put in place on 6 March 2000. Delays in the Titan IV's launch schedule caused construction on the pad to start about six months late. On 14 October 1999, the builders demolished the existing Titan launch towers with explosives; they began to erect new structures two months later. The last steel section of the new Mobile Launch Platform (MLP), on which Atlas V vehicles would be erected and launched, was put in place on 4 June 2001. In a test during 7-9 September 2001, two control vans moved the completed MLP about 2,600 feet to the launch pad for fit checks, and then moved the MLP from the pad into the VIF for further fit checks and component testing. After the successful conclusion of these tests, the MLP and VIF were considered to have attained operational status. The 60-ton bridge crane that would lift and handle

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[42] See note 41 above.

[43] News Release, Aerojet, "Aerojet Wins $500 Million Solid Rocket Motor Contract for Lockheed Martin's Atlas V Launch Vehicle," 4 February 1999, acecssible at http://www.aerojet.com/program/news/nr_atlasv_0299_04.htm on 12 July 2002; News Release, Aerojet, "Aerojet Awarded $8.8 Million Contract to Build Nose Fairings for Atlas V Solid Rocket Motors," 4 May 2000; accessible at http://www.aerojet.com/program/news/nr_050400_aerojet_awarded_8.8m_atlasv_nose_fairing_co.htm on 12 July 2002; News Release, Aerojet, "Aerojet Successfully Test Fires World's Largest Monolithic Solid Rocket Motor," 30 August 2001, accessible at http://www.aerojet.com/program/news/nr_083001_aerojet_successfully_test_fires_worlds_largest.htm on 12 July 2002; News Release, International Launch Services, "Aerojet Successfully Tests Strap-on Motor, 30 August 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec163/prebody.html on 12 July 2002.

Atlas V vehicles completed its installation in the VIF, underwent validation testing, and achieved operational status on 17 September 2001.[44]

The flight components for the first Atlas V launch (Eutelsat's Hot Bird 6) arrived at the launch site for integration during 2000 and 2001. The first flight conical interstage adapter, manufactured by Construcciones Aeronauticas S.A. of Spain, arrived at Cape Canaveral AFS on 10 February 2000. Lockheed Martin delivered the first flight Centaur upper stage to Cape Canaveral on 3 May 2001. After a rollout ceremony at the Final Assembly Building near Denver, Colorado, on 30 April 2001, it delivered the first flight common booster core (CBC), designated AV-001, to Cape Canaveral on 5 June 2001, using an An-124-100 Russian transport aircraft. The CBC and the Centaur were then placed in the Atlas Spaceflight Operations Center (ASOC) to test the support systems in that facility. In preparation for moving the CBC and Centaur to the VIF, a booster simulator was erected in the VIF on 18 September 2001 to test the handling mechanisms. The CBC and Centaur were scheduled to be moved to the VIF in October 2001, where they would be used for validation testing of the VIF and MLP.[45]

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[44] "Lockheed Announces EELV Launch Sites," SpaceDaily, 9 June 1998, accessible at http://www. spacedaily.com/news/eelv-98a.html on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Meets Milestone for New Atlas V Launch Facility," 27 March 1999, accessible at http://www.ast/lmco.com/1999 pressReleases/den019.shtml on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Demolishes Old Launch Towers in Spectacular Fashion for Future Atlas V," 14 October 1999, accessible at http://www.ast/lmco. com/1999pressReleases/den048..shtml on 12 July 2002; News Release, Ken Warren, 45th SW/PA, "Cape Canaveral Launch Gantry Toppled," 20 October 1999, accessible at http://www.af.mil/news/Oct1999/n19991020_991933.html on 12 July 2002; Justin Ray, "Lockheed Martin Building Atlas 5 Rocket Launch Site," Spaceflight Now, 6 March 2000, accessible at http://spaceflightnow.com/news/0003/06slc41/index.html on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Successfully Performs First Power-On Test in New Atlas V Spaceflight Operations Center," 6 June 2001, accessible at http://www.ast/lmco.com/2001press Releases/den060601.shtml on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin's First Atlas V Rocket Stacked Vertically, Capping Period of Highly Successful Milestones on the Way to First Launch," 18 October 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec167/ on 12 July 2002; News Release, Lockheed Martin, "Atlas V Updates," 4 June 2002, accessible at http://www.ilslaunch.com/stories/AtlasVUpdates/prebody.html on 12 July 2002.

[45] 1st Lt Colleen Lehne, "EELV Celebrates Tank Rollout," Astro News, 17 December 1999, p. 3; News Release, Lockheed Martin, "Lockheed Martin Processes First Atlas V Interstage Adapter," 11 February 2000, accessible at http://www.ast.lmco.com/2000pressReleases/den002.shtml on 12 July 2002; Ken Warren, 45th SW/PA, "Atlas Booster Arrives at Cape Canaveral," 8 June 2001, accessible at http://www.af.mil/news/Jun2001/n20010608_0772.shtml on 12 July 2002; News Release, Lockheed Martin, "Atlas V Updates," 4 June 2002, accessible at http://www. ilslaunch.com/ stories/AtlasVUpdates/prebody.html on 12 July 2002.

Illustration 4-6
Launch Complex 41 at Cape Canaveral, March 2002,
AV-001 in Mobile Launch Platform at left (International Launch Services photograph)

CHAPTER 5
GLOBAL POSITIONING SYSTEM

The Air Force designed the Navstar Global Positioning System (GPS) to inform properly equipped users of their positions and velocities in three dimensions. GPS included a space segment, a control segment and a user segment. The space segment consisted of satellites that continuously broadcast navigation and timing signals to the earth 24 hours a day, worldwide, and in all weather. It also provided nuclear detonation detection. The control segment consisted of ground stations that exercised command and control of the satellites, and insured the accuracy of the navigation signals they broadcast. The user segment consisted of military and civilian users of GPS. The military user segment supported military airplanes, ships, submarines, ground vehicles and foot soldiers who usually had Department of Defense (DoD)-issued receivers that utilized the GPS Precise Positioning Service (PPS) signals. The government also made available the less precise GPS Standard Positioning Service (SPS) to civilian and commercial users free of charge to anyone who purchased a receiver from commercial sources. These receivers picked up signals from the satellites and used them to compute their latitude, longitude and altitude, as well as the time. The Navstar system could support a wide variety of operations, including navigation by foot, aircraft, vehicle, ship, rescue missions, instrument approaches, aerial rendezvous and refueling, all-weather air drops, mine laying, mine sweeping, anti-submarine warfare, hombing and shelling, photo mapping, and range instrumentation, among countless others. By 2000, the United States had invested over $14 billion in GPS.[1]

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[1] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 51; Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil /SMC/PA/Fact_Sheets/gps_fs.htm (Doc 5-1); Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2002, http://www.af.mil/news/factsheets/NAVSTAR_Global_Positioning_Sy.html (Doc 5-2); Internet Document, The Aerospace Corporation, "Global Positioning System," printed 7 March 2002, http://www.aero.org/publications/ GPSPRIMER/ (Doc 5-3); Internet Document, Quality Engineering and Survey Technology Ltd, "GPS Tutor - Introduction," 1998, http://www.mercat.com/QUEST/ Intro.htm (Doc 5-4); Fact Sheet, The Boeing Company, "Global Positioning System (GPS) Changing the Direction of Navigation," 1999, (Doc 5-5); Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, p. 4 (Doc 5-6); Briefing Charts, SMC/CZ, "Global Navigation Satellite System (GNSS)," May 2000, p.12 (Doc 5-7); Briefing Charts, U.S. Department of Transportation, "Global Positioning System, Current Status and Modernization Efforts," 26 November 2001, pp. 5-6 (Doc 5-8); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 10 (Doc 5-9); Document, SMC/CZ, "GPS System and Technology," July 2000, (Doc 5-10); Aaron Renenger, "GPS inducted into Space Technology Hall of Fame," Astro News, 24 April 1998, p. 1 (Doc 5-11); Briefing Charts, SMC/CZ, "The Global Positioning System, A Worldwide Information Utility," February 2001, pp. 8-32, 52-53 (Doc 5-12); Fact Sheet, Cheryl Crouch, SMC/CZY, "10 Most Commonly Asked

Several government organizations worked together in a multi-service effort to manage and support GPS. A 1996 presidential directive established the Interagency GPS Executive Board (IGEB) to manage GPS. The Departments of Defense and Transportation jointly chaired the IGEB, and its membership included representatives from NASA, the Joint Chiefs of Staff, and the Departments of Agriculture, Commerce, Interior, Justice, and State. The DoD operated, maintained, and acquired the Navstar system. The Air Force's Space and Missile Systems Center (SMC) GPS Joint Program Office (JPO) (office symbol SMC/CZ) developed and acquired the systems for GPS. The Air Force Space Command's (AFSPC) 2nd Space Operations Squadron, 50th Space Wing, had operational control of the GPS constellation from the Master Control Station at Schriever AFB, Colorado (the Air Force renamed Falcon AFB to "Schriever AFB" on 5 June 1998). The Department of Transportation served as the lead agency for all of the Federal civilian GPS matters, and the Department of State acted as the leader for GPS international issues.[2]

Questions & Answers on GPS," 2002, (Doc 5-13); Review, SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

[2] Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/gps_fs.htm (Doc 5-1); Internet Document, Schriever AFB, "2nd Space Operations Squadron…," printed 4 March 1999, http://www.schriever.af.mil/2sops/fact.html (Doc 5-14); Internet Document, SMC/CZ, "Master Control Station," 8 April 2001, http://www.losangeles.af.mil/control/mcs.htm (Doc 5-15); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… for Navstar Global Positioning System (GPS)," 27 September 2001, (Doc 5-16); Internet Document, Schriever AFB, "Schriever AFB Background," printed 1 March 2002, http://www.jntf.osd.mil/visitors/About_SAFB.asp (Doc 5-17); Internet Document, Interagency GPS Executive Board, "Interagency GPS Executive Board," printed 2 August 2002, http://www.igeb.gov/ (Doc 5-18); Internet Document, Interagency GPS Executive Board, "Charter Interagency GPS Executive Board," 1997, http://www.igeb.gov/charter.shtml (Doc 5-19); Fact Sheet, The White House, "US Global Positioning System Policy," 29 March 1996, http://www.ostp.gov/NSTC/html/pdd6.html (Doc 5-20); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… NAVSTAR Global Positioning System (GPS)," 26 May 1998, (Doc 5-21); Program Management Directive (PMD) (FOUO, extract is not FOUO), Office of the Assistant Secretary of the Air Force, "PMD 4075… NAVSTAR Global Positioning System (GPS)," 20 March 2000, (Doc 5-22); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, pp. 30-32 (Doc 5-9); Internet Document, SPAWAR Systems Center San Diego, "US Navy Global Positioning System (GPS) and Navigation Systems Division," 29 May 2002, http://www.spawar.navy.mil/depts/d30/d31 (Doc 5-23); Briefing Charts, SMC/CZ, "The Global Positioning System, A Worldwide Information Utility," February 2001, pp. 5-6 (Doc 5-12).

SPACE SEGMENT

The GPS space segment consisted of 24 operational Navstar satellites that completed an orbit of the earth every 12 hours at an altitude of 10,900 nautical miles. Among the Navstar satellites that had been launched by October 2001, Rockwell International produced the GPS Block I, Block II, and Block IIA satellites, and Lockheed Martin built the Block IIR satellite. Each satellite carried a navigation payload, and all the satellites (beginning with Navstar 8) had a Nuclear Detonation (NUDET) detection payload. The navigation payload included several atomic clocks to provide frequency standards and a Pseudo Random Noise Signal Assembly. It generated L-Band signals carrying coded timing pulses, and the satellite's current ephemeris coordinates to use in calculating position. The NUDET payload incorporated an X-ray sensor to detect nuclear detonations in space, an optical sensor to detect nuclear detonations in the atmospbere, and a burst detector processor to process the data. A 12-element antenna array sent the navigation and the NUDET data signals to earth. The two payloads had the electrical power, thermal control, attitude and velocity control, reaction control, tracking, telemetry, and command subsystems of the spacecraft.[3]

Since July 1993, the GPS constellation had maintained 24 operational satellites in orbit, the minimum number needed for initial operational capability (IOC). From then on, GPS provided continuous, worldwide, three-dimensional navigation and positioning service, with no gaps in coverage. On 27 April 1995, AFSC declared that the GPS constellation had attained full operational capability (FOC) after the developmental model Block I satellites had been replaced in the constellation with the production model Block II and Block IIA satellites. Once FOC had been accomplished, GPS launches occurred only for replenishment purposes, when satellites in orbit became degraded and needed to be replaced. The Navstar constellation originated with the GPS Block I development model satellites; the Block II was the first production model satellite; Block IIA upgraded the production model satellite; and the Block IIR Replenishment satellite

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[3] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 53; Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/gps_fs.htm (Doc 5-1); Internet Document, National Security Space Road Map, "United States Nuclear Detonation Detection system (USNDS)," 1 October 1997, http://www.fas.org/spp/military/program/nssrm/initiatives/usnds.htm (Doc 5-24); Briefing Charts, Col Doug Loverro, SMC/CZ, "Nuclear Detonation (NUDET) Detection System (NDS)," 14 September 2001, p. 10 (Doc 5-24-1); Briefing Charts, Brig Gen Dan Leaf, AF/XOR, "Nuclear Detonation (NUDET) Detection System (NDS)," 14 September 2001, p. 3 (Doc 5-25); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 6112… for United States NUDET Detection System," 24 April 1998, (Doc 5-26); Program Management Directive (PMD) (FOUO, extract is not FOUO), Office of the Assistant Secretary of the Air Force, "PMD 6112… for United States NUDET Detection System," 20 March 2000, (Doc 5-27).

replaced the Block II and Block IIA satellites. See Table 5-1 below for the replenishment dates.[4]

Illustration 5-1
GPS Block IIA Satellite in Processing

The Air Force usually followed a set process when replacing the satellites within the GPS constellation. After being launched, the replacement GPS satellite typically became operational within a couple of months. The new satellite then replaced a specific older GPS satellite (Block I, II or IIA) in the constellation. The replaced Navstar often became one of the backup satellites for the constellation until the Air Force determined it to be nonoperational. Once a GPS satellite became nonoperational, the Air Force placed it into a disposal orbit by firing the thrusters at the maximum velocity acceleration point in the orbit. This process sustained a constellation of 24 operational GPS satellites with an additional three or four backup satellites maintaining orbit in case they were needed.[5]

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[4] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 54-58; Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/gps_fs.htm (Doc 5-1); News Release, AFNS, "GPS now Full Operational Capability," Printed 29 May 1995, (Doc 5-27-1).

[5] E-mail, Preston D. Prouty, Aerospace Corporation, to Robert Mulcahy, SMC/HO, "RE: GPS Replacement Process," 6 May 2002, (Doc 5-32); Briefing Charts, Brig Gen Dan Leaf (AF/XOR), "Navigation," 6 November 2000, p. 11 (Doc 5-30).

TABLE 5-1
GPS LAUNCHES AS OF 30 SEPTEMBER 2001

SATELLITE	LAUNCH DATE	TYPE	STATUS AS OF 9-30-01
Navstar 1	22 Feb 78	Block I	Nonoperational 1-25-80
Navstar 2	13 May 78	Block I	Nonoperational 8-30-80
Navstar 3	6 Oct 78	Block I	Nonoperational 4-19-92
Navstar 4	11 Dec 78	Block I	Nonoperational 10-27-86
Navstar 5	9 Feb 80	Block I	Nonoperational 11-28-83
Navstar 6	26 Apr 80	Block I	Nonoperational 12-10-90
Navstar 7	18 Dec 81	Block I	Launch Failure
Navstar 8	14 Jul 83	Block I	Nonoperational 5-4-93
Navstar 9	13 Jun 84	Block I	Nonoperational 2-25-94
Navstar 10	8 Sep 84	Block I	Nonoperational 11-18-95
Navstar 11	9 Oct 85	Block I	Nonoperational 2-27-94
Navstar II-1	14 Feb 89	Block II	Nonoperational 4-10-00
Navstar II-2	10 Jun 89	Block II	Operational
Navstar II-3	17 Aug 89	Block II	Nonoperational 10-6-00
Navstar II-4	21 Oct 89	Block II	Nonoperational 3-16-01
Navstar II-5	11 Dec 89	Block II	Operational
Navstar II-6	24 Jan 90	Block II	Nonoperational 7-19-00
Navstar II-7	25 Mar 90	Block II	Nonoperational 5-21-96
Navstar II-8	2 Aug 90	Block II	Operational
Navstar II-9	1 Oct 90	Block II	Operational
Navstar II-10	26 Nov 90	Block IIA	Operational
Navstar II-11	3 Jul 91	Block IIA	Operational
Navstar II-12	23 Feb 92	Block IIA	Operational
Navstar II-13	9 Apr 92	Block IIA	Nonoperational 11-4-96
Navstar II-14	7 Jul 92	Block IIA	Operational
Navstar II-15	9 Sep 92	Block IIA	Operational
Navstar II-16	22 Nov 92	Block IIA	Operational
Navstar II-17	18 Dec 92	Block IIA	Operational
Navstar II-18	2 Febr 93	Block IIA	Operational
Navstar II-19	29 Mar 93	Block IIA	Operational
Navstar II-20	12 May 93	Block IIA	Operational
Navstar II-21	26 Jun 93	Block IIA	Operational
Navstar II-22	30 Aug 93	Block IIA	Operational
Navstar II-23	26 Oct 93	Block IIA	Operational
Navstar II-24	9 Mar 94	Block IIA	Operational
Navstar II-25	28 Mar 96	Block IIA	Operational
Navstar II-26	16 Jul 96	Block IIA	Operational
Navstar II-27	12 Sep 96	Block IIA	Operational

Table 5-1 continued from the previous page

SATELLITE	LAUNCH DATE	TYPE	STATUS AS OF 9-30-01
GPS IIR-1	17 Jan 97	Block IIR	Launch Failure
GPS IIR-2	23 Jul 97	Block IIR	Operational
GPS IIA-28	5 Nov 97	Block IIA	Operational
GPS IIR-3	7 Oct 99	Block IIR	Operational
GPS IIR-4	10 May 00	Block IIR	Operational
GPS IIR-5	16 Jul 00	Block IIR	Operational
GPS IIR-6	10 Nov 00	Block IIR	Operational
GPS IIR-7	30 Jan 01	Block IIR	Operational[6]

SMC (then called "Space Systems Division") awarded a contract (FO4701-89-C-0073) to General Electric (later part of Lockheed Martin) for the development and production of the GPS Block IIR Replenishment satellites in 1989. The contract covered the production of 20 flight-model satellites with options for up to six more. Other options included the storage, launch support, and on-orbit support of the satellites. The Air Force launched the Block IIR satellites as needed to replace the orbiting Block II and Block IIA satellites. The major improvements of the Block IIR satellites over the Block IIA satellites included the following:[7]

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[6] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 54-58; Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/gps_fs.htm (Doc 5-1); Internet Document, Jonathan McDowell, "Master Launch Log," August 2001, http://heawww.harvard.edu/~jcm/space/ (Doc 5-28); Document, Cheryl Crouch, SMC/CZY, and www.GPS-Today.com, "GPS Constellation Status [1 May 2002]," 16 May 2002, (Doc 5-29); Briefing Charts, Brig Gen Dan Leaf, AF/XOR, "Navigation," 6 November 2000, p. 11 (Doc 5-30); Briefing Charts, Col Doug Loverro, SMC/CZ, "Global Positioning System (GPS)," 14 September 2001, p. 10 (Doc 5-31); Internet Document, Mark Wade, "Encyclopedia Astronautica," 5 January 2002, http://www.astronautix.com/craft/gpsand2a.htm (Doc 5-31-1).

[7] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 57-58; Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil /SMC/PA/Fact_Sheets/gps_fs.htm (Doc 5-1).

Table 5-2
Improvements of the Block IIR satellites over the Block IIA[8]

Navigation Payload	--additional radiation hardening --cross link ranging --reprogrammable microprocessor --2 atomic clocks on at all times (hot backup)
Electrical Power Systems	--2 nickel hydrogen batteries instead of 3 nickel cadmium batteries
Attitude and Velocity Control Systems	--autonomous acquisition and pointing
System Design	--larger fuel capacity --redundancy management system in the space vehicle processor

The GPS Block IIR experienced some failures with a couple of the early launches, and then had a series of successful launches. The first launch of the Block IIR satellite took place on 17 January 1997. Unfortunately, GPS IIR-1 failed when the Delta II booster exploded during the launch. It was the first failure of a Delta II booster, and only the second launch failure in the history of the GPS program.[9] The original GPS IIR-3 satellite had to be replaced after being contaminated by rain on 8 May 1999 while it was in the Launch Pad 17A White Room at Cape Canaveral. An unusual amount of rain leaked through several openings in the White Room and collected on top of the satellite's rain shield. The water collapsed the shield and contaminated the satellite. The rain shield should have heen taped on two sides, but it had only been taped on one. In September 1999, the Air Force estimated that the cost of tearing down, inspecting, reworking and retesting the satellite to be between $5 and $30 million, depending on the damage. The damaged satellite (SV-10) had to be replaced by another satellite (SV-11). The damages delayed the GPS Block IIR-3 launch until 7 October 1999. Many repairs had to be conducted on the White Room at Launch Pad 17A to insure that a similar accident would not occur again.[10]

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[8] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 58.

[9] *Ibid* (FOUO, extract is not FOUO), p. 58.

[10] Letter, Joe Straus, Aerospace Corporation, to Col James Armor, SMC/CZ, "GPS-50 (Navstar IIR-3) Flight Readiness," 10 May 1999, (Doc 5-33); Staff Summary Sheet, SMC/CZSF to SMC/CZE, "GPS IIR-3 Mission Readiness Review Action Item Closure," 1 October 1999, with attachment, Point Paper, "SLC-17 Whiteroom Improvements," 24 September 1999, (Doc 5-34); SMC/PA, "GPS accident investigation complete," Astro News, 30 July 1999, pp. 1 and 4 (Doc 5-35); Internet Document, Air Force Space Command, "GPS IIR-3 investigation complete," 21 July 1999, http://www.spacecom.af.mil/hqafspc/library/nr_temp/GPS%20Release.htm (Doc 5-36); Briefing Charts, Brig Gen James Armor, SMC/CZ, "NAVSTAR Global Positioning System Program PEO Portfolio Review," 1 September 1999, p. 28 (Doc 5-37); Executive Summary, Accident Investigative Board, "Executive Summary for the GPS AIB," 23 July 1999,

After the GPS IIR-1 failure and the IIR-3 delay, the Air Force successfully launched the next six Block IIR satellites into orbit. The Air Force successfully launched two GPS Block IIR satellites (IIR-6 on 10 November 2000 and IIR-7 on 30 January 2001) in a record-breaking 82-day window. In 2001, the Block IIR continued to replace the older Navstar satellites to sustain the GPS constellation. The GPS Block IIR-M and Block IIF satellites would be the next Navstar upgrades to follow the Block IIR.[11]

The GPS JPO began designing the original GPS Block IIF satellite to sustain and improve the constellation, pursuant to a requirement issued by AFSPC in 1992. The JPO

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http://www.spacecom.af.mil/hqafspc/library/nr_temp/GPS_Summary-FINAL.htm (Doc 5-38); 45th Space Wing Annual History 1999 (FOUO, extract is not FOUO), 45 SW/HO, pp. 83-84.

[11] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 58; Internet Document, Jonathan McDowell, "Master Launch Log," August 2001, http://heawww.harvard.edu/~jcm/space/ (Doc 5-28); Staff Summary Sheet, SMC/CZSF to SMC/CC, "GPS IIR-3 Mission Readiness Review Approval to Continue Launch Processing," 20 August 1999, (Doc 5-39); Staff Summary Sheet, SMC/CZSF to SMC/CC, "GPS IIR-3 Mission Readiness Review Approval to Continue Launch Processing," 28 September 1999, (Doc 5-40); Plan, SMC/CZ and Space and Control Sustainment Division Peterson AFB, NAVSTAR Global Positioning System Space and Control Segments Product Support Management Plan (Draft #1)," March 2002, p. 2 (Doc 5-41); Letter, Stephen Burrin, Aerospace Corporation, to Col Douglas Loverro, SMC/CZ, "GPS-51 (Navstar IIR-4) Flight Readiness Verification," 17 April 2000, (Doc 5-42); Letter, Stephen Burrin, Aerospace Corporation, to Col Douglas Loverro, SMC/CZ, "GPS-44 (Navstar IIR-5) Flight Readiness," 11 July 2000, (Doc 5-43); Letter, SMC/CC to HQ AFMC/CC, "The GPS IIR-5 Flight Readiness Review (FFR) and Space Flight Worthiness Certification," 14 July 2000, (Doc 5-44); Aerospace Corporation, "GPS IIR-6 joins constellation of 27 satellites," Orbiter, 22 November 2000, pp. 1 and 3 (Doc 5-45); Ronea Alger, "New GPS IIR satellite added to constellation," Astro News, 28 July 2000, p. 1 (Doc 5-46); MSgt T. J. Helton, "SMC launches 28th GPS satellite into orbit," Astro News, 17 November 2000, p. 1 (Doc 5-47); Capt Colleen Lehne, "Seventh GPS IIR spacecraft launched into orbit," Astro News, 9 February 2001, pp. 1 and 3 (Doc 5-48); Staff Summary Sheet, SMC/CZSF to SMC/CC, "GPS II-28 Mission Readiness Review (MRR) Minutes," 17 October 1997, with attachment, Point Paper, "GPS II-28 Mission Readiness Review," 17 October 1997, (Doc 5-49); Howard Antelis, "Air Force rewrites record book with five successful payload launches in 23 days," Astro News, 14 November 1997, pp. 1 and 5 (Doc 5-50); News Release, Boeing, "Satellite, Delta II Rocket Makes it All-Boeing Launch…," 5 November 1997, http://www.boeing.com/news/releases/1997/news_release_9711050.html (Doc-51); E-mail, Cheryl Crouch, SMC/CZY, to Robert Mulcahy, SMC/HO, "Navstar GPS Joint Program Office 2001 AFA Aerospace Award 'Citation of Honor' Nomination," 6 August 2002, (Doc 5-52).

formed an "integrated product team" (a team of experts from various acquisition specialties) on 3 January 1994. In 1995, the Air Force determined that it would purchase 33 Block IIF satellites.[12] The original Block IIF design included the following improvements: a longer design life (12 years rather than 7.5 years for the Block IIA satellites); larger space for additional payloads and missions; provisions for a new, more accurate signal for civilian users; improved military capabilities such as accuracy, availability, anti-jamming and higher integrity; and an estimated life-cycle savings of $1 billion.[13]

SMC released a request for proposals (FO4701-95-R-0001) in September 1995 to acquire the Block IIF. On 22 April 1996, SMC awarded a contract (FO4701-96-C-0025) to Rockwell International Corporation (which by 1997 had merged with The Boeing Company and had taken its name) containing provisions for an initial purchase of six Block IIF satellites, with separate options for 15 satellites and 12 satellites. The contract had a value of $1,318,531,213, and it was scheduled to end in August 2012 with the delivery of the last (the 33rd) satellite. The Air Force initially estimated the unit cost for a GPS Block IIF satellite to be $28 million (a Block IIA satellite cost $43 million and the Block IIR cost $30 million) with a delivery time of five years (the Block IIA took 10 years and the Block IIR took eight years). Boeing completed the preliminary design work on the original Block IIF satellite on 21 February 1997. The GPS JPO designed the Block IIF satellites to be launched with the Evolved Expendable Launch Vehicle (EELV) at Cape Canaveral.[14]

The Air Force delayed the schedule for the Block IIF acquisition. Originally, the GPS JPO scheduled the delivery of the first Block IIF satellite for April 2001 and the first launch in July 2001. A GPS Block IIF satellite was never built based on the original design. The Air Force altered the Block IIF schedule for a few reasons. The existing Navstar satellites lasted longer in orbit than expected and did not require replacements as quickly as originally planned. This provided additional time to further design the Block IIF. The 1999 GPS Modernization Plan (see below) became the main reason for the Block IIF delay. The government decided to improve the original Block IIF design and

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[12] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 58-59; Briefing Charts, SMC/CZ, "GPS Block IIF Overview," 20 July 1998, p. 2 (Doc 5-53).

[13] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 58-60; Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil/SMC/PA/ Fact Sheets/gps_fs.htm (Doc 5-1); News Release, Boeing, "Boeing Receives GPS IIF Modernization Approval," 13 March 2002, http://www.boeing.com/news/releases/2002/ q1/nr020313s.html (Doc 5-54); Briefing Charts, SMC/CZ, "GPS Block IIF Overview," 20 July 1998, p. 3 (Doc 5-53); E-mail, Cheryl Crouch, SMC/CZY to Robert Mulcahy SMC/HO, "RE: Design life GPS Block IIF," 21 March 2002, (Doc 5-55).

[14] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 59-60; Briefing Charts, SMC/CZ, "GPS Block IIF Overview," 20 July 1998, p. 3 (Doc 5-53).

reduce the number of satellites to 12. The first modernized Block IIF satellite should be delivered in September 2004 and the first launch in December 2005.[15]

On 1 May 2000, President Clinton announced that on 2 May 2000 the Navstar system would stop using Selective Availability (SA) - the intentional degradation of GPS signal accuracy. Until this time, the DoD used SA to reduce the accuracy of the Navstar signals for national security purposes. SA could only be corrected with government-authorized GPS user equipment. The administration halted SA in a continuing effort to be more responsive to the ongoing proliferation of civilian and commercial use of GPS worldwide. Before May 2000, the Standard Positioning Service (SPS) for civilian users pinpointed locations within 100 meters; after the removal of SA the accuracy improved to within 10-20 meters. Assessments would be made annually for the next several years to determine the necessity of SA, but the routine use of SA would be discontinued altogether in 2006. The Air Force was assigned the responsibility to develop a system that could deny GPS signals on a regional basis to nations that might threaten the United States. President Clinton gave the military a 2006 deadline to develop and deploy alternatives to SA that would deny GPS to hostile exploitation. The improved signal for civilian users came as a continuation of President Clinton's 29 March 1996 national policy on the future management and use of GPS. After the terrorist attacks to the United States on 11 September 2001, the IGEB announced on 17 September 2001 that the removal policy on SA would not be changed, and it had no intention of ever using SA again.[16]

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[15] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 59-60; No author, "Pentagon Officials Reconsider FY01 Purchase of Next GPS Satellites," Inside the Air Force, 9 July 1999, (Doc 5-56); E-mail, Lt Col Mario Moya, SMC/CZS, to Robert Mulcahy, SMC/HO, "GPS IIF-Space Vehicle Program Schedule," 6 March 2002, (Doc 5-57); E-mail, Lt Col Mario Moya, SMC/CZS, to Robert Mulcahy, SMC/HO, "Block IIF [Schedule]," 6 May 2002, (Doc 5-58); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, p. 9 (Doc 5-59); Briefing Charts, Brig Gen James Armor, SMC/CZ, "NAVSTAR Global Positioning System Program PEO Portfolio Review," 1 September 1999, p. 19 (Doc 5-37); Memo (FOUO, extract is not FOUO), Maj Gen Larry Northington to the Under Secretary of Defense, "PBD [Program Budget Decision] 172 – Space Programs," 8 November 1999, (Doc 5-60); E-mail, From Lt Col Mario Moya, SMC/CZS, "FW: GPS Block IIF-M," 23 July 2002, (Doc 5-61); E-mail, Lt Col Robert Potter, SMC/PA, to Harry Waldron, SMC/HO, "Point Paper on GPS Modernization," 22 September 2000, (Doc 5-62); Briefing Charts, AFSC/DRN, "Global Positioning System Operational Control Segment (OCS) Information Brief to HQ AFSPC/CC," 15 January 1999, p. 13 (Doc 5-63); Review, SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

[16] White House Press Release, U.S. Coast Guard Navigation Center, "Statement By the President Regarding the United States' Decision To Stop Degrading Global Positioning System Accuracy," 1 May 2000, http://www.navcen.uscg.gov/news/archive/2000/May/

On 25 January 1999, Vice President Gore announced a $400 million GPS Modernization Initiative. This six-year plan would significantly improve GPS capabilities for both military and civilian users. The Modernization would make GPS more responsive to the needs of civilians by adding two new civilian signals to future GPS satellites. In 2001, the single civilian GPS signal (L1) could be located at frequency 1575.42 MHz. The two new civilian signals (L2C and L5) would be located at (L2C) 1227.60 MHz beginning in 2003, and at (L5) 1176.45 MHz beginning in 2005. In 2001, authorized government GPS users could utilize both the L1 civilian signal and the L2 military Precise Positioning Service (PPS) signal. The military would co-locate L2 and the civilian L2C frequency in 2003. The L1 frequency had a low power SPS signal that did not allow for the more precise PPS navigation; L2C would also be a low power civilian signal. The Air Force planned for L5 to be a higher power frequency intended for precision accuracy, possibly yielding an accuracy of within four to five meters.[17]

SA.htm (Doc 5-64); SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 60; Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, p. 10 (Doc 5-6); Briefing Charts, SMC/CZEE, "Military Modernization," 26 June 2001, (Doc 5-65); SMC/PA, "GPS available to public," Astro News, 5 May 2000, p. 4 (Doc 5-66); Briefing Charts, U.S. Department of Transportation, "Global Positioning System, Current Status and Modernization Efforts," 26 November 2001, pp. 17-18, 32 (Doc 5-8); Internet Document, Federal Aviation Administration, "Selective Availability," printed 2 August 2002, http://gps.faa.gov/gpsbasics/SA-text.htm (Doc 5-67); Internet Document, Interagency GPS Executive Board, "Special Notice September 17, 2001," 17 September 2001, http://www.igeb.gov/sa.shtml (Doc 5-68); Internet Document, U.S. Department of State, "US Global Positioning System and European Galileo System," 7 March 2002, http://www.state.gov/r/pa/prs/ps/2002/ 8673.htm (Doc 5-69); Fruehauf and Callaghan, "SAASM and Direct P(Y) Signal Acquisition," GPS World, July 2002, (Doc 5-70); Document (FOUO, extract is not FOUO), SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

[17] Internet Document, United States Coast Guard Navigation Center, "Vice President Gore Announces New Global Positioning System Modernization Initiative," 25 January 1999, http://www.navcen.uscg.gov/news/archive/1999/jan.gpsmodinit.htm (Doc 5-71); SMC History 1994-1997 (FOUO, extract is FOUO), SMC/HO, p. 64; Internet Document, Quality Engineering and Survey Technology Ltd, "GPS Positioning Signals," 1998, http://www.mercat.com/QUEST/Signals.htm (Doc 5-72); Briefing Charts, SMC/CZ, "L2 Civil Signal," 2 May 2001,(Doc 5-73); Paula Shaki, "Upgraded GPS Constellation Will Not Carry Civilian Signals," Space News, 1 February 1999, p. 1 (Doc 5-74); Briefing Charts, Interagency GPS Executive Board, "GPS L5," 2 May 2001, (Doc 5-75); Briefing Charts, SMC/CZC, "L2 and L5 Civil Signal Industry Day," 2 May 2001, (Doc 5-76); Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, pp. 12-15 (Doc 5-6); SMC/PA, "New GPS signal increases accuracy, reliability for civilian users," Astro News, 10 April 1998, p. 6 (Doc 5- 77); Philip Klass, "New GPS Signal Format To Benefit All Users," Aviation Week, 29 June 1998, pp. 60-62 (Doc 5-78); Briefing Charts, U.S. Department of Transportation, "Global Positioning System, Current Status and

The modernization of GPS would greatly improve the navigation accuracy for civilian users, and it would generate billions of dollars in revenue. By 2001, the commercial use of GPS had become far greater than the military use. Civilian GPS users outnumbered military users by a ratio of 100 to one. The price and size of GPS receivers continued to decrease which encouraged the number of GPS users to increase. Stephen Moran (a senior White House policy advisor in 1999) stated that the commercial GPS market had an estimated worth of $10 billion in 1999, and he expected it to reach $13 billion by 2003. The Boeing Company estimated that in 2000 the military would have over 100,000 GPS receivers in use and civilians would have about a million. An estimate in 2000 predicted that all 24 satellites within the GPS constellation would be modernized by 2014-2015.[18]

Modernization Efforts," 26 November 2001, pp. 20-22, 24, 28, 30, 35 (Doc 5-8); Internet Document, Federal Aviation Administration, "Selective Availability," printed 2 August 2002, http://gps.faa.gov/gpsbasics/GPSmodernization-text.htm (Doc 5-67); Internet Document, U.S. Department of State, "US Global Positioning System and European Galileo System," 7 March 2002, http://www.state.gov/r /pa/prs/ps/2002/8673.htm (Doc 5-69); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 10 (Doc 5-9); Briefing Charts, Leonard Coleman, SMC/CZU, "Global Positioning System (GPS) User Equipment (UE)," circa 2000, pp. 1-6 (Doc 5-79); Briefing Charts, SMC/CZ, "The Global Positioning System, A Worldwide Information Utility," February 2001, pp. 37-39 (Doc 5-12).

[18] Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… for Navstar Global Positioning System (GPS)," 27 September 2001, (Doc 5-16); Fact Sheet, The Boeing Company, "GPS IIF," 1999, (Doc 5-80); Fact Sheet, The Boeing Company, "GPS IIF-Modernization (IIF-M)," 2001, (Doc 5-81); Paula Shaki, "GPS Poses Marketing Challenge," Space News, 15 February 1999, p. 10 (Doc 5-82); Peggy Hodge, SMC/PA, "GPS modernization efforts increase capability," Astro News, 31 March 2000, p. 10 (Doc 5-83); Plan (FOUO, extract is not FOUO), SMC/CZ, "Test & Evaluation Master Plan for NAVSTAR GPS (Draft)," 31 August 2001, (Doc 5-84); Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, p. 12 (Doc 5-6); Briefing Charts, SMC/CZC, "L2 and L5 Civil Signal Industry Day," 2 May 2001, (Doc 5-76); Aaron Renenger, "GPS celebrates 20 years of service," Astro News, 13 March 1998, p. 1 (Doc 5-85); Briefing Charts, SMC/CZ, "Global Navigation Satellite System (GNSS)," May 2000, (Doc 5-7); Briefing Charts, U.S. Department of Transportation, "Global Positioning System, Current Status and Modernization Efforts," 26 November 2001, pp. 14-16, 35 (Doc 5-8); Internet Document, Federal Aviation Administration, "GPS Modernization," printed 2 August 2002, http://gps.Faa.govl/gpsbasics/ GPSmodernization-text.htm (Doc 5-86); Internet Document, Interagency GPS Executive Board, "Biennial Report to Congress on the Global Positioning System," October 1998, http://www.igeb.gov/news-old.shtml (Doc 5-87); Memo, White House, "Implementation of the Administration's Global Positioning System (GPS) Policy," 12 August 1998, (Doc 5-88); Briefing Charts, SMC/CZ, "The Global Positioning System, A Worldwide Information Utility," February

The GPS Modernization Plan would also significantly upgrade the military Navstar system. The Deputy Secretary of Defense approved the GPS Modernization Plan on 9 February 2000. In 2001, the GPS military modernization goals included: enhanced accuracy and availability, replacing SA security with a fully-modernized Military Code (M-Code), modernizing the GPS infrastructure (technology, logistics, security and control), and protecting the availability and performance of the current Navstar system for both civilian and military users. The modernization of GPS would significantly improve the GPS Block IIR (creating the Block IIR-M) and the Block IIF satellite systems. Two new military-only Navstar signals (LM1 and LM2) would begin with the GPS Block IIR-M. The increased security of the GPS signals had a high priority in the Modernization Plan. The Office of Civil Aviation Security Intelligence described the threat of individuals, terrorists, or hostile nations jamming GPS domestically or overseas as "negligible" in 2000, but it projected that the threat would rise during the next 15 years.[19]

Military Code (M-Code) would be the next generation of GPS security. M-Code would preserve the exclusivity of GPS service for the U.S. military and its Allies during

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2001, pp. 4, 7, 9-18 (Doc 5-12); Fact Sheet, Cheryl Crouch, SMC/CZY, "10 Most Commonly Asked Questions & Answers on GPS," 2002, (Doc 5-13).

[19] Briefing Charts, SMC/CZEE, "Military Modernization," 26 June 2001, (Doc 5-65); Fact Sheet, The Boeing Company, "GPS IIF," 1999, (Doc 5-80); Fact Sheet, The Boeing Company, "GPS IIF-Modernization (IIF-M)," 2001, (Doc 5-81); Peggy Hodge, SMC/PA, "GPS modernization efforts increase capability," Astro News, 31 March 2000, p. 10 (Doc 5-83); E-mail, Lt Col Robert Potter, SMC/PA, to Harry Waldron, SMC/HO, "Point Paper on GPS Modernization," 22 September 2000, (Doc 5-62); Briefing Charts, SMC/CZC, "L2 and L5 Civil Signal Industry Day," 2 May 2001, (Doc 5-76); Plan (FOUO, extract is not FOUO), SMC/CZ, "Test & Evaluation Master Plan for NAVSTAR GPS (Draft)," 31 August 2001, (Doc 5-84); E-mail, Capt Brian Barker, SMC/CZV, to Robert Mulcahy, SMC/HO, "RE: GPS Modernization," 22 July 2002, (Doc 5-89); Report, U.S. Department of Transportation, "Vulnerability Assessment of the Transportation Infrastructure Relying on the Global Positioning System," 29 August 2001, pp. 35-36, 82 (Doc 5-90); Document, SMC/CZ, "Talking Points 1999 SMC Accomplishments and Challenges for 2000," 12 January 2000, pp. 5-7 (Doc 5-91); Briefing Charts, SMC/CZ, "Global Positioning System Modernization," 29 June 2001, pp. 3 and 6-15 (Doc 5-92); Ed Hazelwood, "FAA Considering Backup for GPS," Aviation Week & Space Technology, 2 February 1998, pp. 58-59 (Doc 5-93); Article, Sandra Erwin, "Security Upgrades Underpin New Satellites and Receivers," National Defense Magazine, June 2000, (Doc 5-94); Briefing Charts, Leonard Coleman, SMC/CZU, "GPS Overview," circa 2000, pp. 2-6 (Doc 5-95); Threat Assessment (FOUO, extract is not FOUO), Office of Civil Aviation Security Intelligence, "GPS Jamming and the Potential Threat to U.S. Civil Aviation: For Official Use Only Version," 21 September 2000, pp. 1, 8 (Doc 5-96).

wartime, and it would protect the availability and performance of GPS for both military and civil users. The Air Force had several objectives for M-Code: better performance and flexibility than SA, improved anti-jamming capabilities through higher power, isolation from preventive jamming, improved security (authenticity, confidentiality, exclusive military-only signals, and the ability to jam or deny an adversary from using the signal), compatibility with coarse acquisition (C/A) code and precise code receivers, and to have operations within the existing L1 and L2 bands. The GPS JPO would be responsible for designing, developing, acquiring, and certifying M-Code. At the end of fiscal year (FY) 2001, M-Code continued in its risk assessment phase that should be completed in January 2003. The M-Code source selection process should begin in April 2003. M-Code should be operational in 2010.[20]

The GPS Modernization Plan would upgrade up to 12 of the 14 GPS Block IIR satellites that had been in storage. SMC awarded a $53 million contract (FO4701-00-C-0006) to the Lockheed Martin Missiles and Space Company on 18 August 2000 to produce the modernized GPS Replenishment satellites (Block IIR-M). The affected GPS Block IIR satellites would be retrofitted with improved and additional capabilities during the modernization process. The Block IIR-M would provide greater navigation accuracy than the Block IIR, have increased signal power, include better resistance to jamming, plus it would add two new military signals (LM1 and LM2) and the new L2C civilian signal. On 30 March 2001, SMC awarded a $110,170,885 modification to the GPS Block IIR-M contract (FO4701-00-C-0006, P00006) with Lockheed Martin. By the end of October 2001, the $53 million GPS Block IIR-M contract (FO4701-00-C-0006) had increased in value to $193 million. The Air Force scheduled the first Block IIR-M launch (Block IIR-M 12) for July 2004.[21]

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[20] Briefing Charts, SMC/CZEE, "Military Modernization," 26 June 2001, (Doc 5-65); Briefing Charts, SMC/CZ, "GPS IIF Modernization," 14 June 1999, (Doc 5-97); Threat Assessment (FOUO, extract is not FOUO), Office of Civil Aviation Security Intelligence, "GPS Jamming and the Potential Threat to U.S. Civil Aviation: For Official Use Only Version," 21 September 2000, pp. 1, 8 (Doc 5-96); Bob Brewin, "Rogue transmitter knocks out GPS signals," Federal Computer Week, 13 April 1998, p. 1 http://ebird.dtic.mil/ supplement/04159technology.htm (Doc 5-98); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "M-Code User Equipment (MUE)," 29 May 2002, (Doc 5-99); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 48 (Doc 5-9); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 22-24 (Doc 5-59); E-mail, Oliver Huon, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: M-Code Summary," 16 October 2002, (Doc 5-100); Review, SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1); Conversation, Capt Kevin Traw, SMC/CZU, with Robert Mulcahy, SMC/HO, "[Dates for M-Code Source Selection and Completion]," 26 March 2003.

[21] Internet Document, DefenseLink, "Contracts," 18 August 2000, http://www. defenselink.mil/news/Aug2000/c08182000_ct513-00.html (Doc 5-101); Fact Sheet, Lockheed Martin, "Global Positioning System IIR," 2001, http://www.lockheedmartin.

The GPS Modernization Plan also upgraded the GPS Block IIF design. On 23 August 2000, SMC awarded a $123 million modification to its Navstar Block IIF contract (F04701-96-C-0025) with The Boeing Company to modernize the original design of the Block IIF. The updated GPS Block IIF would have the capabilities of the original Block IIF design, plus several enhancements. The modernized Block IIF design added: signals for both the military (LM1 and LM2) and civilian (L2C and L5) GPS frequencies, upgraded jam resistance, increased the military signal power, had faster signal acquisition, would improve the security codes, and gained spectral separation from civilian signals. The acquisition strategy for the modernized Block IIF gained approval from the Air Force on 28 February 2001; the Air Force received the modernization development proposal from The Boeing Company in July 2001; and the Air Force received the modernization production proposal from Boeing in September 2001. The Boeing Company (not the Air Force) often used the designation "Block IIF-M" when referring to the modernized GPS Block IIF satellite. A modernized Block IIF satellite had an estimated cost of about $60 million, not including non-recurring costs. The Air Force planned to acquire 12 modernized Block IIF satellites (reducing the number from the original 1996 desire for 33 Block IIF satellites), with a delivery schedule of three satellites per year from 2005-2008.[22]

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com/factsheets/product434.html (Doc 5-102); Specification Change Notice (FOUO, extract is not FOUO), Lockheed Martin, "GPS Replenishment Satellites (Block IIR) Modernization," 8 November 2001, (Doc 5-103); E-mail, Karen Cox, SMC/PKX, to Harry Waldron, SMC/HO, "Request for Historical Data," 7 February 2002, (Doc 5-104); Issue Paper, Congress, "GPS Modernizaton," 2000, (Doc 5-105); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 5-7 (Doc 5-59); Internet Document, DefenseLink, "Contracts," 30 March 2001, http://www.defenselink.mil/news/ Mar2001/c03302001_ct138-01.html (Doc 5-106); Memo, Under Secretary of Defense to Assistant Secretary of the Air Force et al., "NAVSTAR Global Positioning System (GPS) Acquisition Decision Memorandum (ADM)," 8 May 2000, (Doc 5-107); Briefing Charts, SMC/CZ, "Global Positioning System Modernization," 29 June 2001, pp. 3 and 6-11 (Doc 5-92); Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, pp. 8, 13-14 (Doc 5-6); 45th Space Wing Annual History 2001 (FOUO, extract is not FOUO), 45 SW/HO, p. 42; Briefing Charts, SMC/CZ, "Control Segment Overview," 29 May 2002, p. 11 (Doc 5-108); News Release, Lockheed Martin, "U.S. Air Force awards Lockheed Martin $53 million contract to modernize GPS IIR satellites," 11 September 2000, http://lmms.external.lmco.com/newsbureau/pressreleases/2000/00.109.html (Doc 5-109); Award, SMC/CZ, "GPS Team Excellence (Apr – Jun 01), Block IIR-M Contracting Team," 2001, (Doc 5-110); Review, SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

[22] Briefing Charts, SMC/CZ, "GPS IIF Modernization," 14 June 1999, (Doc 5-97); Fact Sheet, The Boeing Company, "GPS IIF-Modernization (IIF-M)," 2001, (Doc 5-81); Fact Sheet, The Boeing Company, "GPS IIF," 1999, (Doc 5-80); Internet Document, DefenseLink, "Contracts," 23 August 2000, http://www.defenselink.mil/news/Aug2000/

The GPS Block III satellite program became the latest generation of the Navstar system to begin development. The Air Force conceived of the Block III in late 1999, and it received approval from the Deputy Secretary of Defense in February 2000. On 8 May 2000, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)), Jacques S. Gansler, signed the Acquisition Decision Memo (ADM) that gave approval for the Block III to begin modernization activities. The GPS Block III took an evolutionary approach in its development by continuing to upgrade and improve the past and present Navstar satellite system. The upgrade of GPS began in order to provide the future navigation and time needs worldwide for both military and civilian users. The goals for the Block III included: improved navigation and time transfer accuracy, increased power for anti-jamming, better signal integrity, improved availability, and the ability to prevent its use by adversaries. Future advances could include upgrades to the entire Navstar system: the space constellation, operations, ground support, telemetry, and the user equipment segments. The Air Force predicted that operational service of the GPS Block III would be from approximately 2009-2030.[23]

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c08232000_ct518-00.html (Doc 5-111); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 7-9 (Doc 5-59); Memo, Under Secretary of Defense to Assistant Secretary of the Air Force et al., "NAVSTAR Global Positioning System (GPS) Acquisition Decision Memorandum (ADM)," 8 May 2000, (Doc 5-107); Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, pp. 13, 15 (Doc 5-6); Internet Document, Space Daily, "Boeing To Study GPS 3 Options," 13 November 2000, http://www.spacedaily.com/news/gps-00p.html (Doc 5-112); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… for Navstar Global Positioning System (GPS)," 27 September 2001, (Doc 5-16); E-mail, Lt Col Mario Moya, SMC/CZS, to Cheryl Crouch, SMC/CZY, "FW: Block IIF SV cost," 25 July 2002, (Doc 5-113); Briefing Charts, SMC/CZEE, "Military Modernization," 26 June 2001, (Doc 5-65); Briefing Charts, SMC/CZ, "Global Positioning System Modernization," 29 June 2001, pp. 3 and 6-13 (Doc 5-92); Award, SMC/CZ, "GPS Team Excellence (Jan – Mar 01), GPS Block IIF Team," 2001, (Doc 5-114); E-mail, Lt Col Mario Moya, SMC/CZS, to Cheryl Crouch, SMC/CZY, "FW: GPS Block IIF-M," 23 July 2002, (Doc 5-61); E-mail, Lt Col Mario Moya, SMC/CZS, to Cheryl Crouch, SMC/CZY, "FW: Block IIF SV cost," 23 July 2002, (Doc 5-115).

[23] Briefing Charts, SMC/CZ, "Brief to Industry on GPS III," 19 June 2001, (Doc 5-116); Internet Document, SMC/CZV, "Research and Development Sources Sought – Global Positioning System (GPS) III Component Advanced Development," 12 June 2001, (Doc 5-117); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Pre-Acquisition Strategy Panel GPS III Program (Draft)," 29 April 2002, pp. 4, 7 (Doc 5-118); Memo, Under Secretary of Defense to Assistant Secretary of the Air Force et al., "NAVSTAR Global Positioning System (GPS) Acquisition Decision Memorandum (ADM)," 8 May 2000, (Doc 5-107); Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, pp. 25-35 (Doc 5-6); Briefing Charts, U.S. Department of Transportation, "Global Positioning System, Current Status and Modernization Efforts," 26 November 2001,

The initial Block III acquisition strategy planned for a three-phase program: concept exploration, pre-acquisition, and acquisition and operations. Two prime contractors would be sustained through the first two stages. The pre-acquisition stage planned to award a $100 million contract for the 27-month project that would produce a System Design Review (SDR). A full and open competition for the Block III would award a single acquisition and operations contract. The Air Force revised this acquisition strategy in 2002.[24]

On 11 August 2000, the GPS JPO issued a Request For Proposal (RFP) (F04701-00-R-8031) to solicit potential contractors who could conduct an architecture study for the concept exploration phase of the Block III. The primary objective of the System Architecture and Requirements Definition (SARD) Study was "to assess system wide architectural alternatives that will satisfy the currently defined but evolving military and civilian needs for a space based navigating, timing and nuclear detonation detection system through 2030, and reduce total ownership cost."[25] The RFP had a deadline of 11 September 2000. SMC awarded $16 million firm fixed price contracts to The Boeing Company (FO4701-01-C-0010) and Lockheed Martin (FO4701-01-C-0008) on 8 November 2000 to conduct the 12-month GPS III SARD Study.[26]

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pp. 26-28 (Doc 5-8).

[24] Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Pre-Acquisition Strategy Panel GPS III Program (Draft)," 29 April 2002, p. 27 (Doc 5-118); Discussion, Capt Oscar King, SMC/CZE, and Robert Mulcahy, SMC/HO,"GPS III Acquisition Strategy revised in 2002," 6 May 2002.

[25] Memo, SMC/CZK to all potential offerors, "Executive Summary for GPS III Architecture Studies, Final Request For Proposal (RFP), F04701-00-R-8031," 11 August 2000, (Doc 5-119).

[26] Memo, Col Douglas Loverro, SMC/CZ, to potential offerors, "GPS III Architecture Studies," 10 August 2000, (Doc 5-120); Memo, SMC/CZ, "Charter for the Government System Architecture and Requirements Definition (SARD) Team (Draft)," no date, (Doc 5-121); Memo, SMC/CZ, "NAVSTAR GPS III Architecture Study Statement of Objectives," 11 August 2000, (Doc 5-122); Briefing Charts, SMC/CZ, "Brief to Industry on GPS III," 19 June 2001, p. 15 (Doc 5-116); Briefing Charts, SMC/CZ, "Global Positioning System Modernization," 29 June 2001, pp. 9 and 20 (Doc 5-92); E-mail, Karen Cox, SMC/PKX, to Harry Waldron, SMC/HO, "Request for Historical Data," 7 February 2002, (Doc 5-104); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, p. 2 (Doc 5-59); Internet Document, Space Daily, "Boeing To Study GPS 3 Options," 13 November 2000, http://www.spacedaily.com/news/gps-00p. html (Doc 5-112); Internet Document, Lockheed Martin, "Air Force Awards Lockheed Martin $16 million contract to begin architecture study for next generation Global Positioning System," 9 November 2000,

On 4 June 2001, a Commerce Business Daily announcement listed a notice in advance of an RFP that supported the concept technology and development phase of GPS Block III. The RFP solicited qualified contractors about conducting the Block III Component Advanced Development (CAD) effort. The response date occurred on 12 June 2001. The CAD required the contractor to identify and reduce the system and component risks involved in developing the satellite to provide future Position/Velocity/ Timing (PVT), NUDET, and other civilian and military GPS missions. The effort included the entire Navstar system, and it could alter the operational control, ground support, space constellation, signals-in-space, and the user equipment. The main CAD goal was to remove GPS risk. Up to two $100 million CAD "cost type contracts" would be awarded in January/February 2002 for the minimum 24-month effort.[27]

By the end of FY 2001, the GPS Block III Program Office continued its research to determine the next generation's navigation, timing and NUDET requirements that the Block III would need to acquire. In June 2001, the initial schedule for the Block III acquisition strategy required the SARD Study to be completed by early 2002; the CAD should begin in mid 2002 and finish in mid 2004; the integration-demo (Block III prototype and the required support systems to be acquired and demonstrated) should start in mid 2004 and finish by January 2006; and the production and deployment of the Block III should start in January 2007 and continue into mid 2010.[28]

The European Union planned to compete with GPS in the near future by developing the "Galileo" satellite navigation system. Galileo would be used for nonmilitary navigation purposes that would benefit civilian users. The project received

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http://www.lockheedmartin.com/news/articles/ 110900_1.html (Doc 5-123); Award, SMC/CZ, "GPS Team Excellence (Jul – Sep 00), GPS III RFP Team," 2000, (Doc 5-124); Award, SMC/CZ, "GPS Team Excellence (Oct – Dec 00), GPS III SARD Source Selection Team," 2000, (Doc 5-125).

[27] Briefing Charts, SMC/CZ, "Brief to Industry on GPS III," 19 June 2001, pp. 16-17 (Doc 5-116); Internet Document, Space Daily, "Boeing To Study GPS 3 Options," 13 November 2000, http://www.spacedaily.com/news/gps-00p.html (Doc 5-112); Document, SMC/CZV, "Research and Development Sources Sought – Global Positioning System (GPS) III Component Advanced Development," 12 June 2001, (Doc 5-117).

[28] Internet Document, U.S. Coast Guard Navigation Center, "GPS III Statement of Objectives," 30 August 2001, http://www.navcen.uscg.gov/gps/modernization/default.htm (Doc 5-126); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Pre-Acquisition Strategy Panel GPS III Program (Draft)," 29 April 2002, pp. 4, 7 (Doc 5-118); Briefing Charts, SMC/CZ, "Global Positioning System Modernization," 29 June 2001, p. 19 (Doc 5-92); Discussion, Rita Lollock, Aerospace Corporation, with Robert Mulcahy, SMC/HO, 16 May 2002.

its funding from the European Commission and had an estimated total cost of 3.4 billion Euros. The initial authorization for Galileo provided 550 million Euros; 100 million had been spent on it in 2001. The European Space Agency planned for Galileo to be equal to, or better than, the future accuracy of the modernized GPS Block IIF. Studies conducted by the European Union estimated that Europe would generate up to $270 billion in domestic equipment sales, exports and services with Galileo by 2025. Supporters of Galileo also stated that Europe needed its own navigation space system in case the United States decided to limit or halt the general use of GPS during wartime. In 2001, Galileo continued in its definition phase. The schedule for Galileo required its development and validation phase to be conducted from 2002-2005, and the constellation deployment phase from 2006-2007. The European Space Agency planned to have Galileo fully operational in 2008.[29]

The U.S. government did not see a compelling need for Galileo because of the availability of GPS to meet the world's needs. Nevertheless, the United States decided to negotiate with the European Commission in a cooperative effort to make GPS and Galileo compatible and interoperable. In October 2000, a team from the United States began proposing a GPS-Galileo agreement with the European Commission that could include mutual benefits, interoperability between GPS and Galileo, security, and trade. The State Department expected these talks to continue through 2002.[30]

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[29] Internet Document, The European Union On-Line, "Galileo," 19 April 2002, http://www.europa.eu.int/comm/energy_transport/en/gal_en.html (Doc 5-127); Briefing Charts, SMC/CZ, "Global Navigation Satellite System (GNSS)," May 2000, (Doc 5-7); No author, "GPS Funding Cut Could Endanger U.S. Leadership in Satellite Navigation," Inside the Air Force, 2 July 1999, (Doc 5-128); Paula Shaki Trimble, "Tighter Budget Would Force GPS Upgrade Delay," Space News, 13 September 1999, pp. 10-11 (Doc 5-129); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Pre-Acquisition Strategy Panel GPS III Program (Draft)," 29 April 2002, p. 52 (Doc 5-118); No author, "Raytheon subsidiary wins contract for GPS/ Galileo receiver," Aerospace Daily, p. 6 (Doc 5-130); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 31 (Doc 5-9).

[30] Internet Document, U.S. Department of State, "U.S. Global Positioning System and European Galileo System," 7 March 2002, http://www.state.gov/r/pa/prs/ps/2002/8673.htm (Doc 5-69); E-mail, Cheryl Crouch, SMC/CZY, to Robert Mulcahy, SMC/HO, "Navstar GPS Joint Program Office 2001 AFA Aerospace Award 'Citation of Honor' Nomination," 6 August 2002, (Doc 5-52); Internet Document, Sandra Erwin, "Europe's Galileo Plans to Challenge U.S. GPS Dominance," National Defense Magazine, June 2000, https://www.nationaldefensemagazine.org/article.cfm?Id=8 (Doc 5-131).

CONTROL SEGMENT

The GPS Operational Control Segment (OCS) monitored and updated the navigation messages broadcast by the Navstar satellites, it tracked the satellites, it sent commands to them, and the OCS received and analyzed telemetry from them about the health and status of the satellites. The control segment included the Master Control Station (MCS), the interim Backup MCS, the future permanent Alternate Master Control Station (AMCS), ground antennas, monitor stations, and the Air Force Satellite Control Network (AFSCN). The Lockheed facility at Gaithersburg, Maryland had the interim Backup MCS, and the AMCS at Vandenberg AFB, California should be operational in November 2003. Using remote control, the MCS at Schriever AFB operated the unmanned GPS monitor stations at Schriever AFB, Cape Canaveral, Hawaii, Kwajalein Atoll, the island of Diego Garcia and Ascension Island. The ground antennas had locations at Cape Canaveral, Kwajalein, Diego Garcia, and Ascension. The monitor stations passively tracked all of the Navstar satellites in view, collected ranging data from them, and passed the data on to the MCS. The MCS generated satellite locations and clock parameters, then uploaded this data to each satellite for retransmission in the satellite's navigation signal.[31]

The GPS JPO developed, acquired, and sustained the ground control segment that effectively controlled and supported the Navstar constellation. This included OCS software development, configuration management, plus the support and system integration testing for operations crews. The JPO also provided the initial training and documentation for new upgrades, modifications, or new technology.[32]

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[31] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 64; Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2000, http://www.losangeles.af.mil /SMC/PA/Fact_Sheets/gps_fs.htm (Doc 5-1); Briefing Charts, Brig Gen Dan Leaf, AF/XOR, "Navigation," 6 November 2000, p. 8 (Doc 5-30); Plan, SMC/CZ and Space and Control Sustainment Division Peterson AFB, "NAVSTAR Global Positioning System Space and Control Segments Product Support Management Plan (Draft #1)," March 2002, pp. 4-8, 11 (Doc 5-41); Fact Sheet, SMC/CZ, "Ground Antenna (GA)," 8 April 2001, http://gps.losangeles.af.mil/control/ga.htm (Doc 5-132); Fact Sheet, SMC/CZ, "Monitor Stations (MS)," 8 April 2001, http://gps.losangeles.af.mil/control/ms .htm (Doc 5-133); Plan (FOUO, extract is not FOUO), SMC/CZ, "Test & Evaluation Master Plan for NAVSTAR GPS (Draft)," 31 August 2001, p. 2 (Doc 5-84); Briefing Charts, SMC/CZ, "Control Segment Overview," 29 May 2002, p. 5 (Doc 5-108); Fact Sheet, Cheryl Crouch, SMC/CZY, "10 Most Commonly Asked Questions & Answers on GPS," 2002, (Doc 5-13).

[32] Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… NAVSTAR Global Positioning System (GPS)," 26 May 1998, p. 3 (Doc 5-21); Program Management Directive (PMD) (FOUO, extract is not FOUO), Office of the Assistant Secretary of the Air Force, "PMD 4075… NAVSTAR Global Positioning System (GPS)," 20 March 2000, pp. 2-3 (Doc 5-22); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… for

In 1990, the JPO awarded an OCS software contract (F04701-90-C-0009) to IBM Federal Systems. In January 1994, IBM sold its Federal Systems division to the Loral Corporation and the division changed its name to Loral Federal Systems. Under that contract, IBM developed and coded three packages of software for the GPS legacy mainframe system. The first package, called Operational Release (OR) 5.30, contained software that enhanced the Block II and Block IIA operations at Falcon AFB beginning in May 1993. The second package (OR 5.40) was turned over to Space Command in June 1994; it corrected software deficiencies and automatically detected and reported navigation anomalies. The third package, OR 6.00, provided software to support the Block IIR satellites. SMC divided OR 6.00 into two increments, 6.00A and 6.00B. The delivery of the last software release for OR 6.00A occurred in September 1995.[33]

The work for the Block IIR under OR 6.00B became part of a new contract known as the GPS OCS Support Contract (GOSC). The GOSC simplified the whole area of ongoing software support for the OCS legacy system, including system development, maintenance and sustainment. To combine these efforts, the Sacramento Air Logistics Center at McClellan AFB, California awarded Loral Federal Systems a five-year contract (FO4606-95-D-0239) valued at $400 million on 24 July 1995. Lockheed Martin purchased Loral Federal Systems, and in January 1996 it became known as "Lockheed Martin Federal Systems."[34]

Lockheed Martin conducted the development work for the GOSC contract in Gaithersburg and the maintenance work at Falcon AFB. The numbering system for the legacy software package operational releases changed to a year-release format (OR 96-1, for example). Lockheed Martin at Gaithersburg combined all of the contents for OR 5.30 through OR 6.A into OR 96-1 for the Block IIR. A new GPS software release would accumulate the previous "drops" (fixes) into an upgraded software version while installing new operational enhancements. The basic OR 96-1 software release had 14 drops and 152 Software Change Requests (SCR) from the Air Force that directed Lockheed to correct the deficiencies and provide enhancements to the "baseline system" (the latest configurationally managed and established software). GPS software OR 97-1 followed in 1997.[35]

Navstar Global Positioning System (GPS)," 27 September 2001, (Doc 5-16); Plan, SMC/CZ and Space and Control Sustainment Division Peterson AFB, "NAVSTAR Global Positioning System Space and Control Segments Product Support Management Plan (Draft)," March 2002, p. 8 (Doc 5-41).

[33] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 65-66.

[34] *Ibid* (FOUO, extract is not FOUO), p. 66; Internet Document, DefenseLink, "Contracts," 24 July 1995, http://www.defenselink.mil/news/ Jul1995/c072495_ct401-95.html (Doc 5-134).

In 1998, the legacy mainframe system software package release OR 98-1(M) included the fixes needed to ensure that GPS would be compliant for the Year 2000 (Y2K) computer rollover. The software developers/maintainers started the Y2K process early to ensure success. The OR 98-1(M) would be the last software release prior to 2000. Lockheed had a total of 22 drops and 57 SCRs for OR 98-1(M) to correct as the software problems were discovered, corrected and then updated (or installed) with the improved software. Two of the notable drops included Drop 20 (Nuclear Augmentation Payload Displays) and Drop 22 that updated all the operational displays to support Y2K.[36]

After OR 98-1(M) bad been installed into the legacy system, the numbering format for the software package releases changed to the release number and the year (01-2001, for example). Due to the lag time from the start of OR 98-1(M) through the installation of the last drop (Drop 22, Addendum 1), an attempt was made to reduce the number of drops by permitting multiple software releases per year; this reduced the number of drops by about 50 percent.[37]

Five legacy system software releases followed the release of OR-98(M) by the end of 2001. The OR 01-2001 had its delivery on 22 May 2001; it included 34 SCRs from OR 98-1(M) that had been "baselined" (fixed, installed, and officially established). The OR 02-2001 release had its delivery on 1 October 2001; it included 10 SCRs from OR 01-2001 that had been baselined.[38]

To further support the GOSC efforts, the JPO awarded a modification of the GOSC contract known as the Station Computer System Replacement (SCSR) contract to

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[35] Document, 1Lt Fred Yates, SMC Det 11/CZGI, and Benjiman Alcorn, Det 11/CZGI, "The SMC Historical Description of the Software Upgrades for the GPS OCS 1990 to 2000," 12 September 2002, (Doc 5-135); E-mail, 1Lt Fred Yates, Det 11/CZGI, to Robert Mulcahy, SMC/HO, "RE: baseline definitions," 18 October 2002, (Doc 5-137).

[36] Document, 1Lt Fred Yates, SMC Det 11/CZGI, and Benjiman Alcorn, Det 11/CZGI, "The SMC Historical Description of the Software Upgrades for the GPS OCS 1990 to 2000," 12 September 2002, (Doc 5-135).

[37] Document, 1Lt Fred Yates, SMC Det 11/CZGI, and Benjiman Alcorn, Det 11/CZGI, "The SMC Historical Description of the Software Upgrades for the GPS OCS 1990 to 2000," 12 September 2002, (Doc 5-135); E-mail, 1Lt Fred Yates, Det 11/CZGI, to Robert Mulcahy, SMC/HO, "RE: Control Segment Summary," 16 October 2002, (Doc 5-136).

[38] Document, 1Lt Fred Yates, SMC Det 11/CZGI, and Benjiman Alcorn, Det 11/CZGI, "The SMC Historical Description of the Software Upgrades for the GPS OCS 1990 to 2000," 12 September 2002, (Doc 5-135); E-mail, 1Lt Fred Yates, Det 11/CZGI to Robert Mulcahy, SMC/HO, "RE: baseline definitions," 18 October 2002, (Doc 5-137).

Lockheed Martin Federal Systems on 12 April 1996. The SCSR efforts intended to upgrade the obsolete hardware at the sites used to monitor the quality of the GPS navigation signal, and to provide improved telemetry, tracking, and command of the GPS constellation. The SCSR would be phased in as part of the Architecture Evolution Plan (AEP), and it would be used operationally with the aging legacy system during the transition. The Monitor Station Receiver Element (MSRE) equipment and software would also be installed at each of the monitor stations to upgrade the monitoring portion of SCSR upgrade. SCSR OR 1.0 would be the initial SCSR software release and the baseline for the SCSR system. After its installation, SCSR would provide a distributed architecture for each of the GPS ground antenna sites and the co-located monitor stations. The SCSR OR 1.0 release upgraded to SCSR OR 2.0 (delivered on 18 December 1998), which later upgraded to SCSR OR 3.0.[39]

The Air Force installed SCSR at Schriever AFB and Cape Canaveral in 2000-2001. After SCSR had been deployed to Kwajalein in 2000-2001, four deployment critical issues were discovered. The critical issues delayed the continued installation of SCSR until the problems could be resolved. Upgrades SCSR OR 3.4 and SCSR OR 3.4.1 corrected three of the issues, and MSRE OR 01-2002 corrected the fourth issue. The GPS JPO hoped to complete the SCSR deployments at Diego Garcia, Ascension, and Hawaii in the first half of FY 2002.[40]

In January 1997, SMC issued Boeing a contract modification (F04701-96-C-0025) to conduct a three-part upgrade of the OCS known as the Accuracy Improvement Initiative (AII). The overall effect of the AII would he to improve the accuracy of GPS for military users from 8 meters to less than 4.5 meters. The AII would also help the GPS monitoring stations track the satellites in the Navstar constellation. In 2001, a GPS satellite could be invisible from any Air Force monitoring station for up to two hours, but with AII the visibility gaps would be eliminated. The software development for AII

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[39] SMC History 1994-1997 (FOUO, extracts are U), SMC/HO, pp. 66-67; Document, 1Lt Fred Yates, SMC Det 11/CZGI, and Benjiman Alcorn, Det 11/CZGI, "The SMC Historical Description of the Software Upgrades for the GPS OCS 1990 to 2000," 12 September 2002, (Doc 5-135); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 17-18 (Doc 5-59); E-mail, 1Lt Fred Yates, SMC Det 11/CZGI, to Robert Mulcahy, SMC/HO, "RE: SCSR," 18 October 2002, (Doc 5-138).

[40] 1Lt Fred Yates, SMC Det 11/CZGI, and Benjiman Alcorn, Det 11/CZGI, "The SMC Historical Description of the Software Upgrades for the GPS OCS 1990 to 2000," 12 September 2002, (Doc 5-135); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 17-18 (Doc 5-59).

should be conducted from 1 July 2002 to 30 November 2002. The deployment of AII should occur with the release of the Architecture Evolution Plan (AEP).[41]

Between 1998-2001, the GPS OCS had to develop or produce major upgrades in support of the GPS Modernization Plan. This included upgrading the monitoring stations and ground antennas with new digital receivers and computers. Software would have to be produced for the Navstar satellite upgrades (Blocks IIR-M and IIF) and for the new civil and military signals (M-Code, L2C and L5). The AII and the AEP would also continue to be developed. To fund the Modernization of the OCS, SMC modified its Boeing contract for the GPS Block IIF (F04701-96-C-0025). The predicted competition to GPS from the future Galileo system was a large incentive for conducting the OCS upgrade.[42]

In January 1999, an OCS Transition Plan described the challenges the OCS would have to overcome for the GPS Modernization Plan to succeed. Representatives from SMC and AFSPC considered the OCS Transition Plan a very high risk, and they had serious concerns that they would not be able to support the GPS Modernization activities until the Block IIF OCS was fully operational. The OCS upgrades had already encountered problems with funding, delays, and replanning. If the problems continued, the OCS upgrade and replacement schedule could have delayed the entire GPS Modernization Plan. The setbacks could also have jeopardized the GPS Launch Sustainment Strategy that maintained 24 operational satellites on-orbit. One estimate predicted that any launch slips beyond FY 2003 would result in 22 GPS satellites on-

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[41] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 67; Briefing Charts, SMC/CZ, "Control Segment Overview," 29 May 2002, p. 42-49 (Doc 5-108); Press Release, Lockheed Martin, "U.S. Air Force and Lockheed Martin Celebrate Tenth Anniversary of Global Positioning System Ground Control System," 21 April 1997, http://www.missionsystems.lockheedmartin.com/announce/releases/ocs1.html (Doc 5-139).

[42] Briefing Charts, HQ AFSPC and SMC, "Global Positioning System Operational Control Segment (OCS) Information Brief to HQ AFSPC/CC," 15 January 1999, p. 4 (Doc 5-63); Briefing Charts, SMC/CZ, "Control Segment Overview," 29 May 2002, p. 4 (Doc 5-108); Plan, SMC/CZ and Space and Control Sustainment Division Peterson AFB, "NAVSTAR Global Positioning System Space and Control Segments Product Support Management Plan (Draft #1)," March 2002, p. 8 (Doc 5-41); No author, "Pentagon Officials Reconsider FY01 Purchase of Next GPS Satellites," Inside the Air Force, 9 July 1999, (Doc 5-56); Internet Document, DefenseLink, "Contracts," 5 July 2000, http://www.defenselink.mil/news/Jul2000/c07052000_ct380-00.html (Doc 5-140); Internet Document, DefenseLink, "Contracts," 1 February 2001, http://www.defenselink.mil/news/Feb2001/c02012001_ct050-01.html (Doc 5-141); Fact Sheet, Aerospace Corporation, "Range Safety," 9 June 2000, http://aero.org/controlsystems/range-safety.html (Doc 5-141-1).

orbit. The OCS Transition Plan had to mitigate many acquisition and operations issues for the plan to succeed.[43]

At the end of 2001, the OCS continued to use the legacy mainframe system to control the GPS satellites. The Air Force planned to replace the legacy system by transitioning the current 1970s-era hardware and software to a distributed architecture called the Architecture Evolution Plan (AEP) that would improve and modernize the OCS system. The Air Force had been developing AEP since about 1997. The legacy system continued to become unsupportable, and its software was difficult to modify and maintain. Despite AEP, legacy would be upgraded to support the Block IIR-M, and it would be modernized to support the developmental testing and evaluation of M-Code and L2C. AEP would use modern Commercial Off-The-Shelf (COTS) workstation architecture that would be network based, include distributed processing, have modular implementation, and would add new GPS Block IIR-M and IIF capabilities. The Air Force planned to develop and deploy AEP into the OCS system incrementally to reduce program risks and to support the Block IIF launch schedule. The Air Force would continue to sustain the legacy system until AEP becomes operational and stable. AEP should be operationally usable in 2005. SMC participated in the development of AEP by coordinating the plans to bring the new GPS architecture on line for the operational transition from legacy.[44]

To support AEP, new software had to be developed. The Version 3/4 Software would be the initial baseline for the stepped implementation of the new architecture. The Version 3/4 would be used for the testing and early assessment of AEP. It had the capabilities to functionally support the GPS Block II, IIA and IIR satellites within the AEP architecture, and it was integrated in August-September 2001. Version 5.0 (interim build) Software would be a major COTS upgrade, and it initiated its incremental fielding approach in 2001; Version 5.0 was scheduled to begin its incremental deliveries in July 2002 and start operations in January 2005. Version 5.1 (interim build) would be delivered at about the same time as Version 5.0. Version 5.2 would have Tracking,

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[43] Briefing Charts, HQ AFSPC and SMC, "Global Positioning System Operational Control Segment (OCS) Information Brief to HQ AFSPC/CC," 15 January 1999, (Doc 5-63).

[44] Plan, SMC/CZ and Space and Control Sustainment Division Peterson AFB, "NAVSTAR Global Positioning System Space and Control Segments Product Support Management Plan (Draft #1)," March 2002, pp. 14-17 (Doc 5-41); E-mail, 1Lt Fred Yates, SMC Det 11/CZGI, to Robert Mulcahy, SMC/HO, "RE: AEP and software Versions," 30 September 2002, (Doc 5-142); Briefing Charts, SMC/CZ, "GPS Operations Control Segment Program," 29 May 2002, (Doc 5-143); E-mail, Cheryl Crouch, SMC/CZY, to Robert Mulcahy, SMC/HO, "Navstar GPS Joint Program Office 2001 AFA Aerospace Award 'Citation of Honor' Nomination," 6 August 2002, (Doc 5-52); Briefing Charts, SMC/CZ, "Control Segment Overview," 29 May 2002, pp. 6-10, 20-2 (Doc 5-108).

Telemetry and Commanding (TT&C) capabilities for the Block IIR-M (M-Code and L2C) and the Block IIF (M-Code, L2C and L5); Version 5.2 was scheduled to support the first Block IIF launch in October 2005. Versions 5.3 and 5.5 would provide the remaining Block IIF capabilities, add AMCS mission operations transfer, and would include Selective Availability Anti-Spoofing Module (SAASM) for signal security. Full Modernization would be accomplished when Software Version 6.0 becomes operational and provides the upgraded Block IIF capabilities. Version 6.0 should begin its development in July 2003, have delivery in September 2005, and become operational in March 2007. By the end of 2001, 1.4 million Software Lines Of Code (SLOC) had been tested and delivered as the first installment of AEP for the OCS.[45]

The OCS continued to develop the Launch and Early Orbit, Anomaly Resolution and Disposal Operations (LADO) System that would replace the Air Force Satellite Control Network's (AFSCN) GPS Command and Control System (CCS) upon its deactivation. The AFSCN CCS was a mainframe-based system similar to the legacy system. The CCS supported launches, anomaly resolution, and disposal operations, but it had no capabilities for the Block IIF; CCS should be deactivated in October 2004. The LADO System would be a workstation COTS-based system architecture that would support the current GPS satellites and would add new capabilities for the Block IIF.[46]

USER SEGMENT

The GPS JPO developed, acquired, tested, and sustained the military GPS User Equipment (UE) for multi-service requirements. Whenever possible, the JPO incorporated the requirements of the Allied militaries into the UE development. The JPO also managed and sustained the UE with Precise Positioning Service (PPS) capability for authorized U.S. agencies and DoD users, Allied military forces, and for friendly nations.

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[45] Briefing Charts, SMC/CZ, "GPS Modernization," 15 January 2002, p. 16 (Doc 5-6); E-mail, Cheryl Crouch, SMC/CZY, to Robert Mulcahy, SMC/HO, "Navstar GPS Joint Program Office 2001 AFA Aerospace Award 'Citation of Honor' Nomination," 6 August 2002, (Doc 5-52); Briefing Charts, SMC/CZ, "GPS Operations Control Segment Program," 29 May 2002, (Doc 5-143); Briefing Charts, SMC/CZ, "Control Segment Overview," 29 May 2002, pp. 12-14, 25-26, 36 (Doc 5-108); E-mail, Dennis Midzor, SMC Det 11/CZGA, to Robert Mulcahy, SMC/HO, "RE: Version 3/4," 25 October 2002, (Doc 5-144).

[46] Briefing Charts, SMC/CZ, "GPS Operations Control Segment Program," 29 May 2002, (Doc 5-143); Plan, SMC/CZ and Space and Control Sustainment Division Peterson AFB, "NAVSTAR Global Positioning System Space and Control Segments Product Support Management Plan (Draft #1)," March 2002, pp. 14-15 (Doc 5-41); Briefing Charts, SMC/CZ, "Control Segment Overview," 29 May 2002, pp. 15-16 (Doc 5-108); E-mail, 1Lt Fred Yates, Det 11/CZGI, to Robert Mulcahy, SMC/HO, "RE: Control Segment Summary," 16 October 2002, (Doc 5-136).

In 2000, the navigation accuracy of civilian GPS UE increased dramatically after SA had been removed. In 2001, a civilian with GPS UE could use the Standard Positioning Service (SPS) to determine a three-dimensional position to within 10-20 meters, a three-dimensional velocity to within one-tenth of a meter per second, and the time to within a millionth of a second. Authorized government GPS users of PPS could determine their positions to within four to 12 meters.[47]

The Joint Service System Management Office (JSSMO) at the Warner Robins (WR) Air Logistics Center (ALC) at Robins AFB, Georgia provided the joint service sustainment support for fielded GPS UE since the early 1990s. As the System Support Manager (SSM) for GPS UE, WR-ALC provided sustainment support for GPS receivers, antennas, antenna electronics, and related accessories that was initially acquired by the GPS JPO. Following the UE acquisition and fielding, the JPO transferred the UE program management responsibilities to WR-ALC. The JSSMO support for UE included program management, contracting, logistics, supply chain management, technical documentation, configuration management and engineering support. WR-ALC performed engineering and logistics tasks to ensure UE sustainment for both hardware and software. It also accomplished modifications to the UE that had been approved and funded by the GPS Program Director. The joint forces organized the JSSMO as a jointly manned organization that was part of both the GPS JPO and the Space and Special Systems Management Directorate at WR-ALC.[48]

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[47] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 67; Fruehauf and Callaghan, "SAASM and Direct P(Y) Signal Acquisition," GPS World, July 2002, (Doc 5-70); Internet Document, U.S. Department of State, "U.S. Global Positioning System and European Galileo System," 7 March 2002, http://www.state.gov/r/pa/prs/ps/2002/8673.htm (Doc 5-69); Fact Sheet, SMC/PA, "Navstar Global Positioning System," May 2002, http://www.af.mil/news/factsheets/NAVSTAR_Global_Positioning_Sy.html (Doc 5-2); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 3 (Doc 5-9); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… NAVSTAR Global Positioning System (GPS)," 20 March 2000, pp. 3-4 (Doc 5-22); E-mail, Maj Patrick Harrington, SMC/CZE, to Robert Mulcahy, SMC/HO, "FW: PPS," 29 October 2002, (Doc 5-145).

[48] Product Support Management Plan (PSMP), SMC/CZ, "Miniature Airborne GPS Receiver (MAGR)," 28 February 2002, (Doc 5-146); Internet Document, Robins AFB, "GPS User Equipment," 25 June 2002, https://www.robins.af.mil/1kn/index.htm (Doc 5-147); Internet Document, Robins AFB, "JSSMO Organization," 23 April 2001, https://www. robins.af.mil/1kn/org_new.htm (Doc 5-148); Product Support Management Plan (PSMP), SMC/CZ, "3A Receiver," 28 February 2002, (Doc 5-149); Product Support Management Plan (PSMP), SMC/CZ, "Precision Lightweight GPS Receiver (PLGR)," 28 February 2002, (Doc 5-150); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… for Navstar Global Positioning System (GPS)," 27 September 2001, (Doc 5-16); Program Management Directive (PMD) (FOUO, extract is not FOUO), Office of the Assistant Secretary of the Air Force, "PMD

To procure the equipment for military users, contracting for the initial production of GPS UE began when a contract was awarded to Rockwell International in April 1985. In September 1990, five follow-on contracts were awarded to Rockwell (components for one-channel manpack and other applications), SCI Technologies (two-channel and five-channel airborne and shipborne applications), E-Systems (two contracts: antennas and antenna electronics), and Hollingsead International (four types of mounts).[49]

In January 1992, the Under Secretary of Defense authorized the full rate production for the original airborne and shipborne five-channel GPS receivers. The 3A receiver was the original airborne five-channel set, and the 3S receiver was the original shipborne five-channel set.[50]

During FY 1998-2001, the Air Force continued to procure and integrate the 3A receivers for its own high-dynamic (fast-moving) aircraft. The Air Force transferred the program management of the 3A receivers from the GPS JPO to WR-ALC in 1995. The 3A receiver had many upgrades and software changes to enhance its original capabilities. By February 2002, the number of procured 3A receivers totaled 4,542; the Air Force inventory totaled 2,794. On 26 March 1998, the WR-ALC awarded a $6,284,584 contract (F09603-97/C-0419, P00004) to SCI Technology Inc. to provide 176 of the 3A receivers. Although the 3A performed well, it was considered an "older technology" by 2001. The 3A had a few inadequacies: it could not be field-reprogrammed and had to be returned to WR-ALC for upgrades; it did not have an upgraded anti-spoofing function; and it was bulky with outdated components. The Air Force planned to continue upgrading the 3A receiver and maintain depot support for it through at least 2012.[51]

4075… NAVSTAR Global Positioning System (GPS)," 20 March 2000, (Doc 5-22); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 4075… NAVSTAR Global Positioning System (GPS)," 26 May 1998, (Doc 5-21); E-mail, Lt Col David West, WRACL/LKN, to Robert Mulcahy, SMC/HO, "RE: Warner Robins," 2 September 2002, (Doc 5-151); E-mail, Lt Col David West, WRACL/LKN, to Robert Mulcahy, SMC/HO, "RE: Warner Robins review," 3 September 2002, (Doc 5-152); E-mail, Frank Rowe, WRACL/LKNA, to Robert Mulcahy, SMC/HO, "RE: GPS Support," 10 October 2002, (Doc 5-153).

[49] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 67.

[50] *Ibid* (FOUO, extract is not FOUO), p. 67.

[51] *Ibid* (FOUO, extract is not FOUO), p. 68; Product Support Management Plan (PSMP), SMC/CZ, "3A Receiver," 28 February 2002, (Doc 5-149); Internet Document, Federation of American Scientists (FAS), "RCVR 3A (R-2332()/AR)," 21 February 1999, http://www.fas. org/spp/military/program/nav/rcvr_3a.htm (Doc 5-154); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, pp. 16-17 (Doc 5-9); Internet Document, DefenseLink, "Contracts 3A Receivers],"

The five-channel 3S receiver was significantly larger than the 3A but similar in operation. Certain features enhanced its application to Navy ships and submarines. The Army also used the 3S in its vessels. It would be replaced in most of the Navy's ships and submarines with a less expensive card assembly known as the "GPS Versa Modula Eurocard (VME) Receiver Card (GVRC)." The GVRC took advantage of commercial advancements in GPS receiver technology.[52]

The Navy wanted a smaller, lighter GPS receiver to replace the 3A due to the space and weight limitations of the F-18. The Navy led the effort to procure this receiver for high-dynamic aircraft that was called the "Miniaturized Airborne GPS Receiver (MAGR)." A Navy officer was assigned to the GPS JPO as the MAGR project officer. To procure the MAGR, SMC issued a production contract to Rockwell in November 1990. The MAGR was more reliable and easier to maintain than the 3A. The Air Force and Navy used the MAGR in certain medium-dynamic (slower) types of aircraft that could not accommodate the full-sized five-channel receivers. The Army used the MAGR to replace some of its two-channel receivers in Army helicopters and fixed-wing aircraft.[53]

In 2001, the MAGR continued to be utilized by aircraft in the military services. The Air Force transferred the program management of the MAGR from the GPS JPO to WR-ALC in 1998. The F-117 experienced an unusually high rate of failures with the MAGR receiver during Operation Allied Force. SMC awarded the Raytheon Systems Company a $167 million firm-fixed-price contract (F04701-98-D-0028) on 30 November 1998 to produce the next generation MAGR 2000 receiver. The MAGR 2000 would be the first navigation warfare-compatible avionics system. It would provide better position/velocity/time accuracy, and it would have a higher jam immunity than the original MAGR, among other upgrades. MAGR 2000 would include card versus box

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26 March 1998, http://www.defenselink.mil/news/Mar1998/c03261998_ ct133-98.html (Doc 5-155).

[52] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 69; Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 17 (Doc 5-9); Internet Document, Federation of American Scientists (FAS), "RCVR 3S (R-2331()/URN)," 21 February 1999, http://www.fas.org/spp/military/program/nav/rcvr_3s.htm (Doc 5-156); Internet Document, U.S. Navy, "GPS VME Receiver Card (GVRC)," 29 May 2002, http://www.spawar.navy.mil/debts/d30/d31/home/test/gvrc.html (Doc 5-157).

[53] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 67; Review, SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

replacement and backward compatibility. The MAGR 2000 could be fielded by 2010. The Air Force had no plans to phase out the original MAGR at this time.[54]

In the mid 1990s, the need for an application to combine the functions of GPS and the Inertial Navigation System (INS) became apparent for tactical aircraft, transports, and military helicopters. The tri-service Embedded GPS Inertial (EGI) navigation system combined a GPS receiver card with an inertial navigation system card into one compact unit. The EGI provided precise location and targeting information to aircraft fire control computers. The EGI used the MAGR Technical Requirements Document as its functional specification. The Aeronautical Systems Center (ASC) at Wright-Patterson AFB, Ohio had the program management of the EGI, and ASC subsequently awarded EGI contracts to Honeywell and Litton. The GPS JPO acted as the technology consultant, and it managed the Qualification Test and Evaluation (QT&E) program for the EGI.[55]

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[54] Internet Document, DefenseLink, "Contracts [MAGR Receivers]," 30 November 1998, http://www.defenselink.mil/news/Nov1998/c11301998_ct612-98.html (Doc 5-158); Product Support Management Plan (PSMP), SMC/CZ, "Miniature Airborne GPS Receiver (MAGR)," 28 February 2002, (Doc 5-146); Internet Document, Federation of American Scientists (FAS), "MAGR (R-2512A/U & R-2514A/U)," 21 February 1999, http://www. fas.org/spp/military/program/nav/magr.htm (Doc 5-159); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 17 (Doc 5-9); Internet Document, Raytheon, "Raytheon Awarded Aircraft GPS Systems Contract Potentially Worth $167 Million," 7 December 1998, http://www.raytheon.com/press/ 1998/dec/ magr2000.htm (Doc 5-160); Statement of Objectives, SMC/CZ, "MAGR 2000," 8 April 2001, (Doc 5-161); Document, SMC/CZ, "MAGR 2000 History of Announcements and Updates," 27 March 2002, (Doc 5-162); Internet Document, Warner Robins ALC, "MAGR," Circa 1999, https://army-gps.robins.af.mil/UE/magr/.htm (Doc 5-163); Fact Sheet, Raytheon Company, "MAGR 2000," 1999, (Doc 5-164); Internet Document, Rockwell Collins, "MAGR: Miniaturized Airborne GPS Receiver," 2000, http://www.rockwellcollins.com/ecat/gs/MAGR.html?smenu=4 (Doc 5-165); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 28-29 (Doc 5-59).

[55] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 68; Internet Document, Federation of American Scientists (FAS), "Embedded GPS/Inertial Navigation System (EGI)," 21 February 1999, http://www.fas.org/spp/military/program/nav/egi.htm (Doc 5-166); Internet Document, U.S. Navy, "Embedded GPS Inertial (EGI/GINA)," 16 May 2001, http://navigationsystems.spawar.navy.mil/int_sys.htm (Doc 5-167); Internet Document, Honeywell, "Embedded GPS/INS (EGI) H-764G," 2001, http://www.ais.honeywell.com/dss/sgp/products/gn-h764g.htm (Doc 5-168); Internet Document, DefenseLink, "Contracts [EGI]," 13 May 1997, http://www.defenselink.mil/news/May1997/c051397_c37-97.html (Doc 5-169); Review, SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

Much evolution occurred with the portable, one-channel GPS receivers. The first generation of portable GPS receivers included the Manpack, the Small Lightweight GPS Receiver (SLGR), and the Precision Lightweight GPS Receiver (PLGR). Mobile ground forces used these receivers for navigation, site surveying, field artillery placement, and target acquisition, among other uses. They began with the 17-pound Manpack in the 1980s. Next came the handheld SLGR in the early 1990s. A total of 6,000 SLGRs were procured, and it made a major contribution to Operation Desert Storm. The SLGR received upgrades in the 1990s to become a five-channel PPS set, and it remained in the Army inventory in 2001.[56]

In 1992, the Army selected a smaller, lighter receiver called the Precision Lightweight GPS Receiver (PLGR). On 5 March 1993, SMC awarded a PLGR contract (F04701-93-D-0001) to the Collins Avionics and Communications Division of Rockwell International for 13,999 user sets. The PLGR became available in August 1994. The Air Force was the lead service for the PLGR, but the other services stocked, stored, and issued their own spares. The GPS JPO initially procured the PLGR, and then transferred the program management of PLGR to WR-ALC in 1997.[57]

Unlike the original SLGR, the PLGR could decode the military PPS signal. The PLGR became the first GPS receiver widely used throughout the DoD. The PLGR had a tan exterior, weighed 2.75 pounds, and had an anticipated service life of 10 years. By February 2002, the Air Force had planned and delivered 118,025 PLGR sets, but only 8,484 of the sets belonged to the Air Force. The Army had the majority of the sets (estimated at 70,000 fielded in 2000) that were handheld by ground troops, and mounted in armored and wheeled vehicles, airplanes and watercraft. The PLGR remained the mainstay of the Army GPS user equipment. The Air Force expected another joint service purchase of PLGR sets in 2002. An updated version of the PLGR, the Enhanced PLGR (EPLGR), was placed under contract to Rockwell Collins in September 1996. The upgraded EPLGR set had enhanced software and a green exterior. The original PLGRs in the military inventories were reprogrammed with the enhanced software and upgraded to EPLGRs. The PLGR had navigation problems during the 1999 Operation Allied Force in Yugoslavia that is described below. The contract value of the PLGR amounted to $170 million between 1993 – February 2002.[58]

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[56] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 69; Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, pp. 13-15 (Doc 5-9); Internet Document, Federation of American Scientists (FAS), "Small Lightweight GPS Receiver (SLGR)," 21 February 1999, http://www.fas.org/spp/military/ program/nav/slgr.htm (Doc 5-170); E-mail, Keith Hover, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: SLGR," 23 August 2002, (Doc 5-171).

[57] Product Support Management Plan (PSMP), SMC/CZ, "Precision Lightweight GPS Receiver (PLGR)," 28 February 2002, (Doc 5-150).

The next generation of handheld GPS receivers would begin with the Defense Advanced GPS Receiver (DAGR) that would replace the PLGR. The DAGR would have the same GPS location, velocity, and time information available with the PLGR, plus upgraded navigation and cryptographic features, including the use of both the L1 and L2 signals. The Air Force solicited contractors to conduct the research and development support for the DAGR in June 2000 and completed the negotiations in September 2000. SMC awarded contracts to four companies on 26 January 2001 to conduct the DAGR research and development. The contractors included Raytheon Systems Co. for $8,627,207 (contract No. F04701-01/C-005), Rockwell Collins, Inc. for $6,770,864 (F04701-01/C-004), Allen Osborne Associates, Inc. for $2,192,778 (F04701-01/C-006), and Alliant Integrated Defense Co. for $2.168,531 (F04701-01/C-007). The Air Force scheduled the DAGR for availability in 2003. The DAGR would weigh less than two pounds, and it had a threshold price of $2000 that included a contractor warranty and logistics support for 10 years.[59]

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[58] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 69; Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 15 (Doc 5-9); Product Support Management Plan (PSMP), SMC/CZ, "Precision Lightweight GPS Receiver (PLGR)," 28 February 2002, (Doc 5-150); Document, National Security Space Architect (NSSA), "Precision Lightweight GPS Receiver (PLGR)," 21 May 1998, (Doc 5-172); Internet Document, USGS, "History of the PLGR Procurement," circa 2001, http:// biology.usgs.gov/gps/procurement/history.html (Doc 5-173); Internet Document, USGS, "PLGR (Precision Lightweight GPS Receiver," 26 September 2001, http://biology.usgs. gov/gps/navigation/plgr.html (Doc 5-174); E-mail, Del Crane, SMC/CZA, to Robert Mulcahy, SMC/HO, "FW: Enhanced Precision Lightweight GPS Receiver (EPLGR)," 22 August 2002, (Doc 5-175); Internet Document, U.S. Army, "PLGR," printed 22 August 2002, http://army-gps.robbins.af.mil/ue/plgr.htm (Doc 5-176); E-mail, Keith Hover, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: PLGR," 23 August 2002, (Doc 5-177); Internet Document, Rockwell Collins, "PLGR+96, Precision Lightweight GPS Receiver," 2000, http://rockwellcollins.com/ecat/gs/PLGR-96.html (Doc 5-178); Internet Document, Federation of American Scientists (FAS), "Precision Lightweight GPS Receiver (PLGR)," 21 February 1999, http://www.fas.org/spp/military/program/nav/ plgr.htm (Doc 5-179); Internet Document, Federation of American Scientists (FAS), "Army develops improved Global Positioning System," 15 September 1998, http://www.fas.org/spp/military/program/nav/ a19980915newgps.html (Doc 5-180); Article, Sandra Erwin, "Security Upgrades Underpin New Satellites and Receivers," National Defense Magazine, June 2000, (Doc 5-94); Internet Document, DefenseLink, "Contracts [PLGR]," 1 May 2001, http://www.defenselink.mil/news/May2001/c05012001_ct187-01.html (Doc 5-181).

[59] Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 23 (Doc 5-9); Product Support Management Plan (PSMP), SMC/CZ, "Precision Lightweight GPS Receiver (PLGR)," 28 February 2002,

On 26 April 1996, Secretary of Defense William J. Perry directed that all DoD passenger-carrying aircraft would have GPS capabilities by FY 2000. Prior to the deadline, the Air Force and Navy passenger-carrying aircraft had an "Interim GPS" capability with GPS equipment that was flight-rated, but not necessarily integrated with the aircrafts' avionics. The GPS JPO supplied most of the aircraft with commercially available handheld GPS receivers. SMC obtained the handheld receivers by issuing a contract (FO4701-96-C-0048) to Allied Signal, Incorporated, Aerospace Division, on 10 September 1996. Allied Signal supplied 1,727 KLX 100 GPS receivers that also incorporated communications systems for $1,880,500. The contractor delivered the last increment of Interim GPS receivers on 15 January 1997. The requirement to have GPS capabilities in all DoD passenger-carrying aircraft became part of GPS Project 2005 after the 2000 deadline had to be extended.[60]

The requirements for military GPS user capabilities increased dramatically in 1999 with GPS Project 2005. A Congressional mandate (H.R.2401, 10 November 1993), as amended by the FY 1999 Defense Authorization Act, Section 215, Para (f), 16 October 1998, directed that all DoD aircraft, ships, armored vehicles, and indirect fire weapon systems be equipped with GPS by 30 September 2005. When the mandate is completed GPS would be installed and integrated into about 18,000 airplanes, 435 ships, 35,000 vehicles, and into all of the precision-guided weapons. "GPS is the largest avionics procurement and installation program in the history of the DoD."[61] The JPO summarized the required GPS installs as of 30 September 2000: the Air Force completed 84% of its installs (4,899 systems), the Army completed 70% (31,696 systems), and the Navy completed 81% (6,235 systems). The GPS installs directed by the mandate equaled 72% of the total required for the DoD. In 2001, the DoD continued to implement the mandate.[62]

(Doc 5-150); Internet Document, DefenseLink, "Contracts [DAGR research and development contracts]," 26 January 2001, http://www.defenselink.mil/news/Jan2001/c01262001_ct041-01.html (Doc 5-182); Internet Document, Federation of American Scientists (FAS), "Defense Advanced Global Positioning System Receivers [DAGR]," 21 February 1999, http://www.fas.org/spp/military/program/nav/dagr.htm (Doc 5-183); Internet Document, SMC/CZ, "DAGR Overview," 7 June 2000, (Doc 5-184); Internet Document, Federation of American Scientists (FAS), "Army develops improved Global Positioning System," 15 September 1998, http://www.fas. org/spp/military/program/nav/a19980915newgps.html (Doc 5-180).

[60] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 70-71; Discussion, Leonard Coleman, SMC/CZU, with Robert Mulcahy, SMC/HO, "GPS capabilities in DoD passenger planes became part of Project 2005," 12 September 2002.

[61] Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 37 (Doc 5-9).

On 22 October 1998, the Chairman of the Joint Chiefs of Staff mandated that after 1 October 2002, all DoD GPS user equipment would be required to have the Selective Availability Anti-Spoofing Module (SAASM) - the next generation of security functions for GPS users of PPS. SAASM would allow access to PPS signals to authorized GPS users. It would improve the physical, procedural and functional security over previous generations of equipment. The functional requirements for SAASM had been established and approved in 1994 to give the combatant commanders more tools for protecting the availability and integrity of GPS for the warfighter. SAASM would consist of tamper-resistant multi-chip modules that would be embedded within the GPS receiver. The GPS JPO had the overall management responsibility for the SAASM program, including the authority over the production and sale of security devices and PPS host application equipment. The National Security Agency (NSA) had the responsibility for the other security aspects of SAASM.[63]

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[62] Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 6, 37 (Doc 5-9); Congressional mandate, H.R.2401, "Sec. 152. Global Positioning System," 10 November 1993, (Doc 5-185); Internet Document, SMC/CZ, "Project 2005," 16 October 1998, https://gps.losangeles.af.mil/user/integration (Doc 5-186); Briefing Charts, Leonard Coleman, SMC/CZU, "Global Positioning System (GPS) User Equipment (UE)," circa 2000, p. 8 (Doc 5-79).

[63] DoD Instruction (FOUO, extract is not FOUO), Chairman of the Joint Chiefs of Staff, "NAVSTAR Global Positioning System Selective Availability Anti-Spoofing Module Requirements," 22 October 1998, (Doc 5-187); Internet Document, SMC/CZ, "SAASM Body," 2002, https://gps.losangeles.af.mil/user/products/ue-security/saasm.htm (Doc 5-188); Internet Document, Space Daily, "Zyfer Releases White Paper on Military GPS SAASM Technology," 17 May 2002, https://www.spacedaily.com/news/gps-02k.html (Doc 5-189); Integrated Logistics Support Plan (ILSP) (FOUO, extract is not FOUO), Integrated Logistics Support Plan (ILSP), SMC/CZ, "Selective Availability Anti-Spoofing Module (SAASM)," 11 August 2000, (Doc 5-190); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 26 (Doc 5-9); Internet Document, Sandra Erwin, "Tamper-Proof Receivers Installed in Smart Weapons," National Defense Magazine, June 2002, https://www.nationaldefensemagazine.org/article .cfm?Id=816 (Doc 5-191); White Paper, Zyfer Inc., "Why GPS-SAASM technology should be used in Time/Frequency Synchronization Equipment at Military Ranges and NASA Facilities," August 2002, https://www.zyfer.com/research/whitepapers.html (Doc 5-192); White Paper, Zyfer Inc., "SAASM and Direct P (Y) signal acquisition, a better way of life for the military user," April 2002, https://www.zyfer.com/research/ whitepapers.html (Doc 5-193); Internet Document, SMC/CZ, "Host Application Equipment," 2002, https://gps.losangeles.af.mil/user/products/ue-security/hae.htm (Doc 5-194); Fruehauf and Callaghan, "SAASM and Direct P(Y) Signal Acquisition," GPS World, July 2002, (Doc 5-70); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 20-22 (Doc 5-59); Letter,

The SAASM acquisition strategy shared the development process between the GPS JPO and various industry partners. The JPO developed the basic specifications, interface requirements, and the hardware/software for the Key Data Processor. Instead of awarding contracts for the research and the production of SAASM, Memorandums of Agreement (MOA) between the vendors and the JPO were written for the security requirements. The industry partners paid for their own SAASM research and development. The vendors included: Allen Osborne Associates (MOA number, SA-KDP3-AOA-001A), L-3 - Interstate Electronics Corporation (SA-KDP3-IEC-001A), Raytheon Systems Company (SA-KDP3-RSC-001A), Rockwell Collins (SA-KDP3-RC-001A) and Trimble Navigation Limited (SA-KDP3-TNL-001A).[64]

The 1 October 2002 SAASM mandate deadline remained in affect in 2001. The 1998 SAASM mandate required waivers (through 2004) from all GPS users of PPS who could not comply with the SAASM deadline. On 31 July 2000, the DoD Joint Staff issued a memorandum that altered the SAASM waiver requirement. The memo stated that a SAASM waiver would not be required for UE through 2004, but each military service/agency had to provide a SAASM implementation plan as part of their GPS UE Roadmap for approval by the Joint Staff. In 2005 and beyond, any fielded non-SAASM UE would be required to obtain a SAASM waiver.[65]

Lt Gen Eugene Tattini, SMC/CC, to Lt Gen Michael Hayden, NSA Director, "[NSA involvement in CSEL]," 26 August 1999, (Doc 5-195); Briefing Charts, Leonard Coleman, SMC/CZU, "Global Positioning System (GPS) User Equipment (UE)," circa 2000, pp. 10-19 (Doc 5-79); E-mail (FOUO, extract is not FOUO), Maj Shawn Brennan, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: SAASM review (SMC/HO)," 23 September 2002, (Doc 5-196).

[64] E-mail, Capt Chris Schweighardt, SMC/CZL, to Robert Mulcahy, SMC/HO, "FW: SAASM contract," 4 September 2002, (Doc 5-197); Computer Resources Support Plan (CRSP) (FOUO, extract is not FOUO), SMC/CZ, "CSEL," 16 July 2002, pp. 10-11 (Doc 5-198); Memo, SMC/CZ to SMC/CC, "NAVSTAR GPS Monthly Acquisition Report," May 2001, (Doc 5-199); E-mail, Maj Shawn Brennan, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: SAASM deadline (for SMC/HO)," 10 September 2002, (Doc 5-200); E-mail (FOUO, extract is not FOUO), Maj Shawn Brennan, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: SAASM review (SMC/HO)," 23 September 2002, (Doc 5-196).

[65] Memo, The Joint Staff to Service Acquisition Executives to the Secretaries of the Military Departments, Director NRO, "NAVSTAR Global Positioning System Selective Availability Anti-Spoofing Module Requirements," 31 July 2000, (Doc 5-201); Memo, Assistant Secretary of Defense to the Secretaries of the Military Departments (Attn: Service Acquisition Executives), Director Joint Staff, "Global Positioning System (GPS) Selective Availability Anti-Spoofing Module (SAASM) Waiver Requirements," 10 April 2001, (Doc 5-202); Internet Document, Raytheon, "Raytheon receives security approval for GPS SAASM with advanced receiver performance features," 1 July 2002, https://

Hook-112 System and Combat Survivor Evader Locator System

In June 1995, an Air Force F-16 piloted by Capt Scott O'Grady was shot down on a mission over Bosnia. His successful rescue was attributed in part to the fact that he had a GPS receiver and a radio with him to guide his rescuers. The next month, the Air Force Vice Chief of Staff validated a Mission Need Statement for a survival radio that would incorporate GPS and more secure radio transmission for downed pilots and others in need of rescue. Originally, the Mission Need Statement had come from requirements identified as a result of Operation Desert Storm. The initial studies of such a survival radio and GPS receiver were carried out under the Air Force's Tactical Exploitation of National Capabilities (TENCAP) program at the AFSPC Space Warfare Center at Schriever AFB, where the proposed radio was known as Talon Hook. The Space Warfare Center issued a sole-source contract (F42600-94-G-7581) for the rescue capability to Motorola, Incorporated, on 6 August 1995.[66]

On 10 June 1996, the SMC Developmental Planning Office issued a $9,178,192 increase to the face value of Motorola's contract. For that price, Motorola would provide 1008 Hook-112 units, 25 interrogators, and support equipment by the end of FY 1998. The Air Force and the Navy would share the cost and the equipment. If a pilot had to be rescued, the rescue units (usually airborne) would carry the interrogator units, which would receive positioning information and status messages from the pilot. The outgoing information and messages would be encrypted by the Hook-112 units and broadcast in short bursts of less than one second in duration to reduce the chance that hostile forces would be able to locate the source of the transmissions.[67]

The 311 Human Systems Wing (311 HSW/YA) at Brooks AFB, Texas replaced the SMC Developmental Planning Office as the Air Force program manager of the Hook-112 around 1999. The Air Force intended for the Hook-112 program to be an interim solution to the search and rescue challenge. It would allow time for the development of a much more sophisticated solution known as the Combat Survivor Evader Locator (CSEL).[68]

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www.raytheon.com/newsroom/briefs/070102.html (Doc 5-203); Memo, SMC/CZ to SMC/CC, "NAVSTAR GPS Monthly Acquisition Report," June 2000, (Doc 5-204); E-mail, Maj Shawn Brennan, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: SAASM deadline for SMC/HO," 10 September 2002, (Doc 5-205); E-mail (FOUO, extract is not FOUO), Maj Shawn Brennan, SMC/CZU, to Robert Mulcahy, SMC/HO, "RE: SAASM review (SMC/HO)," 23 September 2002, (Doc 5-196).

[66] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 74.

[67] *Ibid* (FOUO, extract is not FOUO), pp. 74-75.

[68] *Ibid* (FOUO, extract is not FOUO), p. 75; Discussion, Phil Cason, 311 HSW/YA, with Robert Mulcahy, SMC/HO, "311 HSW/YA is the program manager of the Hook 112 Program," 1 October 2002.

SMC was designated as the CSEL implementing systems center, and the GPS JPO provided the overall management direction of CSEL in a joint service program. The program goal for the first block CSEL AN/PRQ-7 hand-held radio was to develop a navigation and communications device that would assist search and rescue teams to rapidly locate, identify, and recover isolated U.S. military personnel (a shot down air crewman, for example) who were behind enemy territory. It would provide the survivor/user with a lightweight (less than two pounds), easily transportable device that would have worldwide communication with potential rescuers, and would navigate on the ground anywhere in the world. CSEL would enable rescue forces to efficiently find, track, and communicate with such survivors, while making sure they were truly U.S. personnel in need of assistance. The survivor would be able to receive communications back from the rescue center and know that help would be arriving. Preformatted messages such as "injured but can move" could be sent by the user to provide his status. With new security features, it would be very difficult (but not impossible) for the enemy to locate the transmission of a CSEL user communicating on the ground with rescue forces. A nine-day battery life (under the most favorable conditions) would provide communications for an extended period of time. Compared to the Hook-112, CSEL would significantly reduce the risks to both the CSEL user on the ground and the arriving rescue forces.[69]

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[69] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 76-77; Fact Sheet, Boeing, "CSEL," 1999, (Doc 5-206); Media Relations and Public Affairs Plan, Cheryl Crouch, SMC/CZY, "CSEL," February - October 2002, pp. 6-8 (Doc 5-207); Program Management Directive (PMD) (FOUO, extract is not FOUO), Office of the Assistant Secretary of the Air Force, "PMD 4075… NAVSTAR Global Positioning System (GPS)," 20 March 2000, (Doc 5-22); Program Management Directive (PMD), Office of the Assistant Secretary of the Air Force, "PMD 2320 (03) PE#35176 Combat Survivor Evader Locator (CSEL) System," 20 August 1999, (Doc 5-208); Program Management Directive (PMD) (FOUO, extract is not FOUO), Office of the Assistant Secretary of the Air Force, "PMD 2320 (04)/PE#35176 Combat Survivor Evader Locator (CSEL) System," 10 March 2000, (Doc 5-209); Program Management Directive (PMD) (FOUO, extract is not FOUO), Office of the Assistant Secretary of the Air Force, "PMD 2320 (5)/PE#35176F Combat Survivor Evader Locator (CSEL) System," 17 September 2001, (Doc 5-210); Internet Document, SMC/CZ, "Military search-and-rescue improved with addition of CSEL," 13 February 2002, https://gps.losangeles.af.mil/csel/PaArticle13Feb02.htm (Doc 5-211); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "CSEL System Overview and Program Status," 9 December 1999, p. 2 (Doc 5-212); Reports, SMC/CZ, "CSEL Monthly Activity Reports," October 1997 - March 1998, (Doc 5-213); Internet Document, U.S. Navy, "CSEL," 8 June 2001, http://navigationsystems.spawar.navy.mil/156-5.htm (Doc 5-214); Hap Parker, "CSEL on way to warfighters," Astro News, 9 February 2001, p. 3 (Doc 5-214-1).

The CSEL program resulted from a requirement expressed in a February 1992 mission need statement. The program officially began on 18 December 1995, when Secretary of Defense William J. Perry and the Under Secretary for Acquisition and Technology, Paul G. Kaminski, approved the program plan submitted by SMC. Dr. Kaminski signed the first major document necessary to obtain approval for the program, the Single Acquisition Management Plan (SAMP), on 19 December 1995. The plan emphasized the importance of conducting a rapid, streamlined acquisition of the CSEL system. SMC issued a request for proposals only three days later, on 22 December 1995, and it received offers from three companies. On 23 February 1996, SMC awarded a contract (F04701-96-C-0020) to Rockwell International Corporation for the engineering and manufacturing development of the CSEL system. After Boeing's purchase of Rockwell's Aerospace and Defense Divisions in December 1996, the contract was then with Boeing's Communications and Information Management Division. The contract had a value of $12,950,885, and it contained three options for the production of 500 units, 3,000 units, and 7,500 units, respectively. SMC exercised the first option in July 1997, and it intended to exercise the second and third options in October 1997.[70]

The CSEL system would consist of three operational segments. The first would be the user segment that consisted of the CSEL AN/PRQ-7 hand-held radio. The program had a target cost of $5,000 per CSEL radio (this increased to $5,500 by 2001), and SMC planned to procure 52,000 units (this unit number did not include the potential requirements by Allied or Coalition forces). The CSEL radio would provide its own location using the GPS PPS signals for military users. This feature would include the new SAASM security for positioning data. The radio would provide two-way Over-the-Horizon (OTH) data communications to Joint Search and Rescue Centers (JSRC) or a Rescue Coordination Center. Two CSEL users (two downed pilots, for example) could also communicate with each other with OTH. A selectable voice communications option using ultra-high frequency (UHF) would also be an option. The second segment would be the OTH Relay segment that consisted of four UHF Base Stations (UBS) installed in Navy communications facilities around the world. The UBS would use UHF satellites to provide two-way secure data communications between the user and the JSRC operators. The third segment would be the ground segment that consisted of JRSC computer workstations using a network that would provide communications with the downed pilot and interface with the command and control systems. The JSRC personnel would read the CSEL messages, forward them to the necessary locations, track the survivor's location, plan and coordinate the recovery mission, and send messages back to the survivor.[71]

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[70] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 76-77.

[71] *Ibid* (FOUO, extract is not FOUO), pp. 76-77, extract is U; Product Support Management Plan (PSMP) Draft (FOUO, extract is not FOUO), SMC/CZ, "CSEL," 26 August 2002, pp. 4-11 (Doc 5-215); Fact Sheet, Boeing, "CSEL," 1999, (Doc 5-206); Media Relations and Public Affairs Plan, Cheryl Crouch, SMC/CZY, "CSEL," February - October 2002, pp. 6-9 (Doc 5-207); 1Lt Tonya Summerall, "CSEL enhances survival of

In 1995, the military thought the CSEL Block I would be an 18-month development program. After the requirements for CSEL had been laid out in 1996, the military realized the program would take much longer to complete. The first group of CSEL radios underwent the first Operational Assessment (OA1) from April - June 1998. The DoD Director of Operational Test and Evaluation (DOT&E) oversaw the tests at sites in Alaska, Arizona, and Washington. The DOT&E's February 1999 report summarized the disappointing results of the OA1 initial CSEL testing, and concluded that the Engineering and Management Development Phase (EMD) of CSEL had not been effective or suitable for fielding. Fourteen Category One deficiencies (would cause loss of life or mission) and 74 Category Two deficiencies (nonconformance to specifications, drawing standards, other technical requirements) were identified during the CSEL tests. The CSEL system had low reliability, and responded too slowly to menu inputs. The menu screen had been too complex for a highly stressful combat environment, the two-way secure data communications OTH proved to be unreliable, and the CSEL voice reception had been distorted and noisy. The significant problems encountered during these tests, along with a several new requirements that had been added to the CSEL program without funding, caused the Air Force to reorganize the CSEL development.[72]

The Air Force restructured the CSEL program in 1998. They began using a spiral development approach that incorporated the new capabilities throughout the program so the device would continue to improve during the process. It also removed cumbersome military standards and significantly reduced contractor oversight. The spiral development approach provided greater insight of the technical risks of CSEL, and provided opportunities for user feedback. Boeing delivered the first 200 of the second-generation CSEL units to the Air Force in April 1999.[73]

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downed combat aircrews," Astro News, 31 March 2000, p. 14 (Doc 5-216); Fact Sheet, SMC/CZ, "CSEL," printed 20 August 2002, http://gps.losangeles.af.mil/csel/index.htm (Doc 5-217); Computer Resources Support Plan (CRSP) (FOUO, extract is not FOUO), SMC/CZ, "CSEL," 16 July 2002, (Doc 5-198); Letter, Lt Gen Eugene Tattini, SMC/CC, to Lt Gen Michael Hayden, NSA Director), "[NSA involvement in CSEL]," 26 August 1999, (Doc 5-195).

[72] Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "CSEL Program Review and Status," 12 July 1999, pp. 40-53 (Doc 5-218); 1Lt Tonya Summerall, SMC/PA, "CSEL enhances survival of downed combat aircrews," Astro News, 31 March 2000, p. 14 (Doc 5-216); No author, "CSEL program to consider next block upgrade," Aerospace Daily, 9 August 2002, p. 5 (Doc 5-219); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," April 2001, (Doc 5-220); E-mail, Capt Dale Kolomaznik, SMC/CZJ, to Robert Mulcahy, SMC/HO, "FW: CSEL operational testing," 12 September 2002, (Doc 5-221).

[73] Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "CSEL System Overview and Program Status," 9 December 1999, p. 4 (Doc 5-212); 1Lt Tonya Summerall, SMC/PA, "CSEL enhances survival of downed combat aircrews," Astro News, 31 March

In FY 1998, funding shortfalls stopped Boeing from implementing modifications to the CSEL system design that would incorporate Demand Assignment Multiple Access Compatibility (DAMA-C) for UHF satellite communications. This would be needed to comply with the CSEL Joint Staff-approved waiver from DAMA compliance, the Defense Information Infrastructure Common Operating Environment (DII COE) level seven JSRC C3 (command, control, and communications) application, and the Joint Technical Architecture (JTA) authorized in late FY 1997. As a result of the 1998 funding issue, the Air Combat Command headquarters presented a plan to restructure the program to the Air Force Chief of Staff (CSAF) in December 1998. The CSAF approved the restructure and directed that the CSEL requirements be revalidated. The Air Force restructure of the CSEL contract in September 1999 authorized Boeing to reinitiate development and fielding of a DAMA-compatible system, including a DII COE level seven-compliant JSRC C3 application at the start of FY 2000. The JROC approved an updated CSEL Operational Requirements Document (ORD) in February 2000.[74]

The Air Force restructured the Boeing CSEL contract again in FY 2001. The Air Force made CSEL an evolutionary acquisition that would be delivered in Block I and Block II capabilities to match the February 2000 ORD Interoperability requirements. CSEL Block 1 would not include DAMA-C, and it would use the existing, stand-alone DII COE level three CSEL workstation and JSRC C3 application so it could acquire the earliest fielding of an IOC capability.[75]

CSEL Block II would incorporate the DAMA-C and a DII COE level seven JSRC C3 application in order to meet its Interoperability requirement. This application could be integrated on Service C4I (command, control, communications, computers, and intelligence) platforms, such as the Air Force's Theater Battle Management Core System (TBMCS) and the Navy's Global Command and Control System - Maritime (GCCS-M). The available funds were not sufficient to execute Block II after the 2001 restructure. In July 2001, the JPO issued a DAMA-C work stoppage. The level seven JSRC C3 application effort never officially stopped, but it slowed to the point of halting work after about August 2001. Progress on the CSEL Block II would begin again in 2002.[76]

2000, p. 14 (Doc 5-216); Ronea Alger and Sergeant Jeff Capenos, SMC/PA, "Survival radio testing shows improvements," Astro News, 5 November 1999, pp. 1 and 3 (Doc 5-222); News Release, Boeing, "Boeing Combat Search and Rescue System Moved to U.S. Navy 'Procure' Status Following Recent Demonstration," 4 May 1999, http://www.boeing.com/news/ releases/ 999/news_release_990504b.html (Doc 5-223).

[74] E-mail (FOUO, extract is not FOUO), John Spisak, SMC/CZJ, to Robert Mulcahy, SMC/HO, "FW: CSEL Summary," 2 April 2003, (Doc 5-223-1).

[75] *Ibid* (FOUO, extract is not FOUO).

[76] *Ibid* (FOUO, extract is not FOUO); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, pp. 43-45

In September 1999, a set of CSEL developmental field-tests took place at Hurlburt Field, Florida. Army aviation (helicopters) and Special Forces personnel participated with Air Force personnel during the tests. They collected data on the Category One and Category Two CSEL deficiencies, and made assessments about the progress towards the next OA. The tests included GPS navigation, message success rates, and voice reception, among others. CSEL succeeded with its overall testing this time and decreased its Category One deficiencies from 14 down to four. The military planned to conduct a CSEL OA in September 2000, but hardware issues with a subcontractor delayed it until 2001.[77]

Operational Assessment Two (OA2) for CSEL occurred at Oahu, Hawaii from 26 February – 30 March 2001. CSEL continued to show improvement. The remaining Category One and the top 20 Category Two deficiencies that had been listed after the 1998 tests were corrected and closed, and no new Category One deficiencies were generated. The tests gave CSEL the highest possible rating for the system, "potentially effective and suitable."[78]

In April 2001, the sale of the Alliant Technologies (ATK) SAASM Division to the Interstate Electronics Corporation presented opportunities to reduce costs, to improve the tamper resistant coating yield, and to improve GPS performance, reliability, and productivity. Because of the change in the SASSM vender, the new design raised strong

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(Doc 5-59).

[77] Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "CSEL Program Review and Status," 12 July 1999, pp. 25-34, 40-53 (Doc 5-218); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "CSEL Program Review and Status," 24 September 1999, pp. 22-25, (Doc 5-224); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," August 1999, (Doc 5-225); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," September 1999, (Doc 5-226); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," March 2000, (Doc 5-227); 1Lt Tonya Summerall, SMC/PA, "CSEL enhances survival of downed combat aircrews," Astro News, 31 March 2000, p. 14 (Doc 5-216); Ronea Alger and Sergeant Jeff Capenos, SMC/PA, "Survival radio testing shows improvements," Astro News, 5 November 1999, pp. 1 and 3 (Doc 5-222).

[78] Media Relations and Public Affairs Plan, Cheryl Crouch, SMC/CZY, "CSEL," February - October 2002, p. 2 (Doc 5-207); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," January 2001, (Doc 5-228); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," March 2001, (Doc 5-229); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," April 2001, (Doc 5-220); Award, SMC/CZ, "GPS Team Excellence (Apr – Jun 01), CSEL," 2001, (Doc 5-230).

objections in the test community due to a requirement to test a "production representative" design.[79]

The CSEL Designated Acquisition Commander (DAC) approved the Low Rate of Initial Production (LRIP-2) for Lot 1 CSEL radios in August 2001. This allowed the delivery of a small number of LRIP Lot 1 radios (approximately 25 radios) with the older ATK-designed SAASM to verify the OA2 fixes and other system improvements not involving GPS. Additionally, the decision assured the assembly of subsequent LRIP-2 and Full-Rate Production (FRP) radios with the new IEC-designed SAASM module. LRIP-2 Lot 1 radios (approximately 110 radios) were also earmarked to support the completion of multi-service operational test and evaluation (MOT&E) in 2002.[80]

CSEL Block I continued with its development and evaluations at the end of FY 2001. The GPS JPO scheduled the next CSEL field-testing from 22 April – 3 May 2002 at the Northern Edge Exercise in Alaska. The GPS JPO expected to field CSEL Block I in late FY 2003, and the Block II should complete its development work in FY 2004.[81]

TABLE 5-3
GPS JPO Contracts (1998-2001)

Contractor	Contract #	Product	Value	Award Date
Rockwell Collins Inc.	FO4701-98-C-0001	FMS, Nighthawk security	0.3 M	6 Jan 98
The Boeing Company	FO4701-98-C-0002	GPS Block IIA Follow-on Sustain.	3.9 M	21 Jan 98
Trimble Navigation	FO4701-98-D-0010	FMS, Centurion receivers	-	1 Apr 98

[79] Document (FOUO, extract is not FOUO), Maj David Micheletti, SMC/CZJ, "[Review of the CSEL section of the History of GPS FY1998-FY2001]," 24 March 2003, (Doc 5-230-1).

[80] *Ibid* (FOUO, extract is not FOUO); E-mail (FOUO, extract is not FOUO), John Spisak, SMC/CZJ to Robert Mulcahy, SMC/HO, "FW: CSEL History Review (FOUO, extract is not FOUO)," 31 March 2003, (Doc 5-230-2).

[81] Media Relations and Public Affairs Plan, Cheryl Crouch, SMC/CZY, "CSEL," February - October 2002, p. 9 (Doc 5-207); Staff Summary Sheet w/1 atch, SMC/CZJ to SMC/CC, "SMC/CC Letter to Gen Eberhart, ACC/CC, Regarding CSEL FY02 POM Input for Economic Order Quantity Purchases of Handheld Radios," 18 August 1999; Atch 1 Letter, SMC/CC to Gen Ralph Eberhart, ACC/CC, "[CSEL purchases]," 26 August 1999, (Doc 5-231); Memo, SMC/CZ to SMC/CC, "CSEL Monthly Activity Report," May 2000, (Doc 5-232); Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "CSEL System Overview and Program Status," 9 December 1999, p. 8-18 (Doc 5-212); E-mail (FOUO, extract is not FOUO), John Spisak, SMC/CZJ, to Robert Mulcahy, SMC/HO, "FW: CSEL Summary," 2 April 2003, (Doc 5-223-1).

Table 5-3 continued from the previous page

Contractor	Contract #	Product	Value	Award Date
Rockwell Collins	FO4701-98-C-0010	FMS, MAGR receivers	.9 M	29 Sep 98
Raytheon Systems	F04701-98-D-0028	MAGR receivers	167 M	30 Nov 98
Dynamics Research	FO4701-98-C-0030	GRAM-SAASM	2.4 M	20 Aug 98
Trimble Navigation	FO4701-98-C-0031	GRAM-SAASM	4.1 M	31 Jul 98
Rockwell Collins	FO4701-98-D-0032	R&D GPS security cards	6.4 M	7 Aug 98
Interstate Electronics	FO4701-98-C-0033	R&D GPS security cards	9.9 M	31 Jul 98
Interstate Electronics	FO4701-98-C-0034	R&D GRAM-SAASM	3.7 M	23 Jul 98
Allen Osborne Assoc.	FO4701-98-C-0035	GRAM-SAASM	3.5 M	23 Jul 98
Raytheon Company	FO4701-98-C-0036	GRAM-SAASM	4.4 M	8 Sep 98
Raytheon Company	FO4701-98-C-0039	FMS – PPS-SM	0.1 M	1 Sep 98
Rockwell Collins	F04701-99-M-0002	PLGR receiver items	45,690	10 Dec 99
Rockwell Collins	F04701-99-M-0003	PLGR receiver items	0.1 M	19 Nov 98
Rockwell Collins	FO4701-99-C-0016	FMS, Nighthawk security sets	0.4 M	6 Aug 99
Trimble Navigation	FO4701-99-C-0021	FMS, PPS-SM	0.4 M	28 May 99
Trimble Navigation	FO4701-99-C-0022	FMS, PPS-SM	0.4 M	1 Jun 99
Trimble Navigation	FO4701-99-C-0023	FMS, PPS-SM	0.2 M	1 Jun 99
Trimble Navigation	FO4701-99-C-0024	FMS, PPS-SM	0.4 M	1 Jun 99
Rockwell Collins	FO4701-99-C-0050	FMS, Nighthawk security sets	0.4 M	30 Aug 99
Rockwell Collins	FO4701-99-C-0051	MAGR receivers	5.3 M	16 Jun 99
Rockwell Collins	FO4701-99-C-0052	FMS, Nighthawk security sets	0.3 M	30 Aug 99
Rockwell Collins	FO4701-99-C-0055	FMS, Ace security chips	0.4 M	30 Aug 99
Rockwell Collins	FO4701-99-C-0056	FMS, Nighthawk security sets	0.4 M	30 Aug 99
Rockwell Collins	FO4701-99-C-0057	FMS, Ace security chips	0.4 M	30 Aug 99
Rockwell Collins	FO4701-99-C-0058	FMS, Nighthawk security	0.4 M	24 Aug 99
Rockwell Collins	FO4701-00-C-0005	FMS, Nighthawk security	0.4 M	20 Mar 00
Lockheed Martin	FO4701-00-C-0006	GPS Block IIR Modernization	53 M	18 Aug 00
Rockwell Collins	FO4701-00-C-0007	FMS, Security sets	0.1 M	11 Aug 00
Rockwell Collins	FO4701-00-C-0010	FMS, 3S receiver upgrade	0.09 M	30 Oct 00
Rockwell Collins	FO4701-01-C-0004	DAGR ground receiver	6.7 M	26 Jan 01
Raytheon E-Systems	FO4701-01-C-0005	DAGR ground receiver	8.6 M	26 Jan 01
Allen Osborne Assoc.	FO4701-01-C-0006	DAGR ground receiver	2.1 M	26 Jan 01
Interstate Electronics	FO4701-01-C-0007	DAGR ground receiver	2.1 M	26 Jan 01
Lockheed Martin	FO4701-01-C-0008	Block III Architecture Studies	16 M	9 Nov 00
The Boeing Company	FO4701-01-C-0010	Block III Architecture Studies	16 M	9 Nov 00
Rockwell Collins	FO4701-01-C-0016	FMS, PLGR security kits	0.5 M	23 Mar 01

Rockwell Collins	FO4701-01-C-0019	FMS, PLGR security kits	0.6 M	9 May 01
Rockwell Collins	FO4701-01-C-0020	FMS, Nighthawk security	0.1 M	6 Aug 01

Abbreviations: FMS = Foreign Military Sales; PPS-SM = Precise Positioning Service-Security Module; R&D = Research and Design. (More than the one product listed in the table may have been involved in the various contracts, and delivery contracts do not have a definite value).[82]

The GPS Foreign Military Sales (FMS) Program increased to 28 authorized countries by October 2001. Six additional nations were pending approval. FMS of GPS receivers, antenna systems, security devices and accessories totaled $10.4 million in FY 1999, $31 million in FY 2000, and 19.8 million in FY 2001. The 28 countries approved for the GPS FMS Program at the end of 2001 included: Australia, Belgium, Canada,

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[82] E-mail, Karen Cox, SMC/PKX, to Harry Waldron, SMC/HO, "Request for Historical Data," 7 February 2002, (Doc 5-104); Briefing Charts, SMC/CZ, "Global Positioning System Modernization," 29 June 2001, p. 20 (Doc 5-92); Internet Document, DefenseLink, "Contracts [DAGR research and development contracts]," 26 January 2001, http://www. defenselink.mil/news/Jan2001/c01262001_ct041-01.html (Doc 5-182); Internet Document, DefenseLink, "Contracts [MAGR Receivers]," 30 November 1998, http://www.defenselink.mil/news/Nov1998/c11301998_ct612-98.html (Doc 5-158); Internet Document, DefenseLink, "Contracts [GPS security cards]," 29 July 1998, http://www.defenselink.mil/news/Jul1998/c07291998_ct405-98.html (Doc 5-233); Internet Document, DefenseLink, "Contracts [GPS security cards]," 5 August 1998, http://www.defenselink.mil/news/Aug1998/c08051998_ct417-98.html (Doc 5-234); Internet Document, SMC/CZ, "GPS Web CM Home Page," printed 3 September 2002, https://gps.losangeles.af.mil/gpsarchives/1000-public/1200-cm/default.html (Doc 5-235); E-mail, Cheryl Crouch, SMC/CZY, to Robert Mulcahy, SMC/HO, "History Office needs a bit of information," 16 September 2002, (Doc 5-236); Contract, SMC/CZK, "F04701-98-C-0010," 29 September 1998, (Doc 5-237); Contract, SMC/CZK, "F04701-99-C-0016," 6 August 1999, (Doc 5-238); Contract, SMC/CZK, "F04701-99-C-0022," 1 June 1999, (Doc 5-239); Contract, SMC/CZK, "F04701-99-C-0023," 1 June 1999, (Doc 5-240); Contract, SMC/CZK, "F04701-99-C-0050," 30 August 1999, (Doc 5-241); Contract Amendment, SMC/CZK, "F04701-99-C-0051," 26 September 2000, (Doc 5-242); Contract, SMC/CZK, "F04701-99-C-0052," 30 August 1999, (Doc 5-243); Contract, SMC/CZK, "F04701-99-C-0055," 30 August 1999, (Doc 5-244); Contract, SMC/CZK, "F04701-99-C-0056," 30 August 1999, (Doc 5-245); Contract Amendment, SMC/CZK, "F04701-99-C-0057," 30 August 1999, (Doc 5-246); Contract, SMC/CZK, "F04701-99-C-0058," 24 August 1999, (Doc 5-247); Contract, SMC/CZK, "F04701-00-C-0005," 20 March 2000, (Doc 5-248); Contract, SMC/CZK, "F04701-00-C-0007," 11 August 2000, (Doc 5-249); Contract, SMC/CZK, "F04701-01-C-0016," 23 March 2001, (Doc 5-250); Contract, SMC/CZK, "F04701-01-C-0019," 9 May 2001, (Doc 5-251); Contract, SMC/CZK, "F04701-99-M-0002," 10 December 1999, (Doc 5-252); Contract, SMC/CZK, "F04701-99-M-0003," 19 November 1998, (Doc 5-253).

Denmark, Finland, France, Germany, Greece, Iceland, Israel, Italy, Japan, Kuwait, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Portugal, Saudi Arabia, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, and the United Kingdom.[83]

Year 2000 (Y2K) Computer Rollover

The possibility of the Year 2000 (Y2K) computer rollover affecting GPS became a national concern due to the millions of civilians and military personnel who depended on it worldwide. It could have led to global disasters if Y2K complications shut down GPS and the navigation signals stopped being sent to airplanes and others who depended on them. SMC, including the GPS JPO, used the Air Force's five-phase (awareness, assessment, renovation, validation and certification) Weapon System Strategy for Year 2000 to attain Y2K compliance. The three segments of GPS (user segment, space segment, and control segment) had to complete individual Y2K certifications.[84]

The GPS JPO conducted phase one (Y2K awareness) of the five-phase certification process from June 1995 to September 1996. This process included developing a Y2K Program Management Plan (PMP) that defined the methods that would be used to ensure Y2K compliance. The second phase (assessment) began for the user segment in October 1996. First they estimated the costs and resources the Y2K effort would require, and then they developed a schedule to meet the Air Force deadlines for each of the 5-phase process dates. The GPS JPO produced an inventory of all the user segment's hardware and software impacted by Y2K, prepared a test plan, and a test report. The GPS user segment completed the Y2K phase two in June 1997, the space segment completed it in September 1997, and the control segment completed it in November 1997.[85]

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[83] Briefing Charts (FOUO, extract is not FOUO), SMC/CZ, "Program Management Review, GPS," 31 October 2001, p. 20 (Doc 5-59); Report, SMC/CZ, "GPS, Novella on User Equipment (UE) Acquisition, second edition," 4 July 2000, p. 7 (Doc 5-9).

[84] Staff Summary Sheet w/2 atchs, SMC/CZ to SMC/CZ programs, "GPS User Equipment Certification Package," 24 August 1998; Atch 1 Report, SMC/CZ, "Background Paper on Year 2000 (Y2K) Certification For GPS User Segment," no date; Atch 2 Certificate, SMC/CZ, "Weapon System Year 2000 (Y2K) Compliance Certification," 11 September 1998, (Doc 5-254); Strategy (FOUO, extract is not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000," 11 August 1997, pp. 1-2 (Doc 2-17).

[85] Strategy (FOUO, extract is not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000," 11 August 1997, pp. 1-2 (Doc 2-17); Staff Summary Sheet w/2 atchs, SMC/CZ to SMC/CZ programs, "GPS User Equipment Certification Package," 24 August 1998; Atch 1 Report, SMC/CZ, "Background Paper on Year 2000 (Y2K) Certification For GPS User Segment," no date; Atch 2 Certificate, SMC/CZ, "Weapon System Year 2000 (Y2K) Compliance Certification," 11 September 1998, (Doc 5-254);

The GPS user segment did not require a Y2K phase three process (renovation), because all of the JPO-procured receivers were found to be Y2K compliant. The GPS space segment and the control segment completed the phase three renovations in June 1998.[86]

On 21 August 1999, GPS had a time rollover similar to Y2K. The Air Force referred to this periodic Navstar event as the "End-of-Week (EOW)" rollover. GPS counted time in weeks, to a maximum of 1,023 weeks (or 19.7 years), rather than calculating time with the less accurate solar years. The GPS clocks started counting time on 8 January 1980 with week "0000," so the Navstar system required a time rollover in August 1999 (week 1,023) to reset its clocks back to zero. The Air Force had concerns that the EOW could create severe navigation problems (especially in receivers more than five years old) if complications resulted from this first-ever GPS clock rollover. Because of the similarity of the EOW to Y2K, the Air Force Materiel Command (AFMC) Y2K office closely monitored the 21 August rollover. The SMC Public Affairs Office and the Coast Guard launched an extensive awareness campaign in newspapers, magazines and on television to alert the public about the EOW and its potential malfunctions.[87]

Briefing Charts, Col James Armor, SMC/CZ, "NAVSTAR Global Positioning System Program Management Review," 28 July 1998, pp. 59-65 (Doc 5-255).

[86] Staff Summary Sheet w/2 atchs, SMC/CZ to SMC/CZ programs, "GPS User Equipment Certification Package," 24 August 1998; Atch 1 Report, SMC/CZ, "Background Paper on Year 2000 (Y2K) Certification For GPS User Segment," no date; Atch 2 Certificate, SMC/CZ, "Weapon System Year 2000 (Y2K) Compliance Certification," 11 September 1998, (Doc 5-254); Briefing Charts, Col James Armor, SMC/CZ, "NAVSTAR Global Positioning System Program Management Review," 28 July 1998, p. 61 (Doc 5-255).

[87] Paul Stone, DefenseLink, "Global Positioning System Goes Through Final Y2K Testing," 8 July 1999, http://www.defenselink.mil/news/Jul1999/n07081999_9907082.html (Doc 5-256); Internet Document, Newsbytes, "Air Force Warns Of GPS Rollover Failures," 6 August 1999, http://www.newsbytes.com/news/99/134521.html (Doc 5-257); News Release, SMC/PA, "GPS End-of-Week Rollover to Occur August 21," 12 August 1999, (Doc 5-258); Internet Document, U.S. Coast Guard Navigation Center, "GPS Week 1024 Rollover," 16 August 1999, http://www.navcen.uscg.mil/gps/geninfo/y2k/gpsweek.htm (Doc 5-259); Stephen Barr, "For GPS, Time Runs Out, And On," Washington Post, 20 August 1999, p. 2 (Doc 5 -260); News Report, 61st Communications Squadron, "GPS Rollover," SMC Today, November 1999, (Doc 5-261); E-mail, Michael Filler, USSPC/J, to Robert Mulcahy, SMC/HO, "RE: GPS Receivers," 16 July 2002, (Doc 5-262); History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is unclassified), HQ AFMC/HO, "The First Milestones," pp. 207-209.

SMC, AFSPC, and AFMC all activated battle staffs several days before and after 21 August in case the Navstar system had any problems during the rollover. Prior to 21 August, AFSPC took one GPS satellite off line and reset its clock back to zero to test how it would react; the satellite successfully continued its operation. At approximately 2200 hours on Saturday 21 August 1999, the Navstar system had its clocks reset to week zero. The GPS constellation and its ground support stations operating in Colorado continued to function normally both during and after the EOW. However, incompatibilities did occur between GPS receivers and the backup or alternate modes of some precision weapons and mission planning systems as a result of the rollover. The Air Force estimated that it would take several months to fully correct the incompatibilities, so the DoD formed an Anomaly Resolution Support Team (headed by Brig Gen Mike Hamel, Vice Commander of SMC) to assist the process. The rollover did not affect the Navstar system or the normal weapon systems' operations.[88]

The GPS JPO developed and published test procedures (available to civilian users on the internet) for GPS receiver manufacturers to validate whether the EOW affected their receiver designs. The JPO also offered the use of government test facilities (for a fee) to test them.[89]

The Y2K compliance process continued for GPS after the EOW. The phase-four process (validation) concluded that the GPS user segment attained Y2K compliance. During the phase-five process (certification), Col James B. Armor Jr. (GPS JPO Program Director) certified the Y2K Compliance Certification Checklist for the user segment on 11 September 1998. Lt Gen Eugene Tattini, the Program Executive Officer for Space, certified the Y2K compliance for the Navstar system on 25 September 1998. The Y2K

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[88] Internet Document, U.S. Coast Guard Navigation Center, "GPS Date Rollover Issues (Y2K)," 2 May 2001, http://www.navcen.uscg.gov/gps/geninfo/y2k/default.htm (Doc 5-263); SMC/PA, "All goes smooth with GPS rollover," Astro News, 27 August 1999, p. 1 (Doc 5-264); Document, SMC/CZ, "[GPS End-of-week Rollover] Lessons Learned," circa September 1999, (Doc 5-265); News Report, 61st Communications Squadron, "GPS Rollover," SMC Today, November 1999, (Doc 5-261); Document (FOUO, extract is not FOUO), SPAWAR Systems Center San Diego, "Boundary Rollover Test Report For Military GPS Receivers," 22 December 1998, (Doc 5-266); E-mail, Michael Filler, USSPC/J, to Robert Mulcahy, SMC/HO, "RE: GPS Receivers," 16 July 2002, (Doc 5-262); E-mail, Michael Filler, USSPC/J, to Robert Mulcahy, SMC/HO, "RE: End-of-week rollover," 17 July 2002, (Doc 5-267); Document, SMC/CZ, "Talking Points 1999 SMC Accomplishments and Challenges for 2000," 12 January 2000, (Doc 5-91).

[89] Review, SMC/CZ, "CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

completion date for the user segment occurred in December 1998, and the control segment's completion date took place in February 1999.[90]

The GPS JPO received funding to conduct the Y2K processing for the Navstar system. During FY 1996, the user segment received $20,000 in Y2K funding, the control segment received $38,000, and the space segment either did not receive any funding or it failed to list it. In FY 1997, the user segment received $100,000 in Y2K funding, the control segment received $1,864,000, and the space segment either did not receive any funding or it failed to list it. During FY 1998, the GPS user segment either did not receive any Y2K funding or it failed to list it, the control segment received $274,000, and the space segment received $100,000. In a July 1998 GPS Program Management Review briefing chart, it forecast that the GPS control segment would receive $1,214,000 for Y2K funding in FY 1999 and $385,000 in FY 2000.[91]

The 1 January 2000 rollover did not affect the GPS space or control segments. No JPO-procured GPS receivers experienced Y2K problems. Some Federal GPS receivers, outdated civilian receivers, and receivers that did not meet the Interface Control Document manufacturing specifications experienced Y2K difficulties, but the Air Force warned the public of that possibility months in advance. In general, few GPS receivers experienced failures due to Y2K.[92]

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[90] Staff Summary Sheet w/2 atchs, SMC/CZ to SMC/CZ programs, "GPS User Equipment Certification Package," 24 August 1998; Atch 1 Report, SMC/CZ, "Background Paper on Year 2000 (Y2K) Certification For GPS User Segment," no date; Atch 2 Certificate, SMC/CZ, "Weapon System Year 2000 (Y2K) Compliance Certification," 11 September 1998, (Doc 5-254); Briefing Charts, Col James Armor, SMC/CZ, "NAVSTAR Global Positioning System Program Management Review," 28 July 1998, p. 60 (Doc 5-255); Staff Summary Sheet w/1 atch, SMC/AXEC to SMC/CC, "Year 2000 Compliance," 24 September 1998; Atch 1, Certificate, SMC/AXEC, "[Y2K] Certificate of Accuracy," 25 September 1998, (Doc 5-268); Briefing Charts, Brig Gen James Armor, SMC/CZ, "NAVSTAR Global Positioning System Program PEO Portfolio Review," 1 September 1999, p. 60 (Doc 5-37); Fax, Paul Miller, Lockheed Martin, to Capt Chris Raybourn, SMC/CZ, "Year 2000 (Y2K) Compliance Checklist," 28 September 1999, (Doc 5-269); Document, Lockheed Martin, "Year 2000 Compliance of Block IIR GPS Operational Support System," 26 August 1999, pp. 1-9 (Doc 5-270).

[91] Briefing Charts, Col James Armor, SMC/CZ, "NAVSTAR Global Positioning System Program Management Review," 28 July 1998, p. 65 (Doc 5-255).

[92] E-mail, Michael Filler, USSPC/J, to Robert Mulcahy, SMC/HO, "RE: GPS Receivers," 16 July 2002, (Doc 5-262); Paul Stone, DefenseLink, "Global Positioning System Goes Through Final Y2K Testing," 8 July 1999, http://www.defenselink.mil/news/Jul1999/n07081999_9907082.html (Doc 5-256); Internet Document, U.S. Coast Guard Navigation Center, "GPS Date Rollover Issues (Y2K)," 2 May 2001, http://www.navcen.uscg.gov/gps/geninfo/y2k/default.htm (Doc 5-263); Review, SMC/CZ,

Operation Allied Force, the 1999 Kosovo Campaign

The Serbian internal aggression against the ethnic Albanians in Kosovo continued for a year before NATO [North Atlantic Treaty Organization] launched Operation Allied Force on 24 March 1999. Secretary of Defense William S. Cohen stated that NATO had three primary goals when it began Operation Allied Force: to ensure the stability of Eastern Europe; to stop the repressive ethnic cleansing campaign being conducted by Yugoslavian President Slobodan Milosevic and his military in Kosovo; and to ensure the credibility of NATO to the region after Serbia forces violated the non-aggression agreements Milosevic made in 1998. In order to remove the Serbian forces from Kosovo, 14 NATO nations conducted air strikes against Serbian targets rather than launch a traditional military campaign with massed ground forces.[93]

The U.S. Air Force and NATO relied heavily on GPS for precision air strikes over Serbia and Kosovo in order to damage Serbia's ability to wage war. The air strikes concentrated on Yugoslavian military forces in Kosovo and at targets in Serbia, including Belgrade. Major efforts were undertaken to minimize civilian casualties and avoid collateral damage during the air raids. NATO had concerns that if civilian casualties mounted in Serbia, world support for Operation Allied Force would decline as a result. The campaign had strict rules of engagement that required very precise bombing strikes.[94]

GPS directed the precision-guided bombs and missiles to their targets with remarkable accuracy that minimized collateral damage and civilian casualties. Allied aircraft accurately dropped munitions in both bad weather and at night with GPS

"CZ Comments on the History of GPS FY1998-FY2001," 24 March 2003, (Doc 5-13-1).

[93] Report to Congress, Department of Defense, "Kosovo/Operation Allied Force After-Action Report," 31 January 2000, pp. 1 (message from Cohen) and 1-6, 21-23, 78; History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is unclassified), HQ AFMC/HO, pp. 133-136; Rebecca Grant, "The Kosovo Campaign: Aerospace Power Made It Work," The Air Force Association, September 1999, pp. 11, 16, 22 (Doc 5-271); Internet Document, Military Analysis Network, "Operation Allied Force," 8 February 2000, pp. 4, 6-7 http://www.fas.org/man/dod-101/ops/allied_force.htm (Doc 5-272); John Tirpak, "The State of Precision Engagement," Air Force Magazine, March 2000, pp. 25-27 (Doc 5-273).

[94] Report to Congress, Department of Defense, "Kosovo/Operation Allied Force After-Action Report," 31 January 2000, pp. 6-8, 58-61, 79-80, 85, 124; History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is unclassified), HQ AFMC/HO, pp. 143-144; Rebecca Grant, "The Kosovo Campaign: Aerospace Power Made It Work," The Air Force Association, September 1999, pp. 4, 6 and 11 (Doc 5-271).

assistance. During Operation Desert Storm, only nine percent of the Allied munitions were "smart" bombs and 10 percent of the U.S. strike aircraft could deliver them; in Operation Allied Force the majority of the munitions were smart bombs and 90 percent of the U.S. strike aircraft could deliver them. Most of the munitions were laser-guided by the aircrews and could accurately deliver the bomb within four yards of the target. Yugoslavia had a 50 percent cloud cover over 70 percent of the time during the 78-day campaign, and only 24 days had unimpeded air strikes. The bad weather made NATO depend upon GPS-guided munitions for precision strikes. During Operation Allied Force, NATO released 23,000 bombs, and only 20 of them went off course and caused collateral damage and civilian casualties. The fixed strategic targets in Serbia that NATO destroyed or significantly damaged in the campaign included 14 command posts, 29 percent of the Serbian ammunition dumps, 11 railroad bridges, 34 highway bridges, 57 percent of the petroleum reserves, all of the Yugoslav oil refineries, over 100 airplanes, and 10 military airfields. The U.S. flew about 60 percent of the NATO sorties over Yugoslavia.[95]

By June 1999, the Yugoslav forces could not effectively continue their operations in Kosovo due to their losses from the NATO air raids. The air attacks destroyed 974 Serbian mobile targets (93 tanks, 153 armored personnel carriers, 389 artillery pieces, 339 other military vehicles). In Serbia, the air campaign seriously hurt Yugoslavia's military capabilities, and badly damaged its industry, communications, infrastructure, and its economy as a whole. After the 78-day air campaign, Milosevic capitulated on 3 June 1999 and agreed to NATO's peace terms. Operation Allied Force proved that a war could be won by air power alone.[96] The Navstar system made irreplaceable contributions

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[95] Report to Congress, Department of Defense, "Kosovo/Operation Allied Force After-Action Report," 31 January 2000, pp. 60, 78-79, 82-91, 97-98, 100, 124, 135; History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is unclassified), HQ AFMC/HO, pp. 143-149; SMC/PA, "Space systems like GPS support joint forces near Iraq," Astro News, 27 March 1998, p. 3 (Doc 5-274); John Tirpak, "The State of Precision Engagement," Air Force Magazine, March 2000, pp. 26, 29 (Doc 5-273); Internet Document, Online NewsHour, "Eyes in the Sky," 19 April 1999, http://www.pbs.org/newshour/bb/europe/jan-june99/weapons_4-19.html (Doc 5-275); Internet Document, Military Analysis Network, "Operation Allied Force," 8 February 2000, pp. 4, 6-7 http://www.fas.org/man/dod-101/ops/allied_force.htm (Doc 5-272); Peggy Hodge, "NAVSTAR GPS: Beaming success for millions," Astro News, 31 March 2000, p. 10 (Doc 5-276); Rebecca Grant, "The Kosovo Campaign: Aerospace Power Made It Work," The Air Force Association, September 1999, p. 17 (Doc 5-271); Fact Sheet, USAF, "Joint Direct Attack Munitions," May 2001, http://www.af.mil/news/factsheets/JDAM.html (Doc 5-277); Paul Richter, "Almost All U.S. Airstrikes Involve 'Smart' Bombs," Los Angeles Times, 13 April 1999, http://www.fas.org/man/dod-101/ops/docs99/990413-t000033260.htm (Doc 5-278).

[96] Report to Congress, Department of Defense, "Kosovo/Operation Allied Force After-Action Report," 31 January 2000, pp. 124, 135; History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is unclassified), HQ AFMC/HO,

to the campaign, "GPS-guided systems were critical to the success of the campaign given the weather and the requirement for minimal collateral damage."[97] Defense Secretary Cohen stated, "We achieved our goals with the most precise application of airpower in history."[98]

The GPS JPO accelerated the acquisition process for the campaign. By doing this, the development of the navigation warfare Advanced Concept Technology Demonstration (ACTD) GPS Receiver Application Module (GRAM) enhanced the warfighter's ability to conduct its mission during the campaign. The accelerated development of the GPS receiver card enabled the GBU-15 (Guided Bomb Unit) Program to address the immediate requirement for an all-weather capable bomb.[99]

The Air Force also improved its Foreign Military Sales (FMS) process in support of the campaign. The GPS JPO quickly processed the FMS case requests from the United Kingdom and Belgium for the GPS handheld receivers. Due to the process improvements conducted by the JPO, the Allies obtained the receivers within days of their requests. The accelerated process implemented a parallel, rather than the usual serial coordination, between the GPS JPO and the Secretary of the Air Force International Affairs (SAF/IA). The JPO forwarded the FMS requirement to the contractor who manufactured the item and began preparing the contractual documentation. The contractor did not have an obligation to begin manufacturing the receivers for the FMS customers, but it made special arrangements to fulfill the FMS requirement due to the sensitivity of time and the importance of the mission. The parallel coordination process reduced the overall cycle-time by over 80%.[100]

GPS made very significant contribution to Operation Allied Force, but improvements needed to be accomplished in a few areas. The MAGR receiver in the F-117 Nighthawk experienced an unusually high rate of failure (five failures) in April during its Kosovo missions. Compatibility problems occurred between the MAGR and the antenna electronics. The high failure rate threatened to exhaust the supply system, so the nonfunctional MAGRs had to be transported to repair shops and then returned to the

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pp. 145-146; Rebecca Grant, "The Kosovo Campaign: Aerospace Power Made It Work," The Air Force Association, September 1999, pp. 22-24 (Doc 5-271).

[97] Report to Congress, Department of Defense, "Kosovo/Operation Allied Force After-Action Report," 31 January 2000, p. 91.

[98] Rebecca Grant, "The Kosovo Campaign: Aerospace Power Made It Work," The Air Force Association, September 1999, p. 18 (Doc 5-271).

[99] Briefing Charts, Richard Teichmann, SMC/AXME, "Kosovo Lessons Learned and Investment Strategy," 4 August 1999, (Doc 5-279).

[100] *Ibid* (FOUO, extract is not FOUO), (Doc 5-279); Talking Paper, SMC/CZ, "[GPS and Kosovo]," 5 August 1999, (Doc 5-280).

field. The Space and Special Systems Management Directorate worked together with the F-117 System Program Office and Lockheed Martin and conducted modifications to the computer software. After the modifications had successfully been tested, the Air Force distributed field reprogramming kits to the 49th Fighter Wing (FW) at Holloman AFB, New Mexico. Since no additional failures had occurred since April, the 49 FW decided not to install the updated kits until after hostilities ended.[101]

On 2 March 1999, U.S. ground troops in the Balkans developed periodic navigation problems when they used their handheld PLGR receivers to determine their position in relation to the border of Yugoslavia. A software instruction that "corrected for oscillator frequency variations" brought a sudden navigation deviation of up to 300 meters from the true position. The error lasted for a couple of minutes per episode, and it occurred as often as every two hours. The government program manager and Rockwell Collins (the manufacturer) worked together to identify the problem. Rockwell Collins developed a software modification to correct the problem, then the government program manager tested it for effectiveness and validated the software for installation. The new software received its authorization for release and distribution to critical military users on 30 April 1999. The PLGR Configuration Control Board approved full release for the updated PLGR on 7 June 1999.[102]

Military members required additional training with GPS receivers. It took from one to two hours for the almanac to bring the GPS receivers to an optimum operational state when they were initially turned on. Some of the field maintenance personnel did not know that it took this long, assumed the receiver to be malfunctioning, and incorrectly labeled good receivers as "defective." This occurred several times, and could have been avoided with better training.[103]

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[101] Briefing Charts, Richard Teichmann, SMC/AXME, "Kosovo Lessons Learned and Investment Strategy," 4 August 1999, (Doc 5-279); History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extracts are U), HQ AFMC/HO, pp. 282-283.

[102] Briefing Charts, Richard Teichmann, SMC/AXME, "Kosovo Lessons Learned and Investment Strategy," 4 August 1999, (Doc 5-279); Talking Paper, SMC/CZ, "[GPS and Kosovo]," 5 August 1999, (Doc 5-280).

[103] Briefing Charts, Richard Teichmann, SMC/AXME, "Kosovo Lessons Learned and Investment Strategy," 4 August 1999, (Doc 5-279); Talking Paper, SMC/CZ, "[GPS and Kosovo]," 5 August 1999, (Doc 5-280).

CHAPTER 6

METEOROLOGICAL SATELLITE PROGRAMS

The mission of the Defense Meteorological Satellite Program (DMSP) was to generate terrestrial and space weather data for operational U.S. military forces worldwide. The space segment of the system nominally consisted of two satellites in 458-nautical mile, sun-synchronous, near-polar orbits. Sensors aboard these satellites collected meteorological, oceanographic, and space environment data in the visible and infrared spectra, and readout stations and terminals around the globe received the data and made it available to users throughout the Department of Defense and other agencies. With a constellation of two satellites functioning nominally, weather data could be refreshed every six hours. Dedicated DMSP ground facilities exercised command and control of the satellites. At the beginning of the period under discussion (October 1997 – September 2001) Air Force Space Command operated these ground facilities and exercised operational command and control of DMSP satellites.[1]

However, the command and control of all government weather satellites was already in the process of transition to an Integrated Program Office reporting to the National Oceanic and Atmospheric Administration. (See the section entitled National Polar-orbiting Operational Environmental Satellite System (NPOESS) later in this chapter.) That Integrated Program Office actually assumed operational command and control of DMSP as well as NOAA satellites on 29 May 1998. The Air Force Weather Agency and the Navy's Fleet Numerical Meteorology and Oceanography Center continued to analyze, evaluate, and disseminate the data. SMC's DMSP Program Office continued to procure hardware and software and to perform sustaining engineering functions for the system's space and ground segments.[2]

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[1] History of SMC (FOUO), October 1994 –September 1997, p. 79 (information used not FOUO) (HO archives). See also Fact Sheet, SMC/PA, "Defense Meteorological Satellite Program," 27 July 2000 (Doc 6-1); Fact Sheet, SAF/PA, "Defense Meteorological Satellite Program," May 2002 (Doc 6-2); Fact Sheet, AFSPC/PA, "Defense Meteorological Satellite Program," no date (Doc 6-3); SMC/CI, "DMSP Overview," 3 July 1997, accessible from http://www. losangeles.af.mil/SMC/CI/overview/index.html (Doc 6-4); Office of the National Security Space Architect (NSSA), National Security Space Road Map, "Defense Meteorological Satellite Program (DMSP)" and related articles, accessible from http://www.wslfweb.org/docs/roadmap/irm/internet/ emonitor/init/html/dmsp.htm (Doc 6-5).

[2] History of SMC (FOUO—information used not FOUO), October 1994-September 1997, pp. 79, 96-100 (HO archives); News Release, SAF/PA, "Air Force Turns Over Weather Satellite Control to NOAA," 2 June 1998 (Doc 6-6).

Space Segment

Each DMSP satellite consisted of a spacecraft and its sensor payloads. The spacecraft began to function at liftoff during launch, when it monitored the ascent phase guidance of the booster. After separation from the booster, an apogee kick motor propelled the satellite to its nominal altitude, and, as it did so, the spacecraft provided ascent guidance, electrical power, and telemetry. A trim burn by the hydrazine propulsion system inserted the satellite into its final orbit. Once the satellite was in orbit, the spacecraft carried out the necessary housekeeping functions, including thermal control, attitude determination and control, generation and distribution of electrical power, communication with ground stations, processing of commands from ground stations, and monitoring and control of spacecraft equipment. All spacecraft activities, from launch through orbital operations, were controlled by on-board computers that were reprogrammable from the ground.[3]

The satellite's payload was made up of a primary sensor and several mission (secondary) sensors. The unclassified primary and mission sensors being flown on DMSP satellites in operation during FY 1998-2001 are listed in Table 6-1. The primary sensor was called the Operational Linescan System (OLS). It used a telescope to scan the earth's surface, moving back and forth along a swath 1600 nautical miles wide and covering the entire globe in about 12 hours. Visible and infrared optical detectors inside the sensor picked up imagery of cloud cover on the earth's surface. This imagery could be downlinked to the ground immediately or stored in the sensor's four tape recorders for transmission at a later time.[4]

The DMSP satellites in orbit during FY 1998 were of the Block 5D-2 configuration.[5] However, a somewhat different DMSP satellite designated F-15 was already in storage awaiting launch at the beginning of this period. It had been produced under a separate procurement, contract FO4701-86-C-0038 with RCA, and had been delivered in FY 1992. F-15 was sometimes considered a prototype of the later model Block 5D-3 spacecraft, although it was sometimes considered the last Block 5D-2

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[3] See note 1 above.

[4] History of SMC (FOUO), October 1994 –September 1997, p. 84 (information used not FOUO) (HO archives); NOAA/National Geophysical Data Center, "DMSP Data Availability," accessible at http://dmsp.ngdc. noaa.gov/html/availability.html (1 August 2002) and HO archives.

[5] The 5D-2 satellites weighed between 1400 and 1700 pounds in orbit and measured 5 feet in diameter by 14 feet in length.

INSERT PAGE 1 OF TABLE 6-1 IN LANDSCAPE.

INSERT PAGE 2 OF TABLE 6-1 IN LANDSCAPE.

instead. In configuration and capabilities, it fell between these two standard DMSP spacecraft blocks. It had a larger, more advanced bus, but its suite of sensors and overall capabilities were similar to the Block 5D-2 satellites.[6] F-15 was also equipped with two digital tape recorders and two solid state recorders (SSRs).

The F-15 spacecraft was shipped to Vandenberg AFB on 19 March 1998 to await launch, but it was affected by some problems during the wait. As we have seen, each DMSP satellite had four recorders to store data that could not be downlinked immediately, a situation that usually occurred when the satellite was not within sight of a ground station. Block 5D-3 satellites beginning with F-16 would be equipped with four solid state recorders (SSRs) that would not be subject to the mechanical failures that had shortened the operational lifespans of earlier DMSP satellites. However, two recorders on F-15 were digital tape recorders (DTRs)—storing data in digital format but operating with mechanical moving parts and tapes—as the recorders on F-14 had been. DTRs were, of course, subject to the same kinds of mechanical failure that had plagued DMSP Block 5D-2 spacecraft. This became more of an issue when three of the four DTRs on F-14 failed during its second year on orbit.[7] The program office decided to request funding for early acquisition of SSRs for F-15 and F-16, despite their approaching launch dates. Ultimately, it decided to replace two of the DTRs on F-15 and all four of the DTRs on F-16 with SSRs. SEAKR Engineering, Incorporated, which manufactured the SSRs under subcontract to Northrop Grumman's contract (F04701-95-C-0014) with SMC, delivered two SSRs for F-15 on 26 March 1999 and four SRRs for F-16 around April 2000. The SRRs for F-17 through F-20 would be delivered during CY 2002.[8]

The launch of F-15, scheduled near the beginning of this period for August 1999, slipped somewhat because of several anomalies that the spacecraft experienced during processing for launch. First, a 50 Ah nickel-cadmium battery exploded during post-shipment testing of the spacecraft at Vandenberg AFB on 1 July 1998. The explosion caused collateral damage to hydrazine thruster number four. The program office estimated that total repair costs could reach $1 million. During August 1998, the contractors replaced the 50 Ah batteries with 40 Ah batteries designed by SAFT Battery

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[6] History of SMC (FOUO), October 1994 –September 1997, p. 86 (information used not FOUO) (HO archives).

[7] F-14 was launched on 4 April 1997, and the three recorders failed on 24 February 1998, 13 October 1998, and 20 November 1998. See Briefing Charts (U), SMC/CI, "DMSP S15/Titan II 23-G8 Executive Mission Readiness Review," 17 August 1999 (HO archives).

[8] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998, 19 July 2000 (HO archives); Defenselink, "Contracts," 5 May 1999, http://www.defenselink.mil/news/May1999/c05051999_ct214-99.html.

Company, replaced the hydrazine thruster, and repeated the tests. The costs were met by a reprogramming action from Air Force headquarters (SAF/AQSS) and delayed procurement of seven Small Tactical Terminals (see Tactical Terminals later in this chapter).[9]

Some other anomalies in the spacecraft were found before launch. A faulty inertial measurement unit (IMU) in the spacecraft had to be replaced, and the new unit had to be tested during June 1999. An electrical short in the spacecraft's solar array caused a complete drain in battery power and had to be repaired during August 1999. During October 1999, a random variation in a clock signal occurred at the SSR interface, and the spacecraft had to be demated from the Titan II booster for replacement of parts and retesting. Shortly before launch, final testing of the reaction wheel assembly revealed that one reaction wheel did not meet specifications, requiring replacement and retesting of the assembly during November and December 1999.[10]

F-15 was launched successfully from Vandenberg AFB on 12 December 1999, using Titan II vehicle 23G-8. The on-orbit checkout was completed successfully on 23 December 1999, and satellite control authority was transferred to the Integrated Program Office (IPO) of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) on 23 December 1999. (See the section entitled "Command and Control Segment" later in this chapter.) The primary sensor, the Operational Linescan System (OLS), was successfully calibrated early in January 2000, and satellite F-15 was declared operational on 19 January 2000, with all sensors operating nominally.[11]

To replenish the constellation after F-15, the DMSP Program Office was procuring a new type of satellite called the Block 5D-3. While generally similar to the Block 5D-2, the 5D-3 incorporated a larger solar array and a third battery pack, which would increase its ability to generate and store power and would help to lengthen its mean mission duration to 42 months. To accommodate the extra battery and larger solar array, the spacecraft structure had been enlarged and strengthened, and modifications had

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[9] Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998 (HO archives); Briefing Charts (U), SMC/CI, "DMSP S15/Titan II 23-G8 Executive Mission Readiness Review," 17 August 1999 (HO archives).

[10] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998, 19 July 2000 (HO archives).

[11] See note 10 above. Additional information about the launch is contained in Table 3-1 in Chapter 3 of this history. See also News Release, AFSPC/PA, "Titan II Launch Delayed," 9 December 1999 (Doc 6-7); News Release, AFSPC/PA, "Titan II Launched," 13 December 1999 (Doc 6-8); Justin Ray, Spaceflight Now, "Mission Status Center: December 12, 1999," 12 December 1999 (Doc 6-9).

INSERT ILLUSTRATION 6-1: DMSP CONSTELLATION AT THE END OF FY 2001

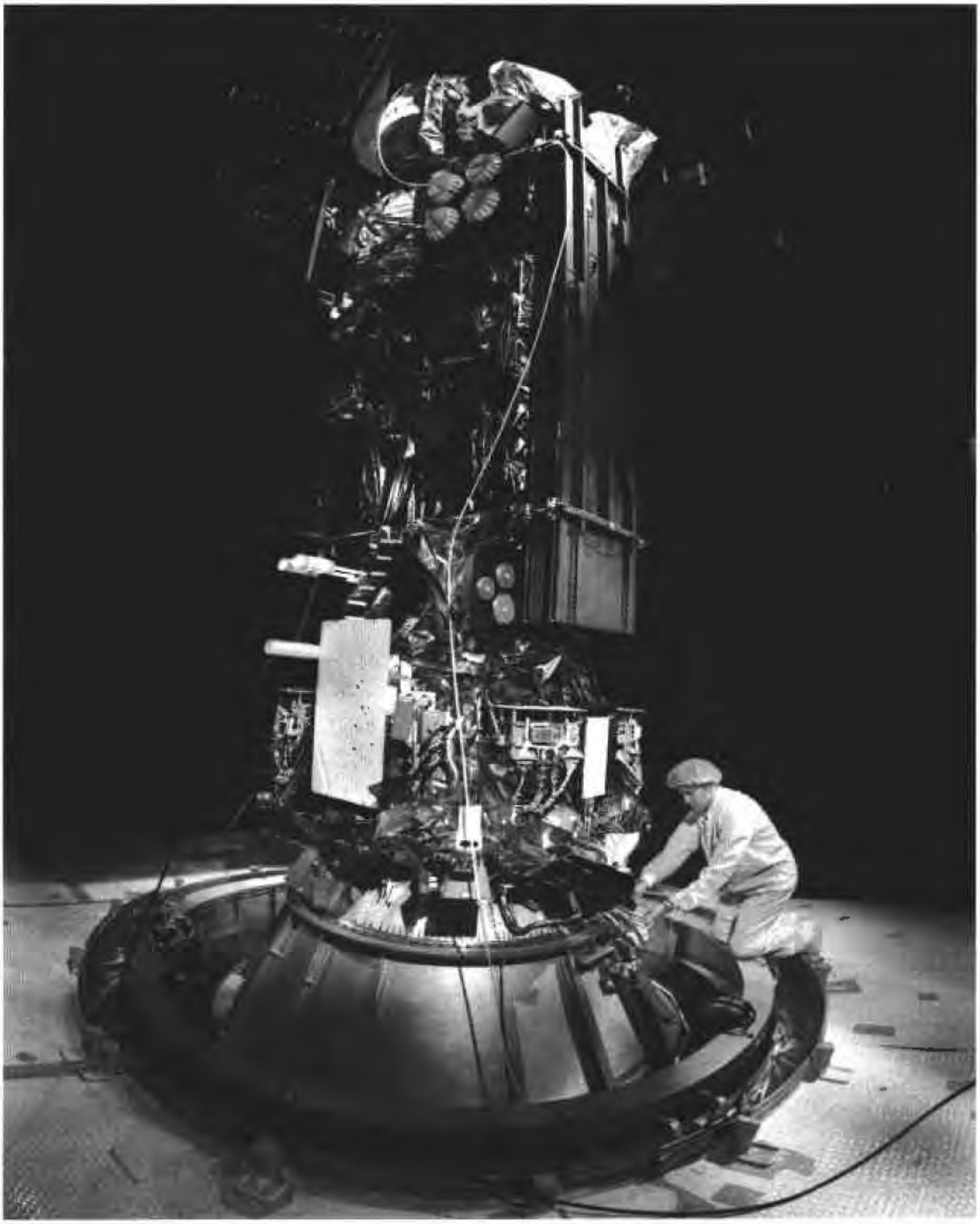

Illustration 6-2:
DMSP Satellite F-16 mated to Titan II Launch Vehicle 12 January 2001
(photograph courtesy Lockheed Martin)

been made in the attitude control and thermal control subsystems. The spacecraft also would be equipped with four solid-state recorders instead of the two solid-state recorders used on F-15. As another improvement, the spacecraft would use a higher commanding rate: 10 Kbs for F-16 compared to 2 Kbs for F-15 and prior satellites. They would also incorporate a new deployable UHF antenna system. Several of the sensors would also be changed. The new OLS incorporated upgraded bearings and a 66 kbps downlink modification retrofitted into the sensors of the later Block 5D-2 satellites. Finally, 5D-3 satellites would be equipped with four new sensors, designated in Table 6-2 below as SSMIS, SSUSI, SSULI, and SSF.[12]

Table 6-2
Comparison of Sensor Suites on F15 and F16[13]

Sensors	F15[14]	F16[11]
Operational Linescan System (OLS)	5D-2 Configuration	5D-3 Configuration
Microwave Imager	SSMI	SSMIS
Microwave Temperature Sounder	SSMT1	SSMIS
Microwave Water Vapor Sounder	SSMT2	SSMIS
Ultraviolet Limb Imager	not equipped	SSULI
Ultraviolet Spectrographic Imager	not equipped	SSUSI
Survivability	SSZ	SSF
Precipitating Electron Spectrometer	SSJ4	SSJ5
Triaxial Fluxgate Magnetometer	SSM	SSM
Scintillation and Plasma Monitor	SSIES2	SSIES3

[12] The mechanical wearing out of tape recorders on orbit had been one of the primary causes of degradation for all DMSP satellites. The tape recorders were to be replaced in the newer satellites with solid-state recorders to enhance the reliability, life span, and worldwide data quality of the units. See History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, p. 86 (HO archives); and Briefing Charts, Aerospace Corporation, "Aerospace President's Review: DMSP F-16/Titan II," 16 January 2002 (HO archives).

[13] Briefing Charts, Aerospace Corporation, "Aerospace President's Review: DMSP F-16/Titan II," 16 January 2002 (HO archives).

[14] Acronyms: SSMI = Special Sensor Microwave Imager, SSMIS = Special Sensor Microwave Imager Sounder, SSMT = Special Sensor Microwave Temperature Sounder, SSULI = Special Sensor Ultraviolet Limb Imager, SSUSI = Special Sensor Ultraviolet Spectrographic Imager, SSZ = Special Sensor Laser Threat Detector, SSF = Special Sensor F, SSJ = Special Sensor Electron/Ion Spectrometer, SSM = Special Sensor Fluxgate Magnetometer, SSIES = Special Sensor for Ions and Electrical Plasma Drift/Scintillation.

INSERT ILLUSTRATION 6-3: DRAWING OF BLOCK 5D-3 SPACECRAFT IN ORBIT

Five Block 5D-3 satellites were being procured under a contract awarded to General Electric's Astro Space Division in 1989. They were designated F-16 through F-20. As with earlier DMSP satellites, the sensors were being acquired from a variety of contractors and government agencies and provided to the spacecraft contractor for integration into the spacecraft. Table 6-2 above shows the suite of sensors to be flown on F-16 in comparison to the sensors used on F-15 for the same missions.[15]

Plans had originally called for further system upgrades for satellites 18-20. The OLS was to be upgraded with additional data channels to improve snow and cloud detection, detection of low clouds, and measurements of sea surface temperatures. A new GPS occultation sensor was supposed to improve worldwide location and pointing and to measure electron densities. Unfortunately, these plans had to be canceled.[16]

Table 6-3[17]
DMSP Development and Production Contracts for Blocks 5D-2 and 5D-3

Contract Number	Contractor	Block Number	Satellite Numbers	Start Date	Completion Date	Value at Award
F04701-75-C-0182	RCA	5D-2	F-6 > F-7	30 Jun 75	30 Apr 86	$228,227,076
F04701-78-C-0063	RCA	5D-2	F-8 > F-10	26 Sep 79	14 Nov 86	
F04701-83-C-0030	RCA	5D-2	F-11 > F-14	2 Aug 83	31 Mar 90	
F04701-86-C-0038	RCA	5D-2/3	F-15	7 Jul 86	30 Oct 91	
F04701-89-C-0029	GE (acquired by Lockheed Martin)	5D-3	F-16 > F-20	10 Jul 89	12 Jun 99	

[15] For additional information about the contract, see Table 6-3 below. In 1993, GE Astro Space was absorbed by Martin Marietta, later part of Lockheed Martin as a result of a merger. See History of SMC (FOUO—information used not FOUO), October 1994 – September 1997, pp. 87-88 (HO archives).

[16] Notes provided by Mr. John Bohlson, Aerospace Corporation, 4 December 2001 (HO archives); History of SMC (FOUO—information used not FOUO), October 1993 – September 1997, p. 89 (HO archives).

[17] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp. 86-87 (HO archives); contract listings in appendices of SMC histories for 1986-1997 (HO archives); various Contractor Performance Assessment Reports (CPARS) (FOUO—information used not FOUO) in HO archives.

Lockheed Martin began production of the 5D-3 satellite vehicles in January 1996. The contractor delivered F-16 and F-17 during FY 1997, F-18 and F-19 during FY 1998, and F-20 early in FY 1999. These vehicles went into long-term storage to await production of the sensors, integration, and delivery to the launch site closer to their scheduled launch dates. F-20, the last 5D-3, was to be launched around February 2009.[18] Satellites F-17 through F-20 would be launched on a new type of launch vehicle, the Evolved Expendable Launch Vehicle. (For information about the EELV, see Chapter III of this history.) On 3 June 1999, SMC awarded a modification to Lockheed Martin's existing contract (F04701-97-C-0024) to design changes to the satellites that would allow them to be launched on EELVs. Lockheed Martin was carrying out the integration efforts under contract F04701-96-C-0023.[19]

Table 6-4
Major DMSP Component (Spacecraft and Sensor) Contracts in Effect During FY 1998-2001[20]

Contract Number	Contractor	Efforts[21]	Start Date	Completion Date	Value at Award
F04701-89-C-0036	Aerojet Elec. Systems Div.	SSMIS	27 March 1989	31 March 2003	
F04701-92-C-0020	Aerojet Elec. Systems Div.	SSM/TW/IS S&S	1 April 1992	30 April 1998	
F04701-95-C-0014	Northrop Grumman	OLS S&S; SSRs	1 May 1995	30 September 2000	$32,766,604
F04701-96-C-0026	Raytheon	SSM/I S&S	1 April 1996	31 March 2001	
F04701-00-C-0001	Northrop Grumman	Consolidated Sensor S&S	3 May 2000	30 November 2004	$99,156,144

[18] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998 (HO archives); Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001 (HO archives).

[19] Defenselink, "Contracts," 3 June 1999, http://www.defenselink.mil/news/May1999/c06031999_ct276-99.html, and 6 August 1999, http://www.defenselink.mil/news/Aug1999/c08091999_ct370-99.html.

[20] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998 (HO archives); Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001 (HO archives); Contract Listing in Appendix G of this history and preceding history.

[21] Acronyms: CDFS = Cloud Depiction and Forecast System; OLS = Operational Linescan System; S&S = Support and Services; SSM/I= Special Sensor Microwave Imager; SSMIS = Special Sensor Microwave Imager/Sounder; SSM/TW/IS = Special Sensor Microwave Temperature Sounder/Water Vapor Profiler/Imager Sounder; SSRs = Solid State Recorders; STT = Small Tactical Terminal.

INSERT ILLUSTRATION 6-4: DMSP BLOCK 5D-3 SENSOR SUITE

As we have seen, DMSP satellites carried many specialized sensors, and SMC's program office had to manage many contracts to procure and support them. It was becoming increasingly difficult to manage a large number of contracts as the program office's manpower declined with the buildup of the National Polar Orbiting Operational Environmental Satellite System (NPOESS) under the Department of Commerce. (See the NPOESS section below). In 1999, the program office undertook an initiative to combine the major sensor contracts under one contract for Consolidated Mission Sensor Support and Services that would be simpler to manage. These efforts culminated in the award of such a contract (F04701-00-C-0001) to Northrop Grumman on 1 May 2000. By the terms of this contract, Northrop Grumman would provide support and services to upgrade, prepare, sustain, integrate, and operate a maximum of 13 sensors on DMSP satellites. It would also manage the sensor-related efforts of a number of subcontractors and government laboratories. (See Table 6-4 above.)[22]

Early in 1998, F-16 (the first Block 5D-3) was scheduled for launch about February 2001, but it encountered various fiscal and technical delays. By June 1999, the program office was planning to launch F-16 in September 2000 to support weather forecasting for operations in Kosovo, to conduct a "fast track" procurement of four SSRs for F-16 (along with the two for F-15 mentioned above), and to refurbish four DTRs for F-16 to provide a contingency backup capability in case the aging satellite F-13 were to fail. Although an early contingency launch proved to be unnecessary, the launch had to be delayed twice in late CY 2000. In January 2001, the launch encountered a third, more significant delay when the spacecraft's inertial measurement unit (IMU) failed during testing on the launch pad. The spacecraft had to be demated from the booster and taken back to the Payload Integration and Test Facility (PITF) at Vandenberg AFB. This delay brought it into conflict with a higher priority Titan IV launch at Vandenberg and ensured an additional delay past August 2001. Further inspection of the spacecraft revealed some breaks in the electrical lines for clocks, and the engineers for Lockheed Martin decided that the spacecraft's controls interface unit (CIU) for distribution of the clock signals would have to be replaced. The replacement was no sooner accomplished than inspecting technicians discovered a crack in the bond between the solar array panel and an assembly

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[22] Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 27 April 2000 (HO archives); Defenselink, "Contracts," 1 May 2000, http://www.defenselink.mil/news/May2000/c05012000_ct220-00.html; Staff Summary Sheet (U), SMC/CIKE to SMC/CC, "Required coordination and approval of Justification Review Document (JRD) for Other Than Full and Open Competition for DMSP Consolidated Mission Sensor Support and Services (Ref SMC/CI-JRD-99-07)," 30 June 1999, with attachments (FOUO—information used not FOUO) (Doc 6-34); Staff Summary Sheet (U), SMC/CIKE to SMC/CC, "Fee Determining Official and Clearance Dele-gation for the DMSP Sensor Support and Services Consolidated Contract," 22 October 1999, with attachments (Doc 6-35); Staff Summary Sheet (U), SMC/CIK to SMC/CD, "CPAR for Contract F04701-00-C-0001, Consolidated Sensor Support and Services Contract," 23 July 2001, with attachments (FOUO—information used not FOUO) (Doc 6-36).

that supported its hinge to the to the deployment boom. Consequently, the solar array was also replaced while the spacecraft was in the PITF. Further delays in the Titan launch queue at Vandenberg, combined with additional testing of F-16's IMU, delayed the launch into the next fiscal year. Engineers were especially concerned about the performance of F-16's IMU because by then F-15 was experiencing failures in the gyroscopes of its IMU on orbit. By the end of FY 2001, launch projections called for F-16 to be launched no earlier than 20 December 2001.[23]

Table 6-5
Major DMSP System Support Contracts in Effect During FY 1998-2001[24]

Contract Number	Contractor	Efforts[25]	Start Date	Completion Date	Value at Award
F04701-97-C-0007	Integral Systems, Inc.	IV&V Flight Software	16 February 1997	15 February 1999	$1,192,900
F04701-97-C-0024	Lockheed Martin	Spacecraft S&S	26 June 1997	July 2002	$308,500,000
F04701-98-C-0006	Aerojet Elec. Systems Div.	S&S	4 May 1998	30 April 2003	

Command and Control Segment

At the beginning of FY 1998, the DMSP command and control segment was in the process of transition from its old Command and Control Segment to a new Command and Control Segment as part of the Presidentially directed convergence of the military and civilian meteorological satellite programs. (See the section about the National Polar-orbiting Operational Environmental Satellite System (NPOESS) later in this chapter.) The old segment had relied upon two dedicated ground facilities—the Fairchild Satellite Operations Center (FSOC), located at Fairchild AFB, Washington, and the Multi-Purpose Satellite Operations Center (MPSOC), located at Offutt AFB, Nebraska. The FSOC and the MPSOC generated commands for transmission to the satellites and processed

[23] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998, 19 July 2000 (HO archives); Briefing Charts (U), SMC/CI, "Program Management Review: SMC/CI Portfolio," 5 September 2001, 27 November 2001 (HO archives).

[24] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998 (HO archives); Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001 (HO archives); Contract Listing in Appendix G of this history and preceding history.

[25] Acronyms: IV&V = Independent Validation and Verification; S&S = Support and Services.

telemetry received from them. The FSOC could use its own antennas to transmit commands and receive telemetry, and it could also send commands and receive telemetry through the Thule and New Hampshire tracking stations of the Air Force Satellite Control Network (AFSCN). These two tracking stations had been specially modified to communicate directly with the FSOC and the MPSOC and function as part of the DMSP command and control segment. Finally, the FSOC and the MPSOC could send commands and receive telemetry through the other tracking stations of the AFSCN, although there were not yet any direct communication links between the FSOC and the MPSOC and the other tracking stations.[26]

However, Presidential Decision Directive NSTC-2 of May 1994 had directed the phasing out of the two separate polar-orbiting environmental satellite programs, DMSP for military users and the National Oceanic and Atmospheric Administration's Polar-orbiting Operational Environmental Satellite System (POESS) for civilian users. The Departments of Defense and Commerce were to "converge" their systems into a single integrated program. As part of that convergence, the command and control systems would have to become a single system. Under the direction of a joint National Polar-orbiting Operational Environmental Satellite System (NPOESS) Integrated Program Office (IPO), DMSP satellite operations would be transferred to a command and control system known as the Integrated Polar Acquisition and Control Subsystem (IPACS). IPACS would have ground facilities in the Satellite Operations Control Center (SOCC) at Suitland, Maryland, (the site of the existing ground facilities for POESS) and at Falcon AFB (the site of the AFSCN's ground facilities).[27]

As the first significant step in combining the military and civilian meteorological programs, the SOCC successfully took over satellite control authority (SCA) as well as actual operational control of the DMSP system in addition to POESS on 29 May 1998, one month ahead of schedule. On 11 June 1998, Air Force Space Command's 6th Space Operations Squadron at Offut AFB, Nebraska, closed down the MPSOC, and in October 1998, an alternate POES control facility opened at Falcon AFB, Colorado, staffed by Air Force reservists.[28] The SOCC at Suitland—staffed by personnel from NOAA, the Air Force, and contractors—successfully supported the launch of DMSP satellite F-15 on 12

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[26] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp.90-92 (HO archives).

[27] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp.91-92 (HO archives).

[28] News Release, Air Force News Service, "Air Force Turns Over Weather Satellite Control to NOAA," 2 June 1998 (Doc 6-10).

December 1999 and successfully assumed operational control of the new satellite on 23 December 1999.[29]

User Segment

Weather data collected by the sensors on DMSP satellites was downlinked in real time and was also stored in tape recorders (or, beginning with F-15, solid state recorders) on board the satellites. The real time data, which covered local weather conditions only, was received by tactical terminals deployed in numerous locations worldwide and was made available to field commanders to support tactical military operations. The stored data, which covered weather conditions all over the globe, was downlinked to the FSOC and to the AFSCN tracking stations at Thule, New Hampshire, and Hawaii. From those sites, it was relayed to the Air Force Weather Agency (AFWA) at Offutt AFB, Nebraska, and to the Fleet Numerical Meteorology and Oceanography Center (FNOC) at Monterey, California. There, it was reconstructed and processed to support strategic missions.[30]

Table 6-6
Major DMSP User Equipment Contracts in Effect During FY 1998-2001[31]

Contract Number	Contractor	Efforts[32]	Start Date	Completion Date	Value at Award
F04701-94-C-0019	Harris Corporation	STT	15 June 1994	30 November 2004	$53,752,085
F04701-95-C-0013	Sterling Software	CDFS II	2 June 1995	30 September 2005	

TACTICAL TERMINALS

The DMSP Program Office had completed the global deployment of a new, improved tactical weather terminal called the Mark IVB in 1995, and it had brought the

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[29] Background Paper, NOAA, "The National Polar-orbiting Operational Environmental Satellite System (NPOESS)," 12 August 2002, accessible at http://www.ipo.noaa.gov/backgrounderAugust2002.html (Doc 6-11).

[30] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, p. 93 (HO archives).

[31] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998; Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001; Contract Listing in Appendix G of this history and preceding history.

[32] Acronyms: CDFS = Cloud Depiction and Forecast System; STT = Small Tactical Terminal.

system to full operational capability in 1997. The Mark IVB was significantly more capable than earlier terminals, but it was large and heavy, weighing 26,000 pounds and requiring a C-130 to transport it to, or within, the theater of operations. Tactical forces often needed weather satellite data in situations where the use of a large terminal with a ten-foot antenna and associated processing equipment was not practical. To meet that need, the DMSP Program Office was procuring a ruggedized and highly portable Small Tactical Terminal (STT). Three versions of the STT were being procured. The basic version would ingest, process, store, and display low-resolution, real-time data from DMSP and other US and foreign meteorological satellites. The enhanced version (known as the High Resolution STT or H-STT) would do that as well as doing so with high-resolution, real-time data from DMSP and NOAA satellites. A version known as the Joint Task Force Satellite Terminal (JTFST) would provide the capabilities of the enhanced version as well as ingesting, processing, storing, and displaying high-resolution data from additional US and foreign meteorological satellites.[33]

SMC had awarded a production contract (FO4701-94-C-0019) for STT units to Harris Corporation in June 1994, and the Air Force had declared initial operational capability for the basic version of the STTs in 1997. By the beginning of FY 1998, Harris was under contract to deliver a total of 183 units. Deliveries of the L-STTs and JTFSTs were completed early in calendar year 1999, bringing the total number of STT units delivered up to 143. Harris also received a delivery order to provide sustaining systems engineering support for STTs. During FY 2000, the program office managed the successful delivery of software upgrades which would allow users in the field to access data from European meteorological satellites.[34]

However, the program office negotiated a production change in July 1998 in response to a requirement from the Air Force Weather Agency. Production plans called for the last 40 units of the total 183-unit production of STTs to be a specially configured, miniature version known as Lightweight STTs (L-STTs). Instead, the user wished to convert the last 40 units to an even smaller version of the tactical terminal known as

[33] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, p. 94 (HO archives); Internet Documents, Harris Corporation, "Small Tactical Terminal (STT)," copyright 2002, accessible at http://www.govcomm.harris.com/solutions/marketindex/product.asp? ccsource=alpha&product_id=275 (Doc 6-12).

[34] RDT&E Budget Item Justification Sheets (R-2 Exhibits), HQ USAF, "0305160F Def Meteorological Satellite Prog (Space)," Sheets dated February 1998, February 1999, February 2000, June 2001, February 2002 (Doc 6-13); Briefing Charts, SMC/CI, "Program anagement Review," 27 November 2001 (Doc 6-14); Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); News Release, Harris Corporation, "U.S. Air Force Awards Harris Corporation $2.3 Million Engineering Support Contract for Small Tactical Weather Terminal," 3 July 2001, accessible at http://www.govcomm.harris.com/view_pressrelease.asp?act=lookup&prid=772 (Doc 6-16).

INSERT ILLUSTRATION 6-5: Tiny Tactical Terminal

Workstation STTs (W-STTs). W-STTs would have no satellite antennas of their own, but would ingest and display data from satellites when the data was transmitted by the planned Global Broadcast Service (GBS). Since GBS was not yet fully developed, the W-STTs would use common-user communications installed ahead of time in buildings rather than in the field.[35]

In 1997, SMC issued Phase I of a type of contract known as a small business innovative research (SBIR) contract, designed to encourage technological breakthroughs by private industry, for an even smaller DMSP tactical terminal known as the Tiny Tactical Terminal (T3) to the ViaSat Corporation. The T3 featured a ruggedized, commercially available notebook computer powered by a battery and solar cells. It could be connected to physically separate programmable receivers and antennas for reception and display of three types of weather data features: Automatic Picture Transmission (APT), Real-time Data Smooth (RDS), and Weather Facsimile (WEFAX). It would receive and display both high-resolution and low-resolution images from satellites in low earth orbit and geosynchronous orbit. The basic version of the T3 weighed only 75 pounds, and the enhanced version only 132 pounds.[36] Phase 2 began in 1998, but in 2000 the program office decided not to proceed to Phase 3. During FY 2000, SMC held discussions with Harris about the T3. The DMSP program office participated in a mid-term planning meeting during 28 February – 3 March 2000 and decided to use the Harris W-STT concept rather than the T3. Harris produced two prototypes in June 2000, and they were used in a Joint Warrior Interoperability Demonstration during 3-28 July 2000 as well as a Joint Contingency Force Advanced Warfighter Experiment in September 2000.[37]

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[35] See note 26 above. See also Staff Summary Sheet, SMC/CISB, "Request for authority to Issue an Undefinitized Contract Action (UCA) to Purchase Workstation Small Tactical Terminals (W-STTs), Contract F04701-94-C-0019, 8 July 1998 (Doc 6-17); Staff Summary Sheet, SMC/CIK, "CPAR for Contract F04701-94-C-0019, Small Tactical Terminal (STT) Production, 15 December 1998, with attachment (FOUO—information used not FOUO) (Doc 6-18); Staff Summary Sheet, SMC/CISB, "Y2K Memorandum for CINC Approval of Configuration Change to STT (AN/TMQ-43)," 30 November 1999 (Doc 6-19); Contractor Performance Assessment Report (FOUO—information used not FOUO), SMC/CI, "Meteorological Satellite (METSAT) Small Tactical Terminal (STT) Production," 5 January 2001 (Doc 6-20); Staff Summary Sheet, SMC/SDDM, "Contractor Performance Assessment Report (CPAR) on Harris Corporation, Contract Number F04606-92-C-0457-P00004, CPAR 98-95," no date (ca. August 1997), with attachment (FOUO—information used not FOUO) (Doc 6-21).

[36] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts, SMC/CI, "Program Management Review: Defense Meteorological Satellite Program Office," 12 January 2000 and 27 April 2000 (HO archives).

[37] Comments from reviewer, John S. Bohlson, Aerospace Corporation, SMC/WX, April 2005.

The upgrade to H-STTs still had to be placed under contract. SMC began negotiations with Harris during August 2000 and issued the definitized contract (that is, the written contract containing the negotiated cost) in September 2000. Initial operational capability for the H-STT was scheduled for February 2002. Beginning in 2001, funding for tactical terminals would be transferred from the DMSP program element (35160F) to the Air Force Weather Agency's program element (35111F).[38]

CLOUD DEPICTION AND FORECAST SYSTEM II

The DMSP program office was also upgrading the hardware and software capability known as the Cloud Depiction and Forecast System (CDFS), located within the Air Force Weather Agency's facilities at Offutt AFB, Nebraska. The original CDFS system was "task saturated" and limited in its ability to support software upgrades. The upgraded data processing system was known as CDFS II, and it was designed to meet an increasing demand for cloud analysis and forecasts at higher resolutions in theaters of combat.[39]

SMC had awarded a contract for the effort to Sterling Software in 1995. Sterling was to develop a system to replace the existing CDFS capabilities that were resident on three mainframe computers—known as systems 3,5, and 6—at Offutt. With the new CDFS II capability, the computers would be able to process data simultaneously from nine meteorological satellites in polar and geosynchronous orbits (including the four DMSP satellites transmitting sensor data) to provide a new three-dimensional cloud analysis model and a worldwide cloud forecast model. The new system would be able to provide hourly, worldwide cloud analyses. By comparison, the original CDFS system could use data from only four polar-orbiting satellites and provide regional cloud updates only every three hours. Furthermore, CDFS II would provide cloud forecasts with a resolution of 24 kilometers, while the original system provided a resolution of only 48 kilometers.[40] Late in 1997, the program office reported that Sterling's progress in developing CDFS II had been slow and that efforts to recover schedule in the design of one of the fundamental software increments (Build 1C) had led to cost growth.[41]

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[38] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts, SMC/CI, "Program management Review," 27 November 2001 (Doc 6-14).

[39] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 96.

[40] Aerospace Corporation, "Annual Report to the Commander, Space and Missile Systems Center," 1 April 1999-30 September 1999, 1 April 2001-30 September 2001 (HO archives).

[41] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15). See MAR for December 1997.

In 1998, the Director of Weather under the Air Force Deputy Chief of Staff for Air and Space Operations asked for development of a capability to produce weather images with higher resolutions than the existing resolutions of 48 kilometers. In response the Aerospace Corporation undertook a feasibility study aimed at using their CDFS II prototype to produce cloud images for analysis and forecast with resolutions of only 6 kilometers (a resolution for weather imagery known as 64th mesh). Such a resolution would be an important achievement because it was not only eight times better than the resolution produced by the existing system, but also four times better than the resolution that the CDFS II program was required to achieve. Early in 1999, Aerospace successfully demonstrated a working prototype of its 64th mesh CDFS II product, using high-resolution data from DMSP satellites only. The Air Force Weather Agency asked the program office to make the capability (known then as the CDFS II Risk Reduction Prototype) operational as soon as possible, using the existing CDFS II contract. Indeed, such a capability was rapidly becoming a critical operational goal as NATO's air campaign against Serbian forces in Kosovo—soon named Operation Allied Force—got under way on 24 March 1999 and lasted until 10 June 1999. Cloud cover was a potential problem for Air Force bombers during much of the operation. The initial operational deployment of the prototype provided vastly superior weather imagery to Allied forces in Kosovo, including 48-hour cloud forecasts at 3-hour intervals.[42]

To provide and fund for incremental improvements in the prototype, the Air Staff authorized the creation of a Combat Mission Need Statement (CMNS), sponsored by the commander of U.S. Air Forces in Europe (USAFE), which was providing much of the fighting force for Allied operations in Kosovo. SMC's DMSP Program Office began work on the CMNS on 7 May 1999, with a maximum of 60 days to provide the required target scale weather forecast improvements. This portion of the CMNS was called the Integrated Weather Information Nephanalysis 64th Mesh (IWIN 64) effort. The program office coordinated the efforts of its own personnel, the Aerospace Corporation's scientists, and Sterling Software's technical experts, meeting all of the milestones required by the CMNS. The team improved the prototype by incorporating data from the two available NOAA satellites as well as the four available DMSP satellites, by improving on the merging and display of cloud data with wind modeling, and by improving quality control for the system. The first products of this process were available to USAFE in only 30 days. The team provided 24-hour, 7-day support to the system's users through the end of September 1999. After Operation Allied Force, the

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[42] SMC/CI, "Talking Paper on Combat Mission Needs Statement (C-MNS) For Target Scale Weather Forecast," no date (1999) (Doc 6-22); SMC/CI, "Operation Allied Force Appreciation Event Nomination for Contributions," no date (Doc 6-23); Briefing Charts, SMC/CI, "DMSP Kosovo Support to The Honorable F. Whitten Peters, Secretary of the Air Force," 5 August 1999 (Doc 6-24); Briefing Charts, SMC/CI, Program Management Review: DMSP," 15 July 1999 (HO archives); Aerospace Corporation, "Annual Report to the Commander, Space and Missile Systems Center," 1 April 1999-30 September 1999 (HO archives).

improved prototype system was used and maintained as a forecasting tool by the Air Force Weather Agency.[43]

During the remainder of the period under discussion (FY 1998-2001), Sterling Software continued with its program of incremental software "builds" designed to achieve an initial operational capability for the overall CDFS II system by 29 December 2000. However, by April 2000, the program office was reporting that Sterling would not be able to adhere to that schedule and that a cost increase would accompany the delay. On 9 November 2000, the Air Force Weather Agency approved additional funding and a new schedule for CDFS II, and the program was officially rebaselined on 12 January 2001. The new schedule called for initial operational capability on 12 October 2001. AFWA would pay for a cost increase of $4.285 million with funds from other weather development programs, one of which was the Small Tactical Terminal (see above). At the end of September 2001, it appeared that Sterling would exceed the new schedule by about a month.[44]

SPACE WEATHER ANALYSIS AND FORECAST SYSTEM

Although DMSP was concerned primarily with monitoring and forecasting terrestrial weather, it was also involved in efforts to monitor and forecast environmental conditions in space—conditions such as solar activity which could heavily affect spacecraft. Some of the sensors on DMSP satellites monitored the space environment, and the program office also became involved in upgrading the Air Force Weather Agency's equipment and sensors which monitored the space environment from the ground.

The Air Force Weather function underwent a great deal of restructuring during 1997-1999. To draw weather analysis and forecasting more tightly into the operational

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[43] SMC/CI, "Talking Paper on Combat Mission Needs Statement (C-MNS) For Target Scale Weather Forecast," no date (1999) (Doc 6-22); SMC/CI, document (no title, subject DMSP support to operations in Kosovo), no date (ca. late 1999) (Doc 6-25); Aerospace Corporation, "Aerospace Corporation Team Helps Improve Weather Forecasting for Yugoslavia Operations," 16 May 1999, accessible at http://www.aero.org/news/current/weather.html (Doc 6-26); Schirite Zick (SMC/PA), "New Weather System to Aid Warfighter," 27 May 1999, accessible at htt://www.af.mil/news/May1999/n19990527_991074.html (Doc 6-27); Schirite Zick, "Product Team Accelerates Acquisition for Warfighters," Astro News, no date (ca. July 1999) (Doc 6-28); Aerospace Corporation, "Annual Report to the Commander, Space and Missile Systems Center," 1 April 1999-30 September 1999 (HO archives).

[44] Briefing Charts, SMC/CI, Program Management Review: DMSP," 27 April 2000, 19 July 2000, 15 November 2000, 28 March 2001, 5 September 2001, 27 November 2001 (HO archives).

INSERT ILLUSTRATION 6-6: SEON SITES

community, the Weather Agency's 50th Weather Squadron became Air Force Space Command's 55th Space Weather Squadron, with headquarters at Schriever AFB. In March 1997, SMC's DMSP program office inherited the responsibility for acquisition and development of new equipment to monitor the space environment from Air Force Materiel Command's Electronic Systems Division. Despite inadequate funding for the overall program known as the Space Environment Support System (SESS), the program office planned to upgrade the 55th Space Weather Squadron's Control Center with a modernized system known as the Space Weather Analysis and Forecast System (SWAFS). At the same time, it would upgrade and modify associated ground sensors and monitoring equipment for solar activity known collectively as Solar Electro-Optical Network (SEON). These modifications included a work station in the Control Center to monitor solar emissions known as the Solar Analyst Work Station (SAWS) and ground sensors to monitor solar activity. The ground sensors included a radio telescope called the Solar Radio Burst Locator (SRBL) to provide the location of solar radio bursts, an upgraded sensor called the Swept Frequency Interferometric Radiometer (SFIR), and a more advanced optical telescope system called the Improved Solar Observing Optical Network (ISOON). When combined, these upgraded sensors would replace the old sensor system known as the Radio Solar Telescope Network.[45]

However, these efforts were complicated by two external changes. One was a reduction in the budget for SESS caused, at least in part, by the cost of war efforts in Kosovo. The other was a decision—requested by the Air Force Weather Agency (AFWA) and endorsed by the Air Staff—to consolidate all space weather functions and terrestrial weather functions at AFWA's headquarters at Offutt AFB, Nebraska, beginning in 1999. The Air Staff's Program Action Directive 99-04, "Restructuring Space Environmental Support Operations," called for placing sustainment contracts for both CDFS (see preceding section) and SWAFS under the Air Force Weather Agency after the system's deployment, and the Air Force Weather Agency requested the transfer of all sustainment activity in a letter dated 2 October 2000. However, this schedule was gradually delayed by the difficulty of developing SWAFS at the Air Force Weather Agency's headquarters in time to allow it to take over the weather functions performed by the 55th Space Weather Squadron.[46]

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[45] HQ USAF/XOW, "Concept of Operations for Reengineered Air Force Weather," 20 April 1998 (HO archives); HQ USAF, "PMD 2326 (4)/PE0604707F/0305111F/0305117F, Program Management Direction for the Weather System (WXSYS)-IWSM," 6 October 1995 (Doc 6-29); Briefing Charts (FOUO—information used not FOUO), SMC/CI, "Space Environmental Support System (SESS)," Space Day Senior Management Review, 12 November 1997 (Doc 6-30); HQ USAF, "RDT&E Budget Item Justification Sheet: 0305111F Weather Service," February 1997, February 1998, February 1999, February 2000, June 2001 (HO archives); Memo (U), SAF/AQ to ESC/CC and SMC/CC, subj: "Air Force Weather Study," 2 April 1999 (Doc 6-33).

[46] Briefing Charts (U), SMC/CI, "Program Management Review: Defense Meteorological Satellite Program Office," 31 March 1998, 23 July 1998, 15 July 1999 (HO archives); SMC/CI, "SESS Monthly Acquisition Report," (FOUO—information used not FOUO)

SWAFS was being developed in three phases referred to as spirals. Each spiral was built up from a number of different capabilities called threads. Spiral 1, for example, would give AFWA an initial operational capability in space weather monitoring and analysis and would allow it take over the mission of the 55th Space Weather Squadron. Spiral 2 would consist of near term technology improvements, and Spiral 3 would consist of far term technology improvements. Spiral 1 would be completed in eight threads. Thread 1 was delivered in November 2000; threads 2 and 3 were delivered in March 2001; threads 4 through 8 had been scheduled for delivery near the end of FY 2001, but by then the delivery date had slipped to about April 2002, causing the initial operational capability for SWAFS (and the closure of the 55th Space Weather Squadron's facilities at Schriever AFB) to slip as well.[47]

The National Polar-orbiting Operational Environmental Satellite System

The civilian space-based meteorological system was known as the Polar-orbiting Operational Environmental Satellite (POES) System. Its satellites were procured by the National Aeronautics and Space Administration (NASA) and operated by the National Oceanic and Atmospheric Administration (NOAA), an agency of the Department of Commerce. The DMSP satellites and the NOAA satellites were produced by the same contractor, and both were injected into low altitude polar orbits. Given the similarity between the two satellite systems, various government agencies from time to time had advocated merging the two meteorological systems into a single system that would serve both military and civilian users and would be less expensive to operate than two parallel systems. The idea of merging DMSP and POES took flight during FY 1993-1994 when both Congress and the White House began to advocate it simultaneously. In 1993, Congress had mandated studies of a combined system, and Vice President Al Gore had recommended consolidation of the military and civilian polar-orbiting remote sensing satellite systems in his "National Performance Review" calling for government efficiencies, issued in September 1993.[48]

June 1999-March 2001 (Doc 6-31); Staff Summary Sheet (U), SMC/CI, "Commander's Action Item Suspense #11484, HQ USAF Program Action Directive (PAD) 99-04, Restructuring Space Environmental Support Operations," 10 September 1999, with attachments (Doc 6-32).

[47] SMC/CI, "SESS Monthly Acquisition Report," (FOUO—information used not FOUO) June 1999-March 2001 (Doc 6-31); Briefing Charts (U), SMC/CI, "Program Management Review: Defense Meteorological Satellite Program," 5 September 2001 (HO archives).

[48] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 96-97; Craig S. Nelson and John D. Cunningham (NPOESS IPO), "The National Polar-orbiting Operational Environmental Satellite System: Future U.S. Environmental Observing System," no date [2002], (Doc 6-40).

On 5 May 1994, President William J. Clinton issued Presidential Decision Directive/NSTC-2 through the National Science and Technology Council. It ordered the convergence of the two systems under the management of an Integrated Program Office (IPO) to be created by a memorandum of understanding among DOD, NASA, and the Department of Commerce by 1 October 1994. The three agencies sketched out their planned sharing of roles and responsibilities in an "Implementation Plan for a Converged Polar-orbiting Environmental Satellite System," issued on 2 May 1994, and they signed a formal agreement on roles and responsibilities on 26 May 1995. All three agencies began to use the converged system in their budget requests for FY 1996.[49]

The IPO was officially established on 3 October 1994 in Silver Spring, Maryland, the location of NOAA's Satellite Operations Control Center. (See COMMAND AND CONTROL SEGMENT above.) Although the IPO's membership was drawn from all three agencies, as was the department-level executive committee for the converged system, the IPO reported directly to NOAA, which appointed the System Program Director, had overall responsibility for the converged system, and would also operate it. By design, therefore, the new system—soon named the National Polar-orbiting Operational Environmental Satellite System (NPOESS)—would have a predominantly civilian character.[50]

The NPOESS program planned to obtain 54 types of environmental data from the system. To generate the data, the NPOESS spacecraft would carry at least 14 major kinds of instruments. At least eight of these instruments would be new sensors (four of them considered critical) that would have to be developed for the program using major contracted efforts. The NPOESS IPO decided to manage seven of the sensor development efforts. NASA would manage the eighth. The major sensor efforts and the purposes of the instruments are listed in Table 6-7 below.

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[49] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 97; Craig S. Nelson and John D. Cunningham (NPOESS IPO), "The National Polar-orbiting Operational Environmental Satellite System: Future U.S. Environmental Observing System," no date [2002], (Doc 6-40).

[50] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 98; Craig S. Nelson and John D. Cunningham (NPOESS IPO), "The National Polar-orbiting Operational Environmental Satellite System: Future U.S. Environmental Observing System," no date [2002], (Doc 6-40).

Table 6-7[51]
Sensors Under Development for NPOESS Satellites

Sensors in Development	Purposes
Ozone Mapping and Profiler Suite (**OMPS**)	To collect data to permit the calculation of the vertical and horizontal distribution of ozone in the Earth's atmosphere. (Development managed by IPO)
Cross-track Infrared Sounder (**CrIS**)	To measure Earth's radiation to determine the vertical distribution of temperature, moisture, and pressure in the atmosphere. (Development managed by IPO)
Global Positioning System Occultation Sensor (**GPSOS**)	To measure the refraction of radiowave signals from GPS and Russia's Global Navigation Satellite System (GLONASS) to characterize the ionosphere. (Development managed by IPO)
Visible/Infrared Imager Radiometer Suite (**VIIRS**)	To collect visible and infrared radiometric data of the Earth's atmosphere, ocean, and land surfaces. Data types include atmospheric, clouds, Earth radiation budget, land/water and sea surface temperature, ocean color, and low light imagery. (Development managed by IPO)
Conical-scanning Microwave Imager Sounder (**CMIS**)	To collect global microwave radiometry and sounding data to produce microwave imagery and other meteorological and oceanographic data. (Development managed by IPO)
Space Environment Sensor Suite (**SESS**)	To collect data related to the neutral and charged particles, electron and magnetic fields, and optical signatures of aurora. (Development managed by IPO)
Aerosol Polarimeter Sensor (**APS**)	To retrieve specified aerosol and cloud parameters using multispectral photopolarimetry. The APS will need to simultaneously measure scene radiance in orthogonal polarizations over a range of viewing angles in order to make these retrievals. (Development managed by IPO)
Advanced Technology Microwave Sounder (**ATMS**)	In conjunction with CrIS, to conduct global observations of temperature and moisture profiles at high temporal resolution ~ daily. (Development managed by NASA)

SMC remained closely involved in the new program and had the specific responsibility of carrying out major systems acquisitions, including launch vehicles. The program office merged its two existing contracts with RCA (FO4701-91-C-0066) and Lockheed (FO4701-91-C-0068) for concept studies of the now-superseded DMSP Block 6 into the NPOESS program's Phase 0 activities. On 10 March 1997, the NPOESS Executive Committee approved the program's acquisition strategy and major milestone

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[51] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounderAugust2002.html (Doc 6-37); National Environmental Satellite, Data, and Information Service, "Sensor Summary," 12 November 2002, accessible at http://www.ipo.noaa.gov/Technology/sensors.html (Doc 6-38).

decision documents produced during Phase 0, thereby authorizing NPOESS to enter Phase I, Program Definition and Risk Reduction. SMC issued contracts on 31 July 1997 for preliminary design concepts for a new group of sensors for the NPOESS spacecraft, and those contracts are summarized in Table 6-8 below. Preliminary design reviews of the sensor efforts took place during the following months: CrIS in April 1999, OMPS in January 1999, GPSOS in November 1998, VIIRS in May 2000, and CMIS February 2001. Critical design reviews were scheduled for 2002-2004.[52]

Table 6-8[53]
Phase I Development Contracts for NPOESS Sensors

Contract Number	Contractor	Efforts[54]	Start Date	Completion Date	Value at Award
F04701-97-C-0028	Hughes Santa Barbara Remote Sensing	NPOESS CrIS & VIIRS sensors	30 Jul 97	30 Jun 00	$36,772,433
F04701-97-C-0029	ITT Aerospace Communications Division	CrIS & VIIRS sensors	30 Jul 97	30 Jun 00	$35,740,180
F04701-97-C-0032	Ball Aerospace and Technologies Corporation	NPOESS OMPS & CMIS sensors	30 Jul 97	28 Apr 00	$35,509,941
F04701-97-C-0033	Hughes Space and Communications	NPOESS CMIS sensor	30 Jul 97	28 Apr 00	$32,000,000
F04701-97-C-0034	Orbital Sciences Sensor Systems Division	NPOESS OMPS sensor	30 Jul 97	2 Sep 00	$4,874,570
F04701-97-C-0036	Saab Ericsson Space (Sweden)	GPS Occultation Sensor (GPSOS)	30 Jul 97	2 Jun 00	$4,000,000

The joint agency planning for the evolution of NPOESS called for NOAA and DOD to continue launching the POES and DMSP spacecraft acquired under their existing contracts until they ran out. Each agency would continue to maintain two fully operational satellites in orbit until the European Organization for Exploitation of Meteorological Satellites (EUMETSAT) launched its new Metop satellite into a polar orbit in 2005. Presuming that EUMETSAT signed the final agreements for cooperation, the constellation would then consist of one Metop, one POES, and two DMSP satellites

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[52] Briefing Charts (U), NOAA, et al., "National Polar-orbiting Operational Environmental Satellite System (NPOESS), The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39); History of SMC (FOUO—information used not FOUO), October 1994–September 1997, pp. 98-99.

[53] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp. 86-87; contract listings in appendices of SMC histories for 1991-1997.

[54] Acronyms: CMIS = Conical Microwave Image Sounder; OMPS = Ozone Mapping and Profiler Suite; CrIS = Cross-track Infrared Sounder; VIIRS = Visible/Infrared Imager Radiometer Suite; GPS = Global Positioning System.

for several years. After that, the newly developed NPOESS spacecraft would be launched beginning about 2009, and a fully operational NPOESS constellation would be in orbit by about 2013. The final NPOESS constellation would consist of three operational satellites in circular orbits of 833 kilometers at an inclination of 98.7 degrees. All of the satellites would be sun-synchronous, crossing the equator at the hours of 0530, 0930, and 1330 local time. However, the spacecraft would not have identical configurations. The early morning (0530) and afternoon (1330) NPOESS spacecraft would each have a full set of environmental sensors, but the mid-morning (0930) spacecraft, known as NPOESS Lite, would host only the most important sensors for national data requirements, such as the Visible/Infrared Imager Radiometer Suite (VIIRS) and the Conical-scanning Microwave Imager Sounder (CMIS).[55]

The Phase I sensor contracts described in Table 6-8 above were followed after about two years by Phase II sensor contracts under which a single contractor for each sensor would complete the follow-on development and fabrication of the first flight units. By the end of the period under consideration (FY 1998-2001), the final designs had been completed, and development of prototypes was well under way. Most of the Phase II sensor efforts were being conducted under contracts awarded by SMC and described in Table 6-9 below.[56]

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[55] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounderAugust2002.html (Doc 6-37).

[56] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounderAugust2002.html (Doc 6-37).

Table 6-9[57]
Phase II Development Contracts for NPOESS Sensors

Contract Number	Contractor	Efforts[58]	Start Date	Completion Date	Value in 2002
F04701-99-C-0044	Ball Aerospace Corporation	NPOESS OMPS Phase II	14 May 99	30 Sep 07	$74.8M
F04701-99-C-0061	ITT Corporation	NPOESS CrIS Phase II	30 Aug 99	31 Aug 07	$74.1M
F04701-99-C-0311	SAAB Ericsson Space AB	NPOESS GPSOS Phase II	27 Aug 99	31 Mar 03	$6.7M
F04701-01-C-0500	Raytheon Systems Company	NPOESS VIIRS Phase II	20 Nov 00	30 Sep 07	$297.6M
F04701-01-C-0502	Boeing Satellite Systems, Incorporated	NPOESS CMIS Phase II	30 Jul 01	30 Sep 07	$298.0M
NASA Contract	Northrop Grumann	NPOESS ATMS	Dec 00	Mar 07	$206.6M

In December 1999, the NPOESS program entered a new phase that it labeled Program Definition and Risk Reduction (PDRR). The vehicles for doing so were two competitive contracts for PDRR awarded to Lockheed Martin and TRW on 13 December 1999. Table 6-10 below contains additional information about the two contracts. During the next two years, the contractors were to define the system requirements for NPOESS, conduct system architecture trades, carry out the preliminary design of the four major NPOESS segments (the space segment; the command, control, and communications segment; the launch support segment, and the integrated data processing segment). Additionally, each contractor was to demonstrate its ability to provide the data processing segment in incremental builds. In the course of the efforts, each contractor would undergo system requirements reviews, system functional reviews, four ground demonstrations, and a priced, optional preliminary design review. At the end of this phase, the NPOESS IPO would select one of the two contractors for to carry out the next phase, known as Acquisition and Operations (A&O). During A&O, the winner would

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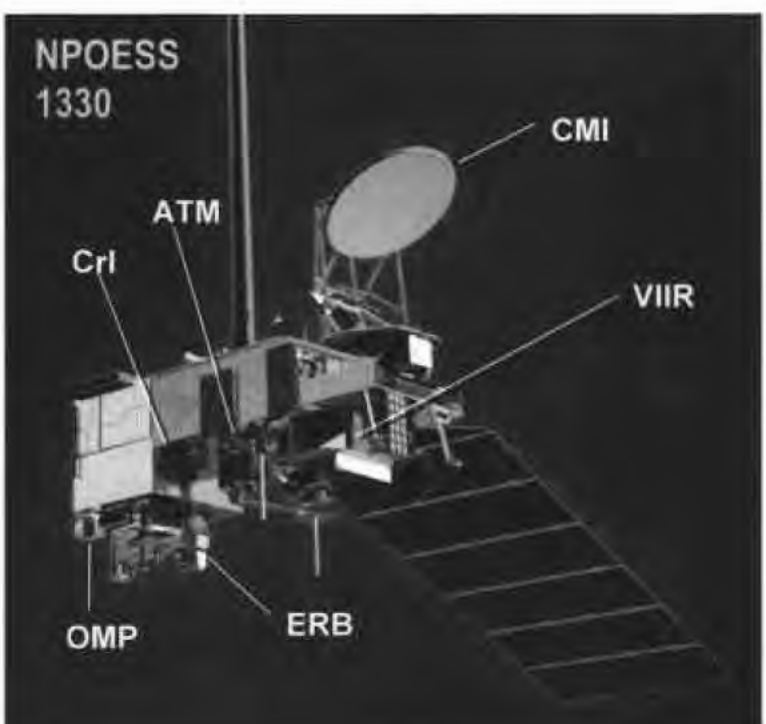
[57] Defenselink, "Contracts," 14 May 1999, 30 August 1999, 13 December 1999, 21 November 2000, 31 January 2001, accessible from http://www.defenselink.mil/news/; News Release, Boeing, "Boeing to Build Next-Generation Weather Instrument Under Potential $300 Million Contract," 31 July 2001, accessible at http://www.boeing.com/news/releases/2001/q3/nr_010731s.html; Briefing Charts (U), NPOESS IPO, , "National Polar-orbiting Operational Environmental Satellite System (NPOESS): The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39); contract listings in Appendix G of this history.

[58] Acronyms: CMIS = Conical Microwave Image Sounder; OMPS = Ozone Mapping and Profiler Suite; CrIS = Cross-track Infrared Sounder; GPSOS = Global Positioning System Occultation Sensor; VIIRS = Visible/Infrared Imager Radiometer Suite.

Illustration 6-7 (top): Artist's Concept of NPOESS Satellite in Orbit
Illustration 6-8 (bottom): Locations of Sensors on NPOESS Satellite



exercise a high degree of trusted oversight in a contractual relationship that the IPO called Shared System Performance Responsibility.[59]

Table 6-10[60]
NPOESS Program Definition and Risk Reduction Contracts

Contract Number	Contractor	Efforts[61]	Start Date	Completion Date	Value at Award
F04701-00-C-0500	TRW Space and Defense Sector	NPOESS PDRR (+ System PDR)	14 Dec 99 (31 Jan 01)	30 Mar 02 (31 Dec 02)	$20,650,000 (+$25,600,000)
F04701-00-C-0501	Lockheed Martin Corporation	NPOESS PDRR (+ System PDR)	14 Dec 99 (31 Jan 01)	30 Mar 02 (31 Dec 02)	$20,650,000 (+$25,600,000)

The overall development would also include a separately contracted flight demonstration of the most critical new sensor technology for the purpose of risk reduction. The IPO planned to competitively select a contractor in 2002 to build a spacecraft for on-orbit testing of at least the VIIRS, CrIS, and ATMS sensors. The project and spacecraft were both referred to as the NPOESS Preparatory Project (NPP). The NPP would be launched in 2005.[62]

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[59] NPOESS IPO, "Program Definition and Risk Reduction," 22 July 2001, accessible at http://www.ipo. noaa.gov/prog_def.html (Doc 6-41); National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounder August2002.html (Doc 6-37); News Release, NOAA, "Contracts Awarded for Preliminary Design of Environmental Satellite System of the Future, NOAA Announces," 13 December 1999 (Doc 6-42); Briefing Charts (U), NPOESS IPO, "National Polar-orbiting Operational Environmental Satellite System (NPOESS): The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39).

[60] Defenselink, "Contracts," 13 December 1999, accessible from http://www.defenselink.mil/news/; contract listings in Appendix G of this history.

[61] Acronyms: PDR = Preliminary Design Review; PDRR = Program Definition and Risk Reduction.

[62] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounder August2002.html (Doc 6-37); Briefing Charts (U), NPOESS IPO, "National Polar-orbiting Operational Environmental Satellite System (NPOESS): The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39).

CHAPTER 7

SPACE BASED INFRARED SYSTEMS

The Air Force began developing space-based infrared surveillance systems in the mid-1950s, and SMC had managed development programs in this area since its original organizational predecessor, the Western Development Division, had assumed responsibility for the first Air Force satellite program in 1955. During the period under consideration, FY 1998 through FY 2001, the Defense Support Program (DSP) provided 24-hour worldwide infrared surveillance for detecting strategic and tactical missile launches and nuclear bursts. After DSP detected a launch, it quickly provided an early warning so the US command authorities would be alerted about a possible missile attack. Its development had begun in 1963, and it had been in operation in various evolutionary phases since 1970.[1]

SMC developed the planned successor of DSP, known as the Space Based Infrared Systems (SBIRS). The SBIRS concept included two planned satellite systems, referred to during this period as SBIRS High and SBIRS Low. Both were heirs of infrared technology developed for the Ballistic Missile Defense Program (earlier known as the Strategic Defense Initiative) during 1983-1995. The baseline architecture for SBIRS would include four satellites in Geosynchronous Earth Orbit (GEO), two payloads on hosted satellites in Highly Elliptical Orbit (HEO), and about 24 satellites in Low Earth Orbit (LEO), ground facilities in the continental United States (CONUS) and overseas, and related communication links. SBIRS High would focus on the detection and tracking of missiles during the earlier phase of their flight while their motors generated heat and infrared signatures in short-wave and mid-wavelengths. SBIRS Low would add the capability of tracking and reporting other data about missiles during the middle portions of their flight when their infrared signatures were at longer wavelengths. The SBIRS High and Low component programs were complementary but independent. Each program contributed to the satisfaction of the overall SBIRS Operational Requirements Document (ORD).[2]

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[1] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, p. 101; Fact Sheet (U), SMC/PA, "Defense Support Program," 14 February 2004 (Doc 7-1); Supplemental Environmental Assessment (SEA) and Finding of No Significant Impact (FONSI) (U), SMC, "Space Based Infrared System (SBIRS) Mission Control Station for Defense Support Program Consolidation," March 2001, p. 1-1 (Doc 7-2).

[2] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, p. 101; Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, p. 1-1 (Doc 7-3); Fact Sheet (U), SMC/PA, "Space Based Infrared Systems," January 2001, (Doc 7-4); Supplemental Environmental Assessment (SEA) and Finding of No Significant Impact (FONSI) (U), SMC, "Space Based Infrared System (SBIRS) Mission Control Station for Defense Support Program Consolidation," March 2001, p. FONSI (Doc 7-2).

The SMC SBIRS Program Office (office symbol SMC/MT) managed the development and acquisition of the DSP and SBIRS programs. It strived to procure these space systems according to schedules and delivery dates, and within the budget and the staffing resources assigned to it. In 2000, the program office had over 400 personnel assigned to it. The SBIRS System Program Director (SPD) had the authority to make decisions and allocate the resources based on the needs of the program. The SPD reported the SBIRS program status and issues to the Program Executive Officer for Space and the Under Secretary of the Air Force. The SBIRS SPDs during this time period included Col Daniel Burkett (4 July 1997 to 17 April 2000), Col Michael Booen (17 April 2000 to 25 June 2001) and Col Mark Borkowski (17 April 2000 to beyond FY 2001).[3]

Defense Support Program

The primary mission of the Defense Support Program (DSP) was to detect and report launches of both land-based and submarine-launched ballistic missiles to the National Command Authority and to theater commanders. Although it was designed for strategic missile detection, DSP was also capable of detecting tactical missile launches. An example of tactical launch detection was the warning it gave about SCUDs that had been launched by Iraq during Operation Desert Storm. DSP used the same sensors for the tactical mission, but it employed a Centralized Tactical Processing Element to fuse data from multiple satellites and to report detections in near real time to theater commanders. In times of conflict, additional uses were found for DSP's fused

[3] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, p. B-6; Single Acquisition Management Plan (SAMP) (U), SMC/MT, "SBIRS High Component," 30 June 2002, p. 4-3 (Doc 7-3); Chronology (U), SMC/MT, "SBIRS High Program," 10 February 2005, pp. 19, 22 (Doc 7-5); Biography (U), Col Michael Booen, SMC/MT SPD, August 2000 (Doc 7-6); Biography (U), Col Mark Borkowski, SMC/MT SPD, December 2001 (Doc 7-7); Program Management Directive (FOUO, nothing referenced), SAF/AQS, "PMD 2362(4), PE# 35911F/35915F/35922F/ 63441F/64441F/64442F, Program Management Directive for Defense Support Program and Space Based Infrared Systems (Space Based Early Warning Systems IWSM Program)," 17 March 2000 (Doc 7-8); Program Management Directive (FOUO, nothing referenced), SAF/AQS, "PMD 2362(5), PE# 35911F/35915F/35922F/64441F/ 64442F, Program Management Directive for Defense Support Program and Space Based Infrared Systems (Space Based Early Warning Systems IWSM Program)," 10 August 2001 (Doc 7-9); Security Classification Guide (SCG) (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-5 (Info is FOUO).

multisatellite observations, which led to the definition of new tactical missions for the ground system that produced this information.[4]

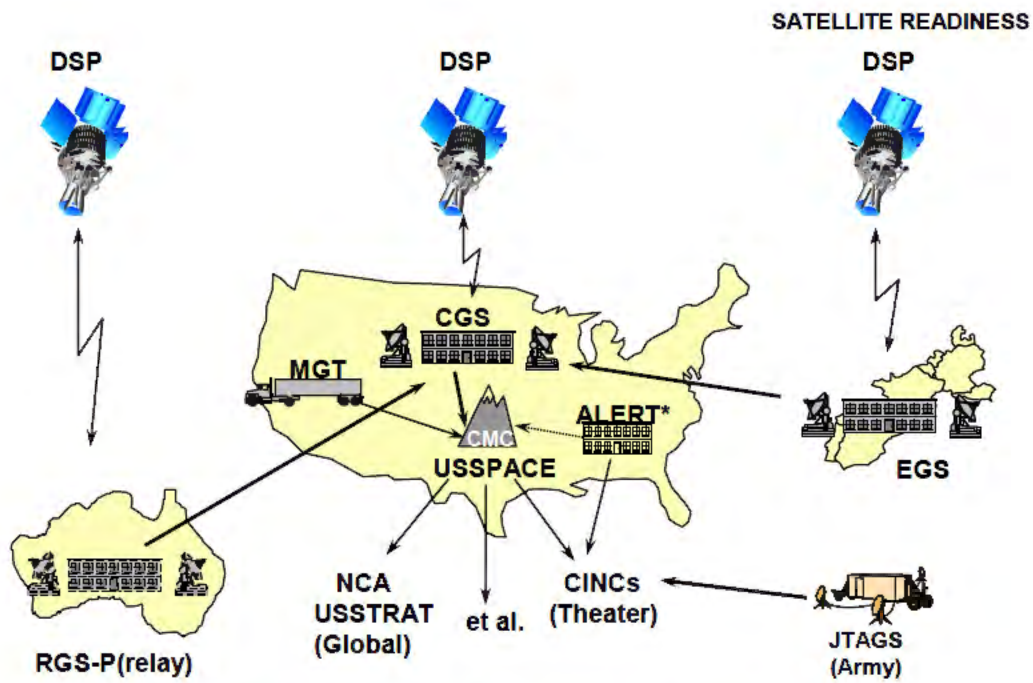

Illustration 7-1: DSP System Architecture

DSP also performed the secondary missions of detecting space launches and nuclear detonations as well as other sources of radiation. It used the same sensors for space launches that it used for missile launches. However, it carried additional sensors to detect, locate, and report on nuclear detonations and background radiation. These sensors were called the NUDET (Nuclear Detonation) Detection System (NDS). They were contained in two packages known as Advanced Radiation Detection Capability (RADEC) I and Advanced RADEC II. The packages consisted of optical, x-ray, neutron, and gamma-ray sensors. They could detect nuclear detonations both inside the earth's atmosphere and in space, and they could monitor background radiation in space. (Global Positioning System (GPS) satellites also carried NDS secondary payloads during this period. See Chapter 5 of this history.)[5]

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[4] Descriptive Pamphlet (U), SMC/MT, "Space Based Infrared System, SBIRS," 1998, pp. 14-16 (Doc V-4 of History of SMC, October 1994 –September 1997); Theodore W. Polk, Aerospace Corporation, comments (FOUO), 21 November 2001.

[5] History of SMC (FOUO), October 1994 - September 1997, p. 110; E-Mail (S), Ron Bowman, AFSPC/A3SF, to Harry N. Waldron, SMC/HO, "FW: [S//N] FOIA Request

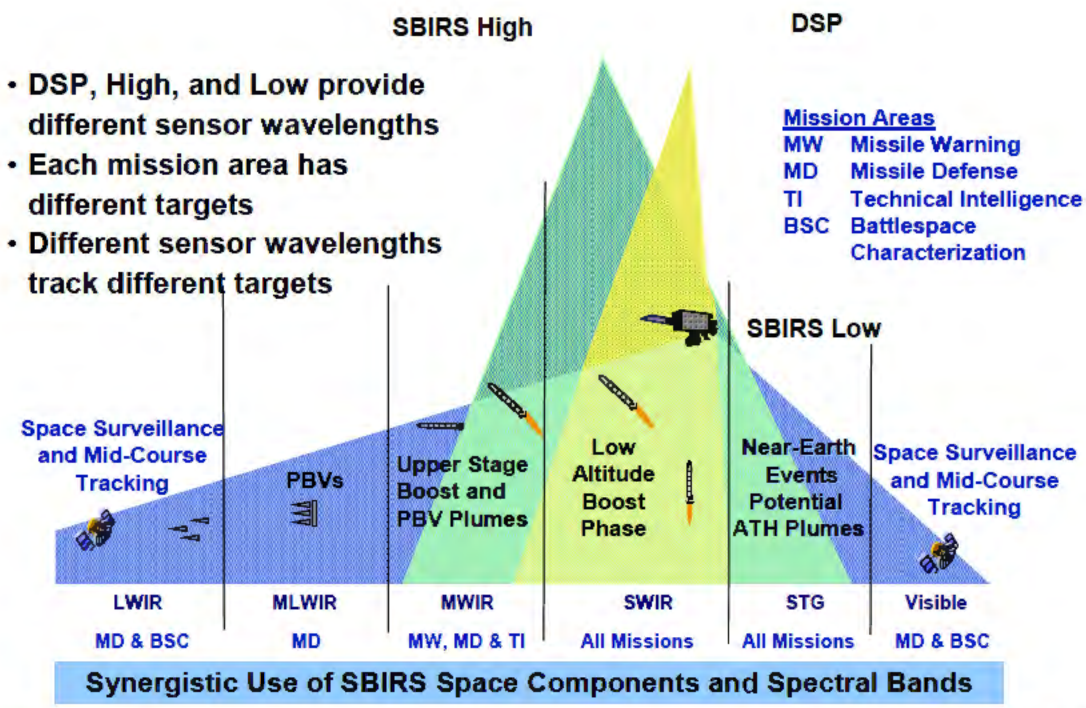

Illustration 7-2: Frequency Bands of Infrared Sensors on DSP and SBIRS Satellites

Spacecraft

The current and last configuration of the DSP satellite was known as DSP-1. It was one of the largest and heaviest military spacecraft in operation, weighing roughly 5,250 pounds and extending 32.8 feet long by 22 feet in diameter when fully deployed in orbit. DSP-1 satellites could be launched on either the Space Shuttle or expendables because they had been designed before military spacecraft were removed from the Shuttle's manifest by the implications of the Challenger disaster of January 1986. The operational and spare satellites were in essentially geostationary orbits—24-hour orbits at a radial distance of 22,767 nautical miles from the earth. Each satellite rotated about its earth-pointing axis, which allowed its telescope to scan the entire terrestrial hemisphere visible from that point in space on every sweep. The layout of sensors on the telescope's focal plane was designed to distinguish signals both above and below the horizon (meaning inside or outside the circle made by the earth's outer edge).[6] The major components of the telescope and sensors are indicated in Illustration 7-3.

2012-0268 – Review SBIRS Chapter [1998-2001]," 11 Apr 13, (Info used is not Secret or FOUO).

[6] Theodore W. Polk, Aerospace Corporation, comments (FOUO), 21 November 2001; E-Mail (S), Ron Bowman, AFSPC/A3SF, to Harry N. Waldron, SMC/HO, "FW: [S//N]

Table 7-1
Characteristics of DSP Satellites by Major Blocs, 1970-2001[7]

	PHASE I	PHASE II	MOS/PIM	PHASE II UG	DSP-1
FLIGHT #	1,2,3,4	5,6,7	8,9,10,11	12,13	14-23
LAUNCH YEARS	1970-1973	1975-1977	1979-1984	1984-1987	1989-
WEIGHT (Pounds)	2000	2300	2580	3690	5250
POWER (Watts)	400	480	500	680	1275
DESIGN LIFE (Years)	1.25	2.0	3.0	3.0	3.0
DETECTORS					
2000 (PbS) (SWIR)	X	X	X		
6000 (PbS) (SWIR)				X	X
2nd Color (HgCdTe) (MWIR)				Demo	X
CAPABILITY					
Below the Horizon (BTH)	X	X	X	X	X
Above the Horizon (ATH)		Demo		X	X
RADEC	X	X	X		
Advanced RADEC				X	X

Abbreviations: HgCdTe=Mercury Cadmium Teluride; MOS/PIM=Multi-Orbit Satellite/Performance Improvement Modification; MWIR=Medium Wave Infrared; PbS=Lead Sulfide; RADEC=Radiation Detection Capability; SWIR=Short Wave Infrared; UG=Upgrade.

Mounted inside each telescope was an array of over 6,000 non-imaging photoelectric cells, called detectors. The telescope picked up infrared radiation from a variety of sources, including the hot exhaust gases given off by missiles during launch. The photoelectric cells absorbed this radiation and produced electrical charges—signals—whose amplitude was proportional to the brightness of the radiation. The

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FOIA Request 2012-0268 – Review SBIRS Chapter [1998-2001],” 11 Apr 13, (Info used is not Secret or FOUO).

[7] History (U), Maj James J. Rosolanka, Defense Support Program (DSP), A Pictorial Chronology, 1970-1998,” 1998 (Doc 5-3 of History of SMC, October 1994 – September 1997).

system then had to discriminate between signals representing missile launches and signals representing less interesting sources of radiation. This task was initiated by signal processing electronics within the sensor and was later completed by computers at the ground stations. Detectors with two different compositions operated in two wavebands. Lead sulfide detectors worked in the shortwave infrared spectrum, and mercury cadmium teluride detectors worked in the mediumwave infrared.[8]

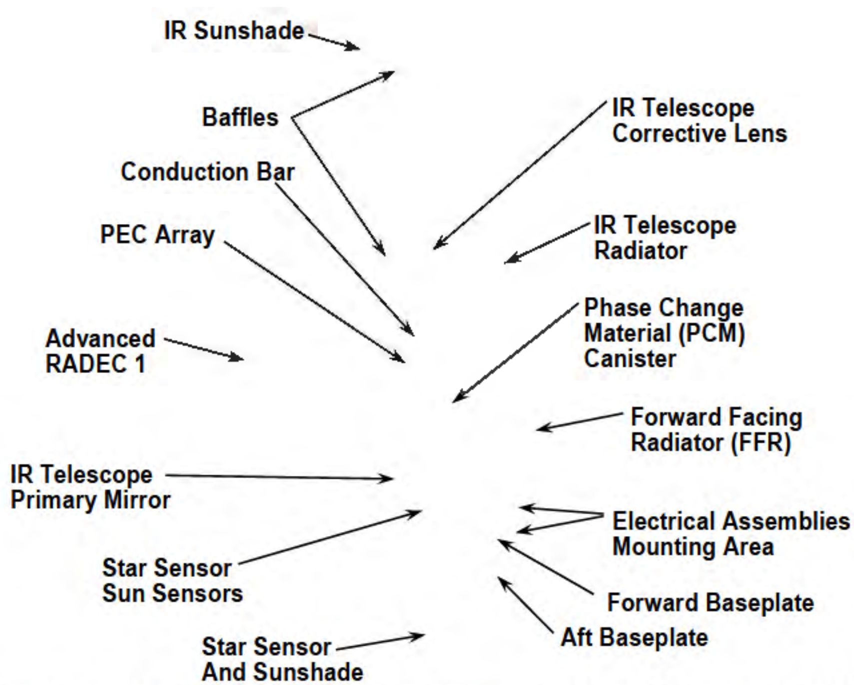

Illustration 7-3: Diagram of Aerojet Sensor on DSP Satellites, Flights 18-21

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[8] History of SMC (FOUO), October 1994 - September 1997, pp. 104-107; History (U), Maj James J. Rosolanka, Defense Support Program (DSP), A Pictorial Chronology, 1970-1998, 1998; E-Mail (S), Ron Bowman, AFSPC/A3SF, to Harry N. Waldron, SMC/HO, "FW: [S//N] FOIA Request 2012-0268 – Review SBIRS Chapter [1998-2001]," 11 Apr 13, (Info used is not Secret or FOUO).

Table 7-2
Major DSP Contracts in Effect During FY 1998-2001[9]

Contract Number	Contractor	Efforts	Start Date	Projected Completion Date	Approximate Value In 2001
F04701-96-C-0030	TRW, Inc.	DSP Satellite Post-Production Support	Oct 96	October 2002	$250 Million
F04701-96-C-0031	Aerojet General Corp.	DSP Sensor Post-Production Support	Oct 96	October 2002	$284 Million
F04701-96-C-0004	Aerojet Electronic Systems Division	Central Theater Processing Program [ALERT System]	Sep 95	September 2001 (consolidated into F04701-96-C-0031)	

TRW, Incorporated, was responsible for developing, fabricating, and supporting the spacecraft, and Aerojet Electronic Systems Division was responsible for the sensors. TRW performed its work under contract FO4701-96-C-0030, and Aerojet worked under contract FO4701-96-C-0031, known as the DSP Sensor Post-Production Support Contract.

Launches

As Table 7-4 indicates, three more DSP satellites—F-19 (spacecraft DSP-22), F-20 (DSP-21), and F-21 (DSP 19)—were launched during FY 1998-2001. All of the launches employed Titan IVB launch vehicles and Inertial Upper Stages. Unfortunately, on 9 April 1999, the first of these launches placed satellite F-19 into an unusable orbit because the first and second stages of the Inertial Upper Stage (IUS-21) did not separate cleanly. Four DSP satellites remained in the unlaunched inventory. They would have to be launched and brought into operation without any failures in order to stretch the lifetime of the DSP constellation until the follow-on SBIRS systems were fully operational. Launch schedules and vehicles had already been assigned to three of the remaining DSP satellites by April 1999. They were:

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[9] Briefing Charts (U), SMC/MT, "Program Management Review: DSP Increment 0," 1 November 2001 (Doc 7-10); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

Table 7-3
DSP Launch Assignments in April 1999 After Launch Failure Affecting F-19

Spacecraft	Planned Launch Date	Planned Launch Vehicle	Actual Launch During FY98-01
DSP-21 (F-20)	1st Quarter FY00	Titan IV with IUS	8 May 2000
DSP-19 (F-21)	1st Quarter FY01	Titan IV with IUS	6 August 2001
DSP-18 (F-22)	4th Quarter FY02	Titan IV with IUS	
DSP-23 (F-23)	FY03	Delta IV Heavy	

Table 7-4
DSP Satellites Launched 1970-2001[10]

Flight #	Block #	Space-craft #	Sensor #	Launch Date	Launch Site	Launch Vehicle	Launch Result
F-1	Phase I	DSP-1	R	11-6-70	CCAFS LC-40	Titan IIIC Transtage	Success
F-2	Phase I	DSP-3	T	5-5-71	CCAFS LC-40	Titan IIIC Transtage	Success
F-3	Phase I	DSP-4	U	3-1-72	CCAFS LC-40	Titan IIIC Transtage	Success
F-4	Phase I	DSP-2	S	6-12-73	CCAFS LC-40	Titan IIIC Transtage	Success
F-5	Phase II	DSP-8	9	12-14-75	CCAFS LC-40	Titan IIIC Transtage	Success
F-6	Phase II	DSP-7	8	6-26-76	CCAFS LC-40	Titan IIIC Transtage	Success
F-7	Phase II	DSP-9	5	2-6-77	CCAFS LC-40	Titan IIIC Transtage	Success
F-8	MOS/PIM	DSP-11	13	6-10-79	CCAFS LC-40	Titan IIIC Transtage	Success
F-9	MOS/PIM	DSP-10	10	3-16-81	CCAFS LC-40	Titan IIIC Transtage	Success
F-10	MOS/PIM	DSP-13	12	3-6-82	CCAFS LC-40	Titan IIIC Transtage	Success
F-11	MOS/PIM	DSP-12	11	4-14-84	CCAFS LC-40	Titan 34D Transtage	Success
F-12	Phase II UG	DSP-6R	7R	12-22-84	CCAFS LC-40	Titan 34D Transtage	Success
F-13	Phase II UG	DSP-5R	6R	11-29-87	CCAFS LC-40	Titan 34D Transtage	Success
F-14	DSP-1	DSP-14	17	6-14-89	CCAFS LC-41	Titan IVA IUS	Success
F-15	DSP-1	DSP-15	15	11-13-90	CCAFS LC-41	Titan IVA IUS	Success
F-16	DSP-1	DSP-16	16	11-24-91	KSC LC-39A	STS IUS	Success
F-17	DSP-1	DSP-17	14	12-22-94	CCAFS LC-40	Titan IVA IUS	Success
F-18	DSP-1	DSP-20	21	2-23-97	CCAFS LC-40	Titan IVA IUS	Success
F-19	DSP-1	DSP-22	22	4-9-99	CCAFS LC-41	Titan IVB IUS	Failure
F-20	DSP-1	DSP-21	18	5-8-00	CCAFS LC-40	Titan IVB IUS	Success
F-21	DSP-1	DSP-19	19	8-6-01	CCAFS LC-40	Titan IVB IUS	Success

Acronyms: CCAFS = Cape Canaveral Air Force Station; D1 = Device 1; D2 = Device 2; DSP = Defense Support Program; IUS = Inertial Upper Stage; KSC = Kennedy Space Center; LC = Launch Complex; MOS = Multi-Orbit Satellite; PIM = Performance Improvement Modification; STS = Space Transportation System; UG = Upgrade.

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[10] History (U), Maj James Rosolanka (SC/MT), "Defense Support Program (DSP): A Pictorial Chronology, 1970-1998," 1998; Briefing Charts (U), Aerospace Corporation, "Flight 21 President's Review," 11 July 2001.

Processing requirements dictated that Titan IV launches take place about six months apart because one of the two Titan IV launch complexes was being converted to launch EELVs. Since other programs were also scheduled to use the Titan IV, DSP satellites could be launched on Titan IVs no more often than a year apart. However, the schedule for F-22 could be accelerated by launching F-22 on the Space Shuttle instead. SMC brought its replenishment options for the DSP constellation to the Joint Chiefs of Staff's Joint Requirements Oversight Council (JROC), which agreed on 26 July 1999 to request emergency supplemental funding to prepare F-22 for a Shuttle launch. Nevertheless, the supplemental appropriation had not materialized by early 2000. The successful launch of F-20 on 8 May 2000 relieved much of the scheduling pressure on the remaining DSP satellites, since the rest of the DSP constellation was also healthy.[11]

At the end of 2001, F-19 was still the only launch failure in the program's 31-year history. (For more details about the launches during this period, see Table 3-1 in Chapter 3 of this history.) F-21 was successfully launched on 6 August 2001, using Titan IVB-31 with an Inertial Upper Stage (IUS-16). The satellite completed on-orbit testing and was transferred to Air Force Space Command on 5 September 2001 for movement to its operational location. By the end of September 2001, only two more DSP satellites remained in the inventory to be launched: DSP-18 and DSP-23. DSP-18 was scheduled for launch as F-22 on a Titan IVB in April 2003. The program office rescheduled DSP-23 for launch as the second payload for the Delta IV Heavy EELV in late August 2003. It would be known as flight F-23.[12]

Ground Sites

Until 1995, DSP's ground stations had consisted of three permanent ground sites, one mobile system, and one support facility. Two of the permanent sites were known as Large Processing Stations. They were the Overseas Ground Station (OGS) at Woomera, Australia, and the Continental U.S. Ground Station (CGS) at Buckley AFB, Colorado.

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[11] Staff Summary Sheet (U), SAF/AQS to SAF/AQS (PEO/Space), "New Start Reprogramming of Missile Procurement (3020 Appropriation) FY99 Funds for Inertial Upper Stage and Defense Support Program to Preserve Shuttle Launch Option," 11 August 1999 (Doc 7-11); Staff Summary Sheet (U), SMC/CLTO to SMC/CV, "Comments on 'New Start Reprogramming of Missile Procurement (3020 Appropriation) FY99 Funds for Inertial Upper Stage and Defense Support Program to Preserve Shuttle Option,'" 17 August 1999 (Doc 7-12); Staff Summary Sheet (U), SMC/CLTO to SMC/CV, "IUS-23 Requirements From NASA," 18 August 1999 (Doc 7-13); Letter (U), SMC/CV to AFSPC/DO, "Inertial Upper Stage (IUS) Vehicle 23 Requirement," 4 October 1999 (Doc 7-14).

[12] Briefing Charts (U), SMC/MTD, "Program Management Review: DSP Increment 0," 1 November 2001 (Doc 7-10); News Release (U), Boeing, "U.S. Air Force Assigns Fifth Delta IV Launch," 25 April 2001 (Doc 7-15).

The primary mission of the OGS was to process data from DSP satellites over the eastern hemisphere—data concerning the satellites' mission, health, and status—and to provide reports to the National Command Authority. The CGS did the same for satellites over the western hemisphere. The third permanent site was the European Ground Station (EGS). The Mobile Ground System (MGS) was intended to ensure that DSP would survive an attack by terrorists or nuclear arms. It consisted of mobile ground terminals, mobile communication terminals, and a Mobile Ground System Operating Base (MOB). The support facility was called the Multi-Purpose Facility. It provided telemetry and mission data analysis, software trouble-shooting for development of upgrades, and operational training for personnel.[13]

In March 1995, a fourth ground site became operational. It contained the Attack and Launch Early Reporting to Theater (ALERT) system, exploiting DSP's potential for warning of missile attacks within local theaters of war such as the Persian Gulf region during Operation Desert Storm. It also improved the dissemination of tactical information to other users. To do so, the system drew together data from the complete DSP constellation as well as data and communications lines from other resources into a single location housed in the National Test Facility at Schriever AFB, Colorado. The data was integrated by a system of data processors, displays, and software collectively known as a Central Tactical Processing Element (CTPE). The resulting warning and cueing reports were transmitted to theater commanders to provide extremely rapid warning information by means of existing tactical communications networks. The program achieved dramatic improvements in the accuracy, description, and timeliness of warning data. The improved warning information contained estimates of missile launch point location, time, and heading, as well as post-boost trajectory data including the predicted impact area. ALERT operations officially began in 1995, and SMC awarded a contract (FO4701-96-C-0004) to Aerojet Electronic Systems Division for maintaining and upgrading the CTPE portion of the ALERT system. Plans called for continuing tactical improvements for DSP until Increment 1 of the SBIRS Ground Segment achieved initial operational capability. At the end of September 2001, with integrated operational test and evaluation (IOT&E) of Increment 1 progressing satisfactorily, the program office consolidated Aerojet's ALERT contract into Aerojet's contract for DSP Sensor Post-Production Support.[14]

A mobile, tactical ground system known as the Army and Navy Joint Tactical Ground Station (JTAGS) became operational in 1997. It provided in-theater warning of a

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[13] History of SMC (FOUO), October 1994 - September 1997, p. 110-111; E-Mail (S), Ron Bowman, AFSPC/A3SF, to Harry N. Waldron, SMC/HO, "FW: [S//N] FOIA Request 2012-0268 – Review SBIRS Chapter [1998-2001]," 11 Apr 13, (Info used is not Secret or FOUO).

[14] See Table 7-2 in this history. For background, see History of SMC (FOUO, extract is not FOUO), October 1994-September 1997, pp. 111-112. See also Briefing Charts (U), SMC/MT to SMC/CC, "DSP Increment 0," 1 November 2001 (Doc 7-10); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

missile attack to theater commanders. This system could receive and use data directly from DSP satellites as well as processed warning information from communications networks. The data would be applied by units in the war zone to aim radars and antimissile weapons at incoming missiles. In the field, the JTAGS units were equipped with three eight-foot antennas to receive telemetry directly from the DSP satellites, a processing and communications unit housed in a shelter measuring 8x8x20 feet, a 60-kilowatt generator, and a HMMWV (High Mobility Multipurpose Wheeled Vehicle).[15]

All four of the existing primary DSP ground sites were close to being phased out by the end of September 2001. Increment 1 of the developing SBIRS would replace the three DSP strategic control centers (the OGS, CGS, and EGS) and the ALERT facility with a new SBIRS Mission Control Station (MCS) at Buckley AFB in Aurora, Colorado. The MCS, which was being developed by Lockheed Martin under its SBIRS High contract (FO4701-95-C-0017), would employ new software designed to be compatible with the SBIRS High and SBIRS Low systems being developed by SMC as well as with DSP. Lockheed Martin was also developing a backup MCS and a mobile MCS under the same contract.[16]

The newly built MCS was accepted by the Air Force early in FY 2001 and entered the prescribed period of initial operational test and evaluation (IOT&E) by the Air Force Operational Test and Evaluation Center (AFOTEC) in late May 2001. The system passed the effectiveness phase of IOT&E near the end of June and immediately began the suitability phase. Testing progressed satisfactorily, despite some minor issues. At Air Force Space Command's request, the program office arranged a pause in IOT&E of several days during August to fix a software problem. Testing resumed immediately, however, and the program office expected IOT&E to be completed during December 2001. If the testing did not turn up any major deficiencies, the MCS would then achieve initial operational capability and begin taking over the duties of the DSP control centers early in 2002. Later in 2002, it would also take over the duties of the ALERT tactical DSP facility.[17]

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[15] History of SMC (FOUO, extract is not FOUO), October 1994-September 1997, p. 112.

[16] News Release (U), SMC/PA, "SBIRS Facility Opens in Colorado," 29 March 2001 (Doc 7-16); News Release (U), Lockheed Martin, "Air Force Begins Independent Test of SBIRS Ground Station," 18 June 2001 (Doc 7-17); Fact Sheet (U), USAF, "Space Based Infrared Systems Mission Control Station," 13 December 2001 (Doc 7-18); News Release (U), Lockheed Martin, "Air Force Accepts New Missile Warning Control Station From Lockheed Martin," 7 January 2002 (Doc 7-19); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

[17] SMC Monthly Highlights (U), SMC/PA, June 2001, July 2001, August 2001, September 2001, October 2001.

Illustration 7-4: Artist's Concept of SBIRS Mission Control Station at Buckley AFB

Space Based Infrared Systems (SBIRS)

During FY 1992 and FY 1993, SMC pursued concepts and technologies for follow-on systems to replace DSP. By 1994, the concept for a system to succeed DSP became known as the Space Based Infrared Systems (SBIRS). The overall SBIRS architecture would be an integrated missile warning system that would support several missions--missile warning, missile defense, battlespace characterization, and technical intelligence. It would integrate various infrared systems into a single architecture that employed multiple constellations of different satellites in different orbits (geosynchronous, elliptical, and low earth) and an evolving ground element. The program office called the combination of all these elements "a system of systems."[18]

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[18] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, p. 113; Article (U), Ronea Alger, "Early warning system safeguards our nation," Astro News, 31 March 2000, p. 5 (Doc 7-20); Article (U), Richard Newman, "Space Watch,

SBIRS High

The Office of the Secretary of Defense (OSD) approved the plan for SBIRS in November 1994 and soon approved the program's entry into the early phase of development. The program's rapid first steps occurred through one of the earliest and most thorough applications of the Air Force's initiatives in streamlined acquisition reform. On 4 August 1995, SMC awarded two 15-month contracts for the SBIRS Architecture Definition and Technology Demonstration (pre-EMD): one (FO4701-95-C-0017) to the team led by the Lockheed Martin Missiles and Space Company (LMMS) as the prime contractor, with Loral and Aerojet as subcontractors, and the other (FO4701-95-C-0018) to the team of Hughes Aircraft Company and TRW. The efforts included the entire system architecture, the ground system for all mission processing, the space element for geosynchronous orbit, and satellite ground control. Each contract had a value of $80 million, and each had a schedule to end on 4 November 1996. These efforts and plans underwent a Milestone II review by the Defense Acquisition Executive, Under Secretary of Defense for Acquisition and Technology Paul Kaminski, on 3 October 1996. As a result, he approved the SBIRS High program for entry into the Engineering and Manufacturing Development (EMD) phase.[19]

After evaluating the contractors' proposals, SMC selected LMMS and its subcontractors to continue into the EMD phase on 8 November 1996. The subcontractors included Aerojet Electro Systems to provide payload integration and mission data processing; Lockheed Martin Federal Systems to provide satellite and ground system control as well as telemetry and tracking operations; Northrop Grumman to provide the telescope and focal plane assembly along with a cryoradiator; and Honeywell to provide on-board data processing. The new work on the contract (FO4701-95-C-0017) had a value of $2.1 billion for efforts over the next 10 years.[20]

Spacecraft

The planned system to be developed for SBIRS High consisted of the following major elements. It would have four GEO satellites (and one spare), two HEO payloads (installed in hosted satellites by another organization), and associated ground elements.

High and Low," Air Force Magazine, July 2001, pp. 35-38 (Doc 7-21); Fact Sheet (U), SMC/PA, "Space Based Infrared Systems," January 2001 (Doc 7-4).

[19] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, p. 114-115; SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

[20] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, pp. 115-116; SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

The spare GEO satellite would be acquired and available if a launch failure occurred. The SBIRS High space segment would provide all the DSP functionality while improving radiometric sensitivity and performance, plus upgraded missile defense, technical intelligence, and battle space characterization capabilities. The sensors would include a scanning infrared sensor for rapid global coverage and a staring infrared sensor to detect and track missiles in theaters of conflict. The satellite bus would be a Lockheed Martin A2100 spacecraft—already in commercial production—adapted for military requirements. The original plan scheduled the first GEO satellite launch for the third quarter of FY 2002, and the following satellites would be launched a year apart. They would be launched with Evolved Expendable Launch Vehicles (EELVs). The SBIRS High contractors would also deliver the two HEO payloads. These payloads would share a common design and common components with the GEO sensors, creating economies of scale for sensor production. However, they would be integrated into the spacecraft for a different, classified system that also used an elliptical orbit.[21]

SBIRS High would have several improvements over DSP. SBIRS would provide more reliable, accurate and timely information on missile launches than DSP. These improvements would include better missile launch point determinations and impact point predictions in support of offensive and defensive operations. The faster, more accurate launch data would increase the probability for a successful defense against a missile attack. SBIRS would have significant improvements in sensor flexibility and sensitivity enabling it to provide much more surveillance capability. Sensors would cover short-wave infrared (like DSP), but expanded mid-wave infrared and see-to-ground bands would allow SBIRS to perform an expanded set of missions.[22]

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[21] History of SMC (FOUO), October 1994 - September 1997, pp. 116-117; Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, pp. 1-1, 2-4 (Doc 7-3); News Release (U), SMC/PA, "SBIRS High payload successfully passes key test," 27 March 2001 (Doc 7-22); Fact Sheet (U), SMC/PA, "Space-Based Infrared System," September 1998 (Doc 7-23); E-Mail (S), Ron Bowman, AFSPC/A3SF, to Harry N. Waldron, SMC/HO, "FW: [S//N] FOIA Request 2012-0268 – Review SBIRS Chapter [1998-2001]," 11 Apr 13, (Info used is not Secret or FOUO).

[22] Fact Sheet (U), SMC/IS, "Space Based Infrared Systems (SBIRS)," January 2005 (Doc 7-24); Article (U), Ronea Alger, "SBIRS: 'System of systems' stands guard in space," Astro News, 31 March 2000, p. 5 (Doc 7-20); Briefing Charts (U), SMC/MT, "SBIRS the First Step in a Credible Missile Defense," circa 2002, p. 6 (Doc 7-25); Article (U), Richard Newman, "Space Watch, High and Low," Air Force Magazine, July 2001, pp. 35-38 (Doc 7-21); SEA and FONSI (U), SMC, "Space Based Infrared System (SBIRS) Mission Control Station for Defense Support Program Consolidation," March 2001, p. 1-2 (Doc 7-2).

Illustration 7-5: Artists' concepts of SBIRS High GEO satellite

Like DSP satellites, the SBIRS High satellites would include a set of sensors to detect, locate, and report nuclear detonations inside and outside of the atmosphere. The detection package was called the Space and Atmospheric Burst Reporting System (SABRS). It would be essential for the detection and identification of nuclear bursts in the upper atmosphere, as well as relatively low-energy bursts, such as those that might be detonated by countries only beginning to develop nuclear capabilities. SABRS would measure and report five types of nuclear data: neutron energy measured by the time of flight, prompt (that is, bursts) of gamma rays from a detonation, delayed gamma rays from a cloud of nuclear debris, background environment of energetic ions and electrons, and spacecraft charging levels by low-energy particles. The SABRS package would consist of two sensor modules that weighed about 75 pounds, and would draw an estimated power total of 53 watts from the host satellite. The first SBIRS flight that the SABRS package could be carried on would be the third GEO launch, pending future production approval from OSD.[23]

[23] History of SMC (FOUO), October 1994 - September 1997, p. 117; E-mail (FOUO), Susan Swift, SMC/ISA, to Robert Mulcahy, SMC/HO, "FW: SABRS (FOUO)," 12 June 2006 (Doc 7-26); Internet Document, Federation of American Scientists (FAS), "SBIRS High Nuclear Exo-atmospheric Detonation (NUDET) Package," 10 September 1998, http://www.fas.org/spp/military/program/nssrm/initiatives/sbirsnp.htm (Doc 7-27); E-Mail (S), Ron Bowman, AFSPC/A3SF, to Harry N. Waldron, SMC/HO, "FW: [S//N] FOIA Request 2012-0268 – Review SBIRS Chapter [1998-2001]," 11 Apr 13, (Info used is not Secret or FOUO).

Ground Segment

The ground segment to be developed for SBIRS High would consist of the following facilities and capabilities: the continental United States (CONUS) based MCS at Buckley AFB; a backup (MCSB) at Schriever AFB; a survivable MCS (SMCS); Relay Ground Stations (RGSs) located overseas - RGS-Europe (RGS-E) and a Relay Ground Station-Pacific 1 (RGS-P1); a survivable RGS (SRGS), and Multi-Mission Mobile Processors (M3Ps) with associated infrastructure. The ground segment for SBIRS High would build on the existing ground segment for DSP, first consolidating and updating the DSP capabilities. The first step would consolidate three legacy DSP strategic warning centers located in the United States and overseas—along with their associated communications networks—into the MCS at Buckley. The MCS would replace the DSP ground control centers and fuse all the data from the infrared sensors and other sources into a product of the greatest utility to national and theater command authorities. The SBIRS ground segment was originally scheduled to attain its Initial Operational Capability (IOC) around June 1999, but software development problems delayed the IOC certification for about 18 months.[24]

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[24] History of SMC (FOUO), October 1994 - September 1997, p. 117; Fact Sheet (U), SMC/MT, "Space Based Infrared Systems (SBIRS) Mission Control Station (MCS)," March 2003, (Doc 7-28); Request for Proposal (RFP) (U), SMC/MT, "RFP F04701-98-R-0006 SBIRS Low Component - Program Definition (PD) Effort," 23 July 1998, p. 21 (Doc 7-29); Chronology (U), SMC/MT, "SBIRS High Program," 10 February 2005, p. 14 (Doc 7-5); Article (U), Maj Richard Williamson, SMC/MT, "Defense Support Program Following in the footsteps of America's earliest silent sentry," Astro News, 5 October 2001, pp. 3-4 (Doc 7-30); Briefing Charts (U), SMC/MT, "Space Based Infrared Systems," circa 2002, p. 13 (Doc 7-31); Document (U), DefenseLink, "[SBIRS MCSB]," 8 September 1998 (Doc 7-32); Document (U), DefenseLink, "[SBIRS Combined Task Force facility]," 21 November 2000 (Doc 7-33); News Release (U), SMC/PA, "SBIRS Facility Opens in Colorado," 29 March 2001 (Doc 7-16); Document, DefenseLink, "[SBIRS upgrades for ground systems operations facility]," 6 April 2001 (Doc 7-34); Article (U), Lt Col Kelly Hazel, "SBIRS ground segment in final test phase," Astro News, 15 June 2001, pp. 1, 3 (Doc 7-35); Memo w/1 atch (U), SAF/SX to AFPEO (Space), "SBIRS Remote Ground Station Europe (RGS-E) Radome Installation at RAF Menwith Hill," 23 June 2000; Atch 1 Memo, SAF/SX to SEC(AS)1 Ministry of Defense UK, "[Change in Color in Radomes Covering two SBIRS Antennas at RAF Menwith Hill Station, UK]," 22 June 2000 (Doc 7-36); Article (U), "Air Force Turns to SGI For Early Warning," Space Daily, 31 October 2000 (Doc 7-37); News Release (U), Lockheed Martin, "Air Force Begins Independent Test of SBIRS Ground Station," 18 June 2001 (Doc 7-17); Article, "House Panel Withholding OK to Initiate Revised SBIRS High Contract," Inside the Air Force, 22 October 1999 (Doc 7-38); Article (U), "Software Problems, More Tests Delay Start of SBIRS Ground Segment," Inside the Air Force, 22 October 1999 (Doc 7-39); Article (U), "Air Force Official Says Inaugural SBIRS High Launch Remains on Track," Inside the Air Force, 16 June 2000 (Doc 7-40); E-Mail (S), Ron Bowman, AFSPC/A3SF, to Harry N. Waldron, SMC/HO, "FW: [S//N] FOIA

Acquisition

Between 1996 and 2001, SBIRS High became one of the pilot programs to implement an Air Force's Acquisition Reform program that intended to streamline large and complex space system acquisitions. The Air Force assigned Total System Program Responsibility (TSPR) to the contractor under this reform program. The decision to implement the TSPR acquisition strategy was directed at the May 1996 Single Acquisition Management Plan (SAMP) review with the Assistant Secretary of the Air Force for Acquisition (SAF/AQ). SMC implemented the new strategy for the SBIRS High acquisition, and planned to evolve the same strategy for the SBIRS Low acquisition as it matured.[25]

The acquisition reform intended to make the contractors more accountable for the acquisition, and reduce the government role and oversight with the intent to deliver to the space system on schedule and within budget ("faster, better, cheaper"). With optimism for the new acquisition strategy, it was predicted that the SBIRS High program would have a cost savings of $2.5 billion during its planned life cycle. The reform intended to reduce research and development with fewer government approvals that would lower the unit cost of the product. The SBIRS High TSPR gave LMMS the responsibility for the product design, development, production (for both the space and ground systems), integration (space, ground and launch support), delivery, and the sustainment. LMMS would determine the development approach (how the product would be built), the implemental approach (what the product would look like), and LMMS would set the agenda (integrated management schedule). The acquisition reform process had no detailed design/approval verification, no Independent Readiness Reviews, no Software (S/W) independent verification and validation, and minimal independent engineering analysis. The government determined the performance requirements, and the contracting would be performance based. SMC depended on the SBIRS Award Fee and Corporate Commitment Plan (AFCCP) as the primary means and incentive for keeping the contractor to the Cost as an Independent Variable (CAIV) cost goals.[26]

Request 2012-0268 – Review SBIRS Chapter [1998-2001]," 11 Apr 13, (Info used is not Secret or FOUO).

[25] Product Support Evaluation Plan (U), SMC/MT, "Space Based Infrared System, Innovative Product Support," circa 2000, pp. 3, 4-5, 7, 17 (Doc 7-41); Document (U), SAFAQ, "Acquisition Reform Success Story," 2 December 1996 (Doc 7-42); Briefing Charts (U), SMC/MT, "SBIRS Review to Independent Strategic Assessment Group," 1 May 2006, p. 9 (Doc 7-43).

[26] Briefing Charts (U), SMC/MT, "SBIRS Review to Independent Strategic Assessment Group," 1 May 2006, pp. 9-12 (Doc 7-43); Product Support Evaluation Plan (U), SMC/MT, "Space Based Infrared System, Innovative Product Support," circa 2000, pp. 3, 4-5, 12, (Doc 7-41); Document w/1 atch (U), SMC/MT, "[Air Force Association] Schriever Award Narrative for Space Based Infrared Systems (SBIRS System Program Office," 1999; Atch 1 Citation, AFA, "Major General Bernard A. Schriever Award for

From 1996 through FY 2001, the SBIRS SPO planned for three increments in the SBIRS High acquisition. Increment 1 would consolidate and replace the DSP ground assets to support the space operations of the remaining DSP satellites, and provide an infrastructure for the new SBIRS space assets. The Increment 1 ground segment would consolidate DSP processing stations and the Attack and Launch Early Reporting to Theater (ALERT) assets into the MCS at Buckley (including the RGS equipment). The Increment 1 architecture included an Interim MCS Backup (IMCSB), along with the SMCS and its associated SRGS. It also included the two RGS in Europe and the Pacific for connectivity between the MCS and the DSP satellites that were not in view of the MCS. The MCS was originally scheduled to be on line in 1999, but technical and organizational problems deferred this milestone until after FY 2001. Increment 1 should attain its IOC around December 2001.[27]

Increment 2 would replace the DSP space segment with the SBIRS High constellation and its associated ground software and hardware modifications. SBIRS High would include a space segment, a ground segment, and the support services (including the launches) needed to complete the mission. The SBIRS High space segment, when fully fielded at the completion of Increment 2, would have four satellites in GEO, the payloads with infrared sensors hosted on two satellites in HEO, and any residual on-orbit DSP satellites. The Increment 2 ground segment would add ground capabilities to help the transition from DSP, and provide launch and mission operations of the GEO satellites and HEO infrared sensors. The Increment 2 ground stations would include the MCS, MCSB, RGS-H, RGS-M2 (and its backup RGS-B), RGS-E, RGS-P2, and the M3P. Increment 3 would deploy the SBIRS Low constellation.[28]

SMC awarded modifications and increases to the SBIRS High contract during this time period. The more costly modifications included the following contract adjustments.

Outstanding Product Management," 1999 (Doc 7-44); E-mail (U), Capt Daniel McCutchon, SMC/MT, to SMC Directors et al., "Total Ownership Cost Briefing Slide," 27 July 1998 (Doc 7-45); Memo (U), SMC/CC to Col Daniel Burkett, SMC/MT, "[Congratulations for 1999 DoD Defense Value Engineering Award]," 17 July 1999 (Doc 7-46); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

[27] Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, p. 3-1 (Doc 7-3); Staff Summary Sheet w/1 atch (U), SMC/MTSG to SMC/CV et al., "Time-On-Station (TOS) Waiver for Maj Falkenstein," 12 June 2000; Atch 1 Memo, SMC/CV to AFSPC/DP, "Time-On-Station (TOS) Waiver for Maj Falkenstein," 12 June 2000 (Doc 7-47).

[28] Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, p. 2-4 (Doc 7-3); Fact Sheet (U), SMC/PA, "Space Based Infrared Systems," January 2001 (Doc 7-4).

On 3 February 1998, SMC awarded LMMS a $39,400,000 face value increase to the cost plus award fee contract (F04701-95-C-0017 P00027) to extend the delivery dates for the HEO payloads by three months, and the first three GEO space vehicles and the ground increment by four months. On 4 October 1999, SMC awarded LMMS a $37 million modification to its cost plus award fee contract (F04701-95-C-0017 P00079) to provide the required design and system evaluations for the integration of the SBIRS High and Low components. The work should be complete by 2006. On 23 January 2001, SMC awarded LMMS a $35,713,200 modification to its cost plus award fee contract (F04701-95-C-0017 P00113) to establish an integrated training capability that supported operation of the SBIRS MCS. The work should be complete by 2008.[29]

Around July 1998, LMMS identified 19 August 1998 as the expiration date for the current funding for SBIRS High. LMMS planned to complete the year's tasks with their own funds. In response, on 21 August 1998 the SBIRS SPD sent LMMS a memo stating that LMMS had no obligation to continue performing the SBIRS High contract without additional funding, and the government would not be obligated to reimburse LMMS for any costs in excess of the funds allotted to the contract.[30]

On 15 September 1998, the Air Force submitted the Budget Estimate Submission (BES) for FY 2000 that had a restructured SBIRS High program and delayed the first GEO launch from 2002 to 2004. The schedule slip occurred so the Air Force could save an estimated $395 million in its FY 2000 budget, and to reduce the funding needs for the SBIRS High Increment 1. The $395 million had to be replaced in the future, in addition to an estimated cost penalty of $400 million about four to six years later. On 1 December 1998, Program Budget Decision 023 acknowledged the Air Force decision to delay the

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[29] Internet Document (U), DefenseLink, "[SBIRS High and Low components]," 4 October 1999, http://www.defenselink.mil/contracts/1999/c10041999_ct460-99.html (Doc 7-48); Internet Document (U), DefenseLink, "[SBIRS integrated training capability]," 23 January 2001, http://www.defenselink.mil/contracts/2001/c01232001_ct037-01.html (Doc 7-49); Document (U), DefenseLink, "[SBIRS High delay Geo Space vehicles…]," 3 February 1998 (Doc 7-50); Document (U), DefenseLink, "[SBIRS Satellite Control System 21 software]," 19 October 1998 (Doc 7-51); News Release (U), AFPN, "Schriever expands mission with SBIRS backup," 13 July 2001, http://www.af.mil/news/Jul2001/n20010713_0955.shtml (Doc 7-52); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

[30] Monthly Acquisition Report (U), SMC/MT, "SBIRS High," July 1998 (Doc 7-53); Memo w/1 atch (U), SMC/MT to LMMS et al., "Rules of Engagement for Interacting with Lockheed Martin Missile and Space (LMMS) Prior to the Allotment of Additional Funds, F04701-95-C-0017," 21 August 1998; Atch 1 Statement, SMC/MT to LMMS, "[Concerning Additional Funding for Contract Number F04701-95-C-0017], August 1998 (Doc 7-54); Budget Item Justification Sheet (U), Federation of American Scientists (FAS), "Space Based IR Arch (EMD) (Space)," February 1999 (Doc 7-55).

first GEO launch to 2004. The Pentagon decided it could continue depending on DSP for early warning surveillance during the SBIRS delay.[31]

Weeks after the president's FY 2000 defense budget had been submitted, the Pentagon informed Congress that LMMS estimated the SBIRS High costs grew between $240 million to $320 million, independent of the schedule slip. In response to this disclosure, on 2 March 1999 Darleen Druyun, Principal Deputy Assistant Secretary of the Air Force for Acquisition and Management (SAF/AQ), chartered a Joint Estimation Team (JET) comprised of contractor (LMMS), DoD and Air Force personnel to review the SBIRS High contract structure and determine the true cost of the restructured SBIRS High program. On 4 May 1999, the JET briefed its recommendations to restructure the SBIRS High program to the Secretary of the Air Force. The Air Force and the DoD supported the revised schedule and strategy recommended by the JET that delayed the first launch until 2004.[32]

In June 1999, the Defense Subcommittee, House Committee on Appropriations did not approve the initial JET proposal to restructure the SBIRS High contract. The Appropriations Committee objected to the strategy to increase hardware concurrency and to the proposed incremental funding of the project rather than the full funding policy that had normally been used. On 20 July 1999, the House Committee on Appropriations directed (in H.R. Report 106-244) that no more than $100 million of the funds provided for SBIRS High would be obligated until the Secretary of Defense (SECDEF) certified that the production program complied with all DoD funding policies, and that the

[31] Chronology (U), SMC/MT, "SBIRS High Program," 10 February 2005, pp. 13, 14 (Doc 7-5); Article (U), TSgt Timothy Hoffman, AFSPC/PA, "Senate committee focuses on military space programs, people," Air Force News, 25 March 1999 (Doc 7-56); Memo w/1 atch (U), DEPSECDEF to Office of Management and Budget Director, "[SBIRS High Funding]," 14 April 1999; Atch 1 FY 2000 Budget Amendment, "For Space Based Infrared System (SBIRS)," April 1999, p. 2 (Doc 7-57); Article (U), "House Panel Withholding OK to Initiate Revised SBIRS High Contract," Inside the Air Force, 22 October 1999 (Doc 7-38); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

[32] Article (U), "SBIRS High Team Projects Lower Delay Costs Than Contractor Anticipated," Inside the Air Force, 30 April 1999 (Doc 7-58); Chronology (U), SMC/MT, "SBIRS High Program," 10 February 2005, p. 16 (Doc 7-5); Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, p. 3-1 (Doc 7-3); Memo w/1 atch (U), DEPSECDEF to Office of Management and Budget Director, "[SBIRS High Funding]," 14 April 1999; Atch FY 2000 Budget Amendment, "For Space Based Infrared System (SBIRS)," April 1999, p. 6 (Doc 7-57); Article (U), "House Panel Withholding OK to Initiate Revised SBIRS High Contract," Inside the Air Force, 22 October 1999 (Doc 7-38); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

program concurrency risk had been minimized. The Pentagon modified its acquisition strategy, and the House Appropriations Committee approved the SBIRS High contract restructure. Although the JET provided strategies that minimized the cost increases, delaying the first launch increased the SBIRS High costs by over $500 million. On 17 December 1999, the SBIRS SPO awarded LMMS a $531,117,229 modification to its cost plus award fee contract (F04701-95-C-0017 P00075) to restructure the SBIRS High Engineering and Manufacturing Development Program to reflect the slip of the first launch (GEO 1) from 2002 to 2004. On 18 January 2000, the SECDEF sent a letter to Congress stating that the Air Force would comply with the full-funding policy for production satellites in the SBIRS High acquisition.[33]

On 14 October 1999, the SBIRS SPO halted the combined development testing and operational testing on the Increment 1 ground segment software. The ground segment had software development problems and required more time to reduce the operational risk, to decrease the training and development concurrency, to conduct certification testing, and to show delays in the delivery of equipment provided by the government. The SBIRS SPD declared an acquisition program baseline schedule breach to the Increment 1 software certification threshold date on 22 December 1999. A chartered management assessment team made determinations as to why the breach occurred and identified corrective actions.[34]

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[33] Memo w/1 atch (FOUO), SAF/FMB to Under Secretary of Defense (Comptroller), "PBD 172 - Space Programs," 8 November 1999; Atch Program Budget Decision No. 172 (FOUO), "SBIRS High," circa November1999, pp. 5-6, 19 (Doc 7-59);Chronology (U), SMC/MT, "SBIRS High Program," 10 February 2005, pp. 17, 18, 19 (Doc 7-5); Letter (U), Chairman of the House Appropriations Defense Subcommittee to SECDEF, "Lewis Letter to Cohen on SBIRS High," 10 June 1999 (Doc 7-60); Article (U), "House Panel Withholding OK to Initiate Revised SBIRS High Contract," Inside the Air Force, 22 October 1999 (Doc 7-38); Article (U), Gigi Whitley, "After Months of Debate, Pentagon Tells Congress of New SBIRS Plans," Inside the Air Force, 13 August 1999 (Doc 7-61); Article (U), "House Appropriations Committee Rejects Overhauled SBIRS High Program," Inside the Air Force, 18 June 1999 (Doc 7-62); E-mail w/1 atch (U), Capt Heather McGee, SMC/XPC, to Harry Waldron, SMC/HO, "RE: Gen Lyles visit: 1-2 Jun 00," 8 June 2000; Atch Issue Paper, SMC/MTPP, "The SBIRS compliance with Congressional direction," 19 May 2000 (Doc 7-63); Internet Document (U), DefenseLink, "[SBIRS first launch delay]," 17 December 1999, http://www.defenselink.mil/contracts/1999/c12171999_ct575-99.html (Doc 7-64); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

[34] Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, p. 3-1 (Doc 7-3); Chronology (U), SMC/MT, "SBIRS High Program," 10 February 2005, p. 18 (Doc 7-5); Article (U), "Software Problems, More Tests Delay Start of SBIRS Ground Equipment," Inside the Air Force, 22 October 1999, pp. 9-10 (Doc 7-39).

LMMS initiated an Over Target Baseline (OTB) in August 2000 that started the Increment 1 recovery plan and various risk reduction proposals. A new SBIRS High spacecraft design and concept of operations was implemented into the technical baseline to recover some of the shortfalls in the Key Performance Parameters. The baseline incorporated technical, cost, and schedule challenges. A Defense Acquisition Executive (DAE) program review occurred on 9 November 2000 to review the SBIRS High program schedules, to endorse program initiatives that reduced schedule risks, to validate updated cost estimates and related funding strategy, and to obtain approval of revised APB thresholds. The overall program strategy and management initiatives received support, but some issues remained relating to cost growth and test strategy. As a result, the proposed APB did not get approved due to the uncertainty of the SBIRS cost.[35]

The SBIRS High program had serious cost and schedule problems that became apparent in early 2001. Test failures and technical issues with the HEO payload were the main problems, but each Integrated Product Team (IPT) also had cost growth. Many of the technical risks inherent in the OTB occurred. By June 2001, the SBIRS SPD had indications that the SBIRS program had significant problems, and in July the SPD estimated a cost overrun of $368 million. LMMS had ongoing problems with cost control, its technical effort, and maintaining program schedules. SMC criticized the ineffective LMMS business management of the program between 1 May 2001 and 30 September 2001, and rated the LMMS overall cost control effort during this time period as unsatisfactory. The inability of LMMS to control costs and its inability to complete many of the significant events during that period led to program scheduling slips and the necessity to restructure the SBIRS High program again after this time period (FY 2001). In September 2001, SMC estimated that the SBIRS High cost overrun could exceed a billion dollars.[36]

In August 2001, the Increment 2 System Critical Design Review occurred and formed the technical basis for a preliminary "quick look" Estimate at Completion (EAC) analysis in October 2001. The EAC analysis provided the initial step in the process to determine a realistic estimate of the total program costs. Initial findings indicated

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[35] Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, p. 3-1 (Doc 7-3).

[36] Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, p. 3-1 (Doc 7-3); Staff Summary Sheet w/1 atch (U), SMC/MTI to AFPEO/SP, "SBIRS High Fee Determining Official Period 10 Letter, LMSSC contract # F04701-95-C-0017," 15 January 2002; Atch 1 Memo, AFPEO/SP to Lockheed Martin Missiles & Space Company, Inc., "[SBIRS High Fee Determining Official Period 10]," 14 January 2002 (Doc 7-65); Article (U), Robert Wall, "New Space-Based Radar Shaped By SBIRS Snags," Aviation Week & Space Technology, 18 February 2002 (Doc 7-66); Briefing Charts (U), SMC/MT, "SBIRS Lessons Learned Overview," 22 October 2002, pp. 4, 24 (Doc 7-67); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

substantial cost growth and schedule delays. It would be determined that SBIRS High had exceeded its budget by $2 billion and would have a schedule delay of another two years. The reactions and responses to the excess costs and the schedule slip would occur in FY 2002.[37]

SBIRS Low

SBIRS Low would provide Over-the-Horizon (OTH) mid-course missile tracking to enable ballistic missile defense of CONUS and theater. The technological basis for the low-altitude follow-on system to provide tracking and discrimination data for missiles in the middle portion of their trajectories had also been a Strategic Defense Initiative (SDI) program. It had been known as the Space Surveillance and Tracking System (SSTS) during the mid and late 1980s. After that, it went through several restructurings and changes in concept as its planned constellation of satellites became smaller and cheaper. In July 1990, the SDI Organization (SDIO) renamed the program Brilliant Eyes. By 1992, Brilliant Eyes became a simpler system as interest shifted from protection against a massive attack of Soviet strategic missiles toward protection against a small number of shorter range, third-world missiles. By FY 1995, the concept for a SBIRS system using Low Earth Orbit (LEO) infrared sensors to track missiles in the middle portion of their trajectories became known as SBIRS Low.[38]

National Missile Defense

The 1998 Rumsfeld Commission (chaired by former Secretary of Defense Donald Rumsfeld) concluded in July 1998 that the possibility of a nuclear ballistic missile attack against the US was more serious and evolved than the intelligence community had estimated. Rogue states such as North Korea and Iran posed a growing threat to the US. Secretary of Defense (SecDef) William Cohen acted upon the conclusions of the Rumsfeld Commission. On 22 July 1999, the National Missile Defense Act of 1999 (Public Law 106-38) was signed into law. The law committed the US to deploying an effective National Missile Defense (NMD) system, as soon as technologically possible, that could defend the territory of the US against a limited ballistic missile attack. The initial primary mission of the NMD program in 1999 was the defense of the US (all 50 states) against the threat of a limited strategic ballistic missile attack by a rogue nation. The NMD would detect the launch of attacking ballistic missiles, track their progress in

[37] Single Acquisition Management Plan (SAMP) (U), SMC/MT, "Space Based Infrared System (SBIRS) High Component," 30 June 2002, pp. 1-1, 3-1 (Doc 7-3); SCG (U), AFSPC, "DSP and SBIRS HEO Operations," 1 Oct 09, p. A-67 (Info is FOUO).

[38] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, pp. 121-122; Document (U), SMC/MT, "SBIRS Low," Printed 13 April 2000, (Doc 7-68).

flight, then engage and destroy the ballistic missile warheads above the earth's atmosphere.[39]

SBIRS Low would augment the NMD program's Capability-3 (C3) architecture by tracking any launched ballistic missiles heading towards the US. In 1993, the Clinton administration renamed the SDIO as the Ballistic Missile Defense Organization (BMDO). The SBIRS SPO worked together with the BMDO during the SBIRS Low acquisition so both organizations could have the requirements they needed from SBIRS Low. The 7 May 1999 Memorandum of Agreement (MOA) between the SBIRS SPO and BMDO assigned a liaison officer from the SBIRS SPO to the BMDO at the Pentagon. The liaison officer provided communications between the SPO and the BMDO by representing the SBIRS program to the BMDO, and representing the BMDO activities to the SBIRS SPO.[40]

Segments

The concept for SBIRS Low continued to evolve, driven by the work of TRW and Rockwell under the Brilliant Eyes contracts and the work of the program office to shape the acquisition and schedule. By 1997, the concept for an operational system included four segments: a launch segment, a space segment, a ground segment, and a support

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[39] Internet Document (U), Federation of American Scientists (FAS), "National Missile Defense," 27 June 2000, http://www.fas.org/spp/starwars/program/nmd (Doc 7-69); Internet Document (U), MissileThreat.com, "National Policy on Ballistic Missile Defense Act of 1999," circa June 1999, http://missilethreat.com/law/federal/nmdact99.html (Doc 7-70); Internet Document (U), Senate, "National Missile Defense Act of 1999," 18 May 1999 (Doc 7-71); Internet Document (U), Library of Congress, "House Report 106-039 Purpose and Background," circa June1999 (Doc 7-72); Internet Document (U), White House, "National Policy on Ballistic Missile Defense Fact Sheet," 20 May 2003, http://www.whitehouse.gov/news/releases/2003/05/print/20030520-15.html (Doc 7-73); Internet Document (U), DefenseLink, "Cohen Announces Plan to Augment Missile Defense Programs," 20 January 1998, http://www.defenselink.mil/news/Jan1999/b01201999_bt018-99.html (Doc 7-74).

[40] Internet Document (U), Wikipedia, "Ballistic Missile Defense Organization (BMDO)," 14 June 2006, http://www.wikipedia.org/wiki/Ballistic_Missile_Defense_Organization (Doc 7-75); Internet Document (U), Federation of American Scientists (FAS), "National Missile Defense," 27 June 2000, http://www.fas.org/spp/starwars/program/nmd (Doc 7-69); Article (U), "SBIRS Low Requirements on the Table for Trade Studies," Defense Daily 19 October 1999 (Doc 7-76); Article (U), Amy Butler, "Contractors Estimate SBIRS Low Costs are Within Air Force's Budget," Inside Missile Defense, 20 September 2000 (Doc 7-77); Memorandum of Agreement (MOA) (U), SMC/MT and BMDO, "Space Based Infrared System Program Office Liaison Officer at Ballistic Missile Defense Organization," 7 May 1999 (Doc 7-78).

segment. The launch segment would employ Delta II launch vehicles that would launch three LEO satellites at a time.[41]

The ground segment would build on the overall SBIRS ground segment that had been under development for the SBIRS High portion of the architecture since 8 November 1996. The unique software and equipment for SBIRS Low would be developed during its Engineering and Manufacturing Development (EMD) Phase as a discrete addition (referred to as a "plug") to the basic MCS developed under SBIRS High. The result would be a consolidated SBIRS ground processing station.[42]

The SBIRS Low space segment would consist of about 24 LEO satellites. Although their low altitude would require a greater number of satellites in orbit to provide adequate coverage of the earth, their proximity to potential targets would make it easier for their sensors to acquire longwave infrared radiation from missiles in mid-flight and to provide surveillance of theaters of conflict at higher resolutions.[43]

Each satellite would have two primary infrared sensors. They would cover a wide part of the electromagnetic spectrum, enabling them to observe targets of different temperatures. They would also be able to conduct surveillance of space objects and battlefields. The first sensor, the Acquisition Sensor, would be a scanning infrared sensor operating in the shorter wavelengths. It would cover the visible area in a fast scan mode from horizon to horizon, using a wide field of view and a small aperture to acquire missile targets during their boost phase. After the Acquisition Sensor initiated a two-dimensional track of the target, it would then pass information about the target to the Tracking Sensor.[44]

The Tracking Sensor would be a staring infrared sensor with a narrow field of view and large aperture that would be mounted on a two-axis gimbal. After receiving the target from the Acquisition Sensor, it would verify the target, lock on to it, and track it through midcourse trajectory into re-entry. If a target left a given satellite's field of view, that satellite would use an inter-satellite crosslink to hand off the target to another satellite in a better viewing position. This crosslink would enable any satellite to communicate with all other satellites in the constellation.[45]

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[41] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, p. 122.

[42] *Ibid* (FOUO, extract is not FOUO), p. 123.

[43] *Ibid* (FOUO, extract is not FOUO), p. 123; Fact Sheet (U), SMC/PA, "Space Based Infrared Systems," January 2001, (Doc 7-4).

[44] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, pp. 123-124.

[45] *Ibid* (FOUO, extract is not FOUO), pp. 124-125.

The satellites' on-board data processors would determine the target missile's trajectory, predict its impact point, and relay the information to the NMD ground-based interceptor (GBI) missile sites that would intercept and destroy the target. The SBIRS Low sensors would cover a wider area than the ground-based radars used to aim any particular anti-missile weapons. They would allow such GBI missile sites to take several shots at any given hostile missile, and to do so at a safer range.[46]

Acquisition

In 1998, Phase I of the SBIRS Low acquisition was scheduled to begin during the first quarter of FY 1999 and end in the first quarter of FY 2001. The SBIRS SPO contracted for two SBIRS Low Flight Demonstration System (FDS) satellites to validate the program capabilities to detect and track ballistic missiles throughout flight, to distinguish between missile warheads and decoys, and to perform kill assessments. On 2 May 1995, SMC awarded the FDS flyer contract to TRW to design and build two FDS satellites to be launched together on a Delta II launch vehicle in FY 1999. The actual contractual mechanism was a restructuring of the Brilliant Eyes Demonstration and Validation Contract (FO4701-92-C-0062). The additional work had a value of $15.314 million. On 8 March 1996, SMC added another $214.1 million to the contract to cover the remaining provisions for fabrication, test, and operation of two FDS satellites to validate the Space and Missile Tracking System (SMTS), as SBIRS Low was sometimes called.[47]

The SBIRS SPO issued another flyer contract to make Phase I more competitive. On 2 September 1996, SMC awarded the contract (FO4701-96-C-0044) to Boeing North American to conduct this risk reduction effort as a cost-effective alternate design concept for SBIRS Low. The product of Boeing North American's efforts was known as the Low Altitude Demonstration System (LADS). Boeing planned to launch the LADS satellite

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[46] *Ibid* (FOUO, extract is not FOUO), p. 125; Internet Document (U), Federation of American Scientists (FAS), "National Missile Defense," 27 June 2000, http://www.fas.org/spp/starwars/program/nmd (Doc 7-69).

[47] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, pp. 125-127; Briefing Charts (U), SMC/MTAS, "SBIRS Industry Day (RFP Update)," 21 April 1998, p. 5 (Doc 7-79); Internet Document (U), Gunter's Space Page, "SBIRS-Low-FDS 1, 2," 16 June 2006, http://space.skyrocket.de/doc_sdat/sbirs-low-fds.htm (Doc 7-80); Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, p. 24 (Doc 7-81); Internet Document (U), DefenseLink, "[FDS Hardware and Software Modifications]," 26 February 1998, http://www.defenselink.mil/contracts/1998/c02261998_ct087-98.html (Doc 7-82); Internet Document (U), DefenseLink, "[Definitize the FDS Contract]," 7 April 1998, http://www.defenselink.mil/contracts/1998/c04071998_ct157-98.html (Doc 7-83).

on a Lockheed Martin booster, and it would also operate a ground demonstration payload.[48]

The Air Force scheduled the launch of the two FDS satellites and the LADS satellite for the third quarter of FY 1999. They were not prototype SBIRS satellites. The Air Force planned for the demonstration satellites to provide a year of on-orbit testing that would have verified the SBIRS Low concept. In October 1998, SMC announced that the launch schedule for the two FDS satellites had slipped from October 1999 until an undetermined date in 2000.[49]

Although the sensors and satellites for the FDS and LADS demonstration satellites neared completion, the Air Force terminated the two contracts at the convenience of the government on 5 February 1999. The Air Force halted the contracts due to a major change in the risk reduction strategy that shifted the emphasis from on-orbit functional demonstrations to concentrating on mitigating the risks directly related to the development of the operational system. The Air Force also wanted to avoid the likely cost and schedule impacts to the deployment of the operational SBIRS Low component that could occur if the projects continued. The contracts had schedule slips and significant cost overruns estimated to have reached $79 million, and the recovery plans were inefficient. The Air Force determined that it had gained enough information from the demonstration satellite projects, and didn't need to spend its limited funds launching the satellites. Instead of depending on information from the cancelled demonstration satellites, the SPO intended to base its decision to enter SBIRS Low into the EMD and production phases based on information obtained from ground-based testing and various on-orbit demonstrations to confirm the satellite design.[50]

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[48] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, p. 127.

[49] *Ibid* (FOUO, extract is not FOUO), p. 127; Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, pp. 9, 26 (Doc 7-81); Statement (U), Lt Gen Lester Lyles (Director BMDO) to Subcommittee on Strategic Forces Committee on Armed Services US Senate, "[DoD NMD Program]," 24 February 1999, pp. 8, 10 (Doc 7-84); Internet Document (U), Space Daily, "Integration and Test of SBIRS-Low Satellite Begins," 26 August 1998, http://www.spacedaily.com/news/sbirs-98a.html (Doc 7-85); Article (U), "SBIRS Flight Test, Contracts Delayed Again," Satellite News, 26 October 1998 (Doc 7-86); Article (U), "Raytheon, TRW Finish payload Sensors Fabrication on Air Force SBIRS Project," Satellite News, 25 January 1999 (Doc 7-87); Monthly Acquisition Report (U), SMC/MT, "SBIRS Low," January 1998 (Doc 7-88); Monthly Acquisition Report (U), SMC/MT, "SBIRS Low," July 1998 (Doc 7-89); Internet Document (U), Gunter's Space Page, "SBIRS-LADS," 14 June 2006, http://space.skyrocket.de/index_frame.htm?http://space.skyrocket.de/doc_sdat/sbirs-lads.htm (Doc 7-90).

[50] Memo draft (FOUO), SMC/MTKA to SAF/AQC, "Contract Termination, 1412 Report, Boeing North American, Inc. Contract F04701-96-C-0044," circa January 1999

In 1994, SMC planned to launch the first SBIRS Low satellite in 2006, but Congress mandated that the schedule be accelerated to 2004. On 15 September 1998, the Air Force submitted its Budget Estimate Submission (BES) for FY 2000. The Research Development Test and Evaluation (RDT&E) Budget Item Justification Sheet had a restructured SBIRS Low program with the first LEO launch delayed from FY 2004 to FY 2006. The Air Force assessed that the 2004 launch date would be too risky and impractical due to technical and scheduling problems. The Air Force also pointed out that BMDO did not plan to deploy the NMD systems until 2006, and the DSP missile warning satellites continued to last longer than expected. The Congressional Research Service stated in 2006 that funding issues were the primary reason for the schedule slip. Members of Congress complained because the Air Force delayed SBIRS Low without consulting Congress first. The House Intelligence Committee criticized both the delay in the schedule and the large cost growth that would result. Around May 1999, the House

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(Doc 7-91); Document (U), SMC/MT, "SBIRS Master Schedule," 2 December 1999 (Doc 7-92); Memo draft (FOUO), SMC/MTKA to SAF/AQC, "Contract Termination, 1412 Report, TRW, Inc. Contract F04701-92-C-0062," circa January 1999 (Doc 7-93); Memo w/1 atch (U), SMC/MT to AFPEO/SP et al., "Rules of Engagement for Interacting with Boeing North American, Inc. (BNA) Prior to the Allotment of Additional Funds, F04701-96-C-0044," 1 September 1998; Atch 1 Statement, SMC/MT to Boeing, "[Concerning Additional Funding for Contract Number F04701-96-C-0044], September 1998 (Doc 7-94); Article (U), Warren Ferster, "SBIRS Demonstration Projects Terminated," Space News, 15 February 1999, p. 1 (Doc 7-95); E-mail (U), Col Christopher Pelc, SMC/ISM, to Susan Swift, SMC/ISA, "FW: Livelink access Request for SMC History [FDS satellite contract]," 18 May 2006 (Doc 7-96); E-mail (U), Zorin Alexander, SAF/USAE, to Susan Swift, SMC/ISA, "[FDS Cancellation] RE: MOA Transferring Low to MDA," 19 May 2006 (Doc 7-97); Briefing Charts (FOUO), SMC/MT, "USD(A&T) Decision Briefing SBIRS Low Execution," 20 January 1999, pp. 1, 7, 8 (Doc 7-98); Statement (U), Lt Gen Lester Lyles (Director BMDO) to Subcommittee on Strategic Forces Committee on Armed Services US Senate, "[DoD NMD Program]," 24 February 1999, p. 9 (Doc 7-84); Article (U), James Peltz and Jeff Leeds, "Air Force Cancels Pacts With TRW and Boeing," Los Angeles Times, 6 February 1999, p. C1 (Doc 7-99); Article (U), "Air Force Asked to Reinstate Satellite Program," Los Angeles Times, 16 February 1999 (Doc 7-100); Article (U), "Flight-Test Debate Hinders SBIRS Low Design Awards," Space News, 5 July 1999, pp. 8-9 (Doc 7-101); Article (U), "Boeing Ponders Options Over Cancellation of SBIRS Low," Defense Daily, 9 February 1999 (Doc 7-102); Article (U), "Air Force Surprises Industry with SBIRS Low Award to Spectrum Astro," Inside the Air Force, 20 August 1999, p. 1 (Doc 7-103); Article (U), "Pentagon Decision on SBIRS Low Program is Delayed Until Funding Found," Inside the Air Force, 29 January 1999 (Doc 7-104); Article (U), "AF restructures Space Based Infrared System," Astro News, 12 February 1999, p. 1 (Doc 7-105); Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, p. 9 (Doc 7-81).

Intelligence Committee recommended that the management of SBIRS High and Low should be transferred from the Air Force to BMDO.[51]

The Phase I Program Definition (PD) effort proceeded at the same time as the FDS contract. The PD would provide for the initial system design that would be used to develop, manufacture, deliver, operate and sustain the LEO component of the SBIRS System-of-Systems (SoS) architecture. As a minimum, the design had to satisfy the objectives in the SBIRS Operational Requirements Document (ORD) as assigned to the Low Component in the SBIRS Requirements Allocation Document (RAD). The Air Force would conduct a source selection for the Engineering and Manufacturing Development (EMD) effort as the PD neared its completion. The successful conclusion of the PD objectives would support a Milestone II decision to enter into EMD.[52]

SMC released a Request for Proposal (RFP) (F04701-98-R-0006) on 23 July 1998 for the SBIRS Low Component PD effort. The interested contractors had to respond by 2 September 1998 with their proposals. SMC negotiated for the contract until 21 May 1999. On 16 August 1999, SMC awarded a $275 million firm fixed-price contract to the

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[51] History of SMC (FOUO, extract is not FOUO), October 1994 - September 1997, pp. 127-128; Chronology (U), SMC/MT, "SBIRS High Program," 10 February 2005, p. 13 (Doc 7-5); Budget Item Justification Sheet (U), Air Force, "Space Based Infrared Sys(SBIRS) Low," February 1999 (Doc 7-106); Article (U), "Gen Estes: Moving SBIRS to BMDO 'A Bad Idea'," Defense Daily, 19 May 1999 (Doc 7-107); Statement (U), Lt Gen Lester Lyles (Director BMDO) to Subcommittee on Strategic Forces Committee on Armed Services US Senate, "[DoD NMD Program]," 24 February 1999, p. 9 (Doc 7-84); Presentation (U), Keith Hall (Director NRO) to Subcommittee on Strategic Forces Committee on Armed Services US Senate, "Space Policy, Programs and Operations," 22 March 1999, p. 2 (Doc 7-108); Report (U), Congressional Research Service (CRS), "Issues Concerning DOD's SBIRS and STSS Programs," 30 January 2006, p. 5 (Doc 7-109); Article (U), Robert Wall, "Pentagon Delays SBIRS Launches," Aviation Week, 18 January 1999, p. 26 (Doc 7-110); Article (U), Lisa Burgess, "SBIRS Delay?," Defense News, 5-11 October 1998, p. 4 (Doc 7-111).

[52] Briefing Charts (U), SMC/MTAS, "SBIRS Industry Day (RFP Update)," 21 April 1998, p. 5 (Doc 7-79); Request for Proposal (RFP) (U), SMC/MT, "RFP F04701-98-R-0006 SBIRS Low Component - Program Definition (PD) Effort," 23 July 1998, p. 21 (Doc 7-29); Internet Document (U), Federation of American Scientists (FAS), "Space Based Infrared System – Low Space and Missile Tracking System Brilliant Eyes," 31 August 1999, p. 3 http://www.fas.org/spp/military/program/warning/smts.htm (Doc 7-112); Statement of Objectives (SOO) (U), SMC/MT, "RFP F04701-98-R-0006 SBIRS Low Component," 1998 (Doc 7-113); Briefing Charts (U), SMC/MT, "SBIRS Low RFP and Source Selection Overview," 14 July 1998, p. 4 (Doc 7-114); News Release (U), SMC/MT, "Space Based Infrared System Contract Award," 18 August 1999 (Doc 7-115); Briefing Charts (U), SMC/MT, "SBIRS Low DAB Status Industry Day #5," 13 July 1998 (Doc 7-116).

TRW Space and Electronics Group (F04701-99-C-0047), and a $275 million firm fixed-price contract to the to Spectrum Astro Incorporated (F04701-99-C-0048) to conduct what the Air Force now called the Program Definition and Risk Reduction (PDRR) effort for SBIRS Low. The 38-month contract had an expected completion date in October 2002.[53]

Illustration 7-6: SBIRS Low Design by Spectrum Astro/Northrop Grumman

The TRW Space and Electronics Group and Spectrum Astro Incorporated added different aerospace companies to their SBIRS Low PDRR efforts. Spectrum Astro teamed with Northrop Grumman. Spectrum Astro (prime contractor) led the team's design effort and had the responsibility for the spacecraft and the overall system architecture. Northrop Grumman led the Mission IPT that had the responsibility for the overall mission sensor design, related ground system data processing and ground segment integration. The Spectrum Astro/Northrop Grumman team also included Boeing, Lockheed Martin, Litton TASC, Logican, Analex Corporation, ITT Industries, and the

[53] Monthly Activity Report (U), SMC/MT, "SBIRS Low," July 1998 (Doc 7-117); Request for Proposal (RFP) (U), SMC/MT, "RFP F04701-98-R-0006 SBIRS Low Component - Program Definition (PD) Effort," 23 July 1998, p. 21 (Doc 7-29); Internet Document (U), DefenseLink, "[SBIRS Low Component PD Contracts]," 17 August 1999, http://www.defenselink.mil/contracts/1999/c08171999_ct385-99.html (Doc 7-118); Article (U), "TRW/Raytheon Give Space Spy Definition," Space Daily, 18 August 1999, http://www.spacedaily.com/news/sbirs-99a.html (Doc 7-119); Article (U), "Top DoD Officials Visit Air Force Facility to Assess SBIRS Low Strategy," Inside the Air Force, 9 July 1999 (Doc 7-120); Article (U), "Air Force Surprises Industry with SBIRS Low Award to Spectrum Astro," Inside the Air Force, 20 August 1999, p. 1 (Doc 7-103); Article (U), "Despite Contract Awards, Open Competition for SBIRS Low EMD Planned," Inside the Air Force, 27 August 1999 (Doc 7-121); Monthly Activity Report (U), SMC/MT, "SBIRS Low," May 1998 (Doc 7-122).

Space Dynamics Laboratory of Utah State University. During the week of 23 April 2001, Spectrum Astro/Northrop Grumman completed its SBIRS Low System Design Review (SDR). The next milestone would be the Preliminary Design Review (PDR) scheduled for early 2002.[54]

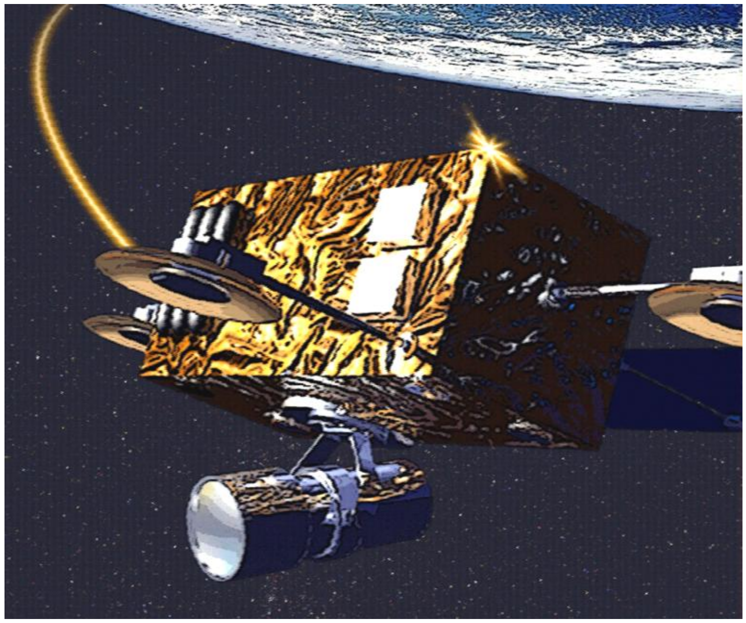

Illustration 7-7: SBIRS Low Design by TRW/Raytheon

TRW teamed with Raytheon for the SBIRS Low PDRR effort. The TRW/Raytheon team also included Aerojet, Motorola, Agilent, Honeywell, Ball Aerospace & Technologies, Sparta and PRA. By early April 2001, TRW/Raytheon completed its SDR for SBIRS Low.[55]

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[54] Internet Document (U), "Lockheed Martin and Boeing Join Spectrum Astro Northrop Grumman SBIRS Low Team," Space Daily, 19 March 2001, http://www.spacedaily.com/news/sbirs-01a.html (Doc 7-123); Internet Document (U), "TRW/Raytheon SBIRS Low Team Completes Initial System Design," Space Daily, 9 April 2001, http://www.spacedaily.com/news/sbirs-01b.html (Doc 7-124); Internet Document (U), "Spectrom Astro/Northrop Grumman Complete SBIRS Low Review," Space Daily, 7 May 2001, http://www.spacedaily.com/news/sbirs-01c.html (Doc 7-125); Internet Document (U), "Air Force Needs to 'Freeze' SBIRS Low Requirements," Inside the Air Force, 16 June 2000 (Doc 7-126).

[55] Internet Document (U), "Aerojet To Help Manage New Early Warning System Development," Space Daily, 22 November 1999, http://www.spacedaily.com/news/sbirs-99b.html (Doc 7-127); Internet Document (U), "TRW/Raytheon Puts the Scope SBIRS Program," Space Daily, 18 May 2000, http://www.spacedaily.com/news/sbirs-00a.html (Doc 7-128); Internet Document (U), "TRW/Raytheon SBIRS Low Team Completes Initial System Design," Space Daily, 9 April 2001, http://www.spacedaily.com/news/sbirs-01b.html (Doc 7-124).

SMC intended Phase II of the SBIRS Low acquisition (the EMD) to begin after the completion of the PDRR effort. SMC planned to award the EMD contract through a rolling downselect procedure. The EMD effort would have a single contractor to develop, deploy, and sustain the military operations of the SBIRS Low system. SMC planned the acquisition of this architecture to proceed in four increments as written in the 1 October 1996 SBIRS Single Acquisition and Management Plan (SAMP). Increment 1 would consolidate the DSP Attack Launch Early Report to Theater (ALERT) and the Joint Tactical Ground Station (JTAGS) ground stations. Increment 2 would be the deployment of the SBIRS High Block I. Increment 3 would add the SBIRS Low capabilities to the SoS architecture. Increment 4 would update the SBIRS High/Low system as needed to provide the best value to the government. The SBIRS Low program would be restructured in 2002.[56]

SecDef Cohen stated in August 1999 that the Pentagon planned to use the first six SBIRS Low satellites to obtain early on-orbit experience and to evaluate the performance of the system. The Pentagon intended to evaluate the performance of the first six satellites for a year while it concurrently purchased parts and manufactured the satellites that followed. The remainder of the LEO satellites would then begin launching after the one-year evaluation. SecDef Cohen stated that this approach would provide more complete and meaningful on-orbit data than the cancelled FDS and LADS demonstration satellites would have, and it would field the operational system at the earliest possible date. Cohen stated that this approach included concurrency between the on-orbit testing and satellite production, but he balanced the risk against the opportunity to deploy the system in a timely manner.[57]

In February 2001, the US General Accounting Office (GAO) issued a report (GAO-01-6) that evaluated the plans and progress of the SBIRS Low program. The GAO conducted its research between May 1999 and December 2000. The report concluded that the SBIRS Low acquisition schedule had a high risk of not delivering the system on time, at cost, or with the expected performance. The GAO had concerns about

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[56] Briefing Charts (U), SMC/MTAS, "SBIRS Industry Day (RFP Update)," 21 April 1998, p. 5 (Doc 7-79); Request for Proposal (RFP) (U), SMC/MT, "RFP F04701-98-R-0006 SBIRS Low Component - Program Definition (PD) Effort," 23 July 1998, pp. 20-21 (Doc 7-29); Internet Document (U), Federation of American Scientists (FAS), "Space Based Infrared System – Low Space and Missile Tracking System Brilliant Eyes," 31 August 1999, p. 3 http://www.fas.org/spp/military/program/warning/smts.htm (Doc 7-112); Briefing Charts (U), SMC/MT, "Space Based Infrared Systems," 27 June 2002, p. 10 (Doc 7-129).

[57] Article (U), Gigi Whitley, "After Months of Debate, Pentagon Tells Congress of New SBIRS Plans," Inside the Air Force, 13 August 1999 (Doc 7-61).

the lack of on-orbit testing of SBIRS Low satellites prior to production, the delays in the SBIRS Low system software, and the technical risks of the program.[58]

The SBIRS SPO disagreed with the conclusions of the GAO, and wrote that the GAO had reviewed an outdated acquisition strategy that had been revised and no longer existed. The SPO asserted that the Air Force had completely restructured the SBIRS Low acquisition strategy to considerably reduce concurrency and significantly reduce the risk of meeting the 2006 first launch. The revised strategy intended to reduce concurrency by increasing the on-orbit evaluation period to two years and spacing out the launches. The Air Force received approval for the revised strategy at a 14 December 2000 Defense Acquisition Review.[59]

The GAO had apprehension about the cancellation of the FDS and LADS demonstration satellites that would have provided a year of data and on-orbit testing of the satellite's functions and capabilities. These test results traditionally finalized the design of new satellites prior to production, but the on-orbit tests for SBIRS Low were not scheduled for completion until 2008, over five years after production of the satellites was planned to begin. If the Air Force identified design changes as a result of the 2008 testing, these changes would have to be integrated into satellites already under production. Parts that had already been purchased based on the initial design could be obsolete and need to be replaced with new parts, increasing program costs and causing schedule delays.[60]

The SPO stated that the GAO analyzed an outdated approach that had already been revised concerning the plan to finalize the SBIRS Low satellite design. The SPO planned to complete the satellite design earlier in the development program by conducting comprehensive, more cost-effective ground-based testing. The SPO planned for a two-year on-orbit test period as the integrated risk management plan. This approach began with the PDRR program to identify, develop, and implement risk management plans for various areas of the program. The SPO implemented a Ground Demonstration Program (GDP) during the PDRR as a risk reduction effort and to mature the satellite design. During the EMD phase of the program, the GDP would continue its central focus

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[58] Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, pp. 4-5, 21 (Doc 7-81).

[59] Memo (U), SMC/MT to PEO/SP et al., "SBIRS Program Office Response to GAO Report," 1 March 2001 (Doc 7-130); Briefing Charts (U), SMC/MT, "SBIRS Low Overarching IPT," 6 December 2000, pp. 17-19, 21, 23 (Doc 7-131); Article (U), Jeremy Singer, "Air Force Official Slams GAO Report about SBIRS Low," Space News, 12 March 2001, pp. 3, 20 (Doc 7-132).

[60] Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, pp. 3-4 (Doc 7-81).

on validating the performance of the various SBIRS Low components on the ground. The on-orbit test period would prove the on-orbit performance of the capabilities that could not be verified during the GDP. The results of the on-orbit tests would be used mainly to refine software algorithms used on board the spacecraft and the ground stations. The SPO concluded that the GAO assertion that the on-orbit testing would finalize the design had been incorrect, because the satellite design would be finalized and most of the testing accomplished long before the first launch.[61]

The GAO stated that in December 1999 the SPO concluded it could not complete the software needed to perform all the SBIRS Low missions a year before the scheduled first launch of the LEO satellites. The delay in the software schedule occurred due to an underestimation of the level and complexity of the effort. To maintain the FY 2006 first launch schedule, the SPO planned to use an evolutionary approach to develop the software in increments. The software needed to support the SBIRS Low missions was scheduled for completion in March 2010, more than three years after the planned first launch. The GAO had concerns that the schedule increased the risk that the software might not be available when needed or perform as required. The GAO wrote that the Air Force traditionally completed the software required to support a new satellite system a year before the first launch in order to reduce the risk by ensuring that the system's problems had been resolved, and the operators of the systems had been adequately trained. This had been the original schedule and plan for the SBIRS Low program. The evolutionary approach would develop the software to support the satellite launches, early on-orbit testing, ballistic missile defense, and the integration with SBIRS High, followed by the software required to support ancillary missions, such as technical intelligence, space surveillance, and battlespace characterization. [62]

The GAO report summarized the SPO schedule for the SBIRS Low software increments. The first two increments of software should be completed for the on-orbit test period for the first six SBIRS Low satellites in FY 2007. The two increments of software would provide all of the capabilities the ground control system and the satellites would need to conduct the on-orbit testing. The third increment, the ground control and space related software needed to operate the satellite constellation in support of ballistic missile defense, was scheduled for completion in FY 2008. The fourth software increment, scheduled for completion in mid-FY 2009, would integrate SBIRS Low with SBIRS High. The fifth increment, scheduled for completion in mid-FY 2010, would add

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[61] Memo (U), SMC/MT to PEO/SP et al., "SBIRS Program Office Response to GAO Report," 1 March 2001 (Doc 7-130); Briefing Charts (U), SMC/MT, "SBIRS Low Overarching IPT," 6 December 2000, pp. 26-27 (Doc 7-131); Article (U), Jeremy Singer, "Air Force Official Slams GAO Report about SBIRS Low," Space News, 12 March 2001, pp. 3, 20 (Doc 7-132).

[62] Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, pp. 3-4, 12 (Doc 7-81); Article (U), Richard Newman, "Space Watch, High and Low," Air Force Magazine, July 2001, pp. 35-38 (Doc 7-21).

the software needed for SBIRS Low to conduct the ancillary missions. In 2001, the government estimated that the software required to support SBIRS Low had grown from 900,000 lines of code to over three million.[63]

The SPO disputed the GAO report's concerns about the software schedule. The SPO stated that the evolutionary software approach reduced the risk that the software would be available when needed and would perform as required. It also contradicted the GAO by stating the evolutionary development plan had been the industry standard and consistent with DoD Directive 5000.1 and DoD Instruction 5000.2 that endorsed the evolutionary acquisition strategies as the preferred approach to satisfy operational requirements. The SPO stressed that each software deployment would be enough to fully support the existing missions and hardware until the deployment of the next software increment. The software would be ready for testing one year prior to delivery and deployment. The evolutionary approach deployed the software as required to keep pace with the deployed system, so that the system capability grew steadily with hardware and software. The evolutionary software deployment plan reduced the software development schedule by matching the software development schedule with the satellite deployment schedule. The Air Force presented this approach to the Under Secretary of Defense for Acquisition and Technology [USD (AT&L)] in spring 2000 who endorsed the approach. On 14 December 2000, the DoD also responded to the GAO report and stated that the evolutionary approach reduced the schedule risk because having the software completed by the first launch would not be achievable.[64]

The GAO stated that the SBIRS Low program had high technical risks. SBIRS Low required six critical technologies to be in place for the system to function correctly. In the GAO report, the SPO rated five of the six most critical satellite technologies as immature for the current stage of the program, and at high risk levels for availability when needed or to perform as required. The technology readiness level should have been at readiness level six for each of the technologies when SBIRS Low began its PDRR phase in 1999. The SPO provided the following technology readiness level ratings: the scanning infrared sensor that would acquire ballistic missiles in the early stages of flight (readiness level four); the tracking infrared sensor that would track missiles, warheads,

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[63] Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, pp. 13-14 (Doc 7-81); Report (U), Congress, "(107-298) Department of Defense Appropriations Bill, 2002 and Supplemental Appropriations, 2002," 19 November 2001, p. 250 http://thomas.loc.gov/cgi-bin/cpquery/T?&report=hr298&dbname=107& (Doc 7-133).

[64] Memo (U), SMC/MT to PEO/SP et al., "SBIRS Program Office Response to GAO Report," 1 March 2001, (Doc 7-130); Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, p. 32 (Doc 7-81); Article (U), Jeremy Singer, "Air Force Official Slams GAO Report about SBIRS Low," Space News, 12 March 2001, pp. 3, 20 (Doc 7-132).

and other objects such as decoys during the middle and later stages of flight (readiness level four); the fore optics cryocooler (readiness level four) and the tracking infrared sensor cryocooler (readiness level four) that would be required to cool the tracking sensor optics and other sensor components to allow the sensor to detect missile objects in space; the satellite communications crosslinks that would enable the satellites to communicate with each other (readiness level five); and the on-board computer processors needed to perform the complex satellite operations for providing missile warning and location information in brief timeframes (readiness level six).[65]

The SBIRS SPO stated the GAO's claims about high technical risks were misleading. The SPO had confidence that the PDRR program would mitigate the technology risk. The PDRR planned for more time (38 months) than comparable acquisition programs and its risk reduction effort was well funded and competitive. The Air Force and the PDRR contractors provided funding to reduce the technical risk of SBIRS Low. In 2001, the Air Force planned to spend over $200 million on the development of SBIRS Low and accelerate the technology. The SPO reported that substantial progress had been accomplished on the six critical technologies by March of 2001, and predicted that the technologies would be ready when needed (the start of the EMD program).[66]

Ballistic Missile Defense Organization

The program management of SBIRS Low transferred from the Air Force to the BMDO on 1 October 2001. Congressional direction stated that ballistic missile defense would be the primary mission of SBIRS Low. In a 17 April 2000 memo, Air Force Secretary F. Whitten Peters and Chief of Staff Gen Michael Ryan stated that to meet the Congressional and SecDef direction, SBIRS Low should be more closely integrated into the BMDO architecture and program. They recommended that the best way to achieve this would be to transfer the SBIRS Low program and funding responsibility from the Air Force to the BMDO. They endorsed the transfer of SBIRS Low because the system had closer links to the BMDO mission. The FY 2001 Defense Authorization Act directed the transfer of the SBIRS Low program management from the Air Force to the BMDO no later than 1 October 2001. The SPO would continue working the details to fully integrate with the NMD system both administratively and technically. The integration effort

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[65] Report (U), General Accounting Office (GAO), "Space-Based Infrared System-Low at Risk of Missing Initial Deployment Date," February 2001, pp. 4, 15-17 (Doc 7-81); Fact Sheet (U), Northrop Grumman Corporation, "SBIRS Low," 2001 (Doc 7-134); Report (U), Congressional Research Service (CRS), "Issues Concerning DOD's SBIRS and STSS Programs," 30 January 2006, p. 6 (Doc 7-109); Article (U), Richard Newman, "Space Watch, High and Low," Air Force Magazine, July 2001, pp. 35-38 (Doc 7-21).

[66] Memo (U), SMC/MT to PEO/SP et al., "SBIRS Program Office Response to GAO Report," 1 March 2001 (Doc 7-130); Article (U), Jeremy Singer, "Air Force Official Slams GAO Report about SBIRS Low," Space News, 12 March 2001, pp. 3, 20 (Doc 7-132).

would include defining the roles and relationships between the BMDO space programs and the Under Secretary of the Air Force for Space.[67]

[67]Article (U), "Ryan, Peters Support SBIRS Low Transfer to BMDO in Memo to de Leon," Inside Defense, 28 April 2000 (Doc 7-135); Briefing Charts (U), AF/XOR, "Space Based Infrared System (SBIRS)," 14 September 2001, p. 16 (Doc 7-136); SMC Highlights October 2001 (U), SMC/MT, "SBIRS Low PEO Transfer to BMDO," p. 6 (Doc 7-137); E-mail w/1 atch (U), Capt Heather McGee, SMC/XPC, to Harry Waldron, SMC/HO, "RE: Gen Lyles visit: 1-2 Jun 00," 8 June 2000; Atch Issue Paper, SMC/MTPP, "The SBIRS compliance with Congressional direction," 19 May 2000 (Doc 7-63); Press Release (U), "Senate and House Complete Conference on national Defense Authorization Bill for Fiscal Year 2001," 6 October 2000, p. 18 (Doc 7-138).

CHAPTER 8
MILITARY SATELLITE COMMUNICATIONS

The Air Force's Space and Missile Systems Center (SMC) and its organizational predecessors developed many varieties of communications satellites for the Department of Defense (DoD) (for example, the Defense Satellite Communications System [DSCS] and the Milstar system), for more specialized applications by U.S. military services (the Fleet Satellite Communications System and the Air Force Satellite Communications System), by allies (the NATO II and NATO III systems), and by British military forces (Skynet). The spacecraft used by all of these systems occupied or would occupy equatorial orbits at geosynchronous altitude (23,230 nautical miles), and therefore they were launched from Cape Canaveral Air Station (redesignated to Cape Canaveral Air Force Station in December 1999), Florida. The SMC Military Satellite Communications (MILSATCOM) Joint Program Office (MJPO) (office symbol SMC/MC) developed, acquired, and sustained the military satellite communications systems. The MJPO was the largest space program office in the DoD with operating locations in Los Angeles (HQ), Washington, D.C., Hanscom AFB, Massachusetts, and Colorado.[1]

The MJPO had several operating and developing space communications systems between 1998 and 2001. DSCS was the oldest system, but it remained the backbone of MILSATCOM. It provided voice, data, and imagery transmissions at super-high frequencies (SHF) between high-capacity fixed users such as major military terminals and National Command Authorities. Milstar was a newer, more versatile, more capable space-based system that achieved initial operational capability in 1996. It provided secure, highly survivable, tactical, and strategic communications at extremely high frequencies (EHF) with low and medium data rates. The Global Broadcasting Service (GBS) provided rapid, one-way transmissions of data such as weather, intelligence, and imagery from higher echelons to large groups of dispersed users with small, mobile receivers. The Wideband Gapfiller Satellite (WGS), still under development during this period, should augment DSCS and GBS with advanced wideband military communications beginning in 2004 (according to the planned 2001 schedule). The Advanced Extremely High Frequency (AEHF) satellite, still under development during this period, would initially augment and eventually replace the Milstar constellation with worldwide, secure, survivable communications to strategic and tactical forces beginning in 2006. The MJPO Program Directors from FY 1998 to FY 2001 included Brig Gen

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[1] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 129; Briefing Charts, SMC/MC, "MILSATCOM JPO [Overview]," 26 July 2001, p. 18 (Doc 8-1); Fact Sheet, SMC/MC, "MILSATCOM Joint Program," Printed 15 November 2002, http://www. losangeles.af.mil/SMC/MC/index.htm (Doc 8-2).

Joseph Sovey (April 1996 to November 1998), Brig Gen Craig Cooning (December 1998 to January 2001), and Christine M. Anderson (January 2001-).[2]

Defense Satellite Communications System (DSCS)

DSCS satellites were developed to serve users who transmitted message traffic at medium to high data rates using relatively large ground terminals. DSCS III satellites provided global, nuclear-hardened, anti-jam, communications at high data rates. In wartime they linked high defense officials, battlefield commanders, and deployed units, using fixed, transportable, and mobile terminals. Its users operated on the ground, in the air, and at sea. DSCS provided worldwide, secure, uninterrupted telephone, facsimile, video, e-mail and Internet communications. DSCS users included the U.S. military forces, the National Command Authorities, the White House Communications Agency, NATO, the United Kingdom, and the Diplomatic Telecommunications Service. It also linked space-based platforms (such as early warning satellites) with their users. The system as a whole consisted of a control segment, earth terminals, and five on-orbit primary satellites and five residual satellites. The Air Force often described DSCS III as the backbone of military satellite communications.[3]

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[2] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 130; Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office (SMC Det 11/MCL), "MILSATCOM," 20 February 2002, p. 3 (Doc 8-3); Fact Sheet, Federation of American Scientists (FAS), "Wideband Gapfiller System," 13 April 2000, http://www.fas.org/spp/military/program/com/wgs.htm (Doc 8-4); Fact Sheet, SMC/MC, "Advanced EHF," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/ mcx.html (Doc 8-5); No author, "Funding Uncertainty over New SAF Satellite," Aviation Week & Space Technology, 19 June 2000, p. 31 (Doc 8-6); No Author, "MILSATCOM gets new director [Christine Anderson]," Astro News, 26 January 2001, p. 3 (Doc 8-6-1); Biography, Air Force, Christine M. Anderson, SMC/MC Program Director, October 2002, http://www.af.mil/biographies/anderson_cm.html (Doc 8-6-2); Biography, Air Force, Maj Gen Craig Cooning, SMC/MC Program Director, September 2002, http://www.af.mil/biographies/cooning_cr.html (Doc 8-6-3); Biography, Air Force, Maj Gen Joseph Sovey, SMC/MC Program Director, February 2003, http://www.af.mil/bios/bio_7209.shtml (Doc 8-6-4).

[3] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 130-132; Capt Colleen Lehne, "DSCS vaults hurdle, satellite sent to orbit," Astro News, 3 November 2000, pp. 1-2 (Doc 8-7); Product Support Management Plan (PSMP), SMC/MC, "Defense Satellite Communications System," 24 January 2002, (Doc 8-8); Fact Sheet, SMC/PA, "Defense Satellite Communications System Phase III," February 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/dscs_fs.html (Doc 8-9); Interview, Lt Col Orlando Darang, SMC/MCD, with SMC/PA, 23 January 2003, (Doc 8-10).

The initial series of the satellite (DSCS I) was developed under the Initial Defense Communications Satellite Program (IDCSP) that had been launched in the 1960s. The second series (DSCS II) had its introduction in the 1970s. The Air Force successfully launched the first DSCS III satellite in October 1982, and achieved a full constellation of five primary DSCS III satellites in July 1993. The Air Force produced two series of DSCS III satellites prior to 1998. The A-series was the first generation of DSCS III satellites, and the B-series was a newer improved DSCS III, although the future A3 satellite will be upgraded to the B-series level. In September 1998, the DSCS III B5 satellite was moved into the West Pacific Reserve and replaced the last operational DSCS II satellite (E15) in the constellation; E15 was then moved out of orbit.[4]

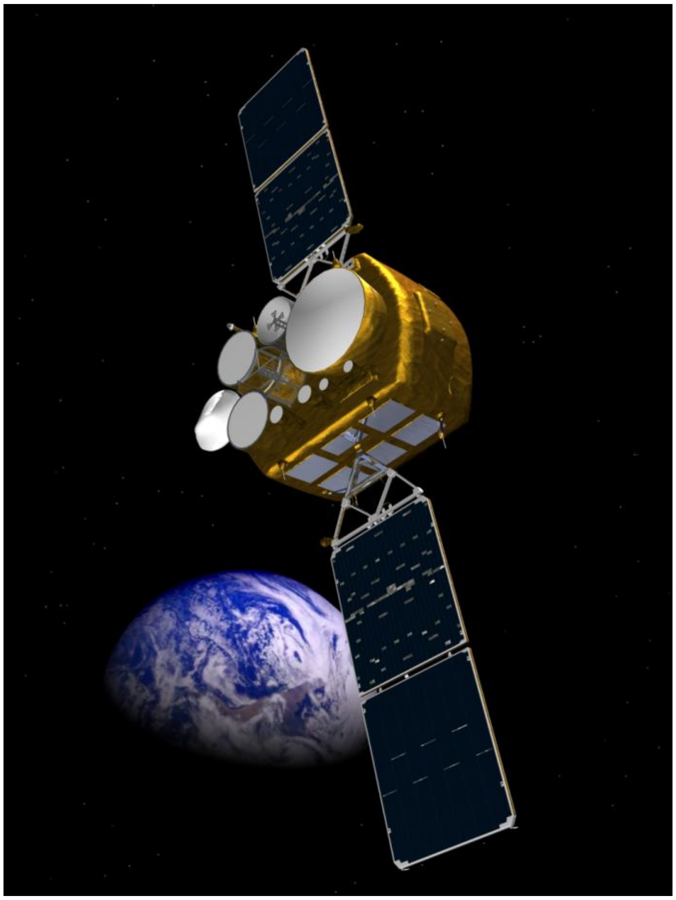

Illustration 8-1:
DSCS III Satellite in Orbit (artist's concept)

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[4] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 132; E-mail, Dorothy Mehta, SMC/MCZ, to Robert Mulcahy, SMC/HO, "RE: DSCS II and FLTSATCOM," 27 November 2002, (Doc 8-11); Internet Document, Federation of American Scientists (FAS), "DSCS-3," 4 April 1998, p. 3 http://www.fas.org/spp/military/program/com/dscs_3.htm (Doc 8-12).

General Electric Corporation initially produced the DSCS III satellites until it became part of Lockheed Martin prior to 1998. The spacecraft weighed 2,580 pounds. The cube-shaped satellite body measured 6 feet 10 inches long, by 38 feet 2 inches wide (with solar panels extended), by 6 feet 5 inches deep. The satellites were stabilized in orbit on three axis, permitting their power subsystems to use deployable solar arrays to supply electrical power. Their telemetry, tracking, and command subsystems operated in both the S-band used by the Air Force Satellite Control Network and in the X-band used by the Defense Information Systems Agency (DISA). This allowed both DISA and the Air Force Satellite Control Network (AFSCN) to monitor, track, and command the satellites through their respective ground stations. Their communications subsystems provided six communication channels, and their antenna subsystems used multiple beam antennas as well as horn and dish antennas. DSCS III had three receive and five transmit antennas that provided selectable options for Earth, area, or spot beam coverage.[5]

DSCS III satellites—as well as some other military satellite systems—also carried single channel transponders (SCTs) belonging to the Air Force Satellite Communications System (AFSATCOM). Like other elements of the AFSATCOM system, these SCTs were used to command and control nuclear-capable U.S. forces around the world, using 22 UHF 5-kHz channels. Each SCT had its own UHF transmitting and receiving antennas that could be connected to the spacecraft's X-band antenna for Earth coverage or to its multiple-beam receiving antennas. The X-band had anti-jam protection. After receiving an uplink, the SCT demodulated the signal, remodulated it for retransmission, and stored it for repeated retransmission if necessary.[6]

The U.S. Strategic Command had the overall responsibility of the DSCS system. The MJPO at SMC developed, acquired, and sustained the DSCS constellation. Lt Col Terry Peterson replaced Lt Col Norm Albert as the DSCS Program Manager at SMC in July 1998; Lt Col Orlando Darang became the DSCS Program Manager in July 2001. The operational control of the constellation was exercised through the Defense Information System Agency (DISA). Within DISA, the DSCS Operations Control System (DOCS) had the responsibility for DSCS control. The DOCS consisted of the DISA Operations Center at Arlington, Virginia, the two Regional Control Centers (RCC) at Wheeler AFB, Hawaii and at Vaihingen, Germany, and the DSCS Operations Centers (DSCSOCs) for the satellite regions: Eastern Atlantic (DSCSOC at Fort Meade, Maryland), Western Atlantic (at Fort Detrick, Maryland), Eastern Pacific (at Fort Detrick), Western Pacific (at Camp Roberts, California) and the Indian Ocean (at Landstuhl, Germany). The RCCs had the responsibility for the daily operation and

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[5] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 134-135; Fact Sheet, Lockheed Martin, "DSCS III," circa 1998, (Doc 8-13); Fact Sheet, Lockheed Martin, "Defense Satellite Communications System," 2002, http://lmms.external.lmco/telnav/dscs.html (Doc 8-14); Interview, Lt Col Orlando Darang, SMC/MCD, with SMC/PA, 23 January 2003, (Doc 8-10).

[6] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 135.

control of the DSCS constellation. The Air Force Space Command's 50th Space Wing at Schriever AFB provided the bus command and control for the DSCS satellites.[7]

In 1994, the program office began an initiative first called the "Service Life Extension Program" (SLEP) to extend the mean mission duration (essentially, the predictable useful lifetime on orbit) of the last four DSCS III satellites. The acquisition plan for SLEP production received approval in 1995, and SMC released a request for proposal on 15 August 1995. SMC added implementation studies for SLEP to the contract (F04701-84-C-0072) with Martin Marietta Astro Space Company for DSCS III.[8]

However, on 11 January 1996, DoD's Space Architect, Major General Robert S. Dickman, recommended that the SLEP Program be reoriented toward improving the tactical utility of the DSCS Program rather than extending the lifetime of the satellites. The SMC program office renamed the program the "Service Life **Enhancement** Program" (SLEP) and proceeded to modify the SLEP studies and the subsequent acquisition in the following ways.

-- It terminated the portion of the existing study that dealt with adding 40-watt solid-state amplifiers for communication Channels 1 and 2.

--Instead, the upgraded satellites would have 50-watt, commercial off-the-shelf traveling wave tube amplifiers in all six DSCS channels that provided users with a 200 percent increase in tactical communications capability.

--The spacecraft's inboard north and south solar panels would be replaced with upgraded solar cells to provide over 1700 watts of solar array power.

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[7] Product Support Management Plan (PSMP), SMC/MC, "Defense Satellite Communications System," 24 January 2002, (Doc 8-8); Fact Sheet, Schriever AFB, "50th Space Wing," June 2003, (Doc 8-15); Fact Sheet, SMC/PA, "Defense Satellite Communications System Phase III," February 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/ dscs_fs.html (Doc 8-9); E-mail, Andre Moser, SMC/MCD, to Robert Mulcahy, SMC/HO, "RE: DSCS Operations," 24 January 2003, (Doc 8-16); Briefing Charts, SMC/MC, "Typical DSCS Control Segment," 2002, (Doc 8-17); E-mail, Lt Col Orlando Darang, SMC/MCD, to Robert Mulcahy, SMC/HO, "RE: DSCS Program Manager," 23 June 2003, (Doc 8-17-1); E-mail, Lt Col Terry Peterson, AF/XPPL, to Robert Mulcahy, SMC/HO, "RE: DSCS Program Manager," 24 June 2003, (Doc 8-17-2); Biography, Air Force, Lt Col Orlando Darang, DSCS Program Manager, 2003, (Doc 8-17-3).

[8] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 139; Internet Document, Federation of American Scientists (FAS), "DSCS-3," 4 April 1998, p. 3 http://www.fas.org/spp/military/program/com/dscs_3.htm (Doc 8-12).

--Improvements planned for the spacecraft's thrusters under the Extension Program would not be carried out under the Enhancement Program.

--Improvements in the Low Noise Amplifier and the increased bandwidth planned for the Extension Program would be retained under the Enhancement Program.

--A variable-gain step attenuator would be added to allow finer tuning of channel gain in 2 dB steps rather than the current 6 dB steps, thereby allowing more tactical users per channel.

--A routing switch modification would allow Channel 5 to be routed to either the gimbaled dish antenna or the multi-beam antenna to allow more operational flexibility and support for tactical applications.[9]

On 28 March 1996, SMC awarded a cost plus incentive fee development contract (F04701-96-C-0023) valued at $36.062 million to the Lockheed Martin Corporation to carry out the SLEP modifications on the first of the remaining satellites—satellite B8. It successfully passed a preliminary design review in September 1996 and a critical design review in March 1997. On 15 October 1997, SMC added satellites B11, B6, and A3 to the SLEP modifications contract for an additional face value of $62.447 million. The A3 satellite in particular would be upgraded to the level of the DSCS III B series satellites. The SLEP began the process of transitioning the DSCS constellation from a combination of strategic and tactical users to a wideband system that focused on the tactical users. It took almost four years to complete the SLEP upgrade prior to the B8 launch. The DSCS III spacecraft weighed 2,580 pounds and its solar arrays generated an average power of 1269 watts before the upgrade, but these increased to 2716 pounds and 1500 watts after the SLEP had been installed. By mid 2000, the modified DSCS III SLEP spacecraft increased the communications capability to the tactical warfighter by about 200 percent.[10]

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[9] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 140; Fact Sheet, SMC/PA, "Defense Satellite Communications System Phase III," February 2000, http://www.losangeles.af.mil/SMC/ PA/Fact_Sheets/dscs_fs.html (Doc 8-9); Fact Sheet, SMC/MC, "DSCS SLEP," Printed 15 November 2002, http://milsatcom.tripod.com/dscs/dscsslep.htm (Doc 8-18); Mission Overview, "Atlas IIA AC-140 DSCS III," circa 2000, http://www.ilslaunch.com/launches/cbin/Mission_atlas/ac_140_mo.pdf (Doc 8-19); News Release, SMC/PA, "Air Force Communications Satellite Declared Healthy," 27 January 2000, http://www.laafb.af.mil/SMC/PA/Releases/2000/00-4DSCS.htm (Doc 8-20); Briefing Charts, SMC/MC, "Defense Satellite Communications System," 2001, p. 8 (Doc 8-21); E-mail (FOUO, extract is not FOUO), Andre Moser, SMC/MCD, to Robert Mulcahy, SMC/HO, "Back to you [review of the history of DSCS 1998-2001]," 5 February 2003, (Doc 8-22).

[10] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 141; Internet Document, DefenseLink, "Contracts," 16 October 1997, http://www.defenselink.mil/news/Oct1997/c10171997_ct547-97.html (Doc 8-23); Internet Document, Federation of American Scientists (FAS), "[DSCS] Mission Description and Budget Item

Between FY 1998 and FY 2001, the Air Force conducted three DSCS III launches. On 24 October 1997, Cape Canaveral Air Station (AS) successfully launched the $160 million DSCS III B13 satellite into orbit with an Atlas IIA/Centaur rocket. This launch increased the DSCS III constellation to 10 active satellites; five primary satellites and five residual satellites. The B13 satellite replaced the B9 in February 1998 as the primary DSCS III satellite to cover the Western Pacific region of the constellation. The 5 SOPS from Onizuka AS led the early orbit team for the first six days after the launch while boosting the DSCS satellite into a geosynchronous orbit. This would be the last launch test and early orbit operations of a DSCS flight conducted at Sunnyvale before the realignment of Onizuka AS due to the Base Realignment and Closure Commission (BRAC).[11]

On 20 January 2000, the Air Force successfully launched the $200 million DSCS III B8 satellite with an Atlas IIA/Centaur rocket. In August 1999, the B8 satellite had to be shipped from Cape Canaveral AS back to Sunnyvale to repair splice defects that delayed the original July 1999 launch date. B8 was the eleventh DSCS III satellite launched, and it began the process of replacing the oldest DSCS III satellites in constellation. B8 would also be the first of four DSCS III satellites that had the SLEP upgrade. The 3SOPS at Schriever AFB provided the satellite bus command and control of the B8 launch from the new Space Command Launch and Early Orbit Control facility in Colorado after transitioning the mission from Onizuka AS. The entire hardware and software capability of the system was rebuilt at Schriever AFB. B8 replaced the

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Justification," 1998, http://www.fas.org/spp/military/budget/peds_98f/ 0303110f.htm (Doc 8-24); News Release, Aerospace Corporation, "Enhanced DSCS First Satellite Launched in 2000," 6 February 2000, http://www.aero.org/news/current/atlas-launch.html (Doc 8-25); Fact Sheet, SMC/PA, "Defense Satellite Communications System Phase III," February 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/dscs_fs.html (Doc 8-9); Briefing Charts, SMC/MC, "MILSATCOM JPO Program Overview," September 2000, p. 11 (Doc 8-26); E-mail, Andre Moser, SMC/MCD, to Robert Mulcahy, SMC/HO, "RE: Increased Communications," 7 February 2003, (Doc 8-27).

[11] Chet DelSignore, "Atlas IIA/DSCS successfully launches after one-hour delay," Astro News, 14 November 1997, pp. 1 and 6 (Doc 8-28); Internet Document, Space Online, "Lockheed Martin Launches Newest Defense Satellite Communication System III Spacecraft," 25 October 1997, http://www.floridatoday.com/space/explore/stories/1997b/102597e.htm (Doc 8-29); Internet Document, Federation of American Scientists (FAS), "DSCS-3," 4 April 1998, http://www.fas.org/spp/military/program/com/dscs_3.htm (Doc 8-12); Product Support Management Plan (PSMP), SMC/MC, "Defense Satellite Communications System," 24 January 2002, (Doc 8-8); Aerospace Corporation, "Aerospace plays crucial role in successful launch of DSCS III," Orbiter, 3 December 1997, pp. 1 and 3 (Doc 8-30); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO Overview," 11 May 1998, p. 11 (Doc 8-31).

DSCS III A1 satellite (launched in 1982) to cover the West Pacific region of the DSCS constellation. After being replaced in the constellation, the A1 satellite continued to be used for telemetry and command tests.[12]

On 19 October 2000, Cape Canaveral Air Force Station (AFS) successfully launched the $200 million DSCS III B11 satellite with an Atlas IIA/Centaur rocket. The launch had originally been scheduled for 12 October, but it had to be delayed for a week after an initiation timer problem was discovered on 4 October. B11 became the twelfth DSCS III satellite launched, and it was the second of four DSCS III satellites to include the SLEP upgrades. This would be the last time an Atlas IIA launched a DSCS satellite into orbit. B11 replaced the B4 satellite (launched in 1985) to cover the Eastern Atlantic region in the DSCS constellation. B4 was then boosted out of its operational orbit. B11 completed its on-orbit testing (communications payload, spacecraft bus, and satellite

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[12] Memo, SMC/MC to ESC/MC et al., "DSCS-III B8 Mission Readiness Review," 10 August 1999, (Doc 8-32); Memo, SMC/CL to SMC/CC, "Flight Readiness Review," 15 December 1999, (Doc 8-33); News Release, Aerospace Corporation, "Enhanced DSCS Satellite Launched in 2000," 6 February 2000, http://www.aero.org/ news/current/ atlas-launch.html (Doc 8-25); Ronea Alger, "SMC launches upgraded communications satellite," Astro News, 28 January, 2000, p. 1 (Doc 8-34); Internet Document, Spaceflight Now, "The DSCS 3 satellite fleet," 19 January 2000, http:// spaceflightnow.com/atlas/ ac138/000119scsoverview.html (Doc 8-35); Internet Document, Spaceflight Now, "AC-138 launch timeline," 19 January 2000, http:// spaceflightnow.com/atlas/ac138/ 000119launchtimeline.html (Doc 8-36); Internet Document, Spaceflight Now, "Atlas soars into 2000," 21 January 2000, http:// spaceflightnow.com/atlas/ac138/000121launch .html (Doc 8-37); Internet Document, Spaceflight Now, "Atlas 2A vehicle data," 19 January 2000, http://spaceflightnow. com/atlas/ac138/000119atlasoverview.html (Doc 8-38); News Release, Lockheed Martin, "Lockheed Martin delivers upgraded Air Force communications satellite to Cape for January launch," 30 November 1999, http://lmms.external.lmco.com/newsbureau/ pressreleases/1999/99.222.html (Doc 8-39); Fact Sheet, Patrick AFB, "DSCS," printed 15 November 2002, http://www.patrick.af.mil/45OG/DSCShtm (Doc 8-40); News Release, SMC/PA, "Air Force Communications Satellite Declared Healthy," 27 January 2000, http://www.laafb.af.mil/SMC/PA/Releases/2000/00-4DSCS.htm (Doc 8-20); Fact Sheet, Aerospace Corporation, "Defense Satellite Communications System (DSCS)," 8 June 2000, http://www.aero.org/satellites/dscs.html (Doc 8-41); E-mail, 61CS to SMC/CCA et al., "Defense Satellite Communications System (DSCS III) Mission," 20 November 1998, (Doc 8-42); Aerospace Corporation, "Multiple efforts help DSCS enter next phase," Orbiter, 8 November 2000, (Doc 8-43); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM Portfolio Review," 1 September 1999, p. 59 (Doc 8-44); Monthly Acquisition Report, SMC/MC, "DSCS," July 1998, (Doc 8-45); Internet Document, Federation of American Scientists (FAS), "DSCS-3," 4 April 1998, p. 3 http://www.fas.org/spp/military/program/com/dscs_3.htm (Doc 8-12).

communications terminal) in February 2001, and became operational over the Eastern Atlantic in April 2001.[13]

In September 2001, DSCS reached its highest operational status with all 30 of its channels. It began operating on all six channels of the five primary DSCS satellites in the constellation, plus the additional channels operating on the five residual DSCS satellites. The DSCS constellation provided over 600 Megabits per second (Mbps) of data to users worldwide; the primary satellites provided 557 Mbps and the residual satellites provided 51.9 Mbps.[14]

On 16 October 1998, the Air Force contracted with The Boeing Company (Contract No. F04701-98-D-0002) to have the last two DSCS III SLEP satellites launched with the Delta IV Medium Evolved Expendable Launch Vehicle (EELV). The transition to the EELV was planned to decrease the launch costs and increase standardization. The five DSCS launch platforms included: Titan/Inertial Upper Stage (IUS), Space Shuttle/IUS, Titan/Transtage, Atlas/Centaur, and the Delta IV Medium. Boeing and Lockheed Martin integrated the DSCS III to the Delta IV. The original launch schedules for the last two DSCS satellites were in May 2002 (satellite B6) and May 2003 (satellite A3). In August 2001, the B6 launch date slipped to July 2002 because of a two-month delay in Boeing's first Delta IV commercial flight.[15]

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[13] Memo, SMC/CC to HQ AFMC/CC/DO/DR/EN et al., "The DSCS/MLV-9 Flight Readiness Review (FFR) and Space Flight Worthiness Certification," circa 17 October 2000, (Doc 8-46); Capt Colleen Lehne, "DSCS vaults hurdle, satellite sent to orbit," Astro News, 3 November 2000, pp. 1- 2 (Doc 8-7); Internet Document, Spaceflight Now, "Atlas rocket to fly U.S. military mission Thursday," 18 October 2000, http://spaceflightnow.com/atlas/ac140/index.html (Doc 8-47); Internet Document, Spaceflight Now, "The DSCS satellite fleet," 19 January 2000, http://spaceflightnow.com/atlas/ac138/000119scsoverview.html (Doc 8-35); Internet Document, Spaceflight Now, "AC-140 launch timeline," 18 October 2000, http://spaceflightnow.com/atlas/ac140 /timeline.html (Doc 8-48); Mission Overview, "Atlas IIA AC-140 DSCS III," circa 2000, http://www.ilslaunch.com/launches/cbin/Mission_atlas/ac_140__mo.pdf (Doc 8-19); News Release, Lockheed Martin, "Lockheed Martin ships upgraded Air Force communications satellite to Cape for October launch," 24 July 2000, http://lmms.external.lmco.com/newsbureau/pressreleases/2000/00.103.html (Doc 8-49); Fact Sheet, SMC/MC, "Defense Satellite Communications System," circa 2001, http://www.losangeles. af.mil/ SMC/MC/mcd.html (Doc 8-50); Briefing Charts, SMC/MC, "Defense Satellite Communications System," 2001, p. 2 (Doc 8-21).

[14] Briefing Charts, SMC/MC, "Defense Satellite Communications System," 2001, p. 9 (Doc 8-21); Summary (FOUO, extract is not FOUO), SMC/PA, "SMC Monthly Highlights," September 2001, (Doc 8-51).

[15] Product Support Management Plan (PSMP), SMC/MC, "Defense Satellite Communications System," 24 January 2002, (Doc 8-8); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO Overview," 11 May 1998, pp. 13-14

DSCS would be modernized as technology continued to advance. No plans existed to phase out the DSCS system at the end of 2001, and the DSCS constellation will augment the future Wideband Gapfiller Satellite constellation.[16]

Global Broadcast Service (GBS)

Although the DSCS and Milstar systems gave their users enormous advantages in strategic and tactical communications, the Persian Gulf War of January to February 1991 brought to light a weakness in all of the available space-based communications systems. The weakness lay in an area of performance sometimes called "throughput." The systems could not transmit data in the enormous volume per second that American troops and equipment needed. The shortcoming was so acute that battle maps and Air Tasking Orders had to be delivered daily by aircraft rather than electronically. Furthermore, the data once received was not disseminated thoroughly or carefully in quickly changing circumstances, and it did not have adequate protection from being compromised. The result was that critical military information did not reach the lower echelons quickly enough. In reports to Congress after the war, DoD identified an urgent requirement for high-volume, one-way, worldwide data transmission from command centers to intermediate and field commanders.[17]

To develop and obtain the needed communications system, the Joint Requirements Oversight Council of the Joint Chiefs of Staff approved a Mission Need

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(Doc 8-31); Briefing Charts, SMC/MC, "MILSATCOM JPO Program Overview," September 2000, p. 11 (Doc 8-26); Briefing Charts, SMC/MC, "Defense Satellite Communications System," 2001, p. 10 (Doc 8-21); Summary (FOUO, extract is not FOUO), SMC/PA, "SMC Monthly Highlights," August 2001, (Doc 8-52); Monthly Acquisition Report, SMC/MC, "DSCS," July 1998, (Doc 8-45); Internet Document, Space Daily, "Boeing Delta-4 To Launch DSCS-3 A3 Satellite For US Air Force," 25 June 2001, http://www.spacedaily.com/news/milspace-comms-01e.html (Doc 8-53).

[16] Program Management Directive (PMD) (FOUO, extract is not FOUO), SAF/AQS, "PMD 2325(5)… for Military Satellite Communications (MILSATCOM)," 24 February 2000, p. 9 (Doc 8-54); Fact Sheet, SMC/MC, "Wideband Gapfiller," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcw.html (Doc 8-55); Fact Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.Com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56); Interview, Lt Col Orlando Darang, SMC/MCD, with SMC/PA, 23 January 2003, (Doc 8-10); E-mail (FOUO, extract is not FOUO), Andre Moser, SMC/MCD, to Robert Mulcahy, SMC/HO, "Back to you [review of the history of DSCS 1998-2001]," 5 February 2003, (Doc 8-22).

[17] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 154; Briefing Charts, ESC/MCG, "GBS Newcomer Orientation Brief," 1999, p. 2 (Doc 8-57).

Statement for the Global Broadcast Service (GBS) in August 1995. GBS would not replace another satellite communications system; it would augment the other MILSATCOM systems. In 1996, the Under Secretary of Defense for Acquisition and Technology ordered the creation of the GBS JPO. The mission of the JPO was to acquire a high-throughput system for the rapid broadcast of high-volume military information to almost anywhere in the world. The Air Force would be the Executive Agent. The GBS JPO was initially located at SMC. The GBS Program Manager operated out of Washington, D.C., and the GBS Deputy Program Manager operated out of SMC. In order to consolidate the GBS JPO management, the GBS System Program Director phased out the GBS activities at SMC and transferred the JPO to the Electronic Systems Center (ESC) at Hanscom AFB, Massachusetts on 28 July 2000. The GBS JPO (office symbol ESC/MCG) continued to report directly to the SMC MJPO after its relocation to Hanscom. On 28 July 2000, Mr. Scott Sharp replaced Col Al Moseley as the GBS Program Manager.[18]

GBS provided a high-capacity throughput system for the rapid transmission of high-volume data to deployed, in motion, or garrisoned forces anywhere in the world. The space segment transmitted large data files, voice communications, serial streams, web service, imagery and video. The incoming data could be relayed, stored, recorded, or consumed similar to commercial news service. GBS was a one-way broadcast that could support many users simultaneously, similar to satellite television systems. Live broadcasts could be shown to the troops in the field. Some of the information products communicated through GBS included mapping, charting and geodesy, weather, and other video data. It also communicated mission requirements such as intelligence dissemination, air tasking orders, targeting information, logistics, and pre-mission planning. It could transmit either classified or unclassified video or data, and it would rebroadcast feeds from the National Television System Committee (NTSC), Unmanned Aerial Vehicle (UAV) video, and Navy P3 Orion (airplane) video. GBS provided high-volume data directly into 18-inch antennas, so mobile forces would not be confined by the need to use large, fixed antennas to receive data previously limited to command centers. By 2001, GBS provided high-speed, high-quality, wideband broadcast signals to

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[18] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 154-155; E-mail, Lt Col Terry Gold, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS background," 29 January 2003, (Doc 8-58); Internet Document, ESC/MCG, "Global Broadcast System Division (MCG)," Printed 28 January 2003, http://esc.hanscom.af.mil/esc-mc/mcg/mcgorg.html (Doc 8-59); Internet Document, Federal Computer Week, "DOD should define requirements for GBS," 5 April 1999, http://www.few.com/few/ articles/1999/ FCW_040599_268.asp (Doc 8-60); Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office, SMC Det 11/MCL, "MILSATCOM," 20 February 2002, p. 3 (Doc 8-3); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, p. 1 (Doc 8-61); E-mail, John Baldonado, SMC/CIS, to Robert Mulcahy, SMC/HO, "RE: GBS Program Manager," 12 June 2003, (Doc 8-61-1).

users on land and at sea. After 2001, GBS would eventually be deployed into the warfighters from all the branches of the military.[19]

The MJPO planned for three GBS acquisition phases. Phase I developed an initial broadcast capability. Phase II acquired and launched GBS payloads that had been added to three Navy Ultra High Frequency (UHF) Follow-on (UFO) communications satellites that were developed under a separate Navy communications satellite program. Phase II provided the initial GBS coverage with near worldwide communications, and it continued to refine the GBS system after 2001. Phase II would be augmented by the future Wideband Gapfiller Satellite (WGS) system after its first launch. Phase III would provide a fully capable range of broadcast products and services for its military users that would merge with the Advanced Wideband System satellites (scheduled for first launch in 2009).[20]

The GBS JPO scheduled Phase I to last for two years (1996 to 1998). This phase developed the initial broadcast capability that employed the National Reconnaissance Office's Concept of Operations testbed equipment. The JPO acquired the testbed in September 1996 and transferred it to the Pentagon. There it was operated by the Defense

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[19] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 154; Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, pp. 5-6 (Doc 8-62); Terry Hagar, "New Global Broadcast Satellite features are supporting multiple users," Astro News, 10 April 1998, p. 1 (Doc 8-63); Fact Sheet, BSS, "GBS," 2003, http://www.boeing. com/defense-space/space/bss/factsheets/601/gbs/gbs.html (Doc 8-64); News Release, Hughes Space and Communications Company, "Navy-To-Hughes Video Link Demonstrates Operational Ka-Band System," 18 December 1998, http://www.fas.org/spp/military/program/com/981218uhfdemo.htm (Doc 8-65); Internet Document, Federation of American Scientists (FAS), "Global Broadcast Service," 6 July 1999, http://www.fas.org/spp/military/program/com/gbs.htm (Doc 8-66); Briefing Charts (FOUO, extract is not FOUO), ESC/MCG, "GBS Receive Suite Fielding," 10 December 2001, p. 7 (Doc 8-67); Memo (FOUO, extract is not FOUO), ESC/MCG to Joint Staff, "Requirement for Contractor Access to SIPRNET for the MITRE Corporation, Bedford MA," 31 May 2001, (Doc 8-68); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, p. 3 (Doc 8-61).

[20] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 154; Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO Overview," 11 May 1998, p. 17 (Doc 8-31); Briefing Charts, SMC/MC, "MILSATCOM [Overview]," June 1999, p. 29 (Doc 8-69); Briefing Charts, SMC/MC, "MILSATCOM JPO [Overview]," 26 July 2001, p. 18 (Doc 8-1); Internet Document, Federation of American Scientists (FAS), "0603854F Global Broadcast Service (GBS) (Space)," 1998, http://www.fas.org/spp/military/budget/peds_98f/0603854f.htm (Doc 8-70); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: WGS and GBS development phases," 23 January 2003, (Doc 8-71).

Information Systems Agency (DISA) and managed by U.S. Space Command. The Phase I space asset was the leased commercial Satellite Business Systems 6 (SBS 6) satellite that supported GBS with Ku-band communications. The Hughes Space and Communications (HSC) Company manufactured the SBS 6, the satellite's launch occurred on 12 October 1990, and it was then positioned over the continental U.S.[21]

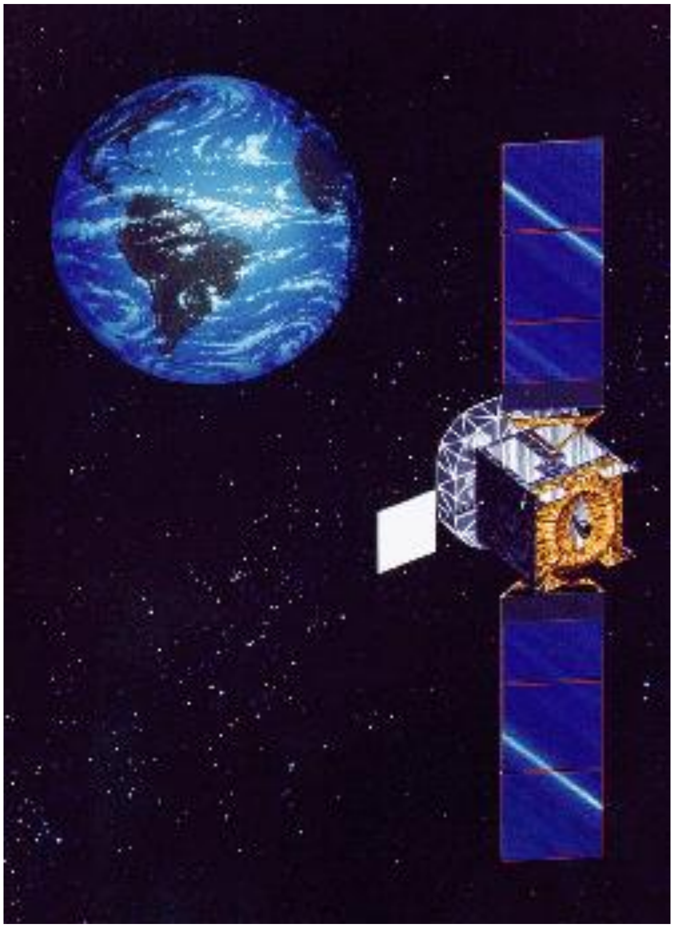

Illustration 8-2:
UFO (UHF Follow-On) Satellite in Orbit (artist's concept)

Phase I integrated some existing broadcast services and demonstrations as well. Perhaps the most important of these was the 1996 Bosnia Command and Control

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[21] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 155; E-mail, Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: Ku satellite," 25 February 2003, (Doc 8-72); Fact Sheet, BSS Inc., "SBS 6," 2003, http://www.boeing.com/defense-space/space/bss/factsheets/376/sbs_6/sbs_6.html (Doc 8-73); E-mail (FOUO, extract is not FOUO), Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS History [Review]," 1 May 2003, p. 3 (Doc 8-73-1).

Augmentation (BC2A), a communications initiative to support the peacekeeping efforts of the North Atlantic Treaty Organization (NATO) in Bosnia. The broadcast segment of BC2A was known as the Joint Broadcast Service (JBS). DISA managed JBS from the Pentagon and used the leased European Ku-band Telstar 11 satellite as its space support. The GBS JPO and DISA coordinated the future transfer of JBS to GBS Phase II. In June 2001, the MJPO signed a Memorandum of Agreement with DISA for the funding and execution of the JBS transfer. In August 2001, the Norfolk Satellite Broadcast Manager (SBM) accomplished an end-to-end test of the augmentation for JBS. The JBS transition into the GBS system took place in November 2001. This would officially end the BC2A funding of JBS as a contingency operation.[22]

Phase I was not an acquisition phase. The initial broadcast capability had been put together from existing DoD assets. The Phase I GBS equipment continued to be used until the Phase II equipment replaced it. The final changeover to the GBS Phase II equipment took place in November 2001.[23]

GBS Phase II required major contractual efforts and acquisition planning. It extended the initial capability to almost worldwide coverage using new space and ground components. The planning was documented in a Single Acquisition Management Plan (SAMP) issued by the program office on 9 May 1997, a Test and Evaluation Master Plan (TEMP) issued on 13 August 1997, and an Independent Cost Estimate (ICE) completed in September 1997. The planning culminated with the Milestone II review by the Office of the Secretary of Defense's (OSD) Defense Acquisition Board (DAB) in November 1997. The OSD approved the Acquisition Program Baseline (APB) on 14 November 1997. The Assistant Secretary of the Air Force for Acquisition (SAF/AQ) signed a Program Deviation Report on 15 June 1999 requesting a nine-month delay in the APB schedule; the delay in the signed APB revision continued at the end of 2001.[24]

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[22] SMC History 1995-1997 (FOUO, extracts are not FOUO), SMC/HO, pp. 155-156; News Release, MITRE, "MSR/MOIE Spotlight – Global Broadcasting Service," August 1998, (Doc 8-74); Internet Document, Federation of American Scientists (FAS), "Global Broadcast Service," 6 July 1999, http://fas.org/spp/military/program/com/gbs.htm (Doc 8-66); Weekly Activity Report (FOUO, extract is not FOUO), ESC/MCG, 20 August 2001, (Doc 8-75); Weekly Activity Report (FOUO, extract is not FOUO), ESC/MCG, 20 September 2001, (Doc 8-76); E-mail, Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: Ku satellite," 25 February 2003, (Doc 8-72); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, pp. 3-4 (Doc 8-61); E-mail (FOUO, extract is not FOUO), Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS History [Review]," 1 May 2003, p. 4 (Doc 8-73-1).

[23] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 161; E-mail, 2Lt Esteban Sanchez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS Phase 1 Inquiry," 10 January 2002, (Doc 8-77).

SMC managed the award of the GBS Phase II contract. SMC issued a Request for Proposals in May 1997, and it received proposals from four prospective contractors. The negotiations continued until November 1997. On 17 November 1997, SMC awarded Hughes Information Systems an $84,760,754 cost plus award fee contract (Contract No. F04701-97-C-0044) for the GBS Phase II effort. Raytheon purchased Hughes Information Systems in December 1997 and thus acquired the GBS contract.[25]

The GBS JPO scheduled Phase II to last for five years, from 1998 to 2003. Phase II began on16 March 1998 with the first launch of a GBS payload onboard the UFO F8 satellite. After each GBS payload had been launched, the JPO refined, integrated and expanded the operational service of GBS.[26]

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[24] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 161; Program Management Directive (PMD) (FOUO, extract is not FOUO), SAF/AQS, "PMD 2325(7)… Military Satellite Communications (MILSATCOM)," 6 August 2002, p. 13 (Doc 8-78); Briefing Charts, SMC/MC, "Global Broadcast Service," May 2000, pp. 7-10 (Doc 8-79); E-mail, Joint Staff Washington to HQ USAF et al., "Dec 98 GBS Program Mid-Course," 7 December 1998, (Doc 8-80); Memo, HQ AFSPC to SMC/MC, "GBS Program Issues," 17 December 1998, (Doc 8-81).

[25] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 162; Internet Document, DefenseLink, "Contracts," 17 November 1997, http://www.defenselink.mil/news/Nov1997/c11171997_ct621-97.html (Doc 8-82); Warren Ferster, "Hughes To Aid Pentagon TV System," Defense News, 24-30 November 1997, p. 6 (Doc 8-83); Warren Ferster, "Experience Leads Hughes to $85 Million GBS Win," Defense News, 24-30 November 1997, p. 9 (Doc 8-84); George Seffers, "GBS Win May Put Hughes Information in Prime Position," Defense News, 8-14 December 1997, p. 32 (Doc 8-85); News Release, Hughes Information Systems, "Hughes Selected To Develop Global Broadcast Service System For U.S. Military Forces," 25 November 1997, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/97_11_25_gbs.html (Doc 8-86); News Release, Boeing, "Boeing Concludes Acquisition of Hughes' Space and Communications Business," 6 October 2000, http://www.boeing.com/news/releases/2000/news_release_001006s.html (Doc 8-87); Fact Sheet, BSS, "GBS," 2003, http://www.boeing.com/defense-space/space/bss/factsheets/601/gbs/gbs.html (Doc 8-64); Briefing Charts, SMC/MC, "GBS Contract History," circa June 2001, (Doc 8-88).

[26] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 156; Fact Sheet, AFSPC/PA, "Ultra High Frequency Follow-On Communications Satellites," March 2001, http://www.spacecom.af.mil/hqafspc/library/facts/uhf.html (Doc 8-88-1); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO Overview," 11 May 1998, pp. 17-19 (Doc 8-31); Internet Document, DefenseLink, "Contracts," 17 November 1997, http://www.defenselink.mil/news/Nov1997/c11171997_ct621-97.html (Doc 8-82); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "PEO Program Review," 8 March 2001, p. 26 (Doc 8-89).

The Phase II space segment consisted of three Navy UFO satellites (UFO F8, F9, and F10) with GBS payloads and the commercial leased SBS 6 satellite services. GBS payloads were integrated into the three UFO satellites to minimize the costs. The Navy's Space and Naval Warfare Systems Command in Arlington, Virginia modified its UFO contract (N00039-88-C-0300) with HSC in 1996 to add the GBS capability to the satellites by December 1998. The GBS coverage gap between the UFO F8 and the UFO F9 satellites required the augmentation of the Ku-band SBS 6 satellite to provide coverage to the continental U.S. The SBS 6 supported GBS until its replacement in January 2002.[27]

The GBS payloads on each UFO satellite replaced the SHF (super-high frequency) payloads. The GBS payload included five antennas and four 130-watt, 24 Mbps, military Ka-band (30/20 GHz) transponders. The antennas consisted of a steerable uplink antenna, a fixed uplink antenna, and three steerable Ka-band (frequency 20.2-21.2 GHz) downlink spot beam antennas. Two of the moveable spot beams covered areas on the earth of about 500 nautical miles across, while the other covered a 2,000 nautical mile area. Using these capabilities, the space segment provided worldwide coverage, and broadcasted data at a maximum rate of 96 Mbps per UFO satellite. Each UFO satellite could receive four uplink data streams and transmit three movable spot beams of data. GBS did not have nuclear survivability and hardened features, so it did not get designated as a critical command and control system.[28]

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[27] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 162; E-mail, Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: Ku satellite," 25 February 2003, (Doc 8-72); Terry Hagar, "New Global Broadcast Satellite features are supporting multiple users," Astro News, 10 April 1998, p. 1 (Doc 8-63).

[28] SMC History 1995-1997 (FOUO, extracts are not FOUO), SMC/HO, pp. 156, 159; Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, p. 6 (Doc 8-62); Briefing Charts, SMC/MC, "Global Broadcast Service," 2001, (Doc 8-90); News Release, Hughes Space and Communications Company, "Navy-To-Hughes Video Link Demonstrates Operational Ka-Band System," 18 December 1998, http://www.fas.org/spp/military/program/com/ 981218uhfdemo.htm (Doc 8-65); Internet Document, Federation of American Scientists (FAS), "UHF Follow-On Satellite Successfully Tests GBS Video," 29 April 1998, http://www.fas.org/spp/military/program/com/9804ufo1.htm (Doc 8-91); Internet Document, Federation of American Scientists (FAS), "Global Broadcast Service (GBS) Terminals," 21 November 1997, http://www.fas.org/spp/military/program/nssrm/ initiatives/gbster.htm (Doc 8-92); Hap Parker, "MILSATCOM ensures critical communications capability to warfighter," Astro News, 31 March 2000, p. 20 (Doc 8-93); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, p. 3 (Doc 8-61); JORD, No author [JCS], "Global Broadcast

An Atlas IIA/Centaur at Cape Canaveral AS successfully launched the UFO F8 satellite with the first GBS payload on 16 March 1998. The satellite was positioned 172 degrees East longitude over the Pacific Ocean. The GBS payload became operational in June 1998. The GBS JPO streamlined the acquisition of GBS and delivered the payload into orbit only two years after the contract had been signed.[29]

An Atlas IIA/Centaur at Cape Canaveral AS successfully launched the UFO F9 satellite with the second GBS payload on 20 October 1998. The satellite was positioned 22.5 degrees West longitude over the Atlantic Ocean. Originally, the satellite had a launch date of 15 September, but the launch was delayed because a faulty capacitor in the communications package had to be replaced and retested.[30]

Service Joint Operational Requirements Document (JORD)," no date given [7 April 1997], p. 3.

[29] News Release, Hughes Space and Communications Company, "Ready To Ship [UHF F8]," February 1998, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/photogallery/uhf_f8/… (Doc 8-94); News Release, Hughes Space and Communications Company, "Hughes Newest UHF Satellite To Launch GBS Capability," 10 March 1998, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/98_03_16_uhf.html (Doc 8-95); News Release, Hughes Space and Communications Company, "Navy's UHF F8 Successfully Launched," 16 March 1998, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/98_03_16_uhff8.html (Doc 8-96); Terry Hagar, "New Global Broadcast Satellite features are supporting multiple users," Astro News, 10 April 1998, p. 1 (Doc 8-63); Internet Document, Federation of American Scientists (FAS), "UHF Follow-On Satellite Successfully Tests GBS Video," 29 April 1998, http://www.fas.org/spp/military/program/com/9804ufo1.htm (Doc 8-91); News Release, Hughes Space and Communications Company, "Navy-To-Hughes Video Link Demonstrates Operational Ka-Band System," 18 December 1998, http://www.fas.org/spp/military/program/com/981218uhfdemo.htm (Doc 8-65); Acquisition Report, SMC/MC, "GBS," April 1998, (Doc 8-97); No author, "UHF F9 Orbited with 2nd GBS Package," Military Space, 26 October 1998, p. 4 (Doc 8-98); No author, "U.S. Navy's UHF F8 Launched on Atlas 2," Space News, 23 March 1998, p. 12 (Doc 8-99); Fact Sheet, BSS, "UHF Follow-On," 2002, http://www.boeing.com/defense-space/space/bss/factsheets/601/uhf_followon/ uhf_followon.html (Doc 8-100); Fact Sheet, BSS, "GBS," 2003, http://www.boeing.com/defense-space/ space/bss/factsheets/601/gbs/gbs.html (Doc 8-64); History of the 45th Space Wing 1 January – 31 December 1998 (FOUO, extract is not FOUO), 45 SW/HO, pp. 84-85.

[30] News Release, Hughes Space and Communications Company, "[UFO F9] Going Global," October 1998, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/photogallery/uhf_f9/uh… (Doc 8-101); News Release, Hughes Space and Communications Company, "Hughes-Built UHF F9 Satellite Awaiting Launch," 13 October 1998, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/98_10_13_uhf9.html (Doc 8-102); Internet Document, Aerospace Corporation, "Global

An Atlas IIA/Centaur at Cape Canaveral AS successfully launched the UFO F10 satellite with the third GBS payload on 23 November 1999. The satellite was positioned 72 degrees East longitude over the Indian Ocean. The Atlas launch had originally been scheduled for 4 November, but the launch was delayed because a suspect Centaur engine had to be replaced. This GBS payload provided the DoD with near-global broadcast coverage. The GBS space segment began supporting operations after September 2001.[31]

The GBS Broadcast Management Segment included fixed and transportable transmit suites. A fixed transmit suite was a fixed-location broadcast center that transmitted signals to a specific UFO satellite and its GBS payload; they had locations at the Naval Stations in Wahiawa, Hawaii (transmitted to UFO F8), Norfolk, Virginia (transmitted to UFO F9 and SBS 6), and Sigonella, Sicily (transmitted to UFO F10). A fixed transmit suite included a Satellite Broadcast Manager (SBM) and a Primary Injection Point (PIP). The SBM gathered the information to be broadcast from the different data sources, and then forwarded the resulting data stream to the PIP for transmission to the satellite. Each PIP could uplink 94 Mbps of data to its assigned Ka-band UFO/GBS satellite. The PIP at Norfolk could also uplink to the supporting Ku-band satellite. The third and final fixed transmit suite (Sigonella) had its groundbreaking

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Broadcast Service," 8 June 2000, http://www.aero.org/satellites/gbs.html (Doc 8-103); News Release, Hughes Space and Communications Company, "Navy's UHF F9 Successfully Launched," 20 October 1998, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/98_10_20_launch. html (Doc 8-104); Article, "UHF F9 Orbited with 2nd GBS Package," Military Space, 26 October 1998, p. 4 (Doc 8-98); Fact Sheet, BSS, "GBS," 2003, http://www.boeing.com/defense-space/ space/bss/factsheets/601/gbs/gbs.html (Doc 8-64); History of the 45th Space Wing 1 January – 31 December 1998 (FOUO, extract is not FOUO), 45 SW/HO, p. 87.

31 Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, p. 17 (Doc 8-62); News Release, Hughes Space and Communications Company, "[UFO F10] Fully Deployed," November 1999, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/ photogallery/ f10_f10.h… (Doc 8-105); News Release, Hughes Space and Communications Company, "Hughes Ready To Launch 10th U.S. Navy Satellite," 17 November 1999, http://www.boeing.com/defense-pace/space/bss/hsc_pressreleases/ 99_11_17_ launch.html (Doc 8-106); News Release, Hughes Space and Communications Company, "Hughes 10th Navy UFO Satellite Successfully Launched," 23 November 1999, http://www.boeing.com/defense-space/space/bss/hsc_ pressreleases/99_11_23_launch. html (Doc 8-107); Fact Sheet, BSS, "GBS," 2003, http://www.boeing.com/defense-space/space/bss/factsheets/601/gbs/gbs.html (Doc 8-64); News Release, Hughes Space and Communications Company, "Hughes-Built UHF F9 Satellite Awaiting Launch," 13 October 1998, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/ 98_10_13_ uhf9.html (Doc 8-102); History of the 45th Space Wing 1 January – 31 December 1999 (FOUO, extract is not FOUO), 45 SW/HO, pp. 71-72.

on 25 October 1999, its PIP hardware arrived in January 2000, the initial site checkout began in May 2000, and it began operating around September 2000. By July 2001, regular broadcast operations were conducted at the Norfolk (Ka-band and Ku-band), Wahiawa, and Sigonella sites. The SBMs at the three fixed sites will have EHF terminals installed after FY 2001. Sigonella should be the first to have the EHF in December 2001 so it can support the ongoing JBS broadcasts.[32]

Theater Injection Points (TIPs) were transportable transmit suites that could be used from any theater they might be deployed to. TIPs could be mounted on the ground, on ships, and on vehicles such as the HMMWV (high mobility multipurpose wheeled vehicles). A TIP consisted of a Transportable SBM (TSBM) and a Transportable Theater Injector (TTI) that would uplink 12 Mbps of data to the space segment. About five personnel would be needed to operate each TIP (two to uplink the data and three for broadcast management), so a commander in a theater of battle could use a TIP to uplink theater data directly to the proper satellite. In January 2001, GBS successfully conducted its first broadcast from a vehicle-mounted TIP. The video and audio broadcast originated from Falls Church, Virginia. TIP validation and verification was completed in June 2001. The Air Force TIP procurement was on hold at the end of 2001, but the Army planned to field three TIPs during GBS Phase II.[33]

The GBS Terminal Segment used receive suites to downlink and relay communication signals from the space segment. A receive suite consisted of a receive

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[32] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 160; Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, pp. 6, 13-14 (Doc 8-62); Weekly Activity Report (FOUO, extract is not FOUO), ESC/MCG, 23 July 2001, (Doc 8-108); Briefing Charts, SMC/MC, "Global Broadcast Service," May 2000, pp. 1-2 (Doc 8-79); Fact Sheet, BSS, "GBS," 2003, http://www.boeing.com/defense-space/space/bss/factsheets/601/gbs/gbs .html (Doc 8-64); Briefing Charts (FOUO, extract is not FOUO), ESC/MCG, "GBS: IP Migration for Dummies," 2003, p. 26 (Doc 8-109); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, pp. 1, 4 (Doc 8-61); E-mail (FOUO, extract is not FOUO), Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS History [Review]," 1 May 2003, p. 9 (Doc 8-73-1).

[33] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 160; Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, pp. 6-7, 14 (Doc 8-62); Fact Sheet, BSS, "GBS," 2003, http://www.boeing.com/defense-space/space/bss/factsheets/601/gbs/gbs.html (Doc 8-64); Briefing Charts, SMC/MC, "Global Broadcast Service," May 2000, p. 2 (Doc 8-79); Briefing Charts, SMC/MC, "Global Broadcast Service (GBS) Description," circa August 2001, p. 4 (Doc 8-110); E-mail (FOUO, extract is not FOUO), Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS History [Review]," 1 May 2003, p. 10 (Doc 8-73-1).

terminal, cryptographic equipment, and a Receive Broadcast Manager (RBM). The receive suite obtained data from the satellite, decrypted it, and then made the data available to local network users. In doing so, it would also authenticate sources, determine user profiles, and provide directory services and downlink scheduling. Each receive suite could route information to many end users over local area networks, but GBS communications were limited to one-way broadcast communications; users could not request information using GBS. The 2001 GBS receive suite configurations included: Fixed Ground Receive Suites (FGRS) for fixed base installations, Transportable Ground Receive Suites (TGRS) for mobile ground units, Shipboard Receive Suites (SRS) for Navy ships, and Subsurface Receive Suites (SSRS) for submarines. The Airborne Receive Suite (ART) for aircraft and the Manpack Receive Suite (MRT) for special operations were objective requirements in the GBS Phase II Operational Requirements Document (ORD) and not part of the acquisition baseline. The Army planned to field 504 TGRS, and it began testing them at Army bases in the U.S. in 2001. The Air Force planned to field 220 receive suits, and the Marine Corps planned to field 26 FGRS. By August of 2001, 36 receive suites had been deployed in the U.S., Europe, and Korea.[34]

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[34] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 160-161; Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, pp. 6-7, 9, 14-16 (Doc 8-62); Memo, The Joint Staff to USD(AT&L), "Global Broadcast Service (GBS) Receive Suite Fielding Plans," 25 May 2001, (Doc 8-111); Briefing Charts, SMC/MC, "Global Broadcast Service," 2001, p. 4 (Doc 8-90); Briefing Charts, SMC/MC, "Global Broadcast Service (GBS) Description," circa August 2001, pp. 1, 4 (Doc 8-110); Briefing Charts (FOUO, extract is not FOUO), ESC/MCG, "JROC Decision Concerning Service Fielding Plans of GBS Receive Suites," 3 May 2001, (Doc 8-112); Paul Oleski, "An Airborne Global Broadcast Service/Military Strategic and Tactical Relay Satellite Wideband Antenna," AFRL Technology Horizons, September 2000, pp. 25-27 (Doc 8-113); Internet Document, Federation of American Scientists (FAS), "Global Broadcast Service," 6 July 1999, http://www.fas.org/spp/ military/program/com/gbs.htm (Doc 8-66); Internet Document, Federation of American Scientists (FAS), "Global Broadcast Service (GBS) Terminals," 21 November 1997, http://www.fas.org/spp/military/program/nssrm/initiatives/gbster.htm (Doc 8-92); Customer Information Package (FOUO, extract is not FOUO), ESC/MCG, "Basic Guidelines for Selecting Installation Sites for GBS Fixed & Transportable Ground Receive Suites," April 2000, https://gbsjpo.hanscom.af.mil/webworks/Customer_info.htm (Doc 8-114); Briefing Charts, ESC/MCG, "RS Fielding Deployments," September 2001, (Doc 8-115); Briefing Charts (FOUO, extract is not FOUO), ESC/MCG, "GBS Receive Suite Fielding," 10 December 2001, pp. 7-10 (Doc 8-67); Weekly Activity Report (FOUO, extract is not FOUO), ESC/MCG, 31 August 2001, (Doc 8-116); E-mail (FOUO, extract is not FOUO), Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS History [Review]," 1 May 2003, pp. 10-11 (Doc 8-73-1).

The Navy planned to field 493 GBS receive suites on ships (306), submarines (74), the shore (63), and MRTs (50). The Navy intended to field receive suits on all classes of its ships and submarines. First in priority were the command ships that should be equipped by September 2002, and then the combatant ships and submarines that should all be equipped by FY 2006. The delivery of GBS shipboard antennas became delayed in early 1998 due to performance problems, but by 1999 the Navy had installed GBS receivers and antennas on a few of its ships. The United States Ship (USS) Coronado in the Pacific had an SRS installed and operational on 25 February 1999. The Coronado received transmissions from the UFO F8 satellite. The USS Mt. Whitney in the Atlantic had an operational SRS on 5 April 1999 and received transmissions from UFO F9. In March 2001, the USS Providence became the first U.S. submarine to deploy with an SSRS. It received sailor mail with digitalized photo attachments, and it received the first submerged submarine Cable News Network (CNN) broadcast. The Shipboard Operational Verification Test on the USS Belleau Wood began in May 2001, making it the first Multi-Service Operational Test and Evaluation (MOT&E) shipboard installation. In September 2001, the USS Theodore Roosevelt and the USS Bataan became the first surface ships to deploy with GBS Phase II capabilities after they had installed Phase II SRSs and JBS antenna systems.[35]

On 27 June 2000, a second Joint Requirements Oversight Council Memo (JROCM) approved an incremental initial operational capability (IOC) for GBS. Most of Phase II developmental milestones in the IOC 1 roadmap were accomplished by August 2001. They included: the PIPs were operational for UFO F8, F9 and F10; GBS could transfer large files and broadcast audio/video, common operational pictures, serial streams, and webcasts; the JPO fielded 20 percent (19 units) of its receive suites; and commercial augmentation was available for the continental U.S. To complete IOC 1, GBS needed to gain full SBM capability, complete the personnel operation and maintenance training, gain logistics support, and independently complete assessing the

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[35] Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, p. 6, 8, 17 (Doc 8-62); Briefing Charts, SMC/MC, "Global Broadcast Service," 2001, (Doc 8-90); E-mail, Brian Polanco, SMC/XPP, to SMC Directors et al., "AQS FY01 Appropriations Appeals," 5 June 2000, (Doc 8-117); Briefing Charts, SMC/MC, "An Evolutionary Acquisition, GBS Joint Program," 20 September 2000, p. 7 (Doc 8-118); Briefing Charts, SMC/MC, "Global Broadcast Service," May 2000, p. 1 (Doc 8-79); Weekly Activity Report (FOUO, extract is not FOUO), ESC/MCG, 4 June 2001, (Doc 8-119); Briefing Charts, SMC/MC, "Global Broadcast Service," 2001, (Doc 8-90); Briefing Charts (FOUO, extract is not FOUO), ESC/MCG, "JROC Decision Concerning Service Fielding Plans of GBS Receive Suites," 3 May 2001, p. 12 (Doc 8-112); Internet Document, Federal Computer Week, "GBS hits snag," 31 August 1998, http://www.few. com/few/articles/1998/FCW_083198_1005.asp (Doc 8-120); Internet Document, Federal Computer Week, "Navy: GBS back on track," 11 January 1999, http://www.few.com/few /articles/1999/FCW_ 011199_22.asp (Doc 8-121); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, p. 4 (Doc 8-61).

system capabilities. The GBS JPO originally hoped to complete IOC 1 in March 2002. IOC 2 should begin at the end of FY 2002 and be completed in mid 2003. IOC 2 included: fielding 90 percent of the JPO receive suites (86 units), completing the remote suite enable/disable abilities, and having classified video capabilities. IOC 3 should begin at the end of FY 2003 and be completed by mid FY 2004. IOC 3 included producing tactically suitable TGRS, protecting all GBS information from exploitation, and achieving all of the threshold requirements in the GBS ORD.[36]

The GBS Phase III was scheduled to begin in 2004 and would be an evolution of the Phase II system. During the 1990s, the product of Phase III was sometimes referred to as the "Objective System," the "Objective GBS Solution," or the "Objective Advanced Wideband System." Its desired characteristics included full worldwide coverage, a robust capability, and a full range of broadcast products and services for its military users. The system concept called for space assets to be deployed on five satellites, and an increase in the equipment for each satellite to 12 transponders using seven spot-beam antennas and one earth-coverage antenna. The result of this increase in capabilities might be a maximum broadcast rate of 270 Mbps per satellite. The future satellite was called the "Advanced Wideband System (AWS)." The AWS Program start date should begin in FY 2004, and the first launch should take place in 2009.[37]

By October 2001, the GBS JPO continued with Phase II of the program. At this time, GBS provided audio and video broadcasts, file transfer service, web broadcast service, and common operational picture data to operational units worldwide. Forces on the ground and at sea utilized GBS, and it could send an Air Tasking Order (1.1 Mb) in 0.38 seconds, and an 8x10 annotated image (24 Mb) in 8.4 seconds. GBS was granted its first Certificate of Networthiness on 6 September 2001; it had an expiration date of 30 June 2002. The terrorist attacks of 11 September 2001 greatly accelerated the fielding of GBS receive suites to the U.S. Central Command that operated in Asia and part of the Middle East. The GBS JPO would begin operational support for GBS-equipped units in

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[36] Internet Document, DefenseLink, "Department of Defense Releases Selected Acquisition Reports," 20 August 2002, http://www.defenselink.mil/news/Aug2002/b08202002_bt432-02.html (Doc 8-122); Briefing Charts, SMC/MC, "Global Broadcast Service," 2001, pp. 6-7 (Doc 8-90); Briefing Charts, SMC/MC, "Global Broadcast Service (GBS) Description," circa August 2001, p. 7 (Doc 8-110); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, p. 3 (Doc 8-61).

[37] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 159-160; Briefing Charts, SMC/MC, "MILSATCOM [Overview]," June 1999, p. 29 (Doc 8-69); Briefing Charts, SMC/MC, "MILSATCOM JPO Program Overview," September 2000, p. 19 (Doc 8-26); Briefing Charts, SMC/MC, "MILSATCOM JPO [Overview]," 26 July 2001, p. 14 (Doc 8-1); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "PEO Program Review," 8 March 2001, p. 26 (Doc 8-89).

October 2001. The GBS JPO negotiated the GBS contracts out of Hanscom AFB after the JPO's transfer from SMC.[38]

Wideband Gapfiller Satellite (WGS)

The purpose of the future Wideband Gapfiller Satellite (WGS) would be to fulfill the growing wideband communications requirements of the U.S. military prior to the deployment of the Advanced Wideband System (AWS). According to the planned 2001 schedule, WGS should begin augmenting (not replacing) DSCS and GBS in 2004 with greatly expanded, high-speed wideband communications to support the entire spectrum of the U.S. military. The Gapfiller would provide enormous improvements in communications capacity, coverage, connectivity, backwards compatibility, and flexibility. WGS would have a six-fold increase in capacity and a five-fold increase in maximum data rates over the combined communications capabilities of DSCS and GBS. The Gapfiller would also be interoperable with the existing DSCS and GBS systems and terminals. The WGS System Program Office (SPO) initiated a groundbreaking, commercial-like acquisition strategy that should rapidly produce WGS while saving the government an estimated $210 million dollars.[39]

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[38] Product Support Management Plan (PSMP), ESC/MCG, "Global Broadcast Service Joint Program Office (GBS JPO)," 22 February 2002, p. 13 (Doc 8-62); Briefing Charts, SMC/MC, "Global Broadcast Service (GBS) Description," circa August 2001, pp. 3, 14 (Doc 8-110); No Author, "Spacecom Accelerated GBS Terminals to Support Enduring Freedom," Inside the Air Force, 15 March 2002, (Doc 8-123); Weekly Activity Report (FOUO, extract is not FOUO), ESC/MCG, 17 September 2001, (Doc 8-124); FY00 Historical Report, ESC/MCG, "Global Broadcast System, ESC/MCG, – 2000," circa September 2001, p. 3 (Doc 8-61); Conversation, Lt Col Terry Gold, ESC/MCG, with Robert Mulcahy, SMC/HO, "Does SMC participate in negotiating GBS contracts since the GBS move to Hanscom AFB?," 11 March 2003; E-mail (FOUO, extract is not FOUO), Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: GBS History [Review]," 1 May 2003, p. 13 (Doc 8-73-1); E-mail, Jaime Fernandez, ESC/MCG, to Robert Mulcahy, SMC/HO, "RE: Certificate of Networthiness," 5 May 2003, (Doc 8-125).

[39] Fact Sheet, SMC/MC, "Wideband Gapfiller," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcw.html (Doc 8-55); Fact Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56); Briefing Charts, SMC/MC, "MILSATCOM [Overview]," June 1999, p. 23 (Doc 8-69); 2Lt Gina Tracey, "Wideband Gapfiller Satellite team wins Welch award," Astro News, 1 June 2001, p. 4 (Doc 8-126); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO [Overview]," 8 May 2002, pp. 47-48, (Doc 8-127); Memo, ASD to USD(AT&L), "WGS Overarching Integrated Product Team (OIPT) Report," 12 October 2000, (Doc 8-128); Document (AF Form 1206), Brig Gen Craig R. Cooning, AFPEO/SP, "Nomination For Award [WGS Team for 2000 Welch Award]," circa 21 February 2001, (Doc 8-129).

The WGS Program was initiated as a result of the August 1997 Senior Warfighters' Forum (SWarF) in Washington, D.C. that gathered to determine the future MILSATCOM architecture. Military communication requirements would greatly increase over the next several years due to the progressing tactical technology. Smart weapons, various forms of worldwide communications, and the precision engagement doctrine required significant amounts of specific information and a rapidly increasing amount of bandwidth. Reconnaissance sources (such as the U-2 and the upcoming Predator and Global Hawk unmanned aerial vehicles) would gather significant amounts of raw data for intelligence purposes. This data would have to be transmitted to intelligence specialists who would rapidly turn it into useful information. Then the operations planners would then quickly turn the information into operational coordinates and orders to the engaged military forces. The entire process would have to be processed and communicated in minutes, if not seconds, and would be extremely perishable. The SWarF concluded that DSCS and GBS did not have enough capacity to provide the expanding data rate communications required for the near future. They also agreed that the future AWS would not be available in a timely manner to augment and then replace DSCS and GBS. The entire capacity of the DoD MILSATCOM system (DSCS, GBS, and Milstar) had less than 1.1 gigabytes in August 1997. Some estimated that by 2004 the DoD would need over four gigabytes of service, and by 2010 the need would increase to over 10 gigabytes.[40]

To meet the escalating military communications requirements, the SWarF recommended that an interim wideband satellite capability be deployed in 2004, two years before AWS had originally been scheduled for service. The SWarF proposed a three-satellite "Gapfiller" system that would provide three wideband communication services: X-band follow-on to DSCS that should focus on supporting tactical fighting forces rather than the more standard strategic and fixed users; it should augment GBS Phase II capabilities; and it should introduce two-way Ka-band services to ease the crowding of the X-band spectrum. Furthermore, the SWarF wanted the Gapfiller to emphasize capacity, not protection from a nuclear attack. It also recommended that the amount of military-unique requirements should be minimized in order to reduce the costs and to streamline the acquisition.[41]

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[40] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. 1-2 (Doc 8-130); Environmental Assessment, SMC, "Wideband Gapfiller," 23 October 2000, p. 1 (Doc 8-131); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reply to your WGS questions," 8 April 2003, (Doc 8-132); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reducing Bureaucracy," 16 April 2003, (Doc 8-133).

[41] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. 1-2, 4 (Doc 8-130); Environmental Assessment, SMC, "Wideband Gapfiller," 23 October 2000, p. 1

The proposals by the SWarF redirected the DoD wideband program. The Air Force would acquire WGS to augment DSCS and GBS, and the deployment of AWS would be delayed from 2006 to 2008. Commercial communication satellites were being manufactured and put into service faster than ever before, so the SWarF proposed researching the commercial satellite communications (SATCOM) market for information and for similar acquisitions that could be used as examples to streamline the procurement of WGS. In October 1997, the Joint Requirements Oversight Council (JROC) used JROC Memorandum 118-97 to approve the SWarF's 1997 course of action for the MILSATCOM architecture. The actions of the SWarF and the JROC initiated WGS as a validated DoD requirement.[42]

Air Force Space Command (AFSPC) had the responsibility to determine the requirements for the WGS system, while the SMC MJPO had the responsibility to acquire it. Soon after the JROC validated the MILSATCOM architecture in October 1997, the MJPO created the WGS Project in 1997 and assigned it to the MJPO's Advanced Programs Division. As the Director of the Advanced Programs Division (office symbol SMC/MCX), Mrs. Janice Smith became the first WGS Project Leader in 1997; she was concurrently the AEHF Program Manager. Army Lt Col Chuck Puchon was later appointed as the WGS Program Manager (under Janice Smith). The Air Force and the Army jointly funded and managed WGS, and they had a multi-service WGS team of Air Force and Army personnel. The Defense Acquisition Board (DAB) approved the WGS Program as a new start in 1999. The MJPO appointed Air Force Lt Col Brian Magazu as the WGS Program Manager in July 1999. The WGS Program remained within the Advanced Programs Division until SMC awarded the WGS contract. The WGS Program Office (office symbol SMC/MCW) was established as an independent three-letter organization within the MJPO in January 2001, and Lt Col Magazu continued as the WGS Program Manager into 2002.[43]

(Doc 8-131); Report (FOUO, extract is not FOUO), SMC/MC, "Wideband Gapfiller Satellite Market Research Report," December 1999, pp. 1-1, 2-2 – 2-3.

[42] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. 1-2 (Doc 8-130); Briefing Charts (Competition Sensitive, extract is not Competition Sensitive), AFSPC, "Operational Requirements for the Wideband Gapfiller System," 24 April 2000, p. 3 (Doc 8-134); Document (FOUO, extract is not FOUO), SMC/MC, "Determination and Findings Commercial Item Determination WGS, RFP F04701-99-R-0065," circa 2000, p. 1 (Doc 8-135); No author, "Funding Uncertainty Over New USAF Satellite," Aviation Week & Space Technology, 19 June 2000, p. 31 (Doc 8-6); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 3 (Doc 8-136).

[43] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. 6, 8 (Doc 8-130); Fact

The WGS team began a comprehensive market research study in September 1998 to determine the best strategy to quickly acquire the Gapfiller requirements. The data sources included library and internet searches, and the input of experts from the DoD, the Aerospace Corporation, the National Aeronautics and Space Administration (NASA), and the National Reconnaissance Office (NRO). The MJPO published a Request for Information (RFI) in the Commerce Business Daily on 8 September 1998, requesting industry feedback about an acquisition strategy for WGS. Several of the questions focused on commercial COMSAT contracting methods. Eight industrial contractors responded to the RFI: Boeing, Harris Corporation, Lockheed Martin, Motorola, Space Systems Loral, Spectrum Astro, and TRW. Seven of the contractors stated their interest in submitting proposals for the WGS contract. The Harris Corporation preferred to participate in WGS as a subcontractor rather than as the prime contractor. In July 1999, the government again requested contractor feedback about the acquisition plans.[44]

Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56); Capt Jay Schatz, "Air Force awards $1.3 billion satellite contract to Boeing," Astro News, 12 January 2001, pp. 1, 3 (Doc 8-137); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reply to your WGS questions," 8 April 2003, (Doc 8-132); Biography, Air Force, Lt Col Brian Magazu, 2003, (Doc 8-138); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Origins of WGS Program Office," 9 April 2003, (Doc 8-139); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Who Proposed FAR Part 12?," 10 April 2003, (Doc 8-140); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reducing Bureaucracy," 16 April 2003, (Doc 8-133); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)" 23 April 2003, pp. 3-4 (Doc 8-136); E-mail, Janice Smith, MC/MCA, to Robert Mulcahy, SMC/HO, "RE: AWS reference," 5 June 2003, (Doc 8-141); E-mail, Janice Smith, SMC/MCA, to Robert Mulcahy, SMC/HO, "FW: Origins of the WGS Program Office," 23 July 2003, (Doc 8-141-1).

[44] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. 16 (Doc 8-130); Document (FOUO, extract is not FOUO), SMC/MC, "Determination and Findings Commercial Item Determination WGS, RFP F04701-99-R-0065," circa 2000, p. 2 (Doc 8-135); SSS, SMC/MCX to SMC/MC et al., "Wideband Gapfiller Request for Information," 4 September 1998, with attachment, Announcement, SMC, "[WGS RFI]," Commerce Business Daily, 8 September 1998, (Doc 8-142); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reducing Bureaucracy," 16 April 2003, (Doc 8-133); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, pp. 4-5 (Doc 8-136); Report (FOUO, extract is not FOUO), SMC/MC, "Wideband Gapfiller Satellite Market Research Report," December 1999, pp. 1-1, 1-2, 2-7 – 2-10.

The MJPO researched whether it would be best to acquire, lease, or use other options to obtain the WGS requirements. The research included the input of industry and an independent assessment by Booz Allen Hamilton Inc. Their input summarized why several of the options for obtaining WGS services would not be feasible. The commercial Ka-band market was too new and turbulent for the DoD to use a commercial service provider to adequately supply some or all of the DoD tactical wideband requirements. The leasing options had too many legal and regulatory barriers. Leasing WGS would also have significantly higher costs and termination liability. An operating lease could not provide X-band and GBS service, and a capital lease would be a high risk to meet the WGS schedule. The dual payloads option had a high schedule risk, and the issue resolutions could take years to conclude. The anchor tenant option had a high risk for meeting the schedule and for probable cost overruns; it also could not provide X-band or GBS services. In August 1999, after reviewing the data and the industry evaluations, an MJPO acquisition strategy panel determined that purchasing WGS in a commercial-like procurement would be the best acquisition alternative and had the lowest risk to meet all of the study's requirements: budget, schedule, regulations, and performance requirements. The Air Force needed a new acquisition approach to rapidly acquire the urgently needed WGS.[45]

Using the marketplace and acquisition research, the WGS team created a groundbreaking, commercial-like strategy to obtain the Gapfiller with a rigorous schedule. The WGS acquisition would be based on Federal Acquisition Regulation (FAR) Part 12 for commercial item procedures that required the contract to be a fixed price. During the market research, industry strongly recommended the FAR Part 12 approach. This would be the first time the DoD used FAR Part 12 to procure a major satellite system. The WGS acquisition would use commercial COMSAT market practices with commercial contract terms and conditions. A fixed-price contract (rather than a conventional government cost plus award contract) made the contractor fully responsible to take all the risks for the costs and the resulting profits or losses for the effort. Realistic contract pricing would be possible because WGS closely resembled COMSAT acquisitions in the commercial market. WGS would use technology that was already available on the market to save time and money. The MJPO planned for WGS to take advantage of all the available technology from the booming commercial SATCOM industry. Various commercial processes would be followed such as block buying the

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[45] Briefing Charts (FOUO and Contractor Proprietary, extract is not FOUO and not Contractor Proprietary), SMC/MC, "Acquisition Strategy Panel, Wideband Gapfiller Satellite (WGS) System," 18 August 1999, pp. 11, 13, 16-17, 31-32, 95 (Doc 8-143); Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. 2, 4 (Doc 8-130); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Who Proposed FAR Part 12?," 10 April 2003, (Doc 8-140); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 5 (Doc 8-136).

parts, block building the satellites, and having short delivery centers. The overall commercial acquisition strategy for WGS would reduce the standard government acquisition bureaucracy and greatly accelerate the delivery schedule. The competitively selected contractor would have three years to develop WGS, the first launch was planned for 2004 (according to the 2001 schedule), and the second and third launches were planned for 2005. This streamlined acquisition strategy would produce WGS at a significant cost savings to the government. [46]

Dr. Jacques Gansler, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)), concurred with the FAR Part 12 acquisition strategy for WGS in a memorandum dated 15 October 1999. Dr. Gansler encouraged using commercial practices in DoD acquisition. He supported DoD procurement reform at this time and worked to bring about major changes.[47]

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[46] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. i, 11-13, 16, 24 (Doc 8-130); Fact Sheet, SMC/MC, "Wideband Gapfiller," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcw.html (Doc 8-55); E-mail, Capt Jean Iwai, SMC/MCE, to Lt Col Brian Magazu, SMC/MCX, "RE: Robert Wall – Aviation Week – Gapfiller Media Query," 14 June 2000, (Doc 8-144); Document (FOUO, extract is not FOUO), SMC/MC, "Determination and Findings Commercial Item Determination WGS, RFP F04701-99-R-0065," circa 2000, p. 8 (Doc 8-135); Memo, Jacques Gansler USD(AT&L) to Secretaries of the Military Departments, "Acquisition Decision Memorandum for Wideband Gapfiller Satellite (WGS) Program," 15 December 2000, (Doc 8-145); Briefing Charts, SMC/MC, "Wideband Gapfiller IIPT #1," 1 April 1999, p. 10 (Doc 8-146); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Who Proposed FAR Part 12?," 10 April 2003, (Doc 8-140); Fact Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.Com/defense-space/ space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56); Document (AF Form 1206), Brig Gen Craig R. Cooning, "Nomination For Award [WGS Team for 2000 Welch Award]," circa 21 February 2001, (Doc 8-129); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 6 (Doc 8-136); Document (FOUO, extract is not FOUO), Christine Anderson, SMC/MC Program Director, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 31 (Doc 8-146-1).

[47] Memo, Jacques Gansler USD(AT&L) to Secretaries of the Military Departments, "Wideband Gapfiller Satellite (WGS) System – Acquisition Category Designation," 15 October 1999, (Doc 8-147); Memo, Jacques Gansler USD(AT&L) to Secretaries of the Military Departments, "Acquisition Decision Memorandum for Wideband Gapfiller Satellite (WGS) Program," 15 December 2000, (Doc 8-145); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Who Proposed FAR Part 12?," 16 April 2003, (Doc 8-148).

The JROC approved the WGS Operational Requirements Document (ORD) on 24 April 2000, and the WGS team completed the WGS Source Selection Plan on 15 May 2000. The MJPO issued an RFP (F04701-99-R-0065) on 12 June 2000 that invited industry to submit proposals for the WGS contract, this included producing the satellites, the control suites, the training sustainment, and other needs. The RFP stated the Air Force's intent to use commercial-like acquisition procedures based on FAR Part 12. The contractor proposals had a submission deadline of 27 July 2000.[48]

A memorandum from the Office of the Assistant Secretary of Defense dated 13 October 2000, stated that the WGS Program completed its C4ISP (command, control, communications, computers, and intelligence Support Plan) and was ready for its milestone decision. The OSD and the Joint Staff reviewed the original 17 August 2000 C4ISP for WGS and had 12 critical and 114 substantive comments unresolved. The WGS team resolved the comments and provided the final C41SP for the Stage II review. On 11 October 2000 the Joint Staff reviewers agreed to the resolutions provided by the WGS staff.[49]

In a 15 December 2000 memorandum, Dr. Jacques Gansler, the USD(AT&L), approved the streamlined Engineering and Manufacturing Development (EMD) and Production phases for WGS. Gapfiller proceeded with a combined EMD/Production phase. The WGS Program did not have, or need, a lead-in development phase. The extensive use of commercially available components for the WGS hardware would introduce almost no new technology into the program. In the same memo, Dr. Gansler approved an Air Force proposal to incorporate a threshold cost figure that was 10 percent

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[48] Memo, SMC/MCKB to all potential offerors, "Executive Summary of Request For Proposal (RFP), F04701-99-R-0065," 12 June 2000, (Doc 8-149); Solicitation For Commercial Items (Standard Form 1449), SMC, "[WGS RFP] F04701-99-R-0065," 12 June 2000, (Doc 8-150); Document (FOUO and Source Selection Sensitive, extract is not FOUO and not Source Selection Sensitive), SMC/MC, "Source Selection Decision Document for the WGS Program," 2 January 2001, p. 1; Briefing Charts, SMC/MC, "Wideband Gapfiller OIPT #2," 13 September 2000, p. 40 (Doc 8-151); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 10 (Doc 8-136).

[49] Memo, Office of the Assistant Secretary of Defense, "Stage II Review of the Command, Control, Communications, Computers, and Intelligence Support Plan (C4ISP) for the Wideband Gapfiller Program," 13 October 2000, (Doc 8-152); Memo, Joint Staff to Joint Requirements Oversight Council, "Minutes of the 24 April 2000 Joint Requirements Oversight Council," 3 May 2000, (Doc 8-153); Memo, ASD to USD(AT&L), "WGS Overarching Integrated Product Team (OIPT) Report," 12 October 2000, (Doc 8-128).

higher than the objective figure cost into the WGS Acquisition Program Baseline. This increased the firm fixed price amount for the acquisition of the three WGS satellites.[50]

The market research conducted by the MJPO revealed parallels between WGS and some commercial COMSATs that could be used as basic acquisition examples. The Japanese Superbird (with X-band and Ku-band), the multi-national Intelsat (with C-band and Ku-band), and the European Eutelsat (Ku-band) were commercial COMSATs that could provide a direct foundation to the WGS Program.[51]

SMC awarded the firm fixed-price WGS contract (F04701-00/C-0011) to Boeing Satellite Systems (BSS) on 2 January 2001. The contract negotiations ended in December 2000. It took only 14 months for WGS to proceed from concept to contract award. SMC awarded BSS an initial $160 million for the WGS design and the advance parts procurement. WGS would be the first Air Force MILSATCOM prime contract for BSS in almost 30 years. Boeing would develop, produce, and launch three WGS satellites, and deliver all the associated satellite control systems. By producing three satellites, the contract could increase in value to $700 million. The contract also contained government options to purchase up to six WGS satellites that could increase the value of the contract to $1.3 billion. The schedule required Boeing to provide on-orbit capability 36 months after the contract award. Following commercial practices, the Air Force would not formally accept a WGS satellite until it had successfully been placed into orbit. If the Air Force decided to obtain six Gapfiller satellites and achieve full global coverage with WGS, the Air Force could wait until FY 2004 to decide to procure satellite number four, and until 2006 to make a decision to procure satellites five and six. The contract's period of performance was from January 2001 to December 2010. The WGS Program did not have any foreign program partners or any plans for foreign military sales or foreign export.[52]

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[50] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. i (Doc 8-130); Memo, Jacques Gansler USD(AT&L) to Secretaries of the Military Departments, "Acquisition Decision Memorandum for Wideband Gapfiller Satellite (WGS) Program," 15 December 2000, (Doc 8-145); Staff Summary Sheet, SMC/MCX to SMC/MCI, "WGS Anti-Tamper Plan," 26 September 2000, with attachment, Memo, SMC/MC to SAF/AQL, "Wideband Gapfiller Satellite Program--Anti-Tamper Plan," 27 September 2000, (Doc 8-154).

[51] Document (FOUO, extract is not FOUO), SMC/MC, "Determination and Findings Commercial Item Determination WGS, RFP F04701-99-R-0065," circa 2000, pp. 1-2, 5 (Doc 8-135); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 9 (Doc 8-136).

[52] Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "PEO Program Review," 8 March 2001, pp. 122, 123 (Doc 8-89); Internet Document, DefenseLink, "Contracts," 4 January 2001, http://www.defenselink.mil/news/Jan2001/c01042001_ct005-01.html

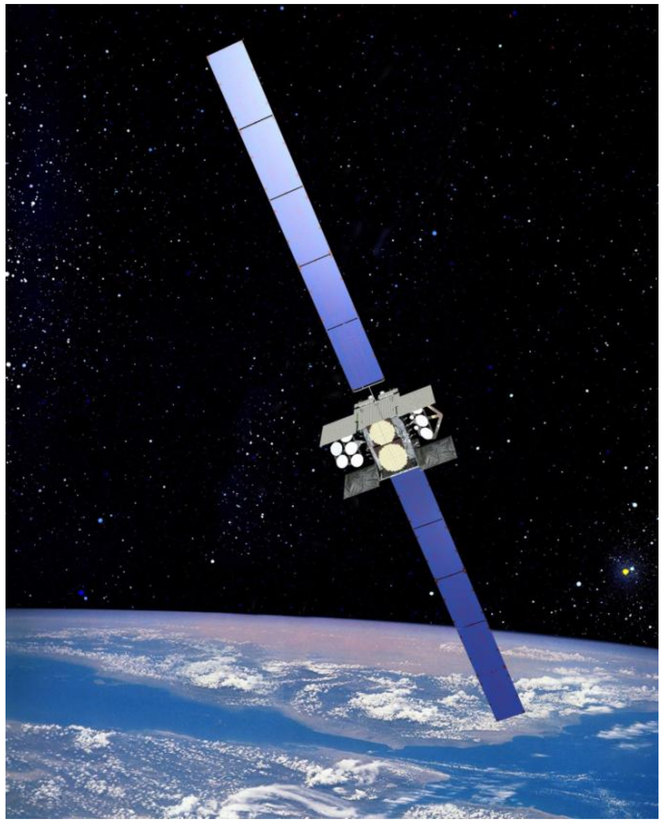

Illustration 8-3:
WGS in orbit (artist's concept)

BSS led a team of subcontractors who would help produce WGS. Harris Corporation provided expertise in the terminal and payload interfaces, and in the satellite Ka-band subsystem. ITT Industries would integrate the payload control segment. Northrop Grumman Information Technology led the system security engineering effort.

(Doc 8-155); Jeremy Singer, "Boeing Wins U.S. Air Force's Wideband Gapfiller Contract," Space News, 8 January 2001, p. 18 (Doc 8-156); BSS, "BSS, Government Exchange WGS Insights," BSS World, 23 March 2001, p. 1, 4 (Doc 8-157); Bill Gregory, "Evolving SATCOM Architecture," Armed Forces Journal International, June 2000, pp. 22-26 (Doc 8-158); Award Announcement, Secretary of the Air Force Office of Legislative Liaison, "[WGS Contract Award]," 2 January 2001, (Doc 8-159); Briefing Charts, SMC/MC, "Wideband Gapfiller OIPT #2," 13 September 2000, p. 23 (Doc 8-151); News Release, BSS, "Boeing-Led Team Awarded $160 Million U.S. Military Communications Satellite Contract," 3 January 2001, http://www.boeing.com/defense-pace/space/bss/hsc_pressreleases/01_01_03_award.html (Doc 8-160); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 13 (Doc 8-136).

Science Applications International Corporation supported the overall WGS systems engineering effort.[53]

The WGS Space Segment was expected to be the most capable, powerful DoD COMSAT upon its first launch. The WGS Program would have at least three satellites with a minimum threshold throughput of 1.2 gigabytes per satellite, and a minimum objective throughput of 3.6 gigabytes per satellite. The satellite bus would be a standard Boeing 702 with a five-panel solar array that would have a design life of at least 14 years on orbit. It included a digital channelizer that would divide the bandwidth into almost 1,900 independently routable 2.6 MHz subchannels for maximum operational flexibility. WGS would have 19 independent coverage areas (nine X-band and 10 Ka-band), and the X-band transmit array would have eight shapeable beams. Delta IV and Atlas V Evolved Expendable Launch Vehicles (EELVs) at Cape Canaveral Air Force Station (AFS) would transport the 12,000-pound WGS spacecraft into a geosynchronous orbit 22,300 miles above the earth. The program planned to use spacecraft and payloads that were already on the market and had on-orbit backgrounds. Over 95 percent of the satellite bus hardware and software would be commercial off-the-shelf (COTS) items. The WGS X-band system would service the DSCS terminals, and support single service data up to 50 Mbps. The WGS Ka-band would support GBS terminals, plus have one and two way communications, at single service maximum data rates up to 50 Mbps. WGS would provide wideband communications to the warfighter during all levels of conflict, except nuclear war.[54]

The two-way Ka-band communications would improve and increase vital military communications capabilities. The military X-band spectrum was very crowded, so WGS needed Ka-band to get the critical communications capacity for the warfighter. The Ka-

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[53] News Release, BSS, "U.S. Air Force Awards $336M Contract to Boeing to Begin Satellite Production," 6 March 2002, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/2002-03-06-wgs.html (Doc 8-161).

[54] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. i, 1, 5, 23-25, 26, 35 (Doc 8-130); Briefing Charts (Competition Sensitive, extract is not Competition Sensitive), AFSPC, "Operational Requirements for the Wideband Gapfiller System," 24 April 2000, p. 3 (Doc 8-134); Fact Sheet, SMC/MC, "Wideband Gapfiller," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcw.html (Doc 8-55); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO [Overview]," 8 May 2002, p. 54-55 (Doc 8-127); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "PEO Program Review," 8 March 2001, p. 113 (Doc 8-89); Fact Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 6 (Doc 8-136); Fact Sheet, Boeing, "Boeing 702 Fleet," 2002, (Doc 8-161-1).

band would provide communications with more bandwidth, with expanded room, to plan and implement communications. The combined Ka-band and X-band WGS payload would provide interoperable communications support among the legacy Ka-band terminals and the X-band terminals.[55]

After the three WGS satellites have been launched, the resulting tactical wideband communications constellation should include three Gapfillers, two GBS payloads onboard UFO satellites, and two DSCS III SLEP satellites augmenting each other. This constellation would provide five X-band payloads and five Ka-band payloads. The constellation orbit locations for the three WGS satellites would be: 12 degrees West longitude over the Atlantic Ocean, 57 degrees East longitude over the Indian Ocean, and 180 degrees East longitude over the Pacific Ocean. WGS would provide an Objective communications connectivity everywhere between 70 degrees North and 65 degrees South latitude, and at all longitudes within each satellite's field of view, 24 hours a day. The WGS satellite coverage would have gaps and could not provide full global communications coverage independently without being augmented by DSCS and GBS. Six WGS satellites would be required for full global communications coverage.[56]

The WGS Control Segment would consist of spacecraft control and payload control at multiple Air Force and Army sites. The Control Segment would mostly consist of COTS hardware and software. WGS satellite control would be integrated into the DSCS operation centers and in the Command and Control System-Consolidated (CCS-C); this would require a number of modifications or additions to the existing hardware, software, and databases. The Air Force Satellite Operations Center at Schriever AFB would be the primary WGS control center. The Air Force Satellite Control Network (AFSCN) would use a WGS database of telemetry, commands, and command sequences within the CCS-C to control the satellites. The satellite payload control system, known as the "Gapfiller Satellite Configuration Control Element" (GSCCE), paid for jointly by the Air Force and the Army, would be integrated into the DSCS operations centers run by the Army Space Command. The GSCCE hardware

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[55] E-mail, Capt Jean Iwai, SMC/MCE, to Lt Col Brian Magazu, SMC/MCX, "RE: Robert Wall – Aviation Week – Gapfiller Media Query," 14 June 2000, (Doc 8-144).

[56] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, p. 4 (Doc 8-130); Briefing Charts (Competition Sensitive, extract is not Competition Sensitive), AFSPC, "Operational Requirements for the Wideband Gapfiller System," 24 April 2000, pp. 3, 8 (Doc 8-134); Memo, Jacques Gansler USD(AT&L) to Secretaries of the Military Departments, "Acquisition Decision Memorandum for Wideband Gapfiller Satellite (WGS) Program," 15 December 2000, (Doc 8-145); Amy Butler, "Air Force Officials Mull Expanding Buy For Gapfiller SATCOM System," Inside the Air Force, 24 August 2001, (Doc 8-162); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 8 (Doc 8-136).

would be a COTS workstation, and the GSCCE software would be similar to existing commercial software. The WGS Control Segment would include four control sites and eight tracking sites for the satellite control, plus five Objective DSCS Operating Centers (ODOCs) and four network planning sites for the payload control.[57]

The WGS Terminal Segment would provide backward compatibility and be fully interoperable with the DSCS and GBS user terminals. GBS terminals included receive suites, PIPs, and TIPs. DSCS terminals included all of its fixed site and tactical (transportable) terminals. The individual services would procure the new or modified two-way Ka-band terminals. The Universal Modem, to be operated at select user terminals, would protect the WGS communications from jamming and signal interceptions. Upon delivery, WGS should operate with over 1500 existing terminals, and with 360 planned two-way Ka-band terminals.[58]

In March 2001, the WGS Program Office relocated into the BSS facilities in El Segundo. Senior Air Force leaders wanted WGS to have a small program management team with an "insight orientation" to manage the program. Darleen Druyun (Principal Deputy Assistant Secretary of the Air Force for Acquisition and Management) requested Brig Gen Craig Cooning (Air Force Program Executive Officer for Space) to implement a plan to collocate the entire WGS SPO to the BSS facilities. Boeing agreed to the concept, and the WGS team moved in a month later. This unique situation of

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[57] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, pp. 5, 6, 18, 25-26, 35 (Doc 8-130); Briefing Charts, SMC/MC, "Wideband Gapfiller Satellites," 2001, pp. 8-9 (Doc 8-163); Fact Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, pp. 9-10 (Doc 8-136).

[58] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Wideband Gapfiller Satellite," 2 June 2000, p. 5, 6 (Doc 8-130); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO [Overview]," 8 May 2002, p. 49 (Doc 8-127); Environmental Assessment, SMC, "Wideband Gapfiller," 23 October 2000, p. 6 (Doc 8-131); Briefing Charts, SMC/MC, "Wideband Gapfiller Satellites," 2001, pp. 9-10 (Doc 8-163); Memo, Jacques Gansler USD(AT&L) to Secretaries of the Military Departments, "Acquisition Decision Memorandum for Wideband Gapfiller Satellite (WGS) Program," 15 December 2000, (Doc 8-145); Fact Sheet, Federation of American Scientists (FAS), "Wideband Gapfiller System," 13 April 2000, http://www.fas.org/spp/military/program/com/wgs.htm (Doc 8-4); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 10 (Doc 8-136).

housing a program office at a contractor facility enhanced communications and promoted combined product team operations.[59]

The commercial-like acquisition strategy (FAR part 12) to procure WGS reduced the standard FAR Part 15/government procurement bureaucracy (also known as "red-tape"). The strategy sought to accelerate the delivery schedule by emphasizing product performance and not oversight. The WGS contract did not require the contractor to produce numerous standard reports, numerous formal program management reviews, or voluminous cost data. Emphasis was placed on commercial production and management efficiencies to produce WGS rapidly. In an era of reduced acquisition budgets, the government wanted to use its available systems development funds to acquire a more capable communication payload, not more contractor generated reports and oversight. The Air Force's Statement of Objectives (SOO), Technical Requirements Document (TRD), and Interface Control Document (ICD) informed industry what the desired program functionality would be. Military Specifications were prohibited from the WGS acquisition; the government made a concerted effort to avoid instructing the contractors about how to produce the satellites. The WGS team focused on telling industry "what" the Air Force wanted and not "how" to make it. Therefore, the Air Force's ICD and TRD emphasized the need for WGS to provide interoperable communications capacity, connectivity, coverage, and control.[60]

The commercial-like provisions in the solicitation and the resultant contract kept the WGS Program progressing smoothly. After the contract had been awarded, the Air Force used new methods to keep informed about the program's progress, such as interim milestone payments to reward\discipline the completion or slip of discrete program milestones. The most instrumental aspect of keeping the information flowing on the program's progress was obtained from the collocation of the WGS SPO with the contractor's program management team in the BSS facility. Working in close proximity

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[59] E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reply to your WGS questions," 8 April 2003, (Doc 8-132); Fact Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56).

[60] E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reducing Bureaucracy," 16 April 2003, (Doc 8-133); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Reviewing Bureaucracy Paragraph," 17 April 2003, (Doc 8-164); Memo, OSD to WGS program office, "WGS (Wideband Gapfiller Satellite) Waiver for Contract Cost Reporting (CCDR), Plan AF-00-H," 25 September 2000, (Doc 8-165); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, pp. 15-16 (Doc 8-136).

with Boeing, the government obtained program insight without the using oversight management.[61]

The overall acquisition process of WGS was streamlined by requiring only two major Defense Acquisition Executive (DAE) reviews. First a streamlined Defense Acquisition Board (DAB) Program Review was conducted. Dr. Jacque Gansler chaired this Program Review that had the requirements of a Milestone 0 and Milestone I reviews. It resulted in the approval to implement the FAR Part 12 procurement strategy on 15 October 1999. Only 14 months later, the WGS SPO successfully passed a second combined Milestone II/Production DAB. At this review, the DAE authorized (on 15 December 2000) the Air Force to award the WGS development and production contact. This 14-month interval between program initiation and contract award was a significant decrease for a program of this size and complexity.[62]

On 19 May 2001, Lt Gen Stephen Plummer (Principle Deputy SAF/AQ) presented the annual John J. Welch, Jr. Award to the WGS team for its pioneering acquisition strategy at the SAF/AQ Annual Awards Banquet. The award recognized the WGS team as the best-managed Air Force acquisition team of 2000. A wall plaque with the names of the WGS team engraved on a brass plate would be permanently displayed at the Pentagon. The WGS team, led by Lt Col Magazu, developed the DoD's first commercial-like acquisition strategy for a communications satellite. The WGS team completed all of its pre-milestone activities (requirements validation, independent cost review, approval by the DAB) in a little over a year.[63]

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[61] E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reducing Bureaucracy," 16 April 2003, (Doc 8-133); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Reviewing Bureaucracy Paragraph," 17 April 2003, (Doc 8-164); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 16 (Doc 8-136).

[62] E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "Reducing Bureaucracy," 16 April 2003, (Doc 8-133); E-mail, Lt Col Brian Magazu, SMC/MCW, to Robert Mulcahy, SMC/HO, "RE: Reviewing Bureaucracy Paragraph," 17 April 2003, (Doc 8-164); Document (FOUO, extract is not FOUO), Col Gregory Miller, SMC/MC Deputy Director, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 42 (Doc 8-146-1).

[63] 2Lt Gina Tracey, "Wideband Gapfiller Satellite team wins Welch award," Astro News, 1 June 2001, p. 4 (Doc 8-126); Biography, Air Force, Lt Col Brian Magazu, 2003, (Doc 8-138); Internet Document, Defense Acquisition Deskbook, "John J. Welch Jr. Award," printed 10 April 2003, http://web2.deskbook.osd.mil/reflib/Awards/0019GDOC.HTM (Doc 8-166); Award Citation, SAF/AQ, "Citation to Accompany the Award of the John J. Welch, Jr. Award for Excellence In Acquisition Management to Wideband Gapfiller Program Team," 19 May 2001, (Doc 8-167); Document (AF Form 1206),

The WGS Program accomplished a major milestone when it completed its Preliminary Design Reviews (PDRs) on 20 August 2001. The PDRs lasted 12 days, and over 100 military, government, and BSS personnel worked together on the WGS design to complete the reviews.[64]

At the end of FY 2001, WGS continued with its EMD Phase, and should advance to its Production Phase in January 2002. The Gapfiller's Critical Design Reviews should also begin in March 2002. The WGS Program office received recognition from the highest levels of the Air Force for establishing its unique commercial-like acquisition strategy. In 2001, the program planned for the first WGS launch to take place in 2004.[65]

Milstar

Milstar (Military Strategic and Tactical Relay) was fielded as the most advanced, reliable military communications satellite system to date. In FY 2001, Milstar's three-satellite constellation provided near global coverage and low to medium data rate communications for the DoD, the U.S. armed forces, and the National Command Authorities. It also provided communications support for the President and the Secretary of Defense. Milstar had assured, flexible, secure, nuclear survivable, highly jam-resistant, two-way communications for tactical and strategic forces. Each satellite contained a communications payload that provided Extremely High Frequency (EHF), Super High Frequency (SHF), and Ultra High Frequency (UHF) communications capabilities. Using crosslinks, the Milstar constellation could simultaneously beam signals to multiple users and eliminated the need for expensive and vulnerable ground relay stations. Milstar served as a "switchboard in space" by routing communications

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Brig Gen Craig R. Cooning, AFPEO/SP, "Nomination For Award [WGS Team for 2000 Welch Award]," circa 21 February 2001, (Doc 8-129); Memo, AFPEO/SP to SAF/AQE, "John J. Welch, Jr., Award for Excellence in Acquisition Management," 21 February 2001, (Doc 8-168).

[64] News Release, BSS, "Boeing Built Wideband Gapfiller Military Satellite Communications Program Passes Major Design Milestone," 20 August 2001, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/01_08_20_wgs.html (Doc 8-169).

[65] Weekly Activity Report (FOUO, extract is not FOUO), SMC/MCW, 31 January 2002, (Doc 8-170); Weekly Activity Report (FOUO, extract is not FOUO), SMC/MCW, 21 March 2002, (Doc 8-171); Fact Sheet, BSS, "Wideband Gapfiller Satellite (WGS)," 2002, http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html (Doc 8-56); E-mail (FOUO, extract is not FOUO), Lt Col Brian Magazu, SMC/MCW, to Lt Col Stephen Hargis, SMC/MCW, "FW: WGS History [Review] (FOUO, extract is not FOUO)," 23 April 2003, p. 18 (Doc 8-136).

traffic from terminal to terminal anywhere in the world. It linked command authorities to the U.S. armed forces through terminals on aircraft, vehicles, ships, submarines, and ground sites with encrypted data, voice, teletype, video teleconferencing, and facsimile communications. The terminals had interoperable communications that could be used between the various U.S. military forces. Milstar also had five technologies not found on any previous MILSATCOM system: onboard signal processing, onboard signal routing, onboard resource control, crossbanding, and crosslinks.[66]

The SMC MJPO Milstar Program Office (office symbol SMC/MCM) developed, acquired, and sustained the Milstar space and mission control segments. The SMC Milstar Program Managers during this time period included Col John Keesee (1995-July 2000), Col Gregory D. Miller (July 2000-May 2001), and Lt Col Scott A. Henderson (17 May 2001-into 2002). The Electronic Systems Center (ESC/MC) at Hanscom AFB, Massachusetts developed and acquired the Air Force portion of the Milstar terminal segment. The Air Force Space Command's (AFSPC) 4th Space Operations Squadron (4SOPS) at Falcon AFB (renamed Schriever AFB in June 1998), Colorado had the overall command and control of the Milstar satellite constellation.[67]

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[66] Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office, "Milstar PSMP," 20 February 2002, pp. 2, 4, 13, 15 (Doc 8-172); Briefing Charts, SMC/MC, "Milstar PMR Overview," November 2001, p. 5 (Doc 8-173); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO Overview," 11 May 1998, p. 9 (Doc 8-31); Fact Sheet, Boeing Satellite Systems, "Milstar II," 2002, (Doc 8-174); Fact Sheet, SMC/PA, "Milstar Satellite Communications System," December 2001, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/milstarsatcom.htm (Doc 8-175); Fact Sheet, SMC/MCM, "Milstar," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcm.html (Doc 8-176); News Release, Lockheed Martin, "Lockheed Martin's next generation military communications satellite ready for launch by the Air Force," 29 April 1999, http:/lmms.external.lmco.com/newsbureau/pressreleases/1999/99.130.html (Doc 8-177); Fact Sheet, 50th Space Wing PA, "Milstar," May 1999, http://www.schriever.af.mil/fact_sheets/milstar/index.htm (Doc 8-178).

[67] Fact Sheet, SMC/PA, "Milstar Satellite Communications System," December 2001, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/milstarsatcom.htm (Doc 8-175); Fact Sheet, Schriever AFB, "4th Space Operations Squadron," April 2002, http://www.schriever.af.mil/FactSheets.asp (Doc 8-179); Internet Document, Hanscom AFB, "MILSATCOM Air Force Terminals," 19 December 2001, http://esc.hanscom.af.mil/esc-mc/ (Doc 8-180); Memo, SMC/MC to MJPO Personnel, "MILSATCOM Assignments," 1 May 2001, (Doc 8-181); E-mail, Lt Col Michael Hirka, SMC/MCM, to Robert Mulcahy, SMC/HO, "RE: command dates," 28 May 2003, (Doc 8-181-1); Telephone call, Robert Bresnick, SMC/MCM, "Milstar Program Managers 1998-2001," 22 September 2003; Biography, Air Force, Col Gregory Miller, SMC/MCM, June 2001.

Unlike DSCS, which operated in the SHF range (3,000-30,000 megaherz), Milstar operated in the EHF range (30,000-300,000 megaherz). EHF had rarely been used for military communications before Milstar. This frequency range provided natural resistance to jamming. EHF also allowed users to employ smaller, highly mobile terminals. Unlike commercial satellites with beams that could cover entire continents, Milstar had very narrow beams that provided less opportunity for enemy detection and penetration.[68]

The Milstar system consisted of three segments: a space segment, a mission control segment, and a terminal segment. The mission control segment controlled the Milstar constellation, maintained the satellites' operational health, and managed communications among the satellites, as well as between satellites and the ground. The 4SOPS used the Milstar Satellite Operations Center (MSOC), the Milstar Support Facility, and three Mobile Constellation Control Stations for the command and control of the constellation. MSOC and the Milstar Support Facility were located in the same building at Schriever AFB, and utilized the common-user Air Force Satellite Control Network. The terminal segment included fixed and mobile ground user terminals as well as terminals in ships, submarines, and aircraft.[69]

The Milstar concept was first defined in 1980 and 1981. Space Division (SMC's organizational predecessor) awarded six concept validation contracts for the satellite and mission control segments of Milstar I in March and May 1982. It awarded a development contract (F04701-83-C-0025) to Lockheed Missiles and Space Company in February 1983. The contract covered full-scale development of the Milstar system. The Air Force launched the first Milstar Block I (DFS-1 or Flight-1 [F-1]) satellite into orbit on 7 February 1994. The Milstar space segment definition changed several times, but in 1995 it was determined that the initial space segment would consist of four Milstars: two Milstar I and two Milstar II satellites. The Air Force planned the final constellation to be four Milstar II satellites. The Air Force launched the second Milstar I satellite (DFS-2 or F-2) from Cape Canaveral Air Station (AS), Florida on 6 November 1995. With two Milstar satellites in orbit, the Milstar system transmitted the first satellite-to-satellite message in history using a radio frequency crosslink. The Milstar I contract was completed in the spring of 1998.[70]

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[68] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 142; News Release, Boeing Satellite Systems, "Hughes On Track to Deliver Payloads for Milstar F-5 Satellite," 1 April 1999, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/99_04_01milstar.html (Doc 8-182).

[69] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 142; Fact Sheet, Schriever AFB, "4th Space Operations Squadron," April 2002, http://www.schriever.af.mil/FactSheets.asp (Doc 8-179).

[70] SMC History 1995-1997 (FOUO, extracts are not FOUO), SMC/HO, pp. 143, 145, 150; Donald H. Martin, "Communication Satellites fourth edition," p. 208; Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "MILSATCOM JPO Overview," 11

SMC awarded a contract (F04701-92-C-0049) that eventually covered the development and production of all Milstar II satellites to Lockheed Missiles and Space Company in October 1992. At first, the contract covered only the fourth satellite. In June 1994, the contract was amended to cover the retrofit of the third satellite with an MDR communications package. In November 1994, SMC added production of the fifth and sixth satellites to the contract.[71]

Illustration 8-4:
Milstar II satellites on orbit (artist's concept)

When the Milstar Program was restructured, the former requirement for the system to provide polar coverage was deleted. The constellation could provide reliable coverage only for the middle latitudes. Rather than using Milstar satellites, the Air Force received direction to find a cost effective solution to provide polar coverage. In July 1995, the Joint Requirements Oversight Council of the Joint Chiefs of Staff approved a separate program for interim communications in the polar regions to augment the Milstar

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May 1998, p. 9 (Doc 8-31); Fact Sheet, SMC/MC, "Advanced EHF," Printed 15 November 2002, (Doc 8-5); E-mail (FOUO, extract is not FOUO), Robert Bresnick, SMC/MCM, to Robert Mulcahy, SMC/HO, "RE: Milstar History Review (FOUO, extract is not FOUO)," 11 June 2003, (Doc 8-183); E-mail (FOUO, extract is not FOUO), Robert Bresnick, SMC/MCM, to Robert Mulcahy, SMC/HO, "Milstar Milestones [March 2001]," 27 June 2003, (Doc 8-184).

[71] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 145.

system. The new program included three satellite payloads known as "Polar MILSATCOM" that would be hosted on a classified satellite occupying a polar orbit. The Polar payload provided operations support in the polar area. The Interim Polar 1 payload was launched and became operational in November 1997. The EHF Polar 2 payload should be available in 2004, and the EHF Polar 3 payload should be available in 2005.[72]

At the end of FY 2001, the Milstar space segment consisted of three orbiting satellites (plus augmentation from the Polar 1 payload), and would have two more future launches. The constellation had a near-geosynchronous orbit of 22,250 nautical miles, and provided 24-hour communications coverage from 65 degrees north to 65 degrees south. Milstar satellites were built and deployed in two phases. Phase I (or the Block I satellites) consisted of the first two Milstar I satellites (F-1 and F-2) that provided a low-data-rate (LDR) of 75 to 2,400 bits per second (bps) communications in 192 channels per satellite. The Air Force scheduled the Milstar I satellites to be replaced in the constellation by Milstar II spacecraft by 2004.[73]

Phase II (or the Block II satellites) consisted of the third (F-3) through sixth (F-6) Milstar satellites, which would provide both LDR and a medium-data-rate (MDR) communications of 4.8 Kilo-bits per second (Kbps) to 1.544 Megabits per second (Mbps). The addition of the MDR payload greatly increased the ability of tactical forces to communicate within and across theater boundaries. Built by Hughes Space and Communications (HSC) (which was acquired by Boeing Satellite Systems in October 2000), the MDR payload sorted incoming data and routed it to the proper downlinks to establish networks and provide bandwidth on demand. With a 32-channel EHF (44 GHz) uplink and a SHF (20 GHz) downlink, the Milstar II sent real-time voice, video, and data communications to military personnel in the field. A Milstar II with MDR had a

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[72] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 143-144; Program Management Directive (PMD) (FOUO, extract is not FOUO), SAF/AQS, "PMD 2325(5)… for Military Satellite Communications (MILSATCOM)," 24 February 2000, p. 11 (Doc 8-54); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Interim Polar System Program Description," circa 2001, (Doc 8-185); RDT&E Budget Item Justification Sheet, DoD, "0603432F Polar MILSATCOM (Space)," February 2002, (Doc 8-186); Fact Sheet, Federation of American Scientists (FAS), "Polar Adjunct," 20 April 1997, http://www.fas.org/spp/military/program/com/ polar.htm (Doc 8-187); Internet Document, Federation of American Scientists (FAS), "FY98 USAF Military Space RDDS, 0603432F Polar Adjunct (Space)," circa 1998, http://www.fas.org/spp/military/budget/peds_98f/ 0603432.htm (Doc 8-188); E-mail (FOUO, extract is not FOUO), Maj James Hallman, SMC/MCA, to Robert Mulcahy, SMC/HO, "FW: Polar MILSATCOM (FOUO, extract is not FOUO)," 25 April 2003, (Doc 8-189).

[73] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 144; Briefing Charts, SMC/MC, "Milstar PMR Overview," November 2001, p. 11 (Doc 8-173).

throughput of 5.7 seconds to disseminate an Air Tasking Order (Milstar I with LDR took 1.02 hours), and a throughput of 2.07 minutes to disseminate an 8x10 image (Milstar I took 22.2 hours). Milstar II provided a 600 percent increase in communications capacity over Milstar I. The Phase II also had increased security through a specially designed, fully autonomous nuller antenna system that could negate the effects of both in-beam and out-beam jamming equipment by changing their gain patterns when a jamming signal was detected. HSC delivered the fourth and final Milstar MDR and crosslink payload to Lockheed Martin in July 2000.[74]

Lockheed Martin and its subcontractors manufactured the major Milstar II components and continued to integrate them into spacecraft F-3 through F-6. Lockheed completed manufacturing the F-3 spacecraft bus plus its LDR and MDR payloads during FY 1996. The LDR payload was integrated and tested with the spacecraft during FY 1996, and the MDR payload completed integration and began testing during FY 1997. Lockheed delivered the completely integrated spacecraft to Cape Canaveral in late 1998 for its launch in 1999. The Milstar F-4 completed its bus manufacturing in 1997, and HSC delivered the satellite's MDR and crosslink payload hardware to Lockheed Martin in June 1998. F-4 began its satellite testing around August of 1998. Manufacturing began during FY 1995 on the LDR and MDR payloads as well as the satellite busses for satellites F-5 and F-6. They were originally scheduled for delivery to Cape Canaveral for launches in November 2000 and October 2001. Lockheed Martin should deliver the Milstar F-5 to Cape Canaveral AFS before 2002.[75]

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[74] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 144-145; Fact Sheet, Boeing Satellite Systems, "Milstar II," 2002, (Doc 8-174); Briefing Charts, SMC/MC, "MILSATCOM JPO [Overview]," 26 July 2001, p. 16 (Doc 8-1); News Release, Boeing Satellite Systems, "Boeing MDR Payload Adds New Capabilities To U.S. Air Force Milstar II Satellite," 19 February 2001, http://www.boeing.com/defense-space/space/bss/ hsc_pressreleases/010115_milstar.html (Doc 8-190); Fact Sheet, SMC/PA, "Milstar Satellite Communications System," December 2001, http://www.losangeles.af.mil/SMC/ PA/Fact_Sheets/milstarsatcom.htm (Doc 8-175); News Release, Boeing Satellite Systems, "Hughes Delivers Final Milstar Satellite Payloads To Lockheed Martin," 26 July 2000, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/00_07_26__milstar.html (Doc 8-191); Internet Document, Spaceflight Now, "Digital processing subsystem key to the MDR payload," 25 February 2001, http://spaceflightnow.com/ titan/b41/010225digital.html (Doc 8-192); Fact Sheet, Spaceflight Now, "MDR nulling antennas: Ensuring secure tactical military communications," 25 February 2001, http://spaceflightnow.com/titan/b41/010225mdr.html (Doc 8-193); Fact Sheet, Spaceflight Now, "Boeing's Milstar payload," 25 February 2001, http://spaceflightnow. com/titan/b41/010225boeing.html (Doc 8-194); News Release, Boeing Satellite Systems, "Hughes On Track to Deliver Payloads for Milstar F-5 Satellite," 1 April 1999, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/99_04__01milstar. html (Doc 8-182).

[75] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 150; News Release, Lockheed Martin, "U.S. Air Force Milstar II satellite shipped to Cape Canaveral

The first Milstar II satellite (designated Milstar 3M or F-3) had a launch slip from 27 January 1999 to April 1999. The delay for the Milstar F-3 launch occurred due to the 12 August 1998 launch failure of the Titan IV mission A-20, and due to Program Objective Memorandum (POM) costs. The Titan failure also slipped all of the original Milstar contract launch schedules: Milstar F-4 (from 6 December 1999 to October 2000), F-5 (from 7 November 2000 to 29 June 2001), and F-6 (from 7 October 2001 to 6 June 2002). To provide funding for the extra costs associated with delaying the three Milstar launch schedules, SMC awarded Lockheed Martin a $59,744,340 cost plus award fee contract modification (F33657-01-C-2083) on 5 July 2001 to perform the ongoing technical/processing effort. SMC expected the work to be completed in August 2003.[76]

On 30 April 1999, Cape Canaveral AS launched Milstar F-3 with a Titan IVB/Centaur. After separating from the Titan IVB, approximately nine minutes into the flight, the Centaur's onboard reaction control system made two improper engine firings, the Centaur then lost its roll axis control, flew off-course, and then injected the Milstar into an incorrect, useless orbit at an altitude of approximately 2,700 miles - almost 20,000 miles below its proper 22,300-mile altitude. The satellite then began tumbling at a high rate of speed (280 degrees per second). The Milstar flight team at Schriever AFB spent the next few days attempting to save the satellite. Unfortunately, the Milstar's many problems degraded the spacecraft sooner than expected, the low orbit put F-3 dangerously in the path of many other operational satellites, and the Milstar could not be raised into its proper altitude. The Space Shuttle could not recover the $800 million satellite, and there were no viable options for saving F-3. The Acting Secretary of the Air Force declared the Milstar F-3 satellite a complete loss on 4 May 1999. Beginning on

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for early 2002 launch," 14 November 2001, http://lmms.external.lmco.com/newsbureau/pressreleases/2001/01.87.html (Doc 8-195); News Release, Lockheed Martin, "U.S. Air Force/Lockheed Martin-led team celebrates success of Milstar program as final satellite is readied for shipment to Cape for January launch," 25 September 2002, http://lmms.external.lmco.com/newsbureau/pressreleases/2002/02.46.html (Doc 8-196); News Release, Lockheed Martin, "Lockheed Martin's next generation military communications satellite ready for launch by the Air Force," 29 April 1999, http:/lmms.external.lmco.com/newsbureau/pressreleases/1999/99.130.html (Doc 8-177); News Release, Boeing Satellite Systems, "Boeing MDR Payload Adds New Capabilities To U.S. Air Force Milstar II Satellite," 19 February 2001, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/010115_milstar.html (Doc 8-190); 45th Space Wing Annual History 1999 (FOUO, extract is not FOUO), 45 SW/HO, p. 63 (Doc 8-197); Briefing Charts, SMC/MC, "Milstar System," 2001, p. 12 (Doc 8-198).

[76] Internet Document, DefenseLink, "Contracts," 5 July 2001, http://www.defenselink.mil/news/Jul2001/c07052001_ct298-01.html (Doc 8-199); Briefing Charts, SMC/MC, "FY00 MILSATCOM PEO Program Review," November 1999, pp. 11-12 (Doc 8-200); Monthly Acquisition Report, SMC/MC, "Milstar," April 1998, (Doc 8-201); Monthly Acquisition Report, SMC/MC, "Milstar," July 1998, (Doc 8-202).

6 May, the control team elevated F-3 over the next four days to a terminal orbit of 2,781 miles, and then turned off all of the satellite's functions and drained all of its remaining power. Air Force officials declared the Milstar satellite dead in orbit on 12 May 1999.[77]

AFSPC launched an investigation to determine the cause of the Milstar F-3 launch failure. The mission failure was extremely costly. The Titan IVB/Centaur had an estimated value of $433 million and the Milstar satellite cost the government approximately $800 million. The Accident Investigation Board released its results on 22 July 1999. It found convincing evidence that the cause of the disaster was the Centaur's software development, plus its testing and quality assurance process. The software in the Centaur upper stage did not detect and correct a human error in the manual input of data values into the Centaur's Inertial Measurement System flight software file. A formal process also did not exist for verifying and validating these values prior to the launch. The erroneous software values caused the Centaur to lose its attitude control, and then its reaction control system depleted its hydrazine fuel while attempting to correct the problem. These errors resulted in the Milstar separating from the Centaur in a low, useless orbit.[78]

After the launch failure, the MJPO began developing acquisition strategies and cost estimates for replacing the expected communication capabilities lost by the F-3. Without four MDR-capable Phase II satellites, Milstar would not achieve its Full Operational Capability (FOC). The Air Force participated in briefings to consider the

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[77] Executive Summary, AFSPC Accident Investigation Board, "Executive Summary for the Milstar AIB," 22 July 1999, http://www.spacecom.af.mil/hqafspc/library/nr_temp/MilStar%20AIB-EXEC%20RPT.htm (Doc 8-203); Aaron Renenger, "Wayward Milstar II satellite challenges SMC controllers," Astro News, 2 July 1999, pp. 1, 7 (Doc 8-204); 45th Space Wing Annual History 1999 (FOUO, extracts are not FOUO), 45 SW/HO, pp. 63-64 (Doc 8-197); Memo, SMC/MCJ to SMC/CC et al., "Milstar Mission Readiness Review (MRR)," Faxed 1 December 1998, (Doc 8-205); SMC/PA, "Milstar launch a mission failure," Astro News, 7 May 1999, p. 1 (Doc 8-206); News Release, SMC/PA, "Milstar Flight 3 Satellite Placed in Terminal Orbit," 12 May 1999, http://www.losangeles.af.mil/SMC/PA/Releases/1999/nr9910.htm (Doc 8-207); News Release, SMC/PA, "Air Force to Launch Milstar Communications Satellite Friday," 28 April 1999, http://www.losangeles.af.mil/SMC/PA/Releases/1999/nr9907-2.htm (Doc 8-207-1).

[78] Executive Summary, AFSPC Accident Investigation Board, "Executive Summary for the Milstar AIB," 22 July 1999, http://www.spacecom.af.mil/hqafspc/library/nr_temp/MilStar%20AIB-EXEC%20RPT.htm (Doc 8-203); 45th Space Wing Annual History 1999 (FOUO, extracts are not FOUO), 45 SW/HO, pp. 63-64 (Doc 8-197); News Release, SMC/PA, "Air Force to Launch Milstar Communications Satellite Friday," 28 April 1999, http://www.losangeles.af.mil/SMC/PA/Releases/1999/nr9907-2.htm (Doc 8-207-1); SMC/PA, "Milstar accident board results," Astro News, 30 July 1999, p. 4 (Doc 8-207-2).

options with the Joint Requirements Board (JRB) on 12 July 1999, and with the Joint Requirements Oversight Council (JROC) on 26 July 1999. The most straightforward proposal was replacing Milstar F-3 with the acquisition of an additional (seventh) Milstar satellite. The JROC endorsed replacing F-3 if supplemental funding could be obtained from Congress. Over $1 billion would have to come from the FY 2000 budget to meet the 2003 Initial Operational Capability (IOC) and to avoid halting the shutdown of Lockheed Martin's Milstar production line. Air Force Secretary Whitten Peters considered it unlikely that Congress would approve such an expensive acquisition. SMC released an announcement in the 16 June 1999 issue of Commerce Business Daily stating that it planned to buy a seventh Milstar, but SMC quickly retracted the announcement in the 21 June 1999 issue of Commerce Business Daily saying the notice had been an error. The Air Force did not have the approval or the funding of the Pentagon or Congress to acquire an additional Milstar satellite. The Air Force soon decided to find an alternative to purchasing a seventh Milstar.[79]

In 1999, the DoD and the Air Force examined various alternatives to spending over $1 billion for a seventh Milstar. One option suggested making do with just five Milstar satellites, positioning the three Milstar II spacecraft over the highest priority areas of the world, and continuing with the planned schedule of the Advanced Extremely High Frequency (AEHF) satellites that were scheduled to begin replenishing Milstar with its first launch in June 2006. The JROC and the Army strongly disliked this option because it could be a detriment to mission readiness, and there would be gaps in the Milstar's MDR coverage over certain areas. A second option advocated continuing with the Milstar II launches while accelerating the AEHF schedule. A third option would have canceled the Milstar II Program and replaced it with schedule-accelerated AEHF

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[79] Internet Document, David Atkinson, "Peters: Seventh Milstar Funding Unlikely," Defense Daily, 3 September 1999, http:/ebird.dtic.mil/Sep1999/e19990903peters.htm (Doc 8-208); Briefing Charts, SMC/MC, "MILSATCOM," 19 October 1999, p. MS-L12 (Doc 8-209); Briefing Charts, SMC/MC, "FY00 MILSATCOM PEO Program Review," November 1999, p. 3 (Doc 8-200); Roger Guillemette, "Battlestar America: Fate of $17 billion Milstar program hinges on next launch," Florida Today, 27 February 2001, http://www.floridatoday.com./news/space/2001a/feb/spa022501roger.htm (Doc 8-210); Legislative Update, AFSPC Commander's Action Group, "Air Force Boondoggles Cost Taxpayers Billions," 10 May 1999, pp. 6-7 (Doc 8-211); No Author, "Joint Staff Considering Alternatives To Extra Milstar Funding," Inside the Air Force, 19 September 1999, pp. 11-12 (Doc 8-212); Announcement, SMC, "Air Force requires a Milstar Satellite," Commerce Business Daily, 16 June 1999, http://frwebgate1.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=9076934114+0+0+0 &WAISaction= retrieve (Doc 8-213); Announcement, SMC, "Retraction of Potential Sources Sought for a Milstar Satellite," Commerce Business Daily, 21 June 1999, http://frwebgate3.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=9103053781+11 +0 =0+0& WAISaction=retrieve (Doc 8-214); Legislative Update, AFSPC Commander's Action Group, "Air Force Announcement Hints at Plans to Buy Seventh Milstar Satellite," 25 June 1999, p. 11 (Doc 8-215).

satellites that would first be launched in 2003. This option was considered unacceptable because it would take too long to initiate MDR capabilities. A fourth option would have added a Milstar II-type payload to the Navy's UFO 11 satellite.[80]

While the Air Force evaluated its options to replace the Milstar, the launch failure of the F-3 caused, or received the blame for, several schedule slips. The Milstar II's Initial Operational Test and Evaluation (IOT&E) Complete and the IOC II milestones were delayed by over six months due to the F-3 loss. The delays in replacing the capabilities of the Milstar F-3 frustrated the Army who had planned to conduct training with its MDR ground terminals at Fort Hood, Texas, Fort Gordon, Georgia, and Fort Irwin, California. On 1 July 1999, the Army's Communications- Electronics Command (CECOM) released a Request for Information (RFI) in the 1 July 1999 issue of Commerce Business Daily asking potential contractor sources for satellite simulator concepts that could provide MDR training and terminal testing. CECOM began contracting for three MDR satellite simulators in March 2000; the first should be delivered in May 2002, the second in January 2003, and the third in April 2003. In its 30 September 1999 Selected Acquisition Report (SAR), the Army estimated that the MDR follow-on test and evaluation (FOT&E) for its Milstar Secure Mobile Anti-Jam Reliable Tactical – Terminal (SMART-T) would be delayed by six months because of the Milstar F-3 failure. In its 30 June 1999 SAR, the Navy reported to Congress that the Navy EHF SATCOM Program (NESP) would have a 25-month schedule slip due to the F-3. In its 2 August 1999 SAR, the Navy reported that its Extremely High Frequency (EHF) satellite communications program would be operational 25 months behind schedule because of the F-3 loss.[81]

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[80] No author, "Air Force Debates Milstar Solution," Defense Daily, 18 May 1999, (Doc 8-216); Legislative Update, AFSPC Commander's Action Group, "Milstar Program Could Not Recover From $147 Million Reduction in FY00," 3 September 1999, pp. 9-10 (Doc 8-217); Legislative Update, AFSPC Commander's Action Group, "Air Force Announcement Hints at Plans to Buy Seventh Milstar Satellite," 25 June 1999, p. 5 (Doc 8-215); Fact Sheet, Federation of American Scientists (FAS), "Milstar 3/Advanced Extremely High Frequency (AEHF)," 1 June 2000, http://www.fas.org/spp/military/program/com/milstar3.htm (Doc 8-218); Internet Document, Aerospace Corporation, "Milstar," 8 June 2000, http://www.aero.org/satellites/milstar.html (Doc 8-219).

[81] News Release, DoD, "Selected Acquisition Reports," 2 August 1999, http://www.dau.mil/pubs/pm/pmpdf99/oasd01so.pdf (Doc 8-220); No author, "DOD releases Selected Acquisition Reports," Aerotech News and Review, 6 August 1999, (Doc 8-221); Jeremy Singer, "Pentagon Delays EHF Satellite Contract," Space News, 10 January 2000, p. 17 (Doc 8-222); RFI, CECOM, "Request for Information for Satellite Simulators," Commerce Business Daily, 1 July 1999, http://frwebgate3.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=9103053781+31+0+0&WAISaction=retrieve (Doc 8-223); No Author, "SAR Report: Launch Failures Slip Navy SATCOM, Milstar Schedules," Aerospace Daily, 3 August 1999, http://ebird.dtic.mil/Aug1999/s19990803sar.htm (Doc 8-224); Internet Document, DefenseLink, "Selected Acquisition Reports as of September 1999," 23 November 1999, p. 3 http://www.defenselink.mil/news/Nov1999/

To replace the F-3 loss, the government decided to launch the last three Milstar spacecraft and accelerate the schedule of the first AEHF launch. This option would provide the most operational capability at the earliest date. At the urging of the three major Aerospace companies, Dr. Jacques Gansler USD(AT&L) halted the contractor competition for the AEHF contract in April 2000 and approved a joint contract between the three bidding companies (Hughes, Lockheed Martin, and TRW) in order to accelerate the acquisition of the satellite. The major corporation pledged to do it under a firm fixed price and an accelerated schedule. The procurement schedule of the first AEHF satellite (called "Pathfinder") planned to accelerate the acquisition by 18 months so it could be launched in December 2004. This option had the lowest risk and the lowest cost among the proposed alternatives to meet the DoD's EHF communication requirements. The Milstar MDR terminals would not have worldwide coverage until the launch of the Pathfinder. Unfortunately, the Pathfinder launch schedule later slipped to 2006.[82]

The Air Force had to delay the final three Milstar launches because of funding shortfalls. The F-4 further delayed its launch to take extra precautions to ensure mission success. The Milstar F-3 launch failure and problems found on the F-4 satellite and launch vehicle delayed the launch schedule for several months. By November 1999, the

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b11231999_bt547-99.html (Doc 8-225); E-mail, Robert Kirzow, CECOM, to Robert Mulcahy, SMC/HO, "RE: When Milstar Satellite Simulators Obtained," 6 May 2003, (Doc 8-226); News Release, Aerotech News and Review, "DOD Selected Acquisition Reports," 6 August 1999, http://www.aerotechnews.com/starc/1999/080699/DOD_Acquisition_Reports.html (Doc 8-221).

[82] EMD Statement of Objectives (FOUO, extract is not FOUO), SMC/MC, "AEHF Program Objectives," 28 September 2001, p. 2 in Attachment 9 (Doc 8-227); Kerry Gildea, "Gansler Does Away With Competition for Advanced EHF Satellite," Fort Worth Star-Telegram, 25 April 2000, (Doc 8-228); News Release, Lockheed Martin, "Lockheed Martin, Hughes and TRW combine strengths to form Advanced EHF National Team for U.S. Air Force," 30 May 2000, http://lmms.external.lmco.com/newsbureau/pressreleases/2000/00_.62.html (Doc 8-229); Briefing Charts, SMC/MC, "MILSATCOM JPO Program Overview," September 2000, p. 9 (Doc 8-26); Fact Sheet, Federation of American Scientists (FAS), "Milstar 3/Advanced Extremely High Frequency (AEHF)," 1 June 2000, http://www.fas.org/spp/military/program/com/milstar3.htm (Doc 8-218); RDT&E Budget Item Justification Sheet, DoD, "0603430F Advanced EHF MILSATCOM (space)," June 2001, (Doc 8-230); Jeremy Singer, "Pentagon Delays EHF Satellite Contract," Space News, 10 January 2000, p. 17 (Doc 8-222); Fact Sheet, Global Security, "Milstar Satellite System," 2001, http://www.globalsecurity.org/military/library/budget/ fy2001/dot-e/airforce/01milstar.html (Doc 8-231); Document (FOUO, extract is not FOUO), Christine Anderson, SMC/MC Program Director, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 42 (Doc 8-146-1).

launches for the Milstar F-5 and F-6 also had planned launch slips of six to seven months.[83]

On 27 February 2001, Cape Canaveral Air Force Station (AFS) launched the first successful Milstar II (F-4) satellite with a $455 million Titan IVB/Centaur. The F-4 was put into the correct orbit about six hours and 35 minutes after launch. The MJPO performed the launch operations, and the early orbit deployment and testing for this first MDR-capable payload. The testing period included software uploads, payload functionality and interface tests, and antenna calibrations. On 12 March the Milstar F-4 relayed the first ever secure/anti-jam video teleconference via protected satellite communications. On 20 March the F-4 had its first major test during the Army Fourth Infantry Division's Capstone Exercise at Fort Hood. The Fourth Division wanted to become the first "digitalized force," and the F-4 provided the first use of secure tactical communications with a Milstar during the exercise. The payload performance proved to be better than expected, and the test team completed all of the critical testing on 9 July 2001, 46 days before the 180-day threshold. The MJPO testing team then turned the $800 million Milstar II over to the 4SOPS operators at Schriever AFB on 23 July 2001. The 4SOPS then maneuvered the Milstar F-4 to its orbit at 177.5 East longitude over North and South America. The three-satellite Milstar constellation had near global LDR coverage after the F-4 became operational.[84]

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[83] MSgt Tim Helton, "Milstar II launch improves communication for warfighter," Astro News, 9 March 2001, p. 1 (Doc 8-232); Briefing Charts, SMC/MC, "FY00 MILSATCOM PEO Program Review," November 1999, pp. 11-14 (Doc 8-200); Briefing Charts, SMC/MC, "Milstar PMR Overview," November 2001, pp. 16-20, 27 (Doc 8-173); Briefing Charts, SMC/MC, "MILSATCOM PEO Program Review," May 2000, p. 14, 17 (Doc 8-233).

[84] Memo, SMC/CC to SAF/AQ et al., "Executive Mission Readiness Report for Milstar-4/Titan IVB-41," 23 February 2001, (Doc 8-234); Fact Sheet, Spaceflight Now, "Milstar satellite overview," 22 February 2001, http://spaceflightnow.com/titan/b41/010222milstar.html (Doc 8-235); Internet Document, Spaceflight Now, "B-41 launch timeline," 25 February 2001, http://spaceflightnow.com/titan/b41/010225ascent.html (Doc 8-236); Fact Sheet, Spaceflight Now, "Digital processing subsystem key to the MDR payload," 25 February 2001, http://spaceflightnow.com/titan/b41/010225digital.html (Doc 8-192); Internet Document, Spaceflight Now, "Titan 4 mission report," 27 February 2001, http://spaceflightnow.com/titan/b41/status.html (Doc 8-237); Fact Sheet, Spaceflight Now, "Titan 4B launch vehicle," 22 February 2001, http://spaceflightnow.com/titan/b41/010222titan4b.html (Doc 8-238); 2Lt Brendan Keavney, "MILSATCOM gives Milstar Flight 4 reins to AFSPC operators," Astro News, 24 August 2001, p. 3 (Doc 8-239); Briefing Charts, SMC/MC, "Milstar PMR Overview," November 2001, p. 8 (Doc 8-173); MSgt Tim Helton, "Milstar II launch improves communication for warfighter," Astro News, 9 March 2001, p. 1 (Doc 8-231); Briefing Charts, SMC/MC, "Milstar System," 2001, pp. 2, 7, 14-15 (Doc 8-198); News Release, Boeing, "Completed Wing [Milstar F-4]," 2002, http://www.boeing.com/defense-space/space/bss/hsc_pressreleases/photogallery/milstar/m… (Doc 8-240); News Release,

The Milstar Mission Control Segment (MCS) had four elements: a Mission Control Element (MCE), a Mission Support Element (MSE), a Mission Development Element (MDE), and a Mission Planning Element (MPE). The MCE performed a number of important spacecraft commanding, processing, and maintenance tasks, using Constellation Control Stations (CCS), each of which consisted of a Satellite Mission Control Subsystem (SMCS) combined with a Milstar Command Post Terminal (CPT). Each CCS used the dedicated EHF ground resources to provide routine operational command and control of the Milstar spacecraft through the Milstar communications payload. The MSE performed a number of functions involved in deploying and activating the satellites. It provided mission unique software and databases to control the Milstar satellites. The MDE provided software tools to produce the SMCS and the MSE databases. It made it possible to develop, install, and operate various software and data systems for the MCS. The MPE generated Milstar satellite and terminal database information. It provided Automated Communication Management System (ACMS) planning software, supported communications resource appointment, and MPE supported the Joint Chief of Staff Commander (JCSC) and the Commander-in-Chief (CINC) Command Communication Planning Staff.[85]

The ACMS was in the final stages of its development at the end of FY 2001. It would be the production system that addressed the communication management and planning for MILSATCOM-based systems. Milstar would be the first MILSATCOM system that would have the automated tools developed under the ACMS functional baseline. It would deliver the network resources, analysis, and management planning functions of the MPE. ACMS would support five major functions: network planning, cryptographic planning, network operations, network support, and terminal support. Naval Research and Development managed the development and testing of the ACMS under an agreement with the SMC program office.[86]

Aerospace Corporation, "Problem Resolution Key to Milstar Mission Success," 30 March 2001, http://www.aero.org/news/current/milstar-launch.html (Doc 8-241); News Release, Space Daily, "Milstar Launch Into GEO a Success," 28 February 2001, http://www.spacedaily.com/news/milspace-comms-01d.html (Doc 8-242); News Release, Lockheed Martin, "First U.S. Air Force Milstar II satellite begins on-orbit testing," 29 March 2001, http://lmms.external.lmco.com/newsbureau/pressreleases/2001/01.27.html (Doc 8-243); News Release, Lockheed Martin, "Lockheed-Martin-built Titan IVB and Milstar II satellite combine for a successful U.S. Air Force launch," 15 January 2001, http://lmms.external.lmco.com/newsbureau/pressreleases/2002/02.05.html (Doc 8-244).

[85] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 150-151; Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office, "Milstar PSMP," 20 February 2002, pp. 6-7, 8 (Doc 8-172).

[86] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 152; Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office, "Milstar PSMP," 20 February 2002, pp. 11-12 (Doc 8-172);

The MCE used fixed and mobile assets to conduct the day-to-day command and control of the Milstar constellation. The fixed site MSOC at Schriever AFB had two fixed CCSs that each consisted of a collocated Milstar Command Post Terminal (CPT) and a Satellite Mission Control Subsystem (SMCS) for the operational control of the system. The Milstar Support Facility personnel at Schriever AFB performed ground control maintenance and testing, and hardware and software configuration control. The Milstar Auxiliary Support Center (MASC) was located at the contractor facility in Sunnyvale, California.[87]

([redacted]) Lockheed's Austin Division developed a mobile satellite command and control unit (within a 40-foot trailer) known as the "Milstar Mobile Constellation Control Station" (MMCCS) under contract F04701-90-C-0104. These units provided contingency control capabilities to the CINC in the event that the primary Milstar CCSs became inoperative. An MMCCS consisted of an SMCS, a CPT, a self-contained power source, and an environmental control system. [redacted] The MJPO supported 4SOPS in its operational deployments (the first in 1997) of the MMCCS and proved the system's worldwide command and control capability. The MMCCS units provided enduring and survivable communications and constellation command and control throughout the entire conflict spectrum, including trans and post nuclear war.[88]

Exemption (b)(1)

Milstar's terminal segment consisted of a variety of Air Force, Army, and Navy user terminals located on ships, aircraft, ground mobile, and fixed location platforms. Each of the three services managed the acquisition of platforms for its forces and sometimes others. The terminals provided completely interoperable voice, facsimile, and data communications at LDR between 75 bits bps and 2400 bps. Terminals with MDR capabilities had data rates between 4.8 Kbps and 1.544 Mbps. Fixed Milstar Ground

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Fact Sheet, Federation of American Scientists (FAS), "Automated Communications Management System," 12 July 1999, http://www.fas.org/spp/military/program/nssrm/initiatives/acms.htm (Doc 8-245).

[87] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 151; Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office, "Milstar PSMP," 20 February 2002, pp. 7-12, 2-8 (Doc 8-172); Fact Sheet, Schriever AFB, "4th Space Operations Squadron," April 2002, http://www.schriever.af.mil/FactSheets.asp (Doc 8-179).

[88] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 151-152; Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office, "Milstar PSMP," 20 February 2002, pp. 5, 9-10, Appendix 2 2-9 (Doc 8-172); Fact Sheet, Schriever AFB, "4th Space Operations Squadron," April 2002, http://www.schriever.af. mil/FactSheets.asp (Doc 8-179).

Command Post Terminals (GNDCPT) supported the President, the Secretary of Defense, and the Single Integrated Operations Plan; these terminals also supported fixed Major Command Headquarters and other special-purpose sites worldwide.[89]

In December 1998, Motorola completed the Milstar Pager using COTS technology. The MJPO Program Director, Brig Gen (sel.) Joseph Sovey, accepted the first pager on 16 December 1998. It took less than a year for the partnership of Motorola, MIT Lincoln Laboratory, and TRW to develop this pager that could receive information in remote areas, unlike commercial pagers. The new pager received transmissions directly from the Milstar satellite, making it effective almost anywhere in the world, and thus removed the requirement for a ground-based transmitter infrastructure. The 20-ounce Milstar Pager could receive 20-character messages. Milstar Pager production was never funded because the receiver was too large and cumbersome in comparison to commercially available units.[90]

The Air Force, Army, and the Navy all had program offices that acquired Milstar terminals. The Air Force Electronic Systems Center's MILSATCOM Terminal Programs Office (ESC/MCK) at Hanscom AFB acquired Milstar terminals for all three services as well as the National Command Authority, the Joint Staff, Theater CINCs who would execute the Single Integrated Operating Plan (a wartime measure), and nuclear-capable forces around the world. The Space and Naval Warfare Systems Command's (SPAWAR) Navy Satellite Communications Program Office (PMW 176) in San Diego procured the Navy EHF Satellite Communications Program (NESP) terminal for tactical and strategic communications among its naval forces. The Army's Communications-Electronics Command (CECOM) at Fort Monmouth, New Jersey acquired the Milstar Ground Tactical Terminal segment that would be used by all the services and other users through two different kinds of terminals: Single Channel Anti-Jam Man-Portable (SCAMP) Block I terminals, and the Secure, Mobile, Anti-jam, Reliable, Tactical Terminal (SMART-T) terminals. These organizations continued to acquire these approved items of terminal equipment throughout the period under consideration.[91]

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[89] SMC History 1995-1997 (FOUO, extracts are not FOUO), SMC/HO, pp. 152-153; Briefing Charts, SMC/MC, "Protected Terminals," circa 2001, (Doc 8-246); Product Support Management Plan (PSMP) (FOUO, extract is not FOUO), MILSATCOM System Sustainment Office, "Milstar PSMP," 20 February 2002, pp. 13, 20, Appendix 2 2-9 (Doc 8-172).

[90] 1Lt Stephen Hill, "MILSATCOM receives first Milstar pager," Astro News, 16 January 1998, p. 4 (Doc 8-247); E-mail (FOUO, extract is not FOUO), Robert Bresnick, SMC/MCM, to Robert Mulcahy, SMC/HO, "RE: Milstar History Review (FOUO, extract is not FOUO)," 11 June 2003 (Doc 8-183); E-mail, Robert Bresnick, SMC/MCM, to Robert Mulcahy, SMC/HO, "RE: Milstar Pager," 16 June 2003, (Doc 8-248).

[91] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 152-153; Fact Sheet, SMC/MC, "Air Force Terminals," Printed 15 November 2002,

The DoD awarded the FY 1999 Value Engineering Achievement Award for Program Management to the Milstar II Program Office. Dr. Jacques Gansler USD(AT&L) presented the award to Brig Gen Craig Cooning (MJPO Director) at a Washington, D.C., ceremony in early 2000. The Milstar II Program Office saved the government $28 million through 58 cost-reduction initiatives. The value engineering effort conducted by the program office encouraged innovations to meet the program's goals, reduce problems, and promoted best business practices.[92]

The Milstar constellation had three orbiting satellites (one Milstar II and two Milstar I spacecraft) at the end of FY 2001. The MJPO scheduled the next Milstar II

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http://www.losangeles. af.mil/SMC/MC/esc.html (Doc 8-249); E-mail, Maj Christina Tarvin, ESC/MCB, to Robert Mulcahy, SMC/HO, "RE: Milstar terminal acquisition," 28 April 2003, (Doc 8-250); Announcement, CECOM, "MILSATCOM Terminals Program Office… seeking potential sources qualified to design… a family of terminals," Commerce Business Daily, 20 February 2001, http://frwebgate3.access.gpo.gov/cgi-bin/waisgate. cgi?WAISdocID=9103053781+15+0=0+0&WAISaction=retrieve (Doc 8-251); E-mail, Linda College, CECOM Acquisition Center, to Robert Mulcahy, SMC/HO, "RE: Army Milstar Terminal Acquisition," 1 May April 2003, (Doc 8-252); Fact Sheet, GlobalSecurity.org, "Communications-Electronics Command (CECOM)," 31 December 2002, http://www.globalsecurity.org/military/agency/army/cecom.htm (Doc 8-253); Internet Document, Space Daily, "Raytheon To Develop And Validate Milstar Upgrade For SMART-T," 23 April 2001, http://www.spacedaily.com/news/ milstar-01b.html (Doc 8-254); Army RD&T Budget Item Justification, DoD, "0603856A – Single Channel Anti-Jam Manportable (SCAMP)," June 2001, (Doc 8-255); Announcement, CECOM, "Market survey to identify equipment compliant with the Milstar SCAMP," Commerce Business Daily, 17 November 1998, http://frwebgate1.access.gpo.gov/cgi-bin/waisgate. cgi?WAISdocID=912000414+11+0+0 &WAISaction=retrieve (Doc 8-256); Briefing Charts, SMC/MC, "Protected Terminals," circa 2001, pp. 3-4 (Doc 8-246); Internet Document, SPAWAR, "PMW 176 Overview," Printed 5 May 2003, http://www. enterprise.spawar.navy.mil/spawarpublicsite/pd17/pmw176/overview.htm (Doc 8-257); Document, SPAWAR, "Space and Naval Warfare Systems Command Awards Contract," 11 January 2000, (Doc 8-258); Announcement, SPAWAR PMW 176, "[Sources to Develop AEHF and Milstar Communication Terminals]," Commerce Business Daily, 13 February 2001, http://frwebgate3.access.gpo.gov/cgi-bin/waisgate.cgi ?WAISdocID= 9103053781+14+0+0… (Doc 8-259); Internet Document, DefenseLink, "Contracts [NESP]," 28 January 1998, http://www.defenselink.mil/news/Jan1998/ c01281998_ ct037-98.html (Doc 8-260).

[92] E-mail (FOUO, extract is not FOUO), Robert Bresnick, SMC/MCM, to Robert Mulcahy, SMC/HO, "Value Engineering (VE) Achievement Award," 27 June 2003, (Doc 8-261); Ron Alger, "Milstar II wins top engineering award," Astro News, 11 August 2000, pp. 1, 11 (Doc 8-262); Memo, SMC/CC to SMC/MC, "Congratulations," 27 March 2000, (Doc 8-263).

(F-5) launch for January 2002, and planned for the final Milstar (F-6) launch to take place in November 2002. The future AEHF satellites will initially augment, and then later replace, the Milstar system.[93]

Advanced Extremely High Frequency (AEHF) System

The future Advanced Extremely High Frequency (AEHF) system would be the follow-on space system to Milstar. AEHF would be the principal means of transferring command and control information in a protected and survivable mode. The purpose of AEHF would be to provide improved worldwide, secure, nuclear war survivable satellite communications in support of the strategic and tactical forces of the U.S. and its international partners during all levels of conflict. In 2006, AEHF should have its first launch and begin augmenting (then replacing) the Milstar system with improved EHF capability. The AEHF system would provide military communications such as real-time video, battlefield maps, and targeting data. It would also provide survivable communications services for the highest priority strategic users: the President, the Secretary of Defense, and the Commanders in Chief (CINC). AEHF would be significantly less costly and have enormous improvements over Milstar II in capacity, coverage, connectivity, and options.[94]

The DoD authorized the AEHF Program as the follow-on for the Milstar Program to meet the increasing need for high capacity, survivable satellite communications. The Air Force estimated that a 10-fold increase in communications capacity would be required by 2010 largely due to future technical upgrades such as digitalization of the systems and security. The spring 1993 Bottom-up review limited the Milstar Program to six satellites, and mandated a transition to a new lower-cost, lighter-weight advanced EHF satellite that should be launched in 2006; this initiated the AEHF Program. The

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[93] Fact Sheet, SMC/MC, "Advanced EHF," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcx.html (Doc 8-5); Briefing Charts, SMC/MC, "Milstar PMR Overview," November 2001, pp. 4 (Doc 8-173).

[94] Product Support Management Plan (FOUO, extract is not FOUO), SMC/MCL, "AEHF PSMP," 15 February 2002, pp. 1, 2 (Doc 8-264); Concept of Operations (FOUO, extract is not FOUO), AFSPC, "Advanced Extremely High Frequency (AEHF) Satellite Operations," September 2002, p. 9 (Doc 8-265); Briefing Charts, SMC/MC, "Advanced EHF System," 2001, pp. 5-7 (Doc 8-266); Early Operational Assessment (FOUO, extract is not FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, p. 1 (Doc 8-267); Fact Sheet, SMC/MC, "Advanced EHF," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcx.html (Doc 8-5); Internet Document, Space Technology, "Advanced EHF Military Communications Satellite USA," Printed 27 June 2003, http://www.space-technology.com/projects/ehf/index.html (Doc 8-268).

follow-on program planned to use advanced technology for AEHF to attain its goals of reducing the unit cost by 40 percent and the payload weight by 50 percent in comparison to Milstar II. A series of architectural studies took place between 1994 and 1997 to plan the future of MILSATCOM. After a year, the studies recommended obtaining an EHF component that would have at least the capacity of Milstar II, data rates increased to 8 Megabits per second (Mbps), and no secondary payloads. A memo (dated 17 January 1995) from the Defense Acquisition Executive (DAE) separated AEHF from the Milstar Program. The 23 April 1996 Follow-On MILSATCOM Mission Need Statement (MNS) stated that AEHF would fulfill its communications requirements. The MJPO provided EHF payload option briefings at the August 1997 Senior Warfighters' Forum (SWarF). In October 1997, the SWarF and the Joint Requirements Oversight Council (JROC) endorsed the design concept of the AEHF Program. The acquisition of the AEHF system would have four phases: the Technology Development (1995 to 1998), the Engineering Model (1997 to 2000), the System Definition (1999-FY 2001), and the Engineering and Manufacturing Development (EMD) phase or system acquisition (2001- first launch scheduled for 2006).[95]

Air Force Space Command Director of Requirements (AFSPC/DR) and US Strategic Command had the responsibility to determine the requirements for the AEHF system, while the SMC MJPO had the responsibility to acquire it. The AEHF Program originated in the MJPO's Advanced Programs Division (SMC/MCX) in 1994 when program planning began. As the Director of Advanced Programs, Mrs. Janice Smith

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[95] Single Acquisition Management Plan (SAMP) (FOUO, extract is not FOUO), SMC/MCX, "Advanced Extremely High Frequency," 2 April1999, pp. 2, 4, (Doc 8-269); Concept of Operations (FOUO, extract is not FOUO), AFSPC, "Advanced Extremely High Frequency (AEHF) Satellite Operations," September 2002, p. 3 (Doc 8-265); Executive Summary (FOUO, extract is not FOUO), SMC/MC, "AEHF Test and Evaluation Master Plan," 31 December 1998, p. vi (Doc 8-270); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Single Acquisition Management Plan," 7 August 1998, pp. 4, 6, 14, 16 (Doc 8-271); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF SATCOM: Operational Requirements," March 1999, pp. 2, 7-12, 22 (Doc 8-272); White Paper (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Analysis of Alternatives Summary White Paper 1993 to 1998," December 1998, pp. 1-4, (Doc 8-273); Environmental Assessment, SMC, "AEHF," 15 February 2001, p. 1-2 (Doc 8-274); Early Operational Assessment (FOUO, extract is not FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, p. 1 "From The Commander" (Doc 8-267); E-mail, Janice Smith, SMC/CI, to Robert Mulcahy, SMC/HO, "RE: AEHF Program Manager," 4 June 2003, (Doc 8-275); Document, SAF/AQ, "Acquisition Reform Success Story, AEHF Engineering Model," 5 December 1998, (Doc 8-276); E-mail (FOUO, extract is not FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: Last AEHF Questions (FOUO, extract is not FOUO)," 25 September 2003 (Doc 8-277); Executive Summary (FOUO, extract is not FOUO), SMC/MC, "AEHF SAR Executive Summary," 8 September 1998, (Doc 8-278).

became the first AEHF Program Manager. On 15 June 2000, the MJPO appointed Lt Col Steven Lauder as the AEHF Program Manager within the Advanced Programs Division. The AEHF Program Office (office symbol SMC/MCA) was established as an independent three-letter organization within the MJPO on 1 May 2001, and Lt Col Lauder continued as the AEHF Program Manager throughout 2001. At other locations, the Electronic Systems Center (ESC/MC) at Hanscom AFB, Massachusetts would develop and acquire the Air Force portion of the AEHF terminal segment. The Air Force Space Command's (AFSPC) 4th Space Operations Squadron (4SOPS) at Schriever AFB, Colorado would have the overall command and control of the AEHF space constellation. A backup command and control facility for AEHF would be located at Vandenberg AFB, California.[96]

The second phase of the AEHF acquisition was the Engineering Model (EM) Program (May 1997 to 2000). The objective of this phase was to reduce the most critical payload risks. It concentrated on reducing digital signal processing and integration risks by constructing an engineering model of the digital signal processing portion of the AEHF payload. The EM phase would develop the hardware and software that functionally demonstrated the digital processing functions, including the crosslink processing. On 22 May 1997, SMC awarded TRW a $59,199,244 cost plus award fee contract (F04701-97/C-0025) and awarded Hughes Space and Communications (HSC) a $64,598,762 cost plus fixed fee contract (F04701-97/C-0026) to concurrently develop EMs by May 2000; solicitation began in January 1997. The difference in the award amounts had to do with additional risk mitigation for phased array and nulling antennas by the Hughes team. The EM Program reduced the acquisition risk by demonstrating and evaluating the design and fabrication of the digital processor subsystem before the program entered the third acquisition phase. Acquisition decisions forestalled Hughes' digital processor EM although many technical problems plagued the effort. TRW

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[96] Early Operational Assessment (FOUO, extract is not FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, p. 6 (Doc 8-267); Concept of Operations (FOUO, extract is not FOUO), AFSPC, "Advanced Extremely High Frequency (AEHF) Satellite Operations," September 2002, p. 12 (Doc 8-265); E-mail, Janice Smith, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF Program Manager," 4 June 2003, (Doc 8-275); Fact Sheet, SMC/MC, "Air Force Terminals," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/esc.html (Doc 8-249); E-mail (FOUO, extract is not FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF History Review," 31 July 2003, p. 3 (Doc 8-278-1); E-mail (FOUO, extract is not FOUO), Janice Smith, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: Origins of the AEHF Program Office (FOUO, extract is not FOUO)," 4 August 2003, (Doc 8-278-2); E-mail, Lt Col Steven Lauder, SMC/MCZ to Robert Mulcahy, SMC/HO, "RE: Date of AEHF PM," 18 August 2003, (Doc 8-278-3); Memo, SMC/MC to MJPO Personnel, "MILSATCOM Assignments," 1 May 2001, (Doc 8-181); Document (FOUO, extract is not FOUO), Manuel De Ponte, Aerospace Corporation - General Manager MILSATCOM Division, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 62 (Doc 8-146-1).

completed its EM in October 2000 with the successful completion of the Lincoln Laboratory TRW EM compatibility test. The EM provided the government with the confidence to assume that many of the digital processing risks had been addressed.[97]

Phase three of the AEHF acquisition was System Definition (SD) (1999-FY 2001). The objective of this phase was the finalization of the system requirements and to propose a system design. The success criteria for this phase would be the completion of the System Design Review (SDR). On 4 May 1999, Dr. Jacques Gansler, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) approved the entry of AEHF into its definition phase. SMC issued a Request for Proposal (RFP) (F04701-98-R-0043) on 6 May 1999 for the SD phase; the deadline for the RFP proposals occurred on 15 June 1999. SMC awarded a competitive $44,499,925 firm fixed price contract (F04701-99-C-0027) on 23 August 1999 to Lockheed Martin ($22,250,000) and HSC ($22,249,925) to develop the AEHF system requirements, architecture, and design concepts for the SD in 18 months. The contract deliverables included: system specification, Payload to Terminal Interface Control Document, Life Cycle Cost Estimate, Risk Management Plan, System Requirements Review, and the System Design Review (SDR). The SDR was completed in December 2000. On 16 March 2001, SMC awarded Lockheed, TRW, and Boeing (Boeing acquired HSC on 6 October 2000) an $86 million fixed-price contract (F04701-99-C-0027-P00010) modification for additional preliminary design efforts and extended the SD phase.[98]

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[97] Executive Summary (FOUO, extract is not FOUO), SMC/MC, "AEHF Test and Evaluation Master Plan," 31 December 1998, p. vi (Doc 8-270); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Single Acquisition Management Plan," 7 August 1998, p. 13 (Doc 8-271); E-mail, Janice Smith, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF Program Manager," 4 June 2003, (Doc 8-275); Fact Sheet, Federation of American Scientists (FAS), "Milstar 3/Advanced Extremely High Frequency (AEHF)," 1 June 2000, http://www.fas.org/spp/military/program/com/milstar3.htm (Doc 8-218); Document, SAF/AQ, "Acquisition Reform Success Story, AEHF Engineering Model," 5 December 1998, (Doc 8-276); Internet Document, DefenseLink, "Contracts," 22 May 1997, http://www.defenselink.mil/news/May1997/c052397_ct256-97.html (Doc 8-281); Announcement, SMC, "[Requesting Information on a Streamlined Acquisition Strategy for the AEHF CCS-C]," Commerce Business Daily, 5 August 1999, http://frwebgate6. access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=930750121129+10+0+… (Doc 8-282); E-mail (FOUO, extract is not FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF History Review," 31 July 2003, p. 5 (Doc 8-278-1); Document (FOUO, extract is not FOUO), Manuel De Ponte, Aerospace Corporation - General Manager MILSATCOM Division, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 65 (Doc 8-146-1).

[98] Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Single Acquisition Management Plan," 7 August 1998, pp. 14-15, 21 (Doc 8-271); News Release, SMC/PA, "SMC announces award of two $22 million Advanced EHF

The fourth phase of the AEHF acquisition strategy would be the Engineering and Manufacturing Development (EMD) phase or system acquisition (2001-). The objective of this phase would be selecting the best contractor and the subsequent fielding of the AEHF constellation. The tasks in this final phase of the AEHF acquisition would include completing the detailed design, fabricating and assembling five satellites, conducting tests and evaluations of the satellites, providing payload adapter and launch support, and providing on-orbit support for the constellation beyond the launch of the final satellite. The success criteria for the fourth phase included: the Preliminary Design meeting the Key Performance Parameter (KPP) thresholds, the critical Preliminary Design Review (PDR) action items closing, the Critical Design meeting KPP thresholds, completely defining the system level tests, and closing the CDR action items. In June 1996, the MJPO scheduled the first of four AEHF launches to occur during the fourth quarter of FY 2005 with subsequent launches every six months; the MJPO planned to build a fifth satellite but did not list its launch schedule during a briefing to a NATO working group. By August 1998, the MJPO rescheduled the five AEHF launches to take place between 2006 and 2008, one approximately every six months. Further launch schedule alterations and decisions are described in the following paragraphs. The number of AEHF satellites and their launch schedules may be altered after 2001 due to the large June 2001 cost increase in the program. In October 2000, SMC began the solicitation for a contract

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contracts," 24 August 1999, http://www.losangeles.af.mil/SMC/PA/Releases/1999/nr9924.htm (Doc 8-283); E-mail, Janice Smith, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF Program Manager," 4 June 2003, (Doc 8-275); Announcement, SMC, "[RFP to be released for the AEHF SD Phase]," Commerce Business Daily, 13 April 1999, http://frwebgate6.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=9307501211+0+0+0… (Doc 8-284); Memo, Jacques Gansler USD(AT&L) to SAF/AQ et al., "Acquisition Decision Memorandum for Advanced EHF (AEHF) Program," 4 May 1999, (Doc 8-285); Executive Summary, SMC, "Executive Summary for RFP, F04701-98-R-0043, AEHF System Definition (SD)," 6 May 1999, (Doc 8-286); Internet Document, DefenseLink, "Contracts," 23 August 1999, http://www.defenselink.mil/news /Aug1999/c08231999_ct390-99.html (Doc 8-287); News Release, Boeing, "Hughes-Led Team Chosen For Next Phase of Advanced Satellite Work," 25 August 1999, http://www.boeing.Com/defense-space/space/bss/hscpress_releases/99_08_25ehf.html (Doc 8-288); News Release, Lockheed Martin, "Lockheed Martin awarded one of two $22 million contracts for next generation military satellite communications system," 24 August 1999, http://lmms.external.lmco.com/newsbureau/pressreleases/1999/99.181. html (Doc 8-289); Internet Document, DefenseLink, "Contracts," 16 March 2001, http://www.defenselink.mil/news/Mar2001/c03162001_ct114-01.html (Doc 8-290); Internet Document, Aerospace Corporation, "MILSATCOM Advanced Programs," 8 June 2000, (Doc 8-291); E-mail (FOUO, extract is not FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: Last AEHF Questions (FOUO, extract is not FOUO)," 25 September 2003 (Doc 8-277).

(F04701-02-C-002) to produce the first two AEHF satellites; negotiations should be completed in the fall of 2001.[99]

AEHF would have significant communications improvements over Milstar II. It would greatly increase the available single data user rate and the satellite capacity. AEHF would also be interoperable with the Milstar satellites and terminals. It would satisfy military communications requirements that Milstar could not, such as connectivity across the spectrum of mission types, including strategic defense, special operations, and tactical operations. The AEHF Extended Data Rate (XDR) of 8.192 Mbps would be an enormous increase in throughput over Milstar II with its maximum medium-data-rate (MDR) of 1.544 Mbps. AEHF would have a crosslink capacity of 60 Mbps compared to Milstar II's 5 Mbps. The average recurring unit cost of an AEHF satellite ($400 million) should be half the price of a Milstar II satellite ($800 million). AEHF would be launched on a medium launch vehicle rather than the larger, more costly Titan IV launch vehicles used by Milstar. AEHF would have considerably more user channels (over 50), and it would have 173 coverage areas per satellite compared to Milstar II's 20 coverage areas. AEHF would provide 10 times the capability of Milstar II at about half the price.[100]

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[99] Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Satellite Program," June 1996, p. 6 (Doc 8-291-1); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Single Acquisition Management Plan," 7 August 1998, pp. 16, 21 (Doc 8-271); Executive Summary (FOUO, extract is not FOUO), SMC/MC, "Acquisition Strategy Panel For Advanced Extremely High Frequency Satellite Communications System," 9 November 1999, (Doc 8-292); EMD Statement of Objectives (FOUO, extract is not FOUO), SMC/MC, "AEHF Program Objectives," 28 September 2001, (Doc 8-227); Internet Document, DefenseLink, "Contracts," 16 November 2001, http://www.defenselink.mil/news/Nov2001/c11162001_ct591-01.html (Doc 8-293).

[100] Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System SSGR," 10 October 2001, p. 4 (Doc 8-279); Briefing Charts, SMC/MC, "MILSATCOM," 14 September 2001, p. 12 (Doc 8-294); Briefing Charts, SMC/MC, "Advanced EHF System," 2001, p. 5 (Doc 8-266); Fact Sheet, SMC/MC, "Advanced EHF," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcx.html (Doc 8-5); Environmental Assessment, SMC, "AEHF," 15 February 2001, p. 1-2 (Doc 8-274); News Release, Boeing, "Hughes-Led Team Chosen For Next Phase of Advanced Satellite Work," 25 August 1999, http://www.boeing.Com/defense-space/space/bss /hscpress_releases/99_08_25ehf.html (Doc 8-288); News Release, SMC/PA, "SMC announces award of two $22 million Advanced EHF contracts," 24 August 1999, http://www. losangeles.af.mil/SMC/PA/Releases/1999/nr9924.htm (Doc 8-283); News Release, Lockheed Martin, "Lockheed Martin awarded one of two $22 million contracts for next generation military satellite communications system," 24 August 1999, http://lmms. external.lmco.com/newsbureau/pressreleases/1999/99.181.html (Doc 8-289).

AEHF would satisfy the future demands for protected voice, data, imagery, and video communications. AEHF would be the only SATCOM system for protected critical voice and data communications against interception, jamming, detection, and nuclear effects. Each AEHF spacecraft would have two uplink nuller spot beams to mitigate the effects of uplink jammers.[101]

To obtain Full Operational Capability (FOC), the AEHF Space Segment would consist of at least four AEHF satellites. In August 2001, the MJPO planned to acquire a four-satellite AEHF constellation and one spare satellite. Each AEHF satellite would have a low-data-rate (LDR) communications capacity of 75 bits per second (bps) to about 19.2 Kilo-bits per second (Kbps), an MDR of about 2.4 Kbps to approximately 1.544 Mbps, and an XDR capacity up to 8.192 Mbps. Data uplinks to the satellites and the crosslinks between the satellites would operate at EHF, and the downlinks would operate at SHF. The AEHF communication services would provide real-time conference networks, broadcast services, and virtual network messaging using a delayed store and forward concept. The satellite would have a modified Lockheed Martin commercial A2100 bus that would have a useful life of 10 years. At FOC the AEHF constellation would provide worldwide connectivity from 65 degrees South to 65 degrees North without requiring ground stations to relay data. The Polar MILSATCOM system would provide the connectivity at latitudes over 65 degrees. Delta IV and Atlas V Evolved Expendable Launch Vehicles (EELVs) at Cape Canaveral Air Force Station (AFS), Florida would transport the 13,500-pound (launch weight) spacecraft into an inclined transfer orbit and the electric propulsion system would complete the boost to a final orbit of 22,300 miles above the earth.[102]

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[101] Early Operational Assessment (FOUO, extract is not FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, p. 11 (Doc 8-267); Concept of Operations (FOUO, extract is not FOUO), AFSPC, "Advanced Extremely High Frequency (AEHF) Satellite Operations," September 2002, p. 8 (Doc 8-265).

[102] Early Operational Assessment (FOUO, extract is not FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, pp. 2, 5, 11 (Doc 8-267); Product Support Management Plan (FOUO, extract is not FOUO), SMC/MCL, "AEHF PSMP," 15 February 2002, p. 4 (Doc 8-264); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Briefing to SecAF," 17 August 2001, p. 3 (Doc 8-295); Fact Sheet, SMC/MC, "Advanced EHF," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcx.html (Doc 8-5); Environmental Assessment, SMC, "AEHF," 15 February 2001, p. 1-2 (Doc 8-274); Briefing Charts, SMC/MC, "Heritage of A2100 for AEHF Spacecraft," 24 October 2001, (Doc 8-296); Fact Sheet, Lockheed Martin, "A2100," 2002, (Doc 8-297); E-mail (FOUO, extract is not FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF History Review," 31 July 2003, p. 9 (Doc 8-278-1); Document (FOUO, extract is not FOUO), Manuel De Ponte, Aerospace Corporation - General Manager MILSATCOM Division, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 69 (Doc 8-146-1).

The Assistant Secretary of Defense (Command Control, Communications, and Intelligence) [ASD(C3I)] directed that AEHF would be the first jointly funded U.S./international MILSATCOM cooperative development project. The U.S. would enter into an international partnership with key allies to share the costs and the use of the AEHF system. The AEHF Operational Requirements Document (ORD) had a requirement for interoperability with coalition forces. The satellite design would be enhanced to meet needs of the international partners (IPs), but the U.S. would maintain operational control over all of the satellites. On 16 November 1999, Canada and the U.S. signed a Memorandum of Understanding (MOU) for the AEHF partnership. Authorized military members and civilian employees of an IP would perform technical or other support functions for AEHF at the MJPO with the Cooperative Program Personnel (CPP) system. CPP applied only to the AEHF Program and it began with the arrival of a Canadian Air Force captain to the MJPO in August 2001. The CPP was a first for a MILSATCOM program. Separate MOUs between the U.S. and the United Kingdom and the Netherlands continued to be negotiated at the end of FY 2001, but no other IP countries were anticipated. A planned combined total of $267 million would be invested by the IPs for the AEHF Program.[103]

The Air Force had to initiate security precautions for providing AEHF information to the IPs. The MJPO took the lead role in producing detailed disclosure guidance for protecting "U.S. Only" information. For example, information about the secure and strategic communications used by the President and the Secretary of Defense would be restricted to the U.S. The MJPO provided the AEHF developmental contractors with legal guidance about providing technical information to the IPs at the FOUO level and above. AEHF would be closely related to the Milstar system, and the large majority of Milstar's information was accessible only to the U.S. Any user terminal

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[103] Memorandum of Understanding (FOUO, extract is not FOUO), DoD and Department of National Defense of Canada, "Development, Documentation, Production and Initial Fielding of [AEHF] MILSATCOM," 16 November 1999, (Doc 8-298); Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System SSGR," 10 October 2001, p. 5 (Doc 8-279); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "FMS Questions for AEHF Cooperative Development Program," 18 March 2003, p. 2 (Doc 8-299); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "AEHF International Programs," 28 June 2002, p.19 (Doc 8-300); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Foreign Disclosure [Regarding AEHF] and Visitors Responsibilities Briefing," circa 1999, pp. 3-4 (Doc 8-301); Briefing Charts, SMC/MC, "MILSATCOM," 14 September 2001, p. 16 (Doc 8-294); Weekly Activity Report (FOUO, extract is not FOUO), SMC/MCA, "IP Issues," 18-22 June 2001, (Doc 8-302); E-mail, Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF Canadian Captain," 12 August 2003, (Doc 8-303); Document (FOUO, extract is not FOUO), Christine Anderson, SMC/MC Program director, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 69 (Doc 8-146-1).

sold to the IPs had to be modified to take out its Milstar capability. The AEHF terminals would be a separate IP procurement, but this caused Canada to withhold its FY 2001 AEHF investment funding until it had a terminal commitment from the U.S.[104]

Illustration 8-5:
AEHF Satellite in orbit (artist's concept)

In 1999 to 2000, the DoD searched for the best alternative to replace the expected communications service that was lost by the launch failure of the Milstar F-3 satellite. The National Team (Lockheed Martin, TRW, and Hughes) for Milstar II sent a jointly approved letter to Darleen Druyun (Principal Deputy Assistant Secretary of the Air Force for Acquisition and Management) on 6 December 1999 proposing an acceleration of the first AEHF satellite (called "Pathfinder"). The letter proposed combining the efforts of the three companies competing for the AEHF contract into a National Team (NT) on a firm fixed-price basis within the existing AEHF funding profile ($2.6 billion) for the production of five AEHF satellites. Lockheed and TRW together had been competing against HSC for the contract. The proposed Pathfinder could have a capacity that exceeded Milstar II, but less capacity than the planned AEHF threshold capacity

[104] Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "AEHF International Programs," 28 June 2002, pp. 5, 7-10, 17, 19 (Doc 8-300); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Foreign Disclosure [Regarding AEHF] and Visitors Responsibilities Briefing," circa 1999, (Doc 8-301).

requirements. The letter predicted that the Pathfinder acquisition could be accelerated by 18 months and launched in December 2004.[105]

The Joint Requirements Oversight Council (JROC) review on 23 March 2000 validated the Pathfinder concept for mitigating the loss of Milstar F-3. When the concept was first brought to Dr. Gansler USD(AT&L) he declined to pursue the options. Later attempts, based primarily on the strength of the recommendation from the JROC review, Dr. Gansler authorized the Pathfinder alternative using the NT in order to accelerate the acquisition of AEHF. Dr. Gansler authorized the AEHF Acquisition Decision Memorandum (ADM) on 26 May 2000. This halted the contractor competition for the AEHF contract, and authorized a joint contract for a sole source acquisition between the three bidding companies (Lockheed Martin, TRW, and HSC) who formed the NT. The same three companies worked together as an NT for the Milstar II Program, so the government wanted to retain and expand on that experience for the AEHF Program. The ADM required the Pathfinder's capacity to exceed Milstar II, and to meet the AEHF threshold requirements at a minimum. The Pathfinder would be able to upgrade to full AEHF capacity with a software upload prior to the launch of the second AEHF. The ADM also required the second through fifth AEHF satellites to exceed the threshold requirements. The government considered the accelerated Pathfinder option as the lowest risk with the lowest cost among the proposed alternatives to meet the DoD's EHF communication requirements.[106]

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[105] Letter (FOUO, extract is not FOUO), Lockheed Martin, TRW, and Hughes to Darleen Druyun, Principal Deputy Assistant Secretary for Air Force Acquisition and Management, "[Pathfinder Alternative]," 6 December 1999, (Doc 8-304); Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System SSGR," 10 October 2001, pp. 8-9 (Doc 8-279); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Briefing to SecAF," 17 August 2001, p. 6 (Doc 8-295); Mary Motta, Space.com, "Lockheed Boosted by Satellite Contract," 31 May 2000, http://www.space.com/businesstechnology/technology/ lockheed_defense_000531.html (Doc 8-305).

[106] Memo, Jacques Gansler, USD(AT&L), to Secretaries of the Military Departments et al., "Acquisition Decision Memorandum for Advanced Extremely High Frequency (AEHF) Program," 26 May 2000, (Doc 8-306); Early Operational Assessment (FOUO, extract is not FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, p. 1 (Doc 8-267); Program Management Directive (PMD) (FOUO, extract is not FOUO), SAF/AQS, "PMD 2325(5)… for Military Satellite Communications (MILSATCOM)," 20 September 2001, p. 18 (Doc 8-307); Kerry Gildea, "Gansler Does Away With Competition for Advanced EHF Satellite," Fort Worth Star-Telegram, 25 April 2000, (Doc 8-228); RDT&E Budget Item Justification Sheet, DoD, "0603430F Advanced EHF MILSATCOM (space)," June 2001, (Doc 8-230); News Release, Lockheed Martin, "Lockheed Martin, Hughes and TRW combine strengths to form Advanced EHF National Team for U.S. Air Force," 30 May 2000, http://lmms.external.lmco.com/newsbureau/ pressreleases/2000/00.62.html

On 30 May 2000, SMC awarded Lockheed Martin a firm fixed-price $98 million contract (F04701-99/C-0027, P00005) to create an NT (that consisted of Lockheed Martin, TRW and HSC) to perform the remaining effort associated with the SD phase of the AEHF system. This contract modification combined the SD efforts of Lockheed Martin and HSC into a joint contractor arrangement. Lockheed Martin would be the prime overall system integrator, HSC would be the payload prime contractor, and TRW would supply the major pieces of the payload subsystems. Boeing Satellite Systems acquired HSC in October 2000. The government expected the NT to work together as a team and to take advantage of their combined technological expertise and experience in communications satellites to quickly and cost-effectively develop AEHF. The NT planned to accelerate the schedule of the first AEHF (Pathfinder) launch date by 18 months and to slightly reduce the schedule dates of the other four AEHF launches: the AEHF SV1 (Pathfinder) launch schedule accelerated from mid FY 2006 to December 2004; SV2 was scheduled for launch in early FY 2006, SV3 in early FY 2008, SV4 in mid 2008, and SV5 (spare satellite) in early FY 2009.[107]

Some of the AEHF procurement documents had to be rewritten or updated after the May 2000 change in acquisition strategies. The original Single Acquisition

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(Doc 8-229); Fact Sheet, Federation of American Scientists (FAS), "Milstar 3/Advanced Extremely High Frequency (AEHF)," 1 June 2000, http://www.fas.org/spp/military/program/com/ milstar3.htm (Doc 8-218); E-mail (FOUO, extract is not FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF History Review," 31 July 2003, p. 11 (Doc 8-278-1); Document (FOUO, extract is not FOUO), Manuel De Ponte, Aerospace Corporation - General Manager MILSATCOM Division, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 74 (Doc 8-146-1).

[107] Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System SSGR," 10 October 2001, p. 10, 15 (Doc 8-279); Media Response, SMC/MC, "AEHF Media Inquiry Responses," 2 July 2001, (Doc 8-308); Article, Jeremy Singer, "Pentagon Readies Plan for Delayed AEHF Deployment," Space News, 1 October 2001, pp. 3, 19 (Doc 8-309); News Release, Lockheed Martin, "Lockheed Martin, Hughes and TRW combine strengths to form Advanced EHF National Team for U.S. Air Force," 30 May 2000, http://lmms.external.lmco.com/newsbureau/pressreleases/2000/00.62.html (Doc 8-229); Internet Document, DefenseLink, "Contracts," 30 May 2000, http://www.defenselink.mil/news/May2000/c05302000_ct296-00.html (Doc 8-310); E-mail (FOUO, extract is not FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF History Review," 31 July 2003, p. 12 (Doc 8-278-1).

Management Plan (SAMP) dated 2 April 1999, had to be updated and was completed on 14 September 2001.[108]

By March 2001, the launch schedule slipped for the Pathfinder to June 2005. The original NT assessment planned for the Pathfinder launch in December 2004. The delay in the launch schedule occurred because the design complexity involved in the government's specified operational requirements took longer to develop than expected. The National Security Agency (NSA) could not meet the scheduled crytpo delivery dates, and the NT underestimated the large AEHF non-recurring engineering (NRE) cost growth for FY 2002. By June of 2001, the Pathfinder launch schedule slipped to December 2005. In October 2001, the Pathfinder launch slipped again to June 2006.[109]

The NT revised its May 2000 "firm commitment" to the price, performance, and schedule of producing the AEHF satellites. The NT agreed to a $2.6 billion commitment in May 2000 to produce AEHF, but on 29 June 2001 the NT declared that the cost had risen to $3.3 billion. The increase in cost occurred because of new requirements, the requirements refinement/design maturity, underestimated costs, the satellite weight, and the DAE removed the contractor cost sharing. The government considered several options after the announcement of the AEHF cost increase: staying the course, a production break, stretching the program's Initial Operational Capacity (IOC) and FOC, reducing the AEHF requirements, producing Milstar 7 and Milstar 8 satellites, re-competing the program with reduced requirements, and terminating the AEHF Program.

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[108] Early Operational Assessment (FOUO, extract is not FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, p. 14 (Doc 8-267).

[109] Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "PEO Program Review," 8 March 2001, pp. 73-74, 83 (Doc 8-89); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Briefing to SecAF," 17 August 2001, pp. 34, 38 (Doc 8-295); Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System Status to Dr. Ballhaus," circa September 2001, pp. 4, 8, 9 (Doc 8-311); Briefing Charts, SMC/MC, "Advanced EHF Program Status WIPT," 15 March 2001, pp. 20, 24 (Doc 8-312); Media Response, SMC/MC, "AEHF Media Inquiry Responses," 2 July 2001, (Doc 8-308); News Release, Lockheed Martin, "Lockheed-led National Team passes major design milestone for next generation military communications satellite program," 5 September 2001, http://lmms.external.lmco.com/ newsbureau/pressreleases/2001/01.html (Doc 8-313); Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System Status to Dr. Ballhaus," 10 October 2001, p. 16 (Doc 8-314); Media Response, SMC/MC, "AEHF Media Inquiry Responses," 25 January 2002, (Doc 8-315); Article, Jeremy Singer, "Pentagon Readies Plan for Delayed AEHF Deployment," Space News, 1 October 2001, pp. 3, 19 (Doc 8-309).

A decision about how to proceed with the AEHF acquisition after this significant cost increase reached a conclusion during FY 2001 DAB.[110]

The MJPO soon recognized that the NT had several problems during the AEHF acquisition that resulted in inefficiency and helped lead to the large increase in cost. The program requirements were not stable enough for the firm fixed price NT commitment. Furthermore, the NT required significant requirements relief on many requirements that had been associated with the program for years. The NT made the commitment with an incomplete Technical Requirements Document (TRD) despite a 95 percent solid requirements base; the five percent proved to be enough to cause considerable turmoil. A proper NT commitment would have involved an unreasonably large coordination and review cycle. The high-level meetings between the government and the contractor leadership gave verbal promises that were not binding or effective. The desired work partnership between the NT partners did not occur. Work sharing discussions lasted 18 months into the program. The loss of contract competition crippled the government's negotiating situation and put it in a position of weakness. A standard source selection and negotiation would have provided a binding contract with actual alternatives and allowed the government to negotiate from a position of strength. The Office of the Secretary of Defense (OSD) obtained progress in the program only after it refused Defense Acquisition Board (DAB) approval without an Air Force funding commitment and associated contractual commitment for the international partner contributions should they not materialize. Last minute cryptographic requirements levied by the Under Secretary of Defense (Acquisition, Technology and Logistics) [USD (AT&L)] based on the National Security Agency's concern were added to cut the DAB. These ill-defined requirements caused great tension to the program baseline.[111]

The AEHF Terminal Segment would consist of legacy Milstar terminals, legacy Milstar terminals with AEHF modifications, newly acquired AEHF terminals, and IP

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[110] Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System SSGR," 10 October 2001, p. 11-12 (Doc 8-279); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Advanced EHF Briefing to SecAF," 17 August 2001, pp. 10, 30, 41 (Doc 8-295); Document (FOUO, extract is not FOUO), Manuel De Ponte, Aerospace Corporation - General Manager MILSATCOM Division, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 77 (Doc 8-146-1).

[111] Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Lessons Learned on National Teams… from an AEHF Program Perspective," 11 January 2002, (Doc 8-316); Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Lessons Learned on National Teams… from an AEHF Program Perspective," 14 January 2002, (Doc 8-317); Document (FOUO, extract is not FOUO), Christine Anderson, SMC/MC Program director, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 74 (Doc 8-146-1); Document (FOUO, extract is not FOUO), Manuel De Ponte, Aerospace Corporation - General Manager MILSATCOM Division, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 77 (Doc 8-146-1).

variants of the AEHF terminals with restricted access. The AEHF terminals would be compatible with existing EHF communication systems: Milstar, UHF Follow-On, Polar EHF, and EHF Subsystem. The AEHF terminals would be backward compatible with legacy Milstar terminals at both LDR and MDR. All of the military services would use AEHF terminals, which would be located on a wide variety of platforms: in the air, on land (fixed and mobile), and at sea. Each service would develop its AEHF terminals or upgrade legacy terminals with the Extended Data Rate (XDR) of up to 8.192 Mbps. The Air Force would develop the Family of Beyond Line of Sight Terminals (FAB-T) for both fixed location and mobile users on the ground and in the air. In 2001, the Army awarded contracts to initiate a terminal System Enhancement Program (SEP) to upgrade its existing Single Channel Anti-Jam Man Portable (SCAMP) and Secure Mobile Anti-Jam Reliable Tactical-Terminal (SMART-T) to be both Milstar and AEHF compatible. It would also develop a second generation SCAMP Block II terminal; the Army planned for a development contract in 2004 and a production contract in 2006. The Navy would upgrade all of its operational terminals and develop new Navy EHF Satellite Program (NESP) terminals for ship, submarine, and shore capability. The DoD planned to acquire 230 new AEHF terminals, and upgrade 1400 legacy terminals for AEHF-compatibility.[112]

The Air Force, Army, and the Navy all had their own program offices to develop and acquire AEHF terminals and to upgrade their existing Milstar terminals to be AEHF-compatible. The Air Force Electronic Systems Center's MILSATCOM Terminal Program Office (ESC/MC) at Hanscom AFB would develop and acquire AEHF terminals for the Air Force, as well as for the National Command Authority, the Joint Staff, and the Theater CINCs. The Space and Naval Warfare Systems Command's (SPAWAR) Navy Satellite Communications Program Office (PMW 176) in San Diego would procure the NESP terminals. The Army's Communications-Electronics Command (CECOM) at Fort Monmouth, New Jersey would acquire new AEHF terminals and issue contracts for its SEP upgrades for its existing SMART-T and SCAMP terminals. CECOM awarded a

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[112] Briefing Charts (FOUO), SMC/MC, "Briefing to the AEHF IIPT [Army AEHF Terminals], " 15 March 2001, pp. 1, 6 (Doc 8-318); Concept of Operations (FOUO), AFSPC, "CONOPS for AEHF Satellite Operations," September 2002, p. 14 (Doc 8-265); Product Support Management Plan (FOUO), SMC/MCL, "AEHF PSMP," 15 February 2002, p. 8 (Doc 8-264); Early Operational Assessment (FOUO), AFOTEC, "Advanced Extremely High Frequency Satellite Communications System," 7 August 2001, pp. 3, 17-19 (Doc 8-267); Briefing Charts (FOUO), PMW 176, "Navy AEHF Terminal Program," 15 March 2001, p. 2 (Doc 8-319); Briefing Charts (FOUO), Aerospace Corporation, "Advanced EHF System SSGR," 10 October 2001, p. 6 (Doc 8-279); Briefing Charts, SMC/MC, "Protected Terminals," circa 2001, pp. 7-10 (Doc 8-246); E-mail (FOUO), Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AEHF History Review," 31 July 2003, p. 15 (Doc 8-278-1); Document (FOUO), Manuel De Ponte, Aerospace Corporation - General Manager MILSATCOM Division, "Review of the 1998-2001 MILSATCOM History," 16 March 2004, p. 71 (Doc 8-146-1).

contract to Rockwell on 28 February 2001 for its SCAMP upgrades, and a contract to Raytheon on 27 April 2001 for its SMART-T upgrades.[113]

The AEHF Mission Control Segment (MCS) would provide the command and control of the combined Milstar and AEHF constellations and communication planning. The AEHF MCS would consist of four primary elements. The AEHF Mission Operations Subsystem (MOPS) would replace the Milstar Mission Control Element (MCE) to provide the day-to-day satellite command and control. It would include upgraded Milstar fixed and mobile survivable platforms. The MOPS functions would provide preplanned responses to anomalies, telemetry and command processing, and orbit management. The Mission Planning Element (MPE) would be used for communication planning and network operations. The Operations Sustainment and Support Element (OSSE) would provide mission support, and consisted of the hardware and software used to develop, maintain, test, and install all operational control system software, procedures, displays, and databases. The Test, Training and Simulation Element (TTSE) would provide a system to support the integration and testing of the AEHF Satellite Mission Control Subsystem (ASMCS), procedure and task verification, ASMCS database verification, and operator training. The TTSE simulator would provide scenarios of the AEHF and Milstar constellation, and communications exchanged between the ASMCS

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[113] Briefing Charts (FOUO, extract is not FOUO), SMC/MC, "Briefing to the AEHF IIPT [Army AEHF Terminals]," 15 March 2001, pp. 3, 8 (Doc 8-318); Fact Sheet, SMC/MC, "Air Force Terminals," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/esc.html (Doc 8-249); Fact Sheet, GlobalSecurity.org, "Communications-Electronics Command (CECOM)," 31 December 2002, http://www.globalsecurity.org/military/agency/army/cecom.htm (Doc 8-253); Announcement, ESC/MCK, "[Sources to Develop AEHF Communication Terminals]," Commerce Business Daily, 20 February 2001, http://frwebgate4.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=76641323397+21+0+0… (Doc 8-320); Announcement, PMW 176, "[Sources to Develop and Manufacture AEHF Communication Terminal Equipment]," Commerce Business Daily, 13 February 2001, http://frwebgate4.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=76641323397+2+0+0… (Doc 8-321); Announcement, CECOM, "[Sources to Add AEHF System Enhancement Program to Block I SCAMP]," Commerce Business Daily, 16 November 2000, http://frwebgate1.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=7629319835+1+0+0… (Doc 8-322); Announcement, CECOM, "[Intention to Solicit Raytheon to Incorporate AEHF capability to the SMART-T]," Commerce Business Daily, 20 November 2000, http://frwebgate4.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=76641323397+7+0+0… (Doc 8-323); Announcement, CECOM, "[Contract Award for SMART-T AEHF Development]," Commerce Business Daily, 27 April 2001, http://frwebgate6.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=834547145889+18+0+… (Doc 8-324); Internet Document, SPAWAR, "PMW 176 Overview," Printed 5 May 2003, http://www.enterprise.spawar.navy.mil/spawarpublicsite/pd17/pmw176/overview.htm (Doc 8-257); Internet Document, Space Daily, "Raytheon To Develop And Validate Milstar Upgrade For SMART-T," 23 April 2001, http://www.spacedaily.com/news/milstar-01b.html (Doc 8-254).

and the Command and Control System-Consolidated (CCS-C) program. TTSE would provide for Initial Qualification Training (IQT), Unit Qualification Training (UQT), and software and hardware database tests.[114]

([redacted]) The AEHF MCS would include fixed and mobile control stations. An existing fixed Satellite Operations Center (SOC) at Schriever AFB would be used for satellite command and control. Three ground mobile (GM) control stations (within trailers transported by trucks) would provide survivable satellite command and control of the AEHF constellation. These mobile control stations would provide contingency control capabilities to the CINC in the event that the primary AEHF fixed control stations became inoperative. [redacted][115]

Exemption (b)(1)

AEHF continued in the EMD phase of its development at the end of FY 2001. The U.S. continued negotiating with the United Kingdom and the Netherlands about joining the IP to share the costs and the use of the AEHF system. On 10 October 2001, the launch schedule for the Pathfinder would slip another six months to June 2006. A contract to produce the first two AEHF satellites should be completed in the fall of 2001.[116]

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[114] Product Support Management Plan (FOUO, extract is not FOUO), SMC/MCL, "AEHF PSMP," 15 February 2002, pp. 4-5 (Doc 8-264); Concept of Operations (FOUO, extract is not FOUO), AFSPC, "Advanced Extremely High Frequency (AEHF) Satellite Operations," September 2002, pp. 10-12 (Doc 8-265).

[115] Product Support Management Plan (FOUO), SMC/MCL, "AEHF PSMP," 15 February 2002, p. 7 (Doc 8-264); Concept of Operations (FOUO), AFSPC, "Advanced Extremely High Frequency (AEHF) Satellite Operations," September 2002, pp. 9, 13 (Doc 8-265); Environmental Assessment, SMC, "AEHF," 15 February 2001, pp. 1-2, 2-9 (Doc 8-274); E-mail, Capt Salvatore Maniscalco, SMC/MCA, to Robert Mulcahy, SMC/HO, "RE: AMCCS," 13 August 2003, (Doc 8-325).

[116] Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System SSGR," 10 October 2001, p. 5, 15-17 (Doc 8-279); EMD Statement of Objectives (FOUO, extract is not FOUO), SMC/MC, "AEHF Program Objectives," 28 September 2001, p. 2 in Attachment 9 (Doc 8-227); Concept of Operations (FOUO, extract is not FOUO), AFSPC, "Advanced Extremely High Frequency (AEHF) Satellite Operations," September 2002, p. 1 (Doc 8-265); Internet Document, DefenseLink, "Contracts," 3 October 2001, http://www.defenselink.mil/news/ Oct2001/c10032001_ ct481-01.html (Doc 8-326); Internet Document, DefenseLink, "Contracts," 16 November 2001, http://www.defenselink.mil/news/Nov2001/c11162001_ct591-01.html (Doc 8-293); Briefing Charts (FOUO, extract is not FOUO), Aerospace Corporation, "Advanced EHF System Status to Dr. Ballhaus," 10 October 2001, p. 16 (Doc 8-314).

[redacted]

CHAPTER 9
SATELLITE AND LAUNCH CONTROL SYSTEMS

The SMC Satellite and Launch Control Systems Program Office (SLCSPO) (office symbol SMC/CW) was the acquisition agency that provided the sustainment and modernization of the Air Force Spacelift Range System (SLRS) and the Air Force Satellite Control Network (AFSCN). The SLRS supported space launch missions and consisted of ground-based navigation, communications, surveillance, and weather assets centered at Vandenberg AFB, California and Cape Canaveral Air Force Station (AFS), Florida. The AFSCN controlled and tracked American military satellites in orbit, received and processed telemetry sent down by them, and sent commands up to the satellites.[1]

The SLCSPO had several responsibilities. It performed as the AFSCN acquisition organization responsible for network sustainment, future architecture planning and data, plus communications and range systems engineering. It served as the primary interface to the AFSCN users for requirements identification and implementation. The SLCSPO had the responsibility to sustain and modernize the SLRS at the major Air Force launch facilities at Cape Canaveral AFS and Vandenberg AFB. The SLCSPO also provided launch control for space lift vehicles, Tracking, Telemetry, and Commanding (TT&C) for on-orbit satellites, and provided test support for ballistic missiles and space experiments. About half of the SLCSPO personnel did not get based at SMC in Los Angeles; the program office assigned them to the SMC detachments across the country at Vandenberg AFB, Cape Canaveral AFS, Peterson AFB, Colorado, Falcon AFB (renamed Schriever AFB on 5 June 1998), Colorado, and Onizuka Air Station (redesignated Onizuka AFS on 4 February 2000), California. The SLCSPO Program Directors at SMC from FY 1998-FY 2001 included Col Barry G. Morgan (August 1997-May 2001) and Col Michael R. Mantz (May 2001-2003).[2]

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[1] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 165; Maj Mary MacLeod, "CW essential to space ops success," Astro News, 31 March 2000, p. 22 (Doc 9-1); Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2).

[2] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 165; Program Management Directive (FOUO, extract is not FOUO), SAF/AQS, "PMD 9038 (22)… for Air Force Satellite Control Network (AFSCN)," 21 March 2000, pp. 2-3 (Doc 9-3); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Program Office Overview CW," 1 January 2000, p. 2 (Doc 9-4); Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2); Maj Mary MacLeod, "CW essential to space ops success," Astro News, 31 March 2000, p. 22 (Doc 9-1); Fact Sheet, SMC/CW, "What is the mission of the Satellite and Launch Control SPO?," Printed 8 July 2003, https://cw.losangeles.af.mil/SMCCW/welcome.htm

Air Force Satellite Control Network

The AFSCN was the DoD common user network that provided TT&C services for over 100 satellites. In 2000, the AFSCN had international facilities valued at $10 billion. The common user element of the AFSCN supported most DoD satellites, and dedicated elements supported individual satellite systems. The common user element consisted of control nodes, scheduling facilities (one at each node), remote tracking sites, and communication links that connected them. From FY 1998-FY 2001, the common user element supported the following satellite programs: the Defense Meteorological Satellite Program (DMSP), the Global Positioning System (GPS), the Defense Support Program (DSP), the Defense Satellite Communications System (DSCS), the Fleet Satellite Communications (FLTSATCOM), Milstar, the UHF Follow-On (UFO), Global Broadcasting Service (GBS), Skynet, NATO II and NATO IV, and classified programs. The AFSCN averaged over 400 daily satellite contacts, and totaled 144,243 contacts in 1999, 145,848 contacts in 2000, and 156,229 contacts in 2001. At the end of FY 2001, AFSCN had a contact success rate of 99 percent. The AFSCN had three cooperative segments: a command and control segment, a range segment, and a communications segment.[3]

(Doc 9-5); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: CW Personnel," 14 July 2003, (Doc 9-6); Biography, SMC/PA, "Col Barry G. Morgan, SMC/CW Program Director," August 1997, http://www.losangeles.af.mil/SMC/PA/Bios /morganbio.htm (Doc 9-7); Biography, Air Force, "Col Michael R. Mantz, SMC/CW Program Director," 6 April 2003, (Doc 9-8); Internet Document, SMC/CW, "History of the Shield," 26 April 1998, http://cw.laafb.af.mil/cw_hist_shield.html (Doc 9-9).

[3] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 167; Briefing Charts (FOUO, extract is not FOUO), SMC/CW, Air Force Satellite Control Network Orientation," 23 January 2002, p. 4 (Doc 9-10); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems (SLCSPO) Air Force Control Network (AFSCN)," 1 March 2002, pp. 8, 10-11 (Doc 9-11); Maj Mary MacLeod, "CW essential to space ops success," Astro News, 31 March 2000, p. 22 (Doc 9-1); Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2); RD&T Budget Item Justification, DoD, "0305110F Satellite Control Network," June 2001, (Doc 9-12); Internet Document, SAFAQ, "AFSCN Overview," Printed 28 February 2002, http://www.safaq.hq.af.mil/aqsl/afscn/ overview/index.html (Doc 9-13); Program Management Review (PMR), Honeywell Technology Solutions Inc., "AFSCN Common user Element Depot Support Contract Review Period 01 June-30 September 2001," 6 November 2001, p. 4 (Doc 9-14); Internet Document, SAFAQ, "AFSCN System Capabilities," 17 March 1998, http://www.safaq. hq.af.mil/aqsl/afscn/overview /products.html (Doc 9-15); Internet Document, Federation of American Scientists (FAS), "Western Range," 7 November 1997, http://fas.org/spp/ military/program/nssrm/ initiatives/westrang.htm (Doc 9-16).

Command and Control Segment

The Air Force exercised satellite command and control from operational control nodes (OCNs) at Schriever AFB and Onizuka AFS. The Onizuka OCN dated back to the 1960s, and the Schriever OCN began operations in 1993. The AFSCN Command and Control Segment (CCS) resources conducted vehicle telemetry, plus tracking and commanding support from launch preparation to on-orbit operations. The OCN at Schriever AFB, within Building 400 (Jack Swigert Space Operations Facility), had operational command and control over the AFSCN, while the Onizuka OCN provided the backup functions. Onizuka also had the primary operational control over selected programs specific to Onizuka AFS, it provided downward direction to the Remote Tracking Stations (RTSs), and it channeled information from the RTSs to the Schriever OCN. Along with the OCNs, the AFSCN relied on 22 common-user antennae at 10 worldwide locations: Thule Air Base in Greenland, Oakhanger in England, Anderson AFB in Guam, Diego Garcia Island in the Indian Ocean, Kaena Point in Hawaii, Camp Parks in California, Kirtland AFB in New Mexico, New Boston AFS in New Hampshire, Schriever AFB, and Vandenberg AFB.[4]

The SLCSPO considered the following functions to be the major responsibilities of the CCS. It conducted operations planning, such as generating Contact Support Plans and resource scheduling at the Satellite Operations Center (SOC) and/or Mission Operations Center (MOC), and the Resource Control Center (RCC). It managed the SOC, MOC, and RCC operational activities and certain development and test complexes. The CCS conducted command planning, processing, and evaluation. It had real-time command capabilities that uplinked command data to a satellite, and interpreted the spacecraft's responses to the commands. The segment provided attitude determination and prediction, based on the analysis of downlink sensor data. The CCS determined the tracking and orbits for orbit planning and prediction. It conducted mission planning for the generation of plans relating to spacecraft orbital insertion, maneuvers, maintenance, and reentry. It conducted telemetry planning, processing, and evaluation with real-time telemetry analysis performed during contacts with the spacecraft. The CCS also provided simulation of the AFSCN range network and space vehicles.[5]

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[4] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 167-169; Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Program Office Overview CW," 1 January 2000, pp. 4-6 (Doc 9-4); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems (SLCSPO) Air Force Control Network (AFSCN)," 1 March 2002, p. 11 (Doc 9-11); Internet Document, Air University (Maxwell AFB), "Force Support--Air Force Satellite Control Network," Printed 1 March 2002, pp. 6-7 http://www.au.af.mil/au/aul/school/awc/au18004a.htm (Doc 9-17).

[5] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 169.

In 1997, the AFSPC HQ directed all of the DoD satellite programs within the 50th Space Wing's mission to move off the CCS by October 2005, but preferably by October 2004. The Air Force expected the CCS maintenance costs to rise to over $40 million, an amount considered unacceptable. The Air Force wanted to replace the CCS legacy system's outdated mainframe architecture and custom-designed software with a modernized, operationally-streamlined, cost-effective system that would depend on commercially available computer servers and work stations. The Military Satellite Communications (MILSATCOM) Joint Program Office (MJPO) developed the Command and Control System – Consolidated (CCS-C) Program to replace the CCS functions for MILSATCOM satellites.[6]

Illustration 9-1 Schriever AFB and the Jack Swigert Space Operations Facility – the large building at the top left

The CCS-C would provide modernized MILSATCOM command and control systems to support the launch, early orbit, and on-orbit operations using state of the art, commercial TT&C technology. The Air Force had a CCS-C objective to reduce the cost of operations by 30 percent, and reduce the cost of sustainment by 75 percent when compared to 2001 CCS levels. It would allow future space operators the ability to conduct up to 18 simultaneous operational and/or simulated activities. It would also have the capacity to control up to 36 communications satellites. The CCS-C system would have more automation, and provide the Warfighter with increased capabilities over those provided by the CCS system.[7]

[6] Fact Sheet, MJPO, "Command & Control System - Consolidated," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcc.htm (Doc 9-18).

[7] Program Management Directive (PMD) (FOUO, extract is not FOUO), SAF/AQS, "PMD 2325(7)… Military Satellite Communications (MILSATCOM)," 6 August 2002,

The CCS-C acquisition would have two phases. Phase I would be the Demonstration Phase, and Phase II would be the Development and Sustainment portion of the CCS-C Program. SMC published a Request For Proposal (RFP) on 5 August 1999 in the Commerce Business Daily seeking industry's input in developing a plan for the CCS-C acquisition. An Industry Day followed on 13 August. SMC received 12 White Papers from interested parties by 8 September 1999. The CCS-C Single Acquisition Management Plan (SAMP) was completed in July 2000. The CCS-C source selection process continued between September 2000 and January 2001. SMC received five CCS-C proposals from interested firms.[8]

On 7 February 2001, SMC awarded $3.4 million firm fixed-price contracts to Integral Systems, Inc. (F04701-01/C-0012) and TRW (F04701-01/C-0015) to perform Phase I of the CCS-C acquisition. Phase I continued for almost a year. It would conclude with a demonstration of the contractors' CCS-C efforts at the Center for Research Support Facility at Schriever AFB. For five weeks (between October and the first week of November 2001) the two contractors would showcase their CCS-C efforts. SMC would award the Phase II CCS-C contract based on the results of the demonstration. A significant part of the competition would be a "fly off" where the contractors would demonstrate their version of CCS-C to control a satellite in space. The two contractors would control a mothballed DSCS III A-1 satellite for about two weeks each to showcase their systems. Another important competition would be a telemetry-processing demonstration using data obtained from a Milstar tape. These demonstrations in the CCS-C acquisition strategy would allow SMC to assess the contractors' abilities

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p. 16 (Doc 8-78); Fact Sheet, SMC/MC, "Command & Control System - Consolidated," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcc.htm (Doc 9-18); Briefing Charts, SMC/MC, "Command and Control System-Consolidated," Circa 2001, p. 2 (Doc 9-19); Maj John Garrett, "MILSATCOM awards command and control contracts," Astro News, 9 March 2001, p. 3 (Doc 9-20).

[8] Program Management Directive (PMD) (FOUO, extract is not FOUO), SAF/AQS, "PMD 2325(7)... Military Satellite Communications (MILSATCOM)," 6 August 2002, p. 16 (Doc 8-78); Briefing Charts, SMC/MC, "Command and Control System-Consolidated," Circa 2001, p. 3 (Doc 9-19); Staff Summary Sheet, SMC/MCX to SMC/MC et al., "Response To 'MILSATCOM Command and Control (C2) FY00 Rapid Prototype Funding,' Letter dated 8 Jun 99," 30 September 1999, (Doc 9-21); Fact Sheet, SMC/MC, "Command & Control System - Consolidated," Printed 15 November 2002, http://www.losangeles.af. mil/SMC/MC/mcc.htm (Doc 9-18); Announcement, SMC, "[RFI for a Plan to Acquire CCS-C]," Commerce Business Daily, 5 August 1999, http://frwebgate5.access.gpo.gov/ cgi-bin/waisgate.cgi?WAISdocID =564732110255+11+0... (Doc 9-22); Internet Document, DefenseLink, "Contracts," 7 February 2001, http://www.defenselink.mil/news /Feb2001/c02072001_ct057-01.html (Doc 9-23); Internet Document, DefenseLink, "Contracts," 14 March 2002, http://www.defenselink.mil/news/Mar2002/ c03142002_ct122-02.html (Doc 9-24).

and greatly reduce the program risks. Phase II of the program would be awarded in February 2002 to develop and sustain the CCS-C Program from 2002-2011 for an estimated $142.7 million.[9]

Range Segment

The AFSCN Range Segment provided the two-way space-ground link between the spacecraft and the AFSCN. It consisted of eight fixed Remote Tracking Stations (RTSs) distributed around the world, deployable systems that provided additional support for satellites in orbit and during testing at manufacturing facilities, and spacecraft checkout facilities at both of the launch sites. They provided real-time satellite tracking, command relay, and telemetry reception. The Transportable Vehicle Checkout Facility East (TVCF-E) provided the pre-launch checkout at Cape Canaveral AFS, Florida, and the Vandenberg Tracking Station (VTS) did the same at Vandenberg AFB. The RTSs employed eighteen S-band primary TT&C antennas that were parabolic dishes with diameters of 23, 33, 46, and 60 feet. Each antenna communicated with one satellite at a time, using uplink frequencies from 1.76 to 1.84 GHz and downlink frequencies from 2.2 to 2.3 GHz.[10]

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[9] Fact Sheet, SMC/MC, "Command & Control System - Consolidated," Printed 15 November 2002, http://www.losangeles.af.mil/SMC/MC/mcc.htm (Doc 9-18); E-mail, Maj Joseph Romero, SMC/MCC, to Robert Mulcahy, SMC/HO, "RE: CCS-C Phase 1 Competition," 27 August 2003, (Doc 9-25); Maj John Garrett, "MILSATCOM awards command and control contracts," Astro News, 9 March 2001, p. 3 (Doc 9-20); Internet Document, DefenseLink, "Contracts," 7 February 2001, http://www.defenselink.mil/news/Feb2001/c02072001_ct057-01.html (Doc 9-23); Internet Document, DefenseLink, "Contracts," 14 March 2002, http://www.defenselink.mil/news/Mar2002/c03142002_ct122-02.html (Doc 9-24); News Release, Integral Systems, "Integral Systems Inc. Awarded Contract to Design and Demonstrate Replacement for the U.S. Air Force MILSATCOM Command and Control Segment," 15 March 2001, http://www.integ.com/ Press%Releases/2001/ISIawardedphaseoneofCCSCcontract.html (Doc 9-26).

[10] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 169, 172; Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2).

Table 9-1: Remote Tracking Stations (RTSs) of the AFSCN

Location	IOC	Special Capabilities	Antennas
Vandenberg RTS (Vandenberg AFB) Call sign "Cook"	1959	Prelaunch checkout of LVs; early orbit checkout of M2P1 packages; DLT receipt of M2P1 communications; interface for ARIA; high-power uplink (A side); use of GTE/CONTEL/ASC communications.	3 antennas: TT&C (60 ft.) ARTS; TT&C (46 ft.) ARTS; Data Link Terminal (DLT) (10 m)
New Hampshire RTS (New Boston, New Hampshire) "Boss"	1959	On-orbit support; operation of Remote Vehicle Checkout Facility; high-power uplink (A side); DMSP Enhancement (B side)	3 antennas: TT&C (60 ft.) ARTS; TT&C (46 ft.) ARTS; DLT (10 m)
Hawaii RTS (Oahu, Hawaii) "Hula"	1959	Supported testing of ballistic missiles launched from Vandenberg AFB and other areas in Pacific region. Supported satellites in low earth and in geosynchronous orbits over the eastern and central Pacific.	2 antennas: TT&C (46 ft.) ARTS; TT&C (60 ft.) ARTS
Thule RTS (Thule AFB, Greenland) "Pogo"	1962	On-orbit support of polar satellites each revolution; DMSP Enhancement (C side); DLT receipt of M2P1 communications	4 antennas: TT&C (11 ft.) ARTS;TT&C (46 ft.) ARTS;TT&C (33 ft.) ARTS;DLT (10 m)
Guam RTS (Anderson AFB, Guam) "Guam"	1965	Provided TT&C for satellites in both low earth orbits and in geosynchronous orbits over the western Pacific Ocean. Had high power uplink.	2 antennas: TT&C (46 ft.) ARTS; TT&C (60 ft.) ARTS
Oakhanger RTS (UK) "Lion"	1978	SGLS and RCSE; supported NASA's SST; supported UK's Skynet satellite; DISA terminal	2 antennas: TT&C (33 ft.) ARTS; Wheel and Track (60 ft.)
Colorado RTS (Schriever AFB) "Pike"	1989	Supported satellites in both polar and equatorial orbits; could be configured as GPS ground antenna for GPS Enhancement	1 antenna: TT&C (33 ft.) ARTS
Diego Garcia RTS "Reef"	1991	Supported NASA's SST launches	1 antenna:TT&C (33 ft.) ARTS[11]

Communications Segment

The AFSCN Communications Segment linked all of the RTSs, control nodes, and users with redundant communications channels. Users at the control nodes employed it to send commands to spacecraft through the RTSs, to receive telemetry from the spacecraft, to receive status data from the RTSs, and to send processed data from the control nodes to the users. The redundant communications between control nodes and RTSs consisted of a wideband and a narrowband channel for each.[12]

The wideband (also known as the primary) channel employed the Defense Satellite Communications System/Satellite Control Facility Interface System (DISIS) that passed data from the space vehicles to the control nodes by mixing (multiplexing) the data stream at the RTS with time data, transmitting the resulting mix to the control nodes, separating (demultiplexing) the space vehicle and time data, and recording them. Although the Schriever AFB OCN had become the dominant OCN in 1992, it did not have its own data connection to the RTSs. Instead, it had to pass data through the OCN at Onizuka AFS that possessed its own set of data pipelines to the RTSs. This roundabout communications linkage was referred to as "Backhaul."[13]

The narrowband (or secondary) channel was backup capability in case wideband became unavailable. Leased common carriers, including domestic communications satellites, Intelsat (International Telecommunications Satellite Organization) satellites, landlines, and microwave links provided bandwidth at a maximum rate of 1.544 Megabits per second. The narrowband channel usually carried voice and ancillary data while the wideband channel was available.[14]

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[11] SMC History 1995-1997 (FOUO), SMC/HO, pp. 171-172; Fact Sheet, Onizuka AFS, "Remote Tracking Station Pogo [Thule]," Printed 24 September 2003, http://www.onizuka.af.mil/rts-pogo.htm (Doc 9-27).

[12] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 172; Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems (SLCSPO) Air Force Control Network (AFSCN)," 1 March 2002, pp. 10-11 (Doc 9-11).

[13] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 172-173.

[14] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 173; Briefing Charts (FOUO), SMC/CW, "Air Force Satellite Control Network," Circa 2000, p. 11 (Doc 9-28).

AFSCN Improvement and Modernization Efforts

The overall goal of the AFSCN Improvement and Modernization Program was to replace or upgrade nonstandard equipment and software that could not be efficiently supported with more reliable, maintainable, and standardized equipment and software. The effort increased the infusion of commercial-based products and services to improve interoperability with civil and commercial networks. One result would presumably be lower maintenance costs for the network because it would require fewer and less skilled personnel to operate it. Another result would be increased reliability for the system. Before 1995, 11 contracts provided for the AFSCN support, sustainment, systems engineering, and modernization. From 1996-2000, SMC consolidated the AFSCN efforts and reduced them to five major contracts. By the end of FY 2001, the SLCSPO worked towards simplifying and streamlining the AFSCN efforts by consolidating everything under one future contract (SCN Contract) and one existing contract (Command and Control Sustainment Contract).[15]

In 1998, the five major AFSCN support, sustainment, engineering, and modernization contracts should expire between 30 September 2000 and 31 October 2003. They included: the Network Operations Upgrades Contract (NOUC) that expired in September 2000, the Depot Support Contract (DSC II) that expired on 31 March 2001, the Network Integration Contract (NIC) originally scheduled to expire on 31 May 2002, the Range and Communication Development Contract (RCDC) that should expire on 31 May 2002, and the Command and Control Sustainment Contract (CCSC) that should expire on 31 October 2003. The follow-on efforts for the NIC, RCDC, and the DSC II would be consolidated into the December 2001 SCN Contract (SCNC). The work involved in the CCSC was scheduled for termination once the contract ends in 2003, and it would not become part of the SCNC.[16]

The $91 million Range and Communication Development Contract (RCDC) (F04701-96-C-0018) awarded to the Lockheed Martin Western Development Labs in 1996 involved the development of range and communications systems. The program office divided the effort into about nine activities: procurement of an archival recorder

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[15] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, pp. 173, 175; Maj Mary MacLeod, "CW essential to space ops success," Astro News, 31 March 2000, p. 22 (Doc 9-1); RD&T Budget Item Justification, DoD, "0305110F Satellite Control Network," February 2002, (Doc 9-29).

[16] Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Air Force Satellite Control Network," Circa 2000, p. 4 (Doc 9-28); Single Acquisition Management Plan (FOUO, Source Selection Sensitive, extract is not FOUO or Source Selection Sensitive), SMC/CW, "Satellite Control Network (SCN) SAMP," 13 December 2000, pp. 17-18 (Doc 9-30); E-mail (FOUO, Source Selection Sensitive extract is not FOUO or Source Selection Sensitive), Capt John Grosvenor, SMC/RNX, to Robert Mulcahy, SMC/HO, "SMC/CW History Comments Summary & SMC/CW History," 22 December 2003, p. 10 (Doc 9-30-1).

system, a system for centralized control and monitor (CC&M), the restructure of archival and Wide Area Network Interface Unit (WANIU), an operational switch replacement (OSR), a control and status (C&S) system, a range and communications centralized control and monitor (RC3M), antenna upgrades, tracking station upgrades, and secure voice upgrades. In April 2001, the SLCSPO estimated that the RCDC contract had reached 86 percent completion.[17]

The other four major AFSCN contracts continued their support, sustainment, and modernization efforts in 1998. The $61 million Network Operations Upgrades Contract (NOUC) (F04701-96-C-0032) awarded to Lockheed Martin Federal Systems in 1996 provided upgrades to the Network Operations Segment. The $247 million Depot Support Contract (DSC II) (F04606-95-D-0033) awarded to Allied Signal Aerospace in 1995 provided sustainment support for the Range, Communications, and Support Segments of the AFSCN. The $67.8 million Network Integration Contract (NIC) (F04701-96-C-0028) awarded to Lockheed Martin Technical Operations in 1996 conducted network level systems engineering and integrations functions. The $110.3 million Command and Control Sustainment Contract (CCSC) (F04701-96-C-0033) awarded to Lockheed Martin Federal Services Corporation in 1996 sustained and modernized the AFSCN CCS. Lockheed completed NOUC in September 2000. In April 2001, the SLCSPO estimated that the DSC II contact reached 60 percent completion, the NIC reached 80 percent completion, and the CCSC reached 93 percent completion. By June 2001, the SLCSPO descoped the NIC with a projected $10 million savings from the early phase-out.[18]

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[17] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 178; Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office," 18 June 2001, p. 27 (Doc 9-31); Briefing Charts, SMC/CW, "DAC Portfolio Review," 3 December 1998, p. 31 (Doc 9-32); Internet Document, Federation of American Scientists (FAS), "Communications Upgrades," 14 August 1998, http://fas.org/spp/ military/program/nssrm/initiatives/commu.htm (Doc 9-33); Internet Document, DefenseLink, "Contracts [Modification to RCDC Contract]," 23 February 2000, http://www.defenselink.mil/cgi-bin/dlprint.cgi (Doc 9-34); Internet Document, DefenseLink, "Contracts [Modification to RCDC Contract]," 30 September 1999, http://www.defenselink.mil/cgi-bin/dlprint.cgi (Doc'9-35); Internet Document, DefenseLink, "Contracts [Increase Value to RCDC Contract]," 1 March 1999, http://www.defenselink.mil/cgi-bin/dlprint.cgi (Doc 9-36).

[18] Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office," 18 June 2001, pp. 18, 27 (Doc 9-31); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Air Force Satellite Control Network," Circa 2000, pp. 4, 11 (Doc 9-28); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems (SLCSPO) Air Force Control Network (AFSCN)," 1 March 2002, p. 13 (Doc 9-11); Briefing Charts, SMC/CW, "DAC Portfolio Review," 3 December 1998, pp. 26, 34, 36 (Doc 9-32).

The SCN Contract (SCNC) would be the overall, consolidated support contract for the AFSCN beginning in FY 2002. It would include the development, systems engineering, integration, and sustainment functions for the AFSCN. The future sustainment of the NIC, RCDC, and the DSC II efforts would be consolidated into the SCNC. It would conduct the future AFSCN development projects, such as the RTS Block Change (RBC) and the Orbital Analysis System (OAS) Follow-On. The basic SCNC would be for six years with the potential of 15 years if the Air Force exercised all of its options. The SCNC would not perform the modernization and sustainment efforts of the CCSC. The appropriate program offices would replace the current CCSC efforts after the contract expires.[19]

For planning purposes the SLCSPO published a notice in the 3 August 1998 issue of Commerce Business Daily that gave advanced notice to qualified sources of the full and open competition RFP for the SCNC. The SLCSPO published the market research/Commerce Business Daily synopsis on 25 August 1998. The draft RFP began around October 1998. The SCNC Acquisition Strategy Panel (ASP) was conducted on 18 January 2000. The SLCSPO hosted industry briefings on 22-25 February, 3-4 April, and 7-9 August 2000 to provide additional information about the SCNC to potential bidders. The SLCSPO released a draft RFP over the Internet on 28 July 2000. The SLCSPO published a notice in the 12 October 2000 issue of Commerce Business Daily that gave advanced notice of the full and open competition RFP for the SCNC for the purpose of obtaining qualified sources. SMC released the final RFP on 3 November 2000. The deadline for the submission of proposals to the RFP occurred on 20 December 2000. The SLCSPO planned to award the SCNC on 30 July 2001, but the contract award date was delayed until December 2001.[20]

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[19] Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems (SLCSPO) Air Force Control Network (AFSCN)," 1 March 2002, p. 13 (Doc 9-11); Announcement, SMC, "[Advance Notice of the RFP for SCNC]," Commerce Business Daily, 12 October 2000, http://frwebgate2.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=378676186847+1+0+... (Doc 9-37); William Hartung, "Honeywell wins US Air Force's Satellite Control Network contract," Yorkshire CND, 19 December 2001, http://www.endyorks.gn.apc.org/yspace/articles/honeywellcontract.htm (Doc 9-38).

[20] Single Acquisition Management Plan (FOUO, Source Selection Sensitive, extract is not FOUO or Source Selection Sensitive), SMC/CW, "Satellite Control Network (SCN) SAMP," 13 December 2000, p. 51 (Doc 9-30); Briefing Charts (FOUO, extract is not FOUO), SMC/CWN, "DAC Program Management Review," 15 November 2000, p. 6 (Doc 9-39); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office," 18 June 2001, p. 43 (Doc 9-31); Staff Summary Sheet, SMC/CWSN to SMC/CC et al., "RFP Release Approval for the Satellite Control Network Contract (SCNC)," 18 October 2000, (Doc 9-40); Announcement, SMC/CW, "[Notice of Planning for RFP for SCNC]," Commerce Business Daily, 3 August 1998, http://frwebgate2.access.gpo.gov/cgi-bin/ waisgate.cgi?WAISdocID=378676186847+0+0+... (Doc 9-41); Announcement, SMC/CW, "[Advance Notice of SCNC Industry Day Forum]," Commerce Business Daily, 10 February 2000,

Spacelift Range System

The Spacelift Range System (SLRS) was the infrastructure operated by the Air Force to launch rockets for space missions and to launch missiles for ballistic test trajectories at Cape Canaveral AFS (Eastern Range) and Vandenberg AFB (Western Range). The two launch ranges operated independently of each other, and exercised local operational command and control from their own operation control centers. The SLRS contained equipment and facilities that provided ground-based surveillance, navigation, flight operations and analysis, communications, and meteorological data to support the launches. The primary mission of the SLRS was to provide real-time command and control of air, sea, and land-based assets to ensure the timely and safe conduct of military, civil (NASA and the National Oceanic and Atmospheric Organization), and commercial spacelift, ballistic missiles, post flight evaluation and analysis, and aeronautical test operations. Each of the two ranges was composed of three inter-related segments: the Instrumentation Segment, the Network Segment, and the Control and Display Segment.[21]

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http://frwebgate2.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=378676186847+2+0+... (Doc 9-42); Announcement, SMC/CW, "[Advance Notice of RFP for SCNC]," Commerce Business Daily, 12 October 2000, http://frwebgate2.access.gpo. gov/cgi-bin/ waisgate.cgi?WAISdocID =378676186847+1+0+... (Doc 9-37); William Hartung, "Honeywell wins US Air Force's Satellite Control Network contract," Yorkshire CND, 19 December 2001, http://www.endyorks.gn.apc.org/yspace/articles/ honeywellcontract.htm (Doc 9-38); E-mail (FOUO, Source Selection Sensitive extract is not FOUO or Source Selection Sensitive), Capt John Grosvenor, SMC/RNX, to Robert Mulcahy, SMC/HO, "SMC/CW History Comments Summary & SMC/CW History," 22 December 2003, p. 10 (Doc 9-30-1).

[21] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 181; Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-43); Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2); Single Acquisition Management Plan (SAMP) (FOUO, Source Selection Sensitive, the extract is not FOUO or Source Selection Sensitive), SMC/CW, "Spacelift Range System SAMP Program Elements (PE) 35181F/35182F," September 1999, p. 3 (Doc 9-44); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: Releasable SMC/CW Information?," 4 September 2003, (Doc 9-45); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 22 (Doc 9-46); Report, Interagency Working Group, "The Future Management and Use of the U.S. Space Launch Bases and Ranges," 8 February 2000, p. E-1 (Doc 9-47).

Instrumentation Segment

The Instrumentation Segment (INSEG) consisted of a variety of sensors such as radars, telemetry receivers, optical systems, weather instruments, and command transmitters. The Air Force used the instruments to support decisions about launches, to collect data on individual missions, for metric tracking, for launch area surveillance, for weather data, and for command destruct of missiles and launch vehicles if they should go astray or otherwise malfunction. INSEG included fixed instrumentation sites and mobile instrumentation stations. The mobile instrumentation stations consisted of ground-based instrumentation vans, containerized ships, and instrumented aircraft and satellites that could be deployed as needed for particular launches.[22]

The fixed INSEG sites included sensors, transmitters, and facilities that had locations around the world. The Eastern Range had numerous INSEG sites within Florida. They included the launch centers at Cape Canaveral AFS and the NASA Kennedy Space Center. The Florida Annexes consisted of Jonathan Dickinson Missile Tracking Annex, Malabar Transmitter Annex, Melbourne Beach Optical Tracking Annex, and the Cocoa Beach Tracking Annex. The international INSEG sites for the Eastern Range comprised the Argentia Missile Tracking Annex in Newfoundland, Canada, Antigua Air Station on the island of Antigua in the West Indies, and Ascension Auxiliary Airfield on the island of Ascension in the middle of the Atlantic Ocean. The fixed INSEG sites for the Western Range had many types of equipment and facilities. The instrumentation sites in California included Vandenberg AFB, Santa Ynez Peak, Point Mugu, Anderson Peak, and Pillar Point. The Western Range also used Kaena Point, Hawaii and other sites in the South Pacific Ocean.[23]

Network Segment

The Network Segment (NETSEG) was the communications backbone of each range. It provided all of the electronic connections and interfaces between the sensors in the INSEG--as well as external sources of data--and the monitors, operators, and decision-makers in the Control and Display Segment (see below). The NETSEG provided the conduit for sending voice, video, and data to and from remote and local

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[22] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 182; Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2).

[23] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 182-183; 45th Space Wing Annual History 1999 (FOUO, extract is not FOUO), 45 SW/HO, pp. 9, 15 (Doc 9-48); Fact Sheet, Global Security, "Jonathan Dickson Missile Tracking Annex," 2 January 2003, http://www.globalsecurity.org/space/facility/dickinson.htm (Doc 9-49); Internet Document, Federation of American Scientists (FAS), "Antigua (U)," 21 November 1997, http://fas.org/spp/military/program/nssrm/initiatives/antigu.htm (Doc 9-50); E-mail, Mark Cleary, 45 SW/HO, to Robert Mulcahy, SMC/HO, "RE: Eastern Test Range Sites," 17 July 2003, (Doc 9-51).

instrumentation sites. This segment had redundant data paths, detection of overloads in its links, and other reliability enhancements.[24]

Control and Display Segment

The Control and Display Segment (CDSEG) used the data coming in from the INSEG to allow operators to manage and manipulate the range assets involved in the launches. This segment incorporated video displays, voice and data communications, and data processing systems. The CDSEG resources and operators provided all of the range services and human interfaces directly observable by SLRS customers.[25]

Range Standardization and Automation

The SLRS continued to upgrade and modernize its equipment and facilities between 1998-2001. The SLRS had an inefficient architecture that continued to rely on equipment and facilities that had been designed and built in the 1950s and 1960s that needed to be modernized after decades of inadequate or piecemeal replacement and maintenance. The two launch ranges had the same mission, but employed different system configurations with outdated hardware and software. The lack of range standardization also caused inefficiency. In 1998, over 40 percent of the ranges' instrumentation components were obsolete without sources of support and could not easily be replaced. Patchwork fixes increased the ranges' complexity and decreased mission reliability. The redundancy to counter the poor reliability of the SLRS required too much manpower to operate and proved to be too costly. The overall result was a declining capability to support launches. The 15 May 1992 Spacelift Range Standardization and Automation (RSA) Mission Need Statement (MNS) AFSPC 022-91, established the need for the two launch ranges to meet modern operational, maintenance, and reliability standards. The goals for the RSA effort included: standardizing the Eastern and Western ranges, preserving and improving range safety, obtaining more reliable and responsive operations, decreasing the operations and maintenance costs, reducing the mission turnaround time, attracting and accommodating range users, and normalizing sustainment responsibilities.[26]

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[24] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 183; Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2).

[25] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 183; Fact Sheet, SMC/PA, "Satellite and Launch Control Systems," August 2000, http://www.losangeles.af.mil/SMC/PA/Fact_Sheets/cw_fs.htm (Doc 9-2).

[26] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 185; Acquisition Plan Background (FOUO, extract is not FOUO), SMC/CW, "Range Standardization and Automation (RSA) Program Phase IIA," Circa 1995, (Doc 9-52); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 9 (Doc 9-46); Briefing Charts, SMC/CW, "Industry Day Acquisition For Satellite Control Network (SCN) & Spacelift Range System (SLRS) Programs," 16 June 1998, pp. 16-17

SMC awarded the RSA Phase I contract (F04701-93-C-0003) to the Harris Corporation Information Systems Division on 29 June 1993. It had a completion date of 30 June 1998. RSA I began the three-phase process of overhauling and modernizing the SLRS, but RSA I concentrated most of its efforts on the Eastern Range. By its terms, Harris would provide solutions for the most immediate problems in the Eastern Range: consolidated instrumentation facilities at Antigua and Ascension, satellite communications from those sites to the Eastern Range Operations Control Center, upgrades for the communications network at Cape Canaveral AFS, and a Centralized Telemetry Processing System for both the Eastern and Western Ranges. The program office decided that the end results of these measures would be to reduce the turnaround time for launches on the range, improve the range's reliability, maintainability, and availability, and reduce the costs of operations and maintenance. The RSA Operational Requirements Document (ORD) was dated 18 July 1994, and the RSA Concept of Operations (CONOPS) was dated 15 February 1997.[27]

In March 1996, the Harris Corporation reported that its estimated final cost of the RSA I contract would be about a third higher than the target cost. The program had already received some heavy budget cuts, and the additional costs pushed it over the edge of what was feasible. The program officials did not effectively manage the known cost risks according to a 1999 audit by the Air Force Audit Agency (AFAA). SMC decided that the contract could not be executed without being restructured. The program office and the contracting office therefore removed some major tasks from the baseline for RSA I. New work would be transferred to the new RSA II contractual effort, beginning with the definition of a baseline system for the ranges. In June 1996, representatives of the government and the contractor agreed on a rebaselined program that would stay within the program's reduced budget but met Air Force Space Command's requirements. They signed a contractual modification for RSA I restructuring the program late in September 1996. The newly rebaselined RSA I contract had a completion date of

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(Doc 9-53); Internet Document, Federation of American Scientists (FAS), "Range Standardization and Automation (RSA) Phase 2A/B," 17 June 1998, http://fas.org/spp/military/program/nssrm/initiatives/rsaph2.htm (Doc 9-54); News Release, Vandenberg AFB, "Tracking Station Open House/[40th] Anniversary," 13 May 1999, http://www.vandenberg.af.mil/30sw/news/news_releases_99.htm (Doc 9-55).

[27] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 185; Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-43); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 9 (Doc 9-46); Internet Document, Federation of American Scientists (FAS), "Range Standardization and Automation (RSA) Phase 1 (U)," 3 July 1998, http://fas.org/spp/military/program/nssrm/initiatives/rsaph1.htm (Doc 9-56); Internet Document, Air Force News, "Range Standardization And Automation, Phase 1," 30 August 1999, http://www.geocities.com/fodellus/rsa1.html (Doc 9-57).

28 May 1999, but as of 28 February 1998, the SLCSPO estimated that the Harris Corporation had completed only 83 percent of the contract.[28]

On 11 May 1999, the SMC commander requested that the Air Force Audit Agency (AFAA) conduct an audit on RSA I. The AFAA audit made recommendations about the RSA I acquisition, the cost and schedule control, and the logistics support. The AFAA concluded, that the untimely (and sometimes incomplete) contractor delivery of the Product Drawings and Vender Item Drawings significantly delayed an adequate documentation of the RSA design, and the proper management of the system configuration. The Harris Corporation also did not fully develop or populate its Logistics Support Analysis Record (LSAR) database with logistics information (such as failure rates, and default detection characteristics) about the RSA I system components. By June 1998, only 30 percent of the LSAR database had been done with the RSA I effort nearing its completion. The program office issued a Stop Work Order on the LSAR on 21 May 1998 because further work on the database would not have been cost effective. The contractor seemed to be reluctant to develop the LSAR database and reports until the government accepted their system design. The government formally documented its concerns in Procuring Contractor Officer letters dated 17 December 1997 and 17 July 1998.[29]

The AFAA audit also had conclusions about the SLCSPO and RSA I. The audit stated that the program office did not take sufficient action to monitor the development of the Logistics Support Analysis (LSA) database or reports. The RSA I program officials also unintentionally permitted the Harris Corporation to purchase 64 items to be used as support equipment (costing over $500,000) without the proper coordination and approval. The contractor did not develop Support Equipment Recommendation Data (SERD) or process the equipment with an Air Force Item Manager. It was later determined that only 11 of the 64 items were considered support equipment. The fieldwork on the RSA I audit concluded on 5 November 1999, and the AFAA provided a draft of its report to management on 19 November 1999. The final audit report had a completion date of 22 June 2000.[30]

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[28] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 186; Briefing Charts, SMC/CW, "Satellite and Launch Control Systems Program Management Review," 2 April 1998, p. 33 (Doc 9-58); Report of Audit, AFAA, "Commanders Audit Program, Review of Program Management, Range Standardization and Automation, Phase-I Program," 22 June 2000, pp. 4-7, 11 (Doc 9-59); Briefing Charts, AF/XOR, Spacelift Range System," 6 November 2000, (Doc 9-60).

[29] Report of Audit, AFAA, "Commanders Audit Program, Review of Program Management, Range Standardization and Automation, Phase-I Program," 22 June 2000, pp. 9-12 (Doc 9-59).

[30] Report of Audit, AFAA, "Commanders Audit Program, Review of Program Management, Range Standardization and Automation, Phase-I Program," 22 June 2000, pp. 12-15 (Doc 9-59).

By the end of June 1999, RSA I was estimated to be 98 percent complete. The RSA I contract had to be extended through March 2000 in order to integrate and test the Satellite Communications (SATCOM), the Cape Fiber Optic Network (CFON), and the Centralized Telemetry Processing System (CTPS). Delays in integrating the Commercial Off-The-Shelf (COTS) items also impacted the schedule. RSA I received $2.46 million in funding for FY 2000. The DD Form 250 (Material Inspection and Receiving Report) for the hardware and software associated with RSA I (SATCOM, CFON, and CTPS) was signed on 16 July 1999 with a few conditions: 12 deficiency notices, the final disposition of six waivers, and the resolution of four "Spec shall" statements. The Harris Corporation delivered the major end systems required, but some minor RSA I tasks did not get completed when the contract expired. The final cost of the RSA I contract totaled approximately $225 million. Although the RSA I effort descoped many of its parts, portions of it remained unfinished at the Eastern Range when 2001 ended.[31]

By the end of FY 2000, RSA I provided some significant improvements to the SLRS. It produced SATCOM - direct satellite communications that sent telemetry from the downrange instrumentation sites (Antigua and Ascension) to the control node at Cape Canaveral for centralized processing. SATCOM proved to be faster and more reliable

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[31] Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office Vision for the Future," March 1998, p. 2 (Doc 9-61); Briefing Charts, AF/XOR, Spacelift Range System," 6 November 2000, p. 11 (Doc 9-60); Briefing Charts (FOUO, extract is not FOUO), SMC/CWP, "RSA I Issues," Circa November 1998, p. 2 (Doc 9-62); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "RSA Phase I Wrap-Up of Harris Contract," 10 August 1999, p. 3 (Doc 9-63); Summary (FOUO, extract is not FOUO), Boeing et al., "RSA I Shortfalls," 9 October 1998, (Doc 9-64); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "RSA Phase I Program Management Review," 10 August 1999, p. 7 (Doc 9-65); Internet Document, Air Force News, "Range Standardization And Automation, Phase 1," 30 August 1999, http://www.geocities.com/ fodellus/rsa1.html (Doc 9-57); Briefing Script (FOUO, extract is not FOUO), Lt Col Michael Coolidge, SMC/CW, "RSA Briefing [Eastern Launch Range]," circa 1999, (Doc 9-66); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 22 (Doc 9-46); E-mail, Jim Pope, SMC/RNP, to Robert Mulcahy, SMC/HO, "RSA I Completion Date," 8 August 2003, (Doc 9-67); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "RSA Phase I Status and Road Ahead," 22 February 2000, (Doc 9-68); Announcement, SMC, "RSA Phase I Program, Exercise of Operational Utility Evaluation (OUE) Hours," Commerce Business Daily, 2 March 2001, http://frwebgate5.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=618446319596+6+0+... (Doc 9-69); E-mail (FOUO, extract is not FOUO), Rick Bailey, SMC/RNP, to Robert Mulcahy, SMC/HO, "RSA I Review," 27 August 2003, (Doc 9-70); Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-42).

than the old microwave links, and it reduced costly downrange processing. RSA I also delivered the CFON - the communication backbone that implemented data, voice, and video services. CFON provided an electronically switchable video network to the Eastern Range that replaced the old manual switching with an automated system. CFON could reconfigure more than 200 circuits in less than 20 minutes; previously, it took 24 hours of reconfiguration time to make 15 manual patches per circuit, with an average of 100 circuits per launch. CFON had been installed in December 1998, and had its development test and evaluation in May 1999. The Operational Utility and Effectiveness (OUE) testing for SATCOM and CFON were completed at the end of March 2000. The Air Force operationally accepted CFON by the end of FY 2000. RSA II would add to CFON's capability and flexibility.[32]

RSA I also produced CTPS that the Eastern Range used as its common telemetry processing system. It provided real-time data used by Flight Operations and Analysis and the Data Product Services. CTPS could be reconfigured in less than 20 minutes, and it significantly reduced the amount of equipment that had to be maintained. The Eastern Range installed CTPS in December 1998, conducted its development test and evaluation in May 1999, but the range had not operationally accepted CTPS by the end of 2001. Plans had been made to install CTPS at the Western Range. The CTPS equipment purchased for installation at Vandenberg AFB, was instead used to support Cape Canaveral AFS when available spare equipment had diminished due to the delays in getting CTPS operationally accepted at the Eastern Range. A future CTPS may be developed and installed at the Western Range.[33]

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[32] Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office," 18 June 2001, p. 58 (Doc 9-31); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "DAC Portfolio Review," 10 February 2000, p. 27 (Doc 9-71); Briefing Charts (FOUO, extracts are not FOUO), SMC/CW, "Satellite and Launch Control SPO DAC PMR," 23 July 1999, pp. 2, 5, 68 (Doc 9-72); 45th Space Wing Annual History 2000 (FOUO, extract is not FOUO), 45 SW/HO, pp. 34-35 (Doc 9-73); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 15 (Doc 9-46); Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-43).

[33] Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "DAC Portfolio Review," 10 February 2000, p. 27 (Doc 9-71); Briefing Charts (FOUO, extracts are not FOUO), SMC/CW, "Satellite and Launch Control SPO DAC PMR," 23 July 1999, pp. 4, 69-70 (Doc 9-72); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 17 (Doc 9-46); Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-43); Review, Christine Stevens, Aerospace Director of Spacelift Range, "Satellite Launch and Control Systems [1998-2001 history]," 17 December 2003, (Doc 9-73-1); E-mail (FOUO, extract is not FOUO), Chistine Stevens, Aerospace Corporation, to Robert Mulcahy, SMC/HO, "RE: SLRSC Contractor Locations," 6 January 2004, (Doc 9-73-2).

The second phase of the SLRS modernization was the RSA Phase II effort. SMC awarded the 10-year $166 million RSA II contract (F04701-95-C-0029) to the Lockheed Martin on 21 November 1995. RSA IIA provided engineering and integration for the SLRS. The contract procurement included a Western Range Operations Control Center, along with imaging systems, communications upgrade, mobile equipment and facilities for telemetry and command, surveillance systems, meteorological collection and prediction systems, debris tracking systems, a GPS system for launch vehicle metric tracking, a planning and scheduling system, a range safety system, and data processing and display systems. The RSA IIA effort would increase range throughput (by reducing turnaround time and eliminating lock-down with automation), improve range reliability, maintainability, and availability (by replacing outdated systems with standardized architecture and reducing the complexity with standard COTS), and it would reduce the range operations and maintenance costs (by reducing the systems using standardization and reducing the number of personnel through automation).[34]

Vandenberg AFB activated its Space Operations Center (SOC) on 13 November 1997. On 8 May 1998, the 14th Air Force activated the 614th Space Operations Squadron (SOPS) to operate the AOC. The Air Force redesignated the SOC as an "Aerospace Operations Center" (AOC) in July 1999. The AOC tracked and monitored the status of orbiting Air Force satellites in a 24-hour per day operation. It became part of the effort to integrate space systems with day-to-day military operations. The AOC gave the 14th Air Force status-monitoring, planning, and assessments from 141 worldwide space units (squadrons, detachments, or operating locations) that provided space surveillance, space warning, satellite command and control, and space launch capabilities. The monitored space systems included Air Force satellites used for navigation, communications, intelligence, and meteorological purposes. The AOC made space-support more readily available to the American military by enabling the 14th Air Force commander to task space units to support of military conflicts worldwide.[35]

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[34] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 187; Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Range Standardization and Automation," 17 September 2001, p. 7 (Doc 9-74); Briefing Script (FOUO, extract is not FOUO), Lt Col Michael Coolidge, SMC/CW, "RSA Briefing [Eastern Launch Range]," Circa 1999, p. 4 (Doc 9-66); Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-43).

[35] Internet Document, TSgt David Morton, "Reserve activates two new space units," Air Force News, 2 November 1999, http://www.fas.org/news/usa/1999/11/n19991102_992018.htm (Doc 9-75); Internet Document, No author, "Air Force's newest space squadron runs space operations center," Air Force News, 13 May 1998, http://www.fas.org/news/usa/1998/05/n19980513_980652.html (Doc 9-76); E-mail, Col Teresa Djuric, 21 OG/CC, to Robert Mulcahy, SMC/HO, "RE: AOC at VAFB," 10 September 2003, (Doc 9-77); Fact Sheet, VAFB, "614th Space Operations Squadron," Printed 9 September 2003, http://www.vandenberg.af.mil/associate_units/614_sops/index.htm (Doc 9-78);

The RSA II effort delivered the Early Scheduling Toolkit for Automated Ranges (ESTAR) that provided automated scheduling capabilities and became operationally accepted in June 1999. The previous scheduling system had been text-based, plus conflicts and resource utilization calculations had to be manually resolved. ESTAR automatically identified conflicts and provided order-of-magnitude greater scheduling, billing and planning detail.[36]

The Air Force planned for an RSA IIB effort to complete the modernization and automation of the fixed instrumentation assets. SMC planned to award an RSA Phase IIB contract around FY 1999. It would have provided the acquisition and integration of fixed instrumentation dedicated to primary telemetry receiving, metric tracking systems, command/destruct systems, and radar. Before SMC could begin the contract effort, the 1996 RSA I contract restructure delayed plans for an RSA IIB contract. SMC never awarded an RSA IIB contract. In 1999, SMC decided to include the planned RSA IIB products and tasks into the November 2000 Spacelift Range System Contract (SLSRC).[37]

The SLCSPO and Lockheed Martin Mission Systems (LMMS) held a joint meeting on 13 December 2000 to discuss the differences between the way the RSA IIA

William Scott, "Air Force's Opens New Space Center," Air Force News, 24 November 1997, p. 71 (Doc 9-79).

[36] Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-43); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office," 18 June 2001, p. 59 (Doc 9-31); Briefing Charts (FOUO, extracts are not FOUO), SMC/CW, "Satellite and Launch Control SPO DAC PMR," 23 July 1999, p. 6, 69-70 (Doc 9-72).

[37] SMC History 1995-1997 (FOUO, extract is not FOUO), SMC/HO, p. 188; Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office Vision for the Future," March 1998, p. 12 (Doc 9-61); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "RSA Phase IIB," 22 September 1997, (Doc 9-80); Single Acquisition Management Plan (SAMP) (FOUO, Source Selection Sensitive, extract is not FOUO or Source Selection Sensitive), SMC/CW, "Spacelift Range System SAMP Program Elements (PE) 35181F/35182F," September 1999, p. 6 (Doc 9-44); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: Review of 1999 SLRSC SAMP references," 15 September 2003, (Doc 9-81); 45th Space Wing Annual History 2000 (FOUO, extract is not FOUO), 45 SW/HO, p. 34 (Doc 9-73); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "RSA Phase IIB," 22 September 1997, (Doc 9-80); Point Paper, SMC/CWR, "Competition Considerations for RSA IIB Effort," 2 September 1997, (Doc 9-82); Quarterly Report, FAA, "Special Report: U.S. Launch Modernization Programs," Third Quarter 1999, p. SR-7 (Doc 9-83); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: RSA IIB," 18 August 2003, (Doc 9-84).

contract (F04701-95-C-0029) had been written and how it was being conducted. The Air Force and LMMS jointly decided to alter the RSA IIA contract to remedy the inconsistencies. On 6 June 2001, LMMS prepared a Contract Change Proposal (CCP) for the reformation of the contract. The CCP described how the RSA IIA contract did not resemble the program that LMMS had been executing. The range delivery increments had slipped, been broken into smaller products, or had been completely eliminated, which greatly affected the original, integrated RSA IIA Program. As a result, the program schedule slipped into years that had reduced funding budgets. By mid 2000, LMMS had to generate a large number of Letters of Notification based on areas of the contract that were vague, poorly defined, and sometimes, not included in the contract. Open contract options resulted in over 39 notification letters. The system engineering tasks in the RSA IIA contract had also been transferred to the recent SLRSC contract. On 21 September 2001, SMC awarded LMMS a $12,268,671 cost plus award fee contract modification (F04701-95-C-0029, P00110) to provide for the changes involved in the RSA II effort that would be transferred to the SLRSC.[38]

At the end of 2001, the upgrades from the RSA efforts made significant contributions towards increased launch reliability. By late September 2001, the Eastern Range had supported 55 consecutive successful launches, and an eastern launch had not been cancelled due to faulty instrumentation in over 2.5 years. In October 2001, RSA IIA continued with its Planning and Scheduling automation, Communication Network modernization, its Differential GPS Metric Tracking System, and the interim Flight Safety effort. The RSA IIA contract had a value of $463.8 million in September 2001, and it should be completed on 21 November 2005. Between 1993-1999, the Air Force invested an estimated $700 million into the launch ranges.[39]

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[38] Contract Change Proposal (FOUO, extract is not FOUO), Lockheed Martin, "Reformation of the RSA IIA Contract [Overview]," 6 June 2001, (Doc 9-85); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Satellite and Launch Control Systems Program Office," 18 June 2001, p. 98 (Doc 9-31); Internet Document, DefenseLink, "Contracts [RSA IIA]," 21 September 2001, http://www.defenselink.mil/news/Sep2001/c09212001_ct446-01.html (Doc 9-86).

[39] Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Range Standardization and Automation," 17 September 2001, p. 3 (Doc 9-74); Briefing Charts, AF/XOR, "Spacelift Range System (SLRS)," 14 September 2001, p. 10 (Doc 9-87); News Release, 45 SW/PA, "Air Force's Eastern Range Upgrades continue, Keeps 45th Space Wing Mission on Track," 20 September 2001, (Doc 9-88); Single Acquisition Management Plan (SAMP) (FOUO, Source Selection Sensitive, the extract is not FOUO and not Source Selection Sensitive), SMC/CW, "Spacelift Range System SAMP Program Elements (PE) 35181F/35182F," September 1999, p. 1 (Doc 9-44); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: Releasable SMC/CW Information?," 4 September 2003, (Doc 9-45).

Spacelift Range System Contract

The SLRS Contract (SLRSC) would be the third phase of the SLRS modernization. The 1992 RSA MNS, the 1994 RSA ORD, and the 1997 RSA CONOPS established the need to modernize the launch ranges. The SLSRC would continue the range modernization by developing, procuring, and sustaining integrated, automated SLRS instrumentation assets at the Western and Eastern Launch Ranges. The SLRSC would streamline the range modernization, increase reliability, capability, and launch throughput, and protect public safety. The overall objective of the SLRS Program was to improve the SLRS and reduce the total cost of ownership through centralizing the command and control data processing, normalizing the logistics support, accelerating the response to increasing launch processing and operational requirements, and providing simultaneous launch operations support capability.[40]

The SLRSC would be a single system contract that would provide development, plus system engineering and sustainment for the spacelift ranges. Previously, the ranges had too many contracts for these purposes that had conflicting goals, overlapping roles and responsibilities, and poor integration. The SLSRC would consolidate the operations, maintenance, sustainment, and modernization requirements for a more cost-effective, integrated SLRS. The SLRSC also emphasized system standardization to the design of hardware, software, and procedures at both of the launch ranges in order to improve operational efficiency, reliability, and supportability while reducing operations and maintenance costs.[41]

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[40] Program Management Directive (FOUO, extract is not FOUO), SAF/AQS, "PMD 2330 (4)… for Spacelift Range System (SLRS) Program," 20 March 2000, pp. 1-2 (Doc 9-89); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Spacelift Range Systems Contract (SLRSC)," 22 April 1999, p. 6 (Doc 9-90); Program Description (FOUO, extract is not FOUO), SMC/CW, "Spacelift Range System," 22 September 2000, p. 3 (Doc 9-91); Single Acquisition Management Plan (SAMP) (FOUO, Source Selection Sensitive, extract is not FOUO or Source Selection Sensitive), SMC/CW, "Spacelift Range System SAMP Program Elements (PE) 35181F/35182F," September 1999, p. 1 (Doc 9-44); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: Releasable SMC/CW Information?," 4 September 2003, (Doc 9-45); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 10 (Doc 9-46); Staff Summary Sheet, SMC/CWR to SMC/CC et al., "Spacelift Range Systems Contract (SLRSC) Acquisition Documentation," 23 September 1999, (Doc 9-92); Fact Sheet, Air Force, "Spacelift Range System (SLRS)," October 2000, (Doc 9-43).

[41] Test and Evaluation Master Plan (Revised Temp - Final Draft) (FOUO, extract is not FOUO), SMC, "Spacelift Range System (SLRS) Program," 9 August 2000, p. 3 (Doc 9-93); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "Spacelift Range Systems Contract (SLRSC)," 22 April 1999, pp. 9-15, 22 (Doc 9-90).

The SLRSC obtained some of the RSA IIA initiatives, and incorporated the products from the planned RSA IIB proposal. The Air Force provided incentives to the SLRSC and RSA IIA efforts to work cooperatively to deliver a single integrated and cost-effective solution. The RSA II initiatives that transferred to the SLSRC included projects featuring surveillance radar, weather instrumentation upgrades, command/ destruct, and metric tracking.[42]

On 3 August 1998, the SLCSPO published a notice in the Commerce Business Daily to provide an advance announcement of the future full and open competition RFP to obtain qualified sources for the SLSRC. On 7 April 1999, SMC published an announcement in the Commerce Business Daily that it would host a joint Industry Day forum on 22 April to provide potential offerors additional information about the future SLSRC. At the 26 May 1999 Acquisition Strategy Panel (ASP), the Principle Deputy Assistant Secretary of the Air Force (Acquisition and Management) delegated the source selection authority of the SLSRC acquisition to the SMC commander. On 4 October 1999, SMC published a notice in the Commerce Business Daily announcing the formal release of the SLRSC RFP (F04701-99-R-0308). The RFP submissions had a deadline of 12 November 1999. The negotiation completion date for the SLSRC came on 8 September 2000.[43]

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[42] 45th Space Wing Annual History 2002 (FOUO, extract is not FOUO), 45 SW/HO, p. 33 (Doc 9-94); Program Management Directive (FOUO, extract is not FOUO), SAF/AQS, "PMD 2330 (4)… for Spacelift Range System (SLRS) Program," 20 March 2000, pp. 1-2 (Doc 9-89); Single Acquisition Management Plan (SAMP) (FOUO, Source Selection Sensitive, extract is not FOUO or Source Selection Sensitive), SMC/CW, "Spacelift Range System SAMP Program Elements (PE) 35181F/35182F," September 1999, p. 9 (Doc 9-44); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: Review of 1999 SLRSC SAMP references," 15 September 2003, (Doc 9-81).

[43] Single Acquisition Management Plan (SAMP) (FOUO, Source Selection Sensitive, extract is not FOUO or Source Selection Sensitive), SMC/CW, "Spacelift Range System SAMP Program Elements (PE) 35181F/35182F," September 1999, p. 2 (Doc 9-44); E-mail, Maj John Russell, SMC/RNX, to Robert Mulcahy, SMC/HO, "RE: Review of 1999 SLRSC SAMP references," 15 September 2003, (Doc 9-81); Staff Summary Sheet w/1 atch, SMC/CWR to SMC/CC, "Spacelift Range System Contract (SLRSC) Acquisition Documentation," 23 September 1999; Atch 1 Memo, SMC/CC, "Executive Management Summary – RFP F04701-99-R-0308, Spacelift Range System Contract (SLRSC) Acquisition," 23 September 1999, (Doc 9-92); Announcement, SMC/CW, "[Advance Notice of RFP for SLSRC]," Commerce Business Daily, 3 August 1998, http://frwebgate5.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=062057234399+19+0… (Doc 9-95); Announcement, SMC, "[SLSRC Industry Day]," Commerce Business Daily, 7 April 1999, http://frwebgate6.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=209386242043+1+0… (Doc 9-96); Announcement, SMC, "[Release of RFP for SLSRC]," Commerce Business Daily, 4 October 1999, http://frwebgate6.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=209386242043+4+0… (Doc 9-97); Internet

On 3 November 2000, SMC awarded ITT Industries the SLSRC (F04704-01-C-0001). The 10.5-year cost plus award fee contract had an estimated total value of $1.5 billion. The SLRSC contractor effort included: program management, interface management, systems engineering and integration, depot maintenance, transition, product acquisitions and modifications, and instrument modernization for operational systems and infrastructure including instrumentation, network, and control and display. The SLRSC contractor effort would be conducted at both of the launch ranges. In 2001, the Air Force awarded a 96 percent award fee to ITT to reward the company for the progress it made on the SLSRC.[44]

Year 2000 (Y2K) Computer Rollover

SMC and the SLCSPO used the Air Force's five-phase (awareness, assessment, renovation, validation, and certification) "Weapon System Strategy for Year 2000" to attain Year 2000 (Y2K) certification. The SLCSPO had the responsibility to complete the Y2K process for the AFSCN and the SLRS that consisted of many complex computer systems which had to be brought into Y2K compliance: 79 different software languages, 2484 configuration items, and 22 million lines of code (changing 22 percent of the code per year). Six segments of the SLCSPO had to complete individual Y2K certifications: Communication, Range, Support, Command and Control, the Orbital Analysis System (OAS), and the Eastern Range. All five of the segments completed the assessment phase on 18 November 1997. The Communication, Range, and Support segments completed their Y2K certifications on 31 December 1998; the Command and Control segment completed it on 30 March 1999. The OAS segment finished its Y2K tests, but did not complete its Y2K certifications by 2000 due to various delays (see Chapter 2 for details). The OAS segment implemented its Y2K Contingency Plan on 1 January 2000 until the OAS completed its Y2K certification around April 2000. It cost $19 million to complete the Y2K fixes, but the AFSCN and the SLR continued operating after the Y2K rollover.[45]

Document, DefenseLink, "Contracts [SLSRC]," 3 November 2000, http://www.dod.mil/news/Nov2000/c11032000_ct678-00.html (Doc 9-98).

[44] Concept of Operations (FOUO, extract is not FOUO), SMC/CW, "CONOPS For SLRSC Contract Management," Circa 2000, (Doc 9-99); Contractor Statement of Work (Attachment 1) (FOUO, extract is not FOUO), SMC/CW, "Spacelift Range System Contact [F04701-01-C-0001]," 24 July 2001, p. 2 (Doc 9-100); E-mail (FOUO, extract is not FOUO), Chistine Stevens, Aerospace Director of Spacelift Range, to Robert Mulcahy, SMC/HO, "RE: SLRSC Contractor Locations," 6 January 2004, (Doc 9-100-1); Internet Document, DefenseLink, "Contracts [SLSRC]," 3 November 2000, http://www.dod.mil/news/Nov2000/c11032000_ct678-00.html (Doc 9-98); Product Support Management Plan (PSMP), SMC/CW, "Satellite and Launch Control Systems Program Office (SLCSPO) Spacelift Range System (SLRS)," 1 March 2002, p. 10 (Doc 9-46); News Release, No author, "ITT Industries, Systems Division Wins Big!," Florida Space Monthly, June 2003, p. 1 (Doc 9-101).

Operation Allied Force, the 1999 Kosovo Campaign

The AFSCN supported the warfighter operations over Yugoslavia by providing increased spacecraft support functions and reducing the time it took to make bandwidth available for mission data operations. For some classified satellites, AFSCN performed these support functions so the dedicated Mission Ground Stations could maximize their mission data operations. The AFSCN increased the dissemination of satellite imagery to the warfighters and decision makers. During the campaign, the AFSCN increased its operations tempo without affecting its performance.[46]

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[45] Briefing Charts (FOUO, extract is not FOUO), SMC/AXEC and SMC/CW, "AFSPC/CC Year 2000 Update," 29 September 1999, pp. 6-8 (Doc 2-32); Background Paper, (FOUO, extract is not FOUO), SMC/CW, "Year 2000 (Y2K) Certification for Air Force Satellite Control Network (AFSCN) Archival System Upgrade," Circa August 1999, (Doc 9-102); Briefing Charts (FOUO, extract is not FOUO), SMC/CW, "DAC Portfolio Review," 10 February 2000, p. 33 (Doc 9-71); Briefing Charts (FOUO, extracts are not FOUO), SMC/CW, "Satellite and Launch Control SPO DAC PMR," 23 July 1999, pp. 12, 98-99 (Doc 9-72); Briefing Charts, SMC/CW, "DAC Portfolio Review," 3 December 1998, p. 79 (Doc 9-32); Monthly Activity Report, Satellite Control Network (SCN), December 1998, (Doc 9-103); Staff Summary Sheet, SMC/CWXN, "Y2K Certification Package for the AFSCN Command and Control Segment," 26 March 1999, (Doc 9-104); Staff Summary Sheet, SMC/CWXC, "Y2K Certification Package for the Eastern Spacelift Range," 10 September 1999, (Doc 9-105); News Release, Vandenberg AFB, "Y2K Ready," 23 December 1999, (Doc 9-106); Lt Col King (FOUO, extract is not FOUO), "CW Year 2000 (Y2K) Action Plan (Draft)," 15 December 1996, (Doc 2-19); Briefing Charts (FOUO, extract is not FOUO), SMC/AXEC and SMC/CW, "AFMC/CC Year 2000 Update," 17 December 1999, (Doc 2-39); Briefing Charts (FOUO, extract is not FOUO), SMC/AXEC and SMC/CW, "Final Year 2000 Review," 20 December 1999, p. 8 (Doc 2-38); E-mail, Capt Wesley Turner, SMC/Det 11/CWSNC, to Robert Mulcahy, SMC/HO, "[Y2K] Completion Date," 30 May 2002, (Doc 2-43); E-mail, Capt Wesley Turner, SMC/Det 11 /CWSNC, to Robert Mulcahy, SMC/HO, "OAS Summary," 31 May 2002, (Doc 2-44).

[46] Briefing Charts (FOUO, extract is not FOUO), 22 SOPS, "AFSCN Surge Operations Mar – Jun 99," 11 April 2000, p. 8 (Doc 9-107); Briefing Charts, AF/XOR, "Air Force Satellite Control Network," 6 November 2000, p. 6 (Doc 9-108).

APPENDIX A

LINEAGE AND HONORS

LINEAGE AND HONORS DATA

APPENDIX A-1

Unit Designation
Space and Missile Systems center (SMC)

Previous Designation
System Systems Division

Authority
Redesignated on Jul 92 per AFR 26-2, DAF/MO 162r ltr, Redesignation of Certain Air Force Systems Command Units, 23 August, 1991, and AFSC SO GA-12, 3 Apr 92

Higher Headquarters
Headquarters Air Force Materiel Command (AFMC)
(Reassigned on 1 Jul 92 per DAF/MO 338r, DAF/CS ltr, 5 Jun 92)

Commander

Maj Gen E. L .Tattini	12 Aug 1998 – 25 May 2001
Lt Gen Brian A. Arnold	25 May 2001 - Present

Vice Commander

Brig Gen M.A. Hamel	20 Aug 1998-1 Jan 2000
Brig Gen W.M. Wilson	19 Aug 1999 - 19 Oct 2001
Brig Gen Cooning	20 Oct 2001- 23 Jun 2004

Assigned Units	Symbol	Authority
Detachment 3	Det 3	1 Oct 2001, Colorado Springs CO, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01
Detachment 8	Det 8	1 Oct 2001, Patrick AFB FL, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01
Detachment 9	Det 9	1 Oct 2001, Vandenberg AFB, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01
Detachment 11	Det 11	1 Oct 2001, Peterson CO, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01
Detachment 12	Det 12	1 Oct 2001, Kirtland AFB NM, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01
61st Air Base Group	61 ABG	1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101. GD-019, 22 Aug 01
61St Communications Squadron	61st CS	1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01

Cont Assigned Units	Symbol	Authority
61st Medical Squadron	61st MS	1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01
61st Mission Support Squadron	61st MSS	1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01
61st Security Forces Squadron	61st SFS	1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01

Assigned Units Reassigned

Detachment 12 Kirtland AFB NM Det 12

Assigned Units Lost

HQ 377th AB W	1 Oct 98	Kirtland AFB NM, AFI 38-101, GA-19, 17 Sept 98 (relieved)

Internal Reassignments

0L-AW00 to Det 12 realigned (L.B. Johnson Space Center)		29 May 01, Houston TX, AFI 38-101, GA-14, 29 May 01

Activated

SMC Logistics	1 Sept 04, Peterson AFB CO, DAF/DPM ltr 539s, 19 Aug 04, AFI 38-101, GD-001, 16 Nov 04
HQ SMC-Loc A	1 Sept 04, Peterson AFB CO, AFI 38-101, amended GD-001, 16 Nov 04
SMC Center Log	1 Sept 04, Schriever AFB CO, AFI 38-101, *amended* GD-001, 16 Nov 04
Det 12 –A,HQ SMC	1 Jul 03, Vandenberg AFB CA, AFI 38-101, GD-017, 27 Jun 03
Det 3 HQ SMC-Loc	20 Nov 02, Peterson AFB CO, AFI 38-101, GD003, 20 Nov 02
Loc C Det 12 HQ SMC	4 June 02, Camp Parks Communication Annex, Ca, AFI 38-101, GD-011, 3 June 02
Loc D HQ SMC	4 June 02, Hanscom AFB MA, AFI-38-101, GD-011, 3 June 02
Loc E HQ AFSPC	4 June 02, Moffett Field CA, AFI 38-101, GD-011, 3 June 02
61 SFS/SMC	1 Jul 98, Los Angeles CA, DAF/XPM ltr 012s, 29 Jun 98 AFI 38-101, GA-7, 30 Jun 98
Det 5 -Loc	1 Jun 98, Peterson AFB, CO, AFI 38-101, GA-5, 30 Apr 98 (Electronic System Center)
Det 11 SMC	1 Jun 98,Peterson AFB, AFI 38-101, GA-7, 30 April 98

Inactivated

Loc HA, Det 11 HQ	1 Sept 04, Schriever AFB CO, AFI 38-101, GD-001, 16 Nov 04
Det 11 HQ SMCC	1 Sept 04, Peterson AFB CO, AFI 38-101, GD-001, 16 Aug 04
Loc C HQ AFSC	13 Jun 03, Pentagon ADM Virginia, AFI 38-101, GD-016, 13 Jun 03
Loc A HQ SMC	13 Jun 03, Hill AFB UT, AFI 38-101, GD-016, 13 Jun 03
Loc AH HQ SMC	1 Jul 03, Huntsville City AL, AFI 38-101, GD-014, 23 May 03
Det 3 HQ SMC-Loc	20 Nov 02, Colorado Springs City CO, AFI 38-101, GD-003, 20 Nov 02
HQ SMC-AFMC	1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD 019, 22 August 2001 *(relieved of assignment)*

LINEAGE AND HONORS DATA

Station — Los Angeles Air Force Base, Los Angeles

Aircraft Flown — None

Decorations

Advanced Systems Directorate (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-121, 22 June 1999) for the period 1 May 1997 – 30 April 1999

SMC Operating Location AW [Space Test Program, Space and Missile Test and Evaluation Directorate] (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-173, 29 February 2000)for the period 1 March 1998 – 29 February 2000

Defense Meteorological Satellite SPO (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-173, 29 February 2000) for the period 1 January 1998 – 31 December 1999

Military Satellite Communications Joint Program Office (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-173, 29 February 2000) for the period 1 January 1999 – 31 December 1999

61st Air Base Group (Space and Missile Systems Center) Air Force Outstanding Unit Award (AFMCSO GB-164, 20 July 2000) for the period 1 January 1999 – 31 December 1999

SMC Detachment 9 [Vandenberg AFB] (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-134, 2002 for the period 1 October 1999 – 30 September 2001

Emblem:

Description: Azure, three bendlets couped or issuing from triangle in chief of the like voided of the field surmounted by an annulet of the second, all within a diminished bordure or.

The SMC emblem represents the cooperation of science, industry, and the military in advancing the defense technology of the United States, and the role of the Center in unifying and directing this effort. It also symbolizes the major elements of the mission—space and missile booster power and satellites in orbit.

In the first symbolism, the diagonal lines represent the role of science, industry, and the military, respectively, in advancing defense technology, and the triangle depicts the function of the Center in directing and managing the work of these elements in the pursuit of desired military objectives. The circle surrounding the diagonal lines represents the total integrating role of the Center in planning, developing, and testing military systems, and in acquiring them for the national defense.

In the second symbolism, the triangle joined by the three lines symbolizes rocket booster power payloads as the basis for both space and ballistic missile systems, while the circle represents both satellites and their orbital traces.

APPENDIX B

ROSTER OF KEY PERSONNEL

Org	Title	Position	Name	Begin Tenure	End Tenure
SMC/CC	Commander	Commander	Lt Gen Roger G. DeKok	19-Aug-96	12-Aug-98
SMC/CC	Commander	Commander	Maj Gen E.L. Tattini	12-Aug-98	25-May-01
SMC/CC	Commander	Commander	Lt Gen Brian A. Arnold	25-May-01	
CV	Vice Commander	Vice Commander	Brig Gen John L. Clay	22-Jul-96	20-Aug-98
CV	Vice Commander	Vice Commander	Brig Gen (Sel) M.A. Hamel	20-Aug-98	1-Jan-00
CV	Vice Commander	Vice Commander	Brig Gen W.M. Wilson	1-Jan-00	20-Oct-01
CV	Vice Commander	Vice Commander	Brig Gen Craig R. Cooning	20-Oct-01	
CD	Executive Director	Executive Director	Mr. William Maikisch	7-Mar-94	
TM	Airborne Laser System Program Office	System Program Director	Col Michael W. Booen	8-Jan-97	1-Apr-00
TM	Airborne Laser System Program Office	System Program Director	Col E. Pawlikowski	1-Apr-00	12-Oct-01
TM	Airborne Laser System Program Office			12-Oct-01	
MC	MILSATCOM JPO	System Program Director	Col Joseph B. Sovey	30-Apr-96	1-Dec-98
MC	MILSATCOM JPO	System Program Director	Brig Gen Craig R. Cooning	Dec 1998-Jan 2001	1-Jan-01
MC	MILSATCOM JPO	System Program Director	Ms. Christine M. Anderson	1-Jan-01	
MT	Space Based Infrared Systems Program Office	Program Director	Col Daniel L. Burkett, II	4-Jul-97	17-Apr-00
MT	Space Based Infrared Systems Program Office	Program Director	Col Michael W. Booen	17-Apr-00	1-Jun-01

MT	Space Based Infrared Systems Program Office	Program Director	Col Mark S. Borkowski	25-Jun-01	
MV	Evolved Expendable Launch Vehicle Program Office	System Program Director	Col Richard W. McKinney	1-Jul-95	7-May-99
MV	Evolved Expendable Launch Vehicle Program Office	System Program Director	Col R.K. Saxer	7-May-99	
CL	Launch Programs	System Program Director	Col Jeffery J. Norton	25-Jan-97	14-May-99
CL	Launch Programs	System Program Director	Col M.J. Dunn	14-May-99	
BC	Small Business Office	Chief	Mr. Charles R. Willett	1-Oct-93	
HO	History Office	Chief	Dr. Harry N. Waldron	1-Dec-95	
IG	Inspector General	Chief	Lt Col Stephen Marchitelli	3-Jul-95	1-Jul-99
IG	Inspector General	Chief	Ms. D. Brown (Acting)	1-Jul-99	1-Oct-99
IG	Inspector General	Chief	Lt Col J. Woodcock	1-Oct-99	
IN	Intelligence Office	Chief	Lt Col John D. Davidson	29-Apr-96	1-Jan-99
IN	Intelligence Office	Chief	Maj L.J. Harambasic (Acting)	1-Jan-99	1-Apr-99
IN	Intelligence Office	Chief	Lt Col (Sel) J.L. Hollett	1-Apr-99	1-Jul-01
IN	Intelligence Office	Chief	Lt Col J.P. Johanson	1-Jul-01	
JA	Staff Judge Advocate	Chief	Col William M. Henabray	1-Aug-95	1-Jul-98
JA	Staff Judge Advocate	Chief	Col S.S. Bagley	1-Jul-98	

MQ	Manpower and Quality Office	Chief	Ms. Sandra C. Semrod	25-Nov-96	1-Oct-00
HR	Human Resources Office	Chief	Ms Sandra C. Semrod	1-Oct-00	
PA	Public Affairs Office	Chief	Maj Alton G. Cherney	7-Jun-96	1-Jul-99
PA	Public Affairs Office	Chief	Lt Col R. Potter	1-Jul-99	1-May-01
PA	Public Affairs Office	Chief	Lt Col (Sel) J.E. Cherry	1-May-01	
SE	Safety Office	Chief	Lt Col Homer L. Tackett	1-Jun-96	1-Apr-00
SE	Safety Office	Chief	Dr. L.C. Huang	1-Apr-00	1-May-01
SE	Safety Office	Chief	Mr. P. Rodriguez	1-May-01	
AX	Systems Acquisition	Director	Mr. Leslie L. Bordelon	14-Jun-96	1-Oct-00
AX	Systems Acquisition	Director	Col T.A. Fitzgerald (Acting)	1-Oct-00	1-Jan-01
AX	Systems Acquisition	Director	Ms. K.L. Gaskins	1-Jan-01	
FM	Comptroller	Director	Col Roy E. Smoker	27-Sep-97	1-Jun-00
FM	Comptroller	Director	Col Andrew E. Notestine III	1-Jun-00	
PK	Contracting	Director	Mr Milton C. Ross	1-Oct-96	12-Aug-98
PK	Contracting	Director	Col J.F. Thumser (Acting)	12-Aug-98	1-Oct-98
PK	Contracting	Director	Ms. P. Kirk-McAlpine	1-Oct-98	
TE	Space and Missile Test & Evaluation Directorate	Director	Col Craig S. Martin	10-Mar-95	16-Jan-98

TE	Space and Missile Test & Evaluation Directorate	Director	Col James E. Ford	16-Jan-98	1-Jul-00
TE	Space and Missile Test & Evaluation Directorate	Director	Col Ralph D. Monfort	1-Jul-00	1-Jun-01
XR	Developmental Planning	Director	Col Robert B. Preston	3-Aug-96	1-Jun-98
XR	Developmental Planning	Director	Col Robert S. Cox	1-Jun-98	1-May-00
XR	Developmental Planning	Director	Col William G. Gardner	1-May-00	
AD	Advanced Systems Directorate	System Program Director	Col Douglas L. Loverro	24-Mar-97	1-Nov-99
AD	Advanced Systems Directorate	System Program Director	Col E.T. Alexander, Jr.	1-Nov-99	
CI	Defense Meteorological Satellite SPO	System Program Director	Col Norton B. James, III	18-Dec-95	1-Jan-98
CI	Defense Meteorological Satellite SPO	System Program Director	Col J.A. Quirk	1-Jan-98	31-Jul-98
CI	Defense Meteorological Satellite SPO	System Program Director	Col R.T. Odle	31-Jul-98	
CW	Satellite & Launch Control SPO	System Program Director	Col Barry G. Morgan	15-Aug-97	1-May-01
CW	Satellite & Launch Control SPO	System Program Director	Col M. Mantz	1-May-01	
CZ	NAVSTAR Global Positioning System JPO	System Program Director	Col James B. Armor, Jr.	26-Jul-96	1-Nov-99
CZ	NAVSTAR Global Positioning System JPO	System Program Director	Col D. L. Loverro	1-Nov-99	
XP	Plans and Programs	Director	Col J.F. Thumser	18-Jan-99	1-May-01

XP	Plans and Programs	Director	Mr. E.M. Salem (Acting)	1-May-01	1-Oct-01
XP	Plans and Programs	Director	Col D.J. Murphy	1-Oct-01	
TL	Space Based Laser Project Office	Director	Col W.N. McCaslan d	1-Jul-00	9-Aug-01
TL	Space Based Laser Project Office	Director	Col I. Falto-Heck	9-Aug-01	
MT3	SBIRS Low Program Office	SBIRS Program Manager	Col R.S. Weidenhei mer	1-Oct-01	
LM	OO-ALC/LM ICBM System Program Office	System Program Director	Col R.P. Fisher	1-Oct-01	
ESC/NW	2nd Space C2 System Program Office	System Program Director	Col J.T. Corley	1-Oct-01	
DS	Director of Staff	Director of Staff	Col D.J. Murphy	1-Oct-01	
61 ABG/CC	61 Air Base Group	Commander	Col Dieter Barnes	12-Sep-97	18-Jun-99
61 ABG/CC	61 Air Base Group	Commander	Col D.E. Price	18-Jun-99	15-Sep-00
61 ABG/CC	61 Air Base Group	Commander	Col P.W. Parker, Jr.	15-Sep-00	
377 ABW	377 Air Base Wing, Kirtland AFB, New Mexico	Commander	Col Gary D. Dills	21-Nov-96	
Det 2	Det 2, Onuzuka AFS, California	Commander	Lt Col Randy T. Odle	20-Jun-97	
Det 8	Det 8, Cape Canaveral AFS, Florida	Commander	Lt Col Mike J. Dunn	10-Dec-96	1-Jul-98
Det 8	Det 8, Cape Canaveral AFS, Florida	Commander	Col G. Muntzner	1-Jul-98	1-Aug-00
Det 8	Det 8, Cape Canaveral AFS, Florida	Commander	Col Michael T. Baker	1-Aug-00	
Det 9	Det 9, Vandenberg AFB, California	Commander	Col John Pesapane	6-Jun-96	19-Jun-98
Det 9	Det 9, Vandenberg AFB, California	Commander	Col (Sel) J.F. Wagner	19-Jun-98	

Det 11	Det 11, Peterson AFB. Colorado	Commander	Col M.C. Dickerson	1-Jul-98	21-Oct-98
Det 11	Det 11, Peterson AFB. Colorado	Commander	Col R.A. Hayes	21-Oct-98	1-Jul-01
Det 11	Det 11, Peterson AFB. Colorado	Commander	Col L.M. Johnson	1-Jul-01	
Det 12	Det 12, Kirtland AFB, New Mexico	Commander	Col James A. Neumeister	29-Jun-01	
61 CS/CC	61 Communications Squadron	Commander	Lt Col Mark D. Hall	8-May-97	
61 MDS/CC	61 Medical Squadron	Commander	Mr. Mark P. Wisniewski	5-Oct-98	

APPENDIX C

PERSONNEL STATISTICS

		18-Sep-98			
		CIV	ENL	OFF	Grand Total
	SPACE & MISSILE SYSTEMS CENTER (SMC) COMMAND				
CC	Command Section (CC/CD)	12	9	12	33
	COMMAND SECTION TOTAL	12	9	12	33
	SMC STAFF				
BC	Small Business Office	4			4
HO	History Office	2			2
IG	Inspector General	1	2	2	5
IN	Intelligence Office	4	11	8	23
JA	Staff Judge Advocate	16	5	12	33
MQ	Manpower and Quality	14	4	3	21
PA	Public Affairs Office	7	2	4	13
SE	Safety Office			1	1
SF	Security Forces	88	15	1	104
	SMC STAFF TOTAL	136	39	31	206
	BASE OPERATING SUPPORT (BOS) ORGANIZATIONS				
	61 Air Base Group	66	55	16	137
	61 Communications Squadron	43	53	15	111
	61 Medical Squadron	16	83	28	127
	61 Mission Support Squadron	57	40	10	107
	BASE OPERATING SUPPORT (BOS) ORGANIZATIONS TOTAL	182	231	69	482
	SMC FUNCTIONAL ORGANIZATIONS				
AX	Systems Acquisition	145	12	77	234
FM	Comptroller	164	32	90	286
PK	Contracting	186	14	71	271
TBXM	Matrix	2		14	16
XR	Developmental Planning	30	8	77	115
	SMC FUNCTIONAL ORGANIZATIONS TOTAL	527	66	329	922
	PROGRAM OFFICES*				
AD	Advanced Systems Directorate	15	5	26	46
CI	Defense Meteorological Satellite SPO	12	3	32	47
CW	Satellite & Launch Control SPO	17	5	79	101
CZ	NAVSTAR Global Positioning System JPO	30	5	78	113
TE	Space and Missile Test & Evaluation Directorate	2		6	8

	PROGRAM OFFICES TOTAL	76	18	221	315
	PROGRAM EXECUTIVE OFFICER (PEO) ORGANIZATIONS				
CL	Launch Programs	17	9	82	108
MC	MILSATCOM JPO	20	5	80	105
MT	Space Based Infrared Systems	42	8	91	141
MV	Evolved Expendable Launch Vehicle P	5	2	26	33
	PEO ORGANIZATIONS TOTAL	84	24	279	387
	SMC OPERATING LOCATIONS (OIs)**				
	Arlington, VA (AX, CI, PK, TE, XR)	3	1	6	10
	Aurora City, CO (CW)			1	1
	Buckley AGB, CO (MT)		2	4	6
	Crystal City, VA (MC)			2	2
	Falcon AFS, CO (AD, AX, CW, CZ, TE)	15	3	40	58
	Huntsville, AL (TE, MT)			2	2
	Kirtland AFB, NM (AX, PK, TE, TM)	89	32	128	249
	LB Johnson Space Center, TX (TE)	2		8	10
	Onizuka AFS, CA (CW)	7	1	11	19
	Unknown Exst. (AD)	8	26	74	108
	Washington, DC (QP)			10	10
	SMC OPERATING LOCATIONS TOTAL	124	65	286	475
	SMC DETACHMENTS				
DET 8	Cape Canaveral AFS, FL (AX, CC, CL, CW, CZ, PK)	37	5	25	67
DET 9	Vandenberg AFB, CA (CC, CL, CW, PK, TE)	53	23	36	112
DET11	Peterson AFB, CO (AP, AX, CC, CI, CW, CZ, MT, PK, RM, SD)	139	38	41	218
	SMC DETACHMENTS TOTAL	229	66	102	397
	377 AIR BASE WING (ABW) ORGANIZATIONS				
	HQ 377 ABW, Kirtland AFB, NM	92	66	30	188
	Comptroller Squadron	20	38	4	62
	Medical Group	76	277	113	466
	Logistics	182	1	2	185
	Transportation Squadron	49	113	2	164
	Support Group	1	1	3	5
	Mission Support Group	61	56	4	121
	Communications Squadron	89	142	3	234
	Services Squadron	82	55	2	139

	Security Police Squadron	6	347	7	360
	Civil Engineering Squadron	318	181	5	504
	896 Munitions Squadron, Nellis AFB, NV	3	97	3	103
	898 Munitions Squadron, Kirtland AFB, NM	12	140	4	156
	377 ABW ORGANIZATIONS TOTAL	991	1514	182	2687
	SMC GRAND TOTAL	2361	2032	1511	5904

* The proper nomenclature is not known

** The list of OL may include Phillips Laboratory locations (data did not specify)

		31-Jul-99			
		CIV	ENL	OFF	Grand Total
	SPACE & MISSILE SYSTEMS CENTER (SMC) COMMAND				
CC	Command Section (CC/CV)	11	11	13	35
	COMMAND SECTION TOTAL	11	11	13	35
	SMC STAFF				
BC	Small Business Office	4			4
HO	History Office	3			3
IG	Inspector General	2	1	2	5
IN	Intelligence Office	4	11	9	24
JA	Staff Judge Advocate	16	5	12	33
PA	Public Affairs Office	7	3	4	14
SE	Safety Office			1	1
XP	Plans and Programs	18	6	11	35
	SMC STAFF TOTAL	54	26	39	119
	BASE OPERATING SUPPORT (BOS) ORGANIZATIONS				
	61 Air Base Group	66	52	17	135
	61 Communications Squadron	57	51	15	123
	61 Medical Squadron	16	83	28	127
	61 Mission Support Squadron	59	36	10	105
	61 Security Forces Squadron	88	7	1	96
	BASE OPERATING SUPPORT (BOS) ORGANIZATIONS TOTAL	286	229	71	586
	SMC FUNCTIONAL ORGANIZATIONS				
AX	Systems Acquisition	158	11	74	243
FM	Comptroller	163	32	85	280

PK	Contracting	195	14	62	271
TBXM	Matrix		3	2	5
XR	Developmental Planning	22	8	67	97
	SMC FUNCTIONAL ORGANIZATIONS TOTAL	538	68	290	896
	PROGRAM OFFICES*				
AD	Advanced Systems Directorate	16	5	27	48
CI	Defense Meteorological Satellite SPO	12	3	30	45
CL	Launch Programs	15	9	72	96
CW	Satellite & Launch Control SPO	17	5	79	101
TE	Space and Missile Test & Evaluation Directorate	2		6	8
	PROGRAM OFFICES TOTAL	62	22	214	298
	PROGRAM EXECUTIVE OFFICER (PEO) ORGANIZATIONS				
CZ	NAVSTAR Global Positioning System JPO	33	5	78	116
MC	MILSATCOM JPO	20	5	80	105
MT	Space Based Infrared Systems	41	8	88	137
MV	Evolved Expendable Launch Vehicle Program Office	6	2	26	34
	PEO ORGANIZATIONS TOTAL	100	20	272	392
	SMC OPERATING LOCATIONS (Ols)**				
	Aurora City, CO (CW)			1	1
	Buckley AGB, CO (MT)		2	4	6
	Crystal City, VA (MC)			2	2
	Holloman AFB, NM (CI)		1		1
	Huntsville, AL (TE, MT)			2	2
	Kirtland AFB, NM (AX, PK, TE, TM)	89	32	129	250
	LB Johnson Space Center, TX (TE)	2	1	6	9
	Onizuka AFS, CA (CW)	6	1	8	15
	Pentagon, DC (CI, MT, PK, TE, TR, XR)	2	1	7	10
	Schriever, CO (AD, AX, CW, CZ, TE)	15	5	40	60
	Unknown Exst. (AD)	9	26	74	109
	Washington, DC (QP)			10	10
	SMC OPERATING LOCATIONS TOTAL	123	69	283	475
	SMC DETACHMENTS				
DET 8	Cape Canaveral AFS, FL (AX, CC, CL, CW, CZ, PK)	33	6	24	63
DET 9	Vandenberg AFB, CA (AX, CC, CL, CW, PK, TE)	49	23	36	108
DET11	Peterson AFB, CO (AP, AX, CC, CI, CW, CZ, FM, MC, MT, PK, RM)	207	61	43	311

	SMC DETACHMENTS TOTAL	289	90	103	482
	SMC Grand TOTAL***	1463	535	1285	3283

* The proper nomenclature has not been verified
** The list of OL may include Phillips Laboratory locations (data did not specify)

		EOM Sep 00			
		CIV	ENL	OFF	Grand Total
	SPACE & MISSILE SYSTEMS CENTER (SMC) COMMAND				
CC	Command Section (CC/CV)	11	11	13	35
	COMMAND SECTION TOTAL	11	11	13	35
	SMC STAFF				
BC	Small Business Office	4			4
HO	History Office	3			3
HR	Human Resources	3	1		4
IG	Inspector General	2	1	2	5
IN	Intelligence Office	4	10	9	23
JA	Staff Judge Advocate	17	5	12	34
PA	Public Affairs Office	9	3	4	16
SE	Safety Office			1	1
XP	Plans and Programs	16	5	12	33
	SMC STAFF TOTAL	58	25	40	123
	BASE OPERATING SUPPORT (BOS) ORGANIZATIONS				
	61 Air Base Group (TB +2 CIV)	67	46	21	134
	61 Communications Squadron	69	3	2	74
	61 Medical Squadron	15	76	34	125
	61 Mission Support Squadron	59	36	10	105
	61 Security Forces Squadron	106	9	2	117
	BASE OPERATING SUPPORT (BOS) ORGANIZATIONS TOTAL	316	170	69	555
	SMC FUNCTIONAL ORGANIZATIONS				
AX	Systems Acquisition	164	9	116	289
FM	Comptroller	169	26	82	277
PK	Contracting	207	4	61	272
TBXM	Matrix			10	10
XR	Developmental Planning	27	8	61	96
	SMC FUNCTIONAL ORGANIZATIONS TOTAL	567	47	330	944

	PROGRAM OFFICES*				
AD	Advanced Systems Directorate	3	6	16	25
CI	Defense Meteorological Satellite SPO	12	3	28	43
CL	Launch Programs	12	9	76	97
CW	Satellite & Launch Control SPO	17	5	79	101
TE	Space and Missile Test & Evaluation Directorate	2		6	8
	PROGRAM OFFICES TOTAL	46	23	205	274
	PROGRAM EXECUTIVE OFFICER (PEO) ORGANIZATIONS				
CZ	NAVSTAR Global Positioning System JPO	33	3	97	133
MC	MILSATCOM JPO	19	4	81	104
MT	Space Based Infrared Systems Program Office	39	6	95	140
MV	Evolved Expendable Launch Vehicle Program Office	5	2	26	33
	PEO ORGANIZATIONS TOTAL	96	15	299	410
	SMC OPERATING LOCATIONS (Ols)**				
	Aurora City, CO (CL, CW)			2	2
	Buckley AGB, CO (MT, AX)	2	2	6	10
	Crystal City, VA (MC)	1		2	3
	Edwards AFB, CA (TM)			1	1
	Huntsville, AL (TE, MT)			3	3
	Kirtland AFB, NM (AX, PK, TE, TL, TM)	90	31	135	256
	LB Johnson Space Center, TX (TE)	2	1	6	9
	Onizuka AFS, CA (CW)	5	1	8	14
	Patrick AFB, FL (AX, CW)	26		8	34
	Pentagon, DC (CI, MT, PK, TE, TR, XR)	1	1	10	12
	Schriever, CO (CZ, RM, TE)	5		7	12
	Unknown Exst. (AD)	14	26	76	116
	Washington, DC (QP)			10	10
	SMC OPERATING LOCATIONS TOTAL	143	60	260	463
	SMC DETACHMENTS				
DET 8	Cape Canaveral AFS, FL (AX, CC, CL, CZ)	4	6	29	39
DET 9	Vandenberg AFB, CA (AX, CC, CL, CW, TE)	46	23	44	113
DET11	Peterson AFB, CO (AD, AP, AX, CC, CI, CW, CZ, FM, MC, MT, PK, R	217	63	63	343
	SMC DETACHMENTS TOTAL	267	92	136	495
	SMC GRAND TOTAL	1504	443	1352	3299

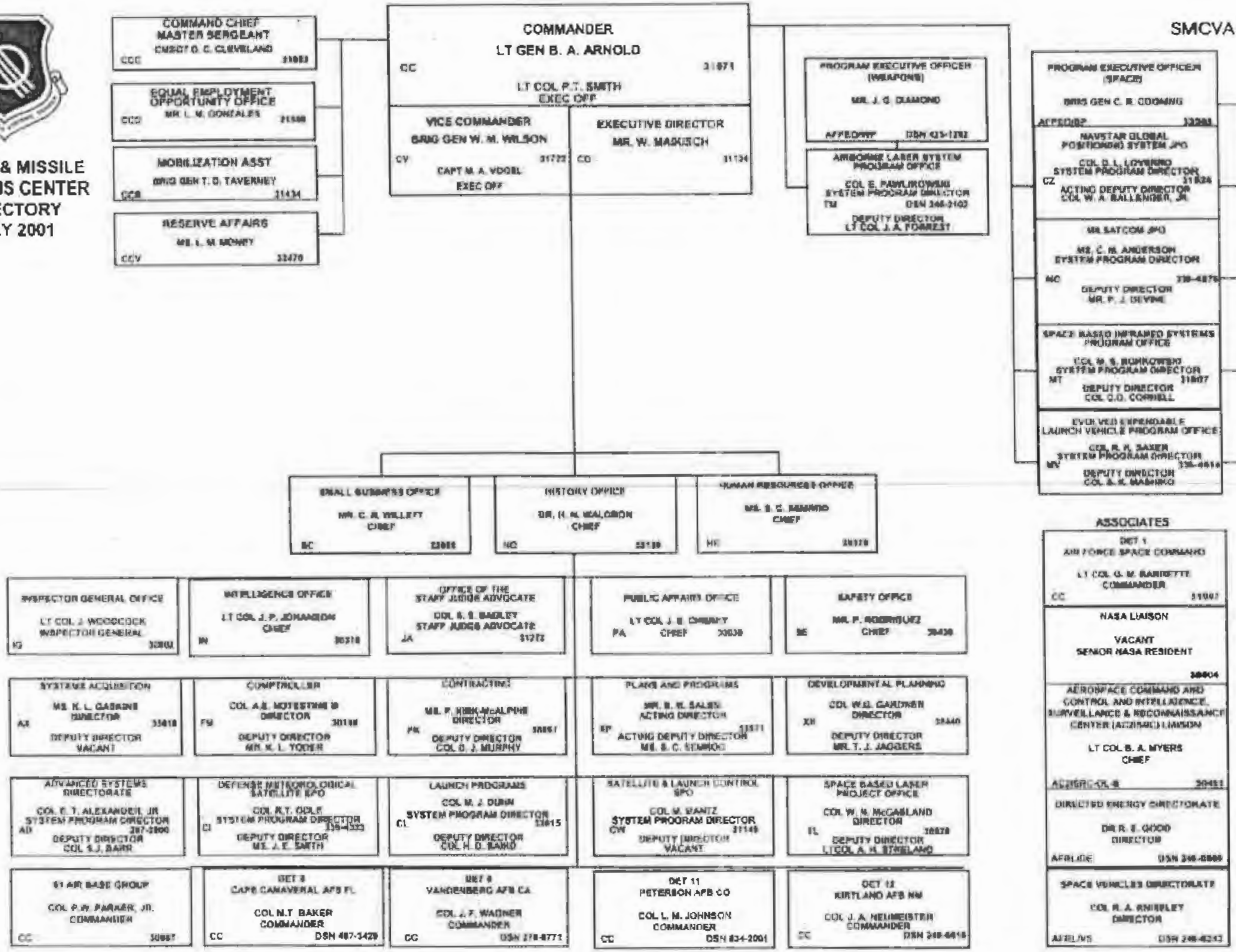
	* The proper nomenclature has not been verified			
	** The list of OL may include Phillips Laboratory locations (data did not specify)			

APPENDIX D

ORGANIZATIONAL CHARTS

SMCVA 23-4

SPACE & MISSILE SYSTEMS CENTER DIRECTORY JULY 2001



SPACE & MISSILE SYSTEMS CENTER DIRECTORY
MAY 2001

COMMANDER — LT GEN B. A. ARNOLD — CC 31071
LT COL P.T. SMITH, EXEC OFF

- **VICE COMMANDER** — BRIG GEN W. M. WILSON — CV 31720; CAPT M. A. VOGEL, EXEC OFF
- **EXECUTIVE DIRECTOR** — MR. W. MAIKISCH — CD 31134

- COMMAND CHIEF MASTER SERGEANT — CMSGT D. C. CLEVELAND — CCC 31083
- EQUAL EMPLOYMENT OPPORTUNITY OFFICE — MR. L. M. GONZALES — CCD 31555
- MOBILIZATION ASST — BRIG GEN T. U. TAVERNEY — CCR 31534
- RESERVE AFFAIRS — MS. L. M. MONEY — CCY 33470

- PROGRAM EXECUTIVE OFFICER (WEAPONS) — MR. J. G. DIAMOND — AFPEO/WP DSN 425-1362
- AIRBORNE LASER SYSTEM PROGRAM OFFICE — COL E. PAWLIKOWSKI, SYSTEM PROGRAM DIRECTOR — TM DSN 246-2102; DEPUTY DIRECTOR LT COL J. A. FORREST

- PROGRAM EXECUTIVE OFFICER (SPACE) — BRIG GEN C. R. COONING — AFPEO/SP 33886
- NAVSTAR GLOBAL POSITIONING SYSTEM JPO — COL D. L. LOVERRO, SYSTEM PROGRAM DIRECTOR — CZ 31126; ACTING DEPUTY DIRECTOR COL W. A. BALLENGER, JR
- MILSATCOM JPO — MS. C. M. ANDERSON, SYSTEM PROGRAM DIRECTOR — MC 336-4570; DEPUTY DIRECTOR MR. P. J. DEVINE
- SPACE BASED INFRARED SYSTEMS PROGRAM OFFICE — COL M. W. BODEN, SYSTEM PROGRAM DIRECTOR — MT 31807; DEPUTY DIRECTOR COL C.O. CORNELL
- EVOLVED EXPENDABLE LAUNCH VEHICLE PROGRAM OFFICE — COL R. R. SAXER, SYSTEM PROGRAM DIRECTOR — MV 336-4614; DEPUTY DIRECTOR COL R. K. MASHIKO

- SMALL BUSINESS OFFICE — MR. C. R. WILLETT, CHIEF — SC 32355
- HISTORY OFFICE — DR. H. N. WALDRON, CHIEF — HO 32136
- HUMAN RESOURCES OFFICE — MS. S. C. SEMROU, CHIEF — HR 30375

- INSPECTOR GENERAL OFFICE — LT COL J. WOODCOCK, INSPECTOR GENERAL — IG 31092
- INTELLIGENCE OFFICE — LT COL J. L. ROLLETT, CHIEF — IN 30216
- OFFICE OF THE STAFF JUDGE ADVOCATE — COL S. B. BAGLEY, STAFF JUDGE ADVOCATE — JA 31372
- PUBLIC AFFAIRS OFFICE — LT COL (SEL) J. E. CHERRY, CHIEF — PA 30030
- SAFETY OFFICE — MR. P. RODRIGUEZ, CHIEF — SE 30436

- SYSTEMS ACQUISITION — MS. K. L. GARDNER, DIRECTOR — AX 35816; DEPUTY DIRECTOR COL T. A. FITZGERALD
- COMPTROLLER — COL A.E. NOTESTINE III, DIRECTOR — FM 35164; DEPUTY DIRECTOR MR. K. L. YODER
- CONTRACTING — MS. P. KIRK-McALPINE, DIRECTOR — PK 30667; DEPUTY DIRECTOR COL D. J. MURPHY
- PLANS AND PROGRAMS — MR. E. M. SALEM, ACTING DIRECTOR — XP 33571; ACTING DEPUTY DIRECTOR MS. S. C. SEMROU
- DEVELOPMENTAL PLANNING — COL W.G. GARDNER, DIRECTOR — XR 30440; DEPUTY DIRECTOR MR. T. J. JAGGERS

- ADVANCED SYSTEMS DIRECTORATE — COL S. T. ALEXANDER, JR, SYSTEM PROGRAM DIRECTOR — AD 297-3800; DEPUTY DIRECTOR COL S.J. BARR
- DEFENSE METEOROLOGICAL SATELLITE SPO — COL R.T. COLE, SYSTEM PROGRAM DIRECTOR — CI 336-4333; DEPUTY DIRECTOR MR L. H. WEEKS
- LAUNCH PROGRAMS — COL M. J. DUNN, SYSTEM PROGRAM DIRECTOR — CL 32916; DEPUTY DIRECTOR COL H. D. BAIRD
- SATELLITE & LAUNCH CONTROL SPO — COL M. MANTZ, SYSTEM PROGRAM DIRECTOR — CW 31146; DEPUTY DIRECTOR VACANT
- SPACE BASED LASER PROJECT OFFICE — COL W. H. McCASLAND, DIRECTOR — TL 38838; DEPUTY DIRECTOR LTCOL A. H. STRELAND

- 61 AIR BASE GROUP — COL P.W. PARKER, JR, COMMANDER — CC 31667
- DET 8, CAPE CANAVERAL AFS FL — COL M.T. BAKER, COMMANDER — CC DSN 467-3428
- DET 9, VANDENBERG AFB CA — COL J. F. WAGNER, COMMANDER — CC DSN 276-6771
- DET 11, PETERSON AFB CO — VACANT, COMMANDER — CC DSN 834-2001
- SPACE AND MISSILE TEST & EVALUATION DIRECTORATE — COL R.D. MONPORT, DIRECTOR — TB DSN 246-8416; DEPUTY DIRECTOR COL G. A. DANGELO

ASSOCIATES

- DET 1, AIR FORCE SPACE COMMAND — LT COL G. M. BARRETTE, COMMANDER — CC 31967
- NASA LIAISON — VACANT, SENIOR NASA RESIDENT — 30604
- AEROSPACE COMMAND AND CONTROL AND INTELLIGENCE, SURVEILLANCE & RECONNAISSANCE CENTER (AC2ISRC) LIAISON — LT COL S. A. MYERS, CHIEF — AC2ISRC-OL-S 30530
- DIRECTED ENERGY DIRECTORATE — DR R. E. DODD, DIRECTOR — AFRL/DE DSN 246-8940
- SPACE VEHICLES DIRECTORATE — COL R. A. KNOBLEY, DIRECTOR — AFRL/VS DSN 246-8243

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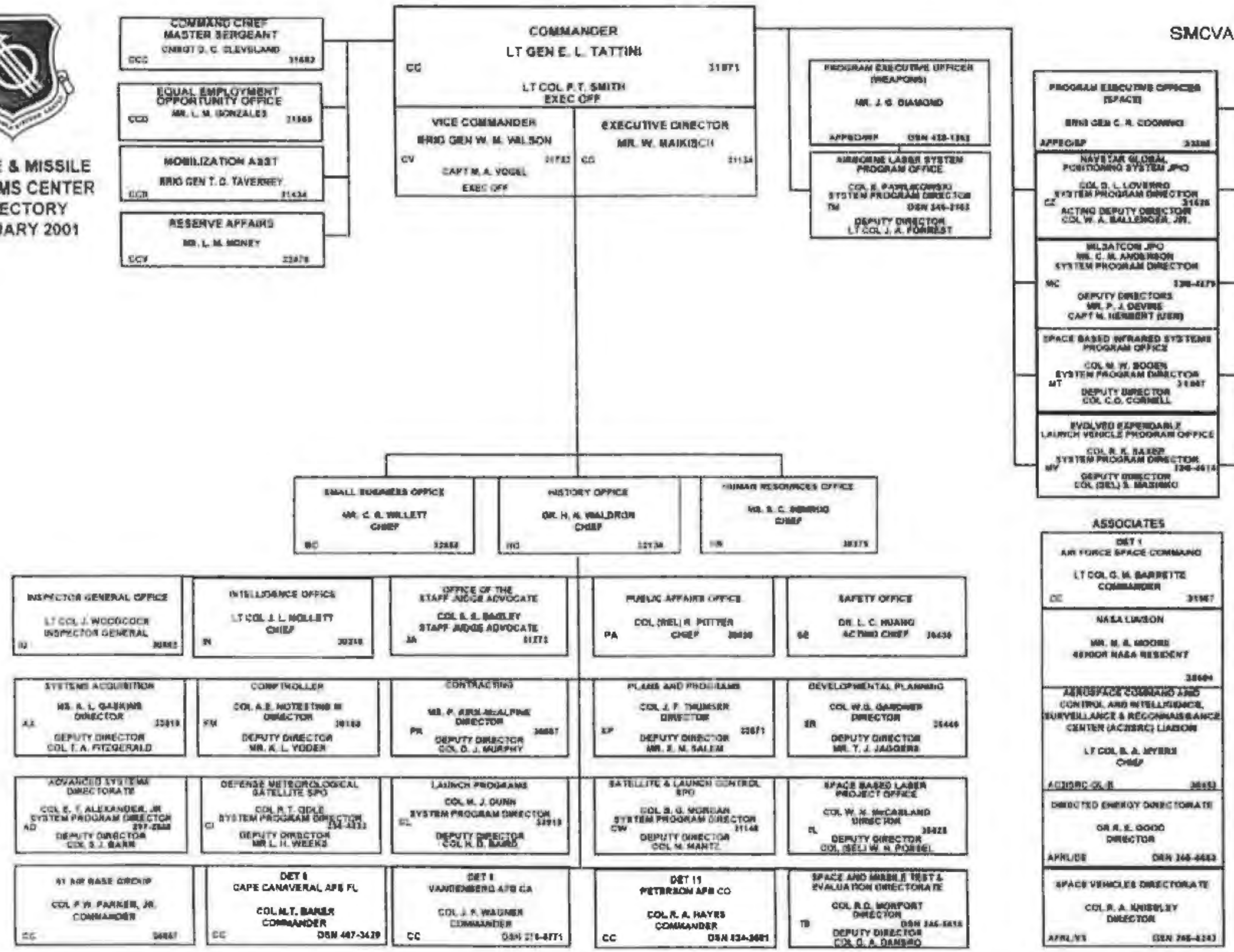
SPACE & MISSILE SYSTEMS CENTER DIRECTORY JANUARY 2001



SPACE & MISSILE SYSTEMS CENTER DIRECTORY
OCTOBER 2000

COMMANDER
LT GEN E. L. TATTINI
CC 31971
LT COL P.T. SMITH
EXEC OFF

VICE COMMANDER
BRIG GEN W. M. WILSON
CV 31723
CAPT M. A. VOGEL
EXEC OFF

EXECUTIVE DIRECTOR
MR. W. MAIKISCH
CD 31134

Command Staff

COMMAND SECTION ADMINISTRATION
SMSGT J. A. SAWYER
CCA 31338

COMMAND CHIEF MASTER SERGEANT
CMSGT D. C. CLEVELAND
CCC 31683

EQUAL EMPLOYMENT OPPORTUNITY OFFICE
MR. L. M. GONZALES
CCD 31849

PROTOCOL
MAJ D. J. DOUCETTE
CCP 32919

MOBILIZATION ASST
BRIG GEN T. D. TAVERNEY
CCR 31434

RESERVE AFFAIRS
MS. L. M. MONEY
CCV 22470

COMMANDERS ACTION GROUP
MAJ D. A. RUFFIN
CCX 31137

Program Executive Officers and Program Offices

PROGRAM EXECUTIVE OFFICER (WEAPONS)
MR. J. G. DIAMOND
AFPEO/WP DSN 425-1383

AIRBORNE LASER SYSTEM PROGRAM OFFICE
COL E. PAWLIKOWSKI
SYSTEM PROGRAM DIRECTOR
TM DSN 246-2102
DEPUTY DIRECTOR
VACANT

PROGRAM EXECUTIVE OFFICER DISCOVERER II
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DARPA/TTO (703) 696-2347

DISCOVERER II JPO
COL J. PUHEK
PROGRAM DIRECTOR
SAF/DJPO (703) 526-1718

PROGRAM EXECUTIVE OFFICER (SPACE)
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AFPEO/SP 33883

NAVSTAR GLOBAL POSITIONING SYSTEM JPO
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SYSTEM PROGRAM DIRECTOR
CZ 35576
DEPUTY DIRECTOR
COL P. H. HOENE

MILSATCOM JPO
BRIG GEN C. R. CODDING
SYSTEM PROGRAM DIRECTOR
MC 336-4879
DEPUTY DIRECTORS
MR. P. J. DEVINE
CAPT M. HERBERT (USN)

SPACE BASED INFRARED SYSTEMS PROGRAM OFFICE
COL M. W. BOOEN
SYSTEM PROGRAM DIRECTOR
MT 31807
DEPUTY DIRECTOR
COL C.D. CORNELL

EVOLVED EXPENDABLE LAUNCH VEHICLE PROGRAM OFFICE
COL R. R. BAKER
SYSTEM PROGRAM DIRECTOR
MV 336-4614
DEPUTY DIRECTOR
COL (SEL) S. MASHIKO

Staff Offices

SMALL BUSINESS OFFICE
MR. C. R. WILLETT
CHIEF
BC 32883

HISTORY OFFICE
DR. H. N. WALDRON
CHIEF
HO 32136

HUMAN RESOURCES OFFICE
MS. B. C. ESMOOD
CHIEF
HR 30373

INSPECTOR GENERAL OFFICE
LT COL J. WOODCOCK
INSPECTOR GENERAL
IG 30992

INTELLIGENCE OFFICE
LT COL J. L. HOLLETT
CHIEF
IN 30315

OFFICE OF THE STAFF JUDGE ADVOCATE
COL S. R. BAGLEY
STAFF JUDGE ADVOCATE
JA 31273

PUBLIC AFFAIRS OFFICE
COL (SEL) R. POTTER
CHIEF
PA 30030

SAFETY OFFICE
DR. L. C. HUANG
CHIEF
SE 38435

Directorates and Program Offices

SYSTEMS ACQUISITION
COL T. A. FITZGERALD
ACTING DIRECTOR
AX 33018
DEPUTY DIRECTOR
VACANT

COMPTROLLER
COL A.E. WOTESTINE III
DIRECTOR
FM 30130
DEPUTY DIRECTOR
MR. K. L. YODER

CONTRACTING
MR. P. KIRK-McALPINE
DIRECTOR
PK 30687
DEPUTY DIRECTOR
COL D. J. MURPHY

PLANS AND PROGRAMS
COL J. F. TRAUBGER
DIRECTOR
XP 33071
DEPUTY DIRECTOR
MR. E. M. SALEM

DEVELOPMENTAL PLANNING
COL W.G. GARDNER
DIRECTOR
XR 38443
DEPUTY DIRECTOR
MR. T. J. JAGGERS

ADVANCED SYSTEMS DIRECTORATE
COL E. T. ALEXANDER, JR
SYSTEM PROGRAM DIRECTOR
AD 287-3000
DEPUTY DIRECTOR
COL S.J. BARR

DEFENSE METEOROLOGICAL SATELLITE SPO
COL B.T. COLE
SYSTEM PROGRAM DIRECTOR
CI 336-4333
DEPUTY DIRECTOR
MR L. H. WEEKS

LAUNCH PROGRAMS
COL M. J. DUNN
SYSTEM PROGRAM DIRECTOR
CL 33916
DEPUTY DIRECTOR
COL K. D. BAIRD

SATELLITE & LAUNCH CONTROL SPO
COL B. G. MORGAN
SYSTEM PROGRAM DIRECTOR
CW 31148
DEPUTY DIRECTOR
COL M. MANTZ

SPACE BASED LASER PROJECT OFFICE
COL W. N. McCASLAND
DIRECTOR
TL 38831
DEPUTY DIRECTOR
COL (SEL) W. H. POSSEL

Bases and Detachments

61 AIR BASE GROUP
COL P.W. PARKER, JR.
COMMANDER
CC 30487

DET 8
CAPE CANAVERAL AFS FL
COL M.T. BAKER
COMMANDER
CC DSN 467-3429

DET 9
VANDENBERG AFB CA
COL J. F. WAGNER
COMMANDER
CC DSN 276-8771

DET 11
PETERSON AFB CO
COL R. A. HAYES
COMMANDER
CC DSN 834-2004

SPACE AND MISSILE TEST & EVALUATION DIRECTORATE
COL R.D. MORFORT
DIRECTOR
TE DSN 246-4418
DEPUTY DIRECTOR
COL D. A. DAMBRO

ASSOCIATES

DET 1
AIR FORCE SPACE COMMAND
LT COL G. M. BARRETTE
COMMANDER
CC 31987

NASA LIAISON
MR. M. R. MOORE
SENIOR NASA RESIDENT
38604

AEROSPACE COMMAND AND CONTROL AND INTELLIGENCE, SURVEILLANCE & RECONNAISSANCE CENTER (AC2ISRC) LIAISON
LT COL R. A. MYERS
CHIEF
AC2ISRC-OL-B 30492

DIRECTED ENERGY DIRECTORATE
DR R. R. GOOD
DIRECTOR
AFRL/DE DSN 246-8690

SPACE VEHICLES DIRECTORATE
MS. C. M. ANDERSON
DIRECTOR
AFRL/VS DSN 246-6243

LOS ANGELES AFB CA [illegible]
COMMERCIAL (310) 363-[illegible]
DSN 833-[illegible]

SUPERSEDES SMCVA 23-4, [illegible]
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CERTIFIED BY: [illegible]
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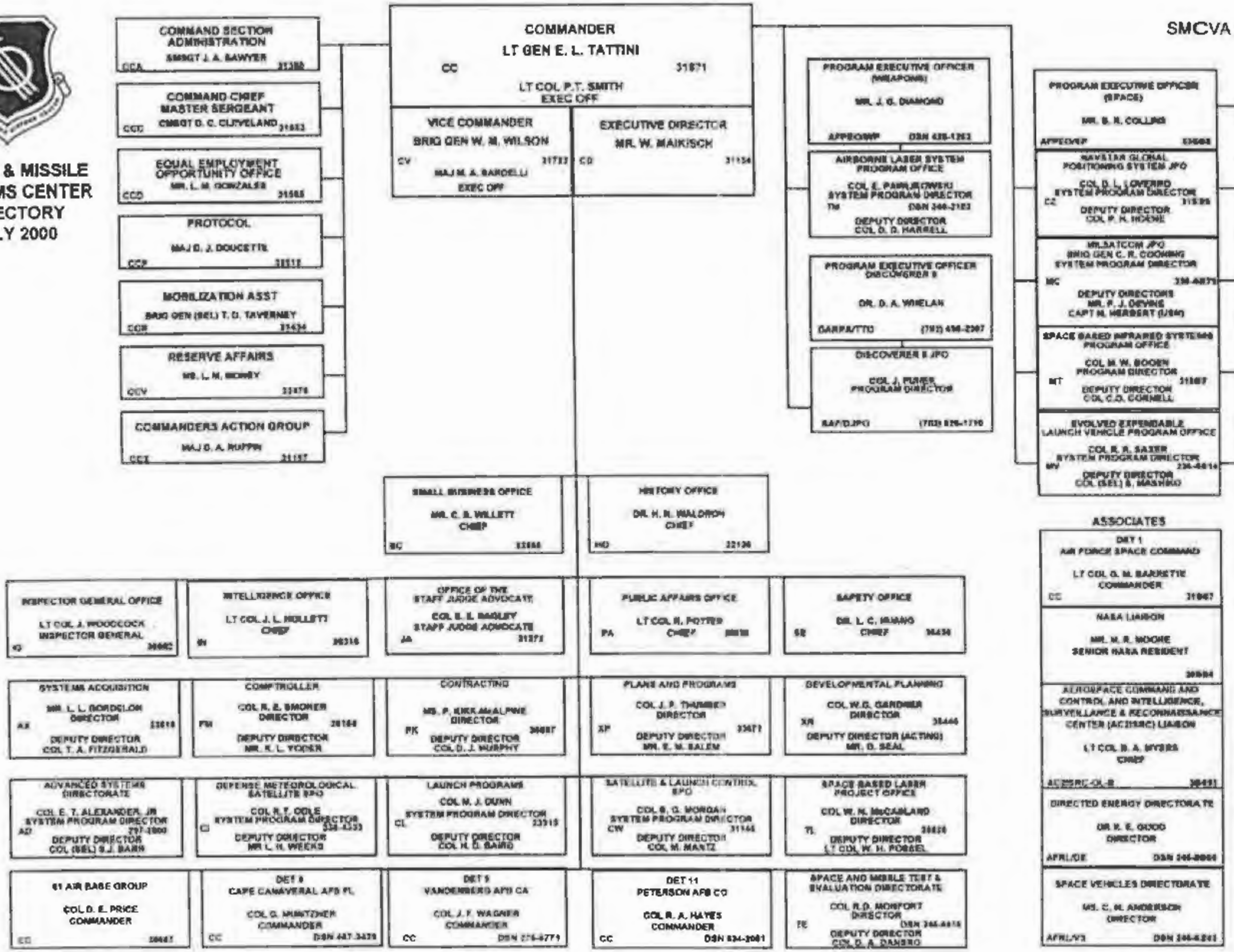
SMCVA 23-4

SPACE & MISSILE SYSTEMS CENTER DIRECTORY JULY 2000



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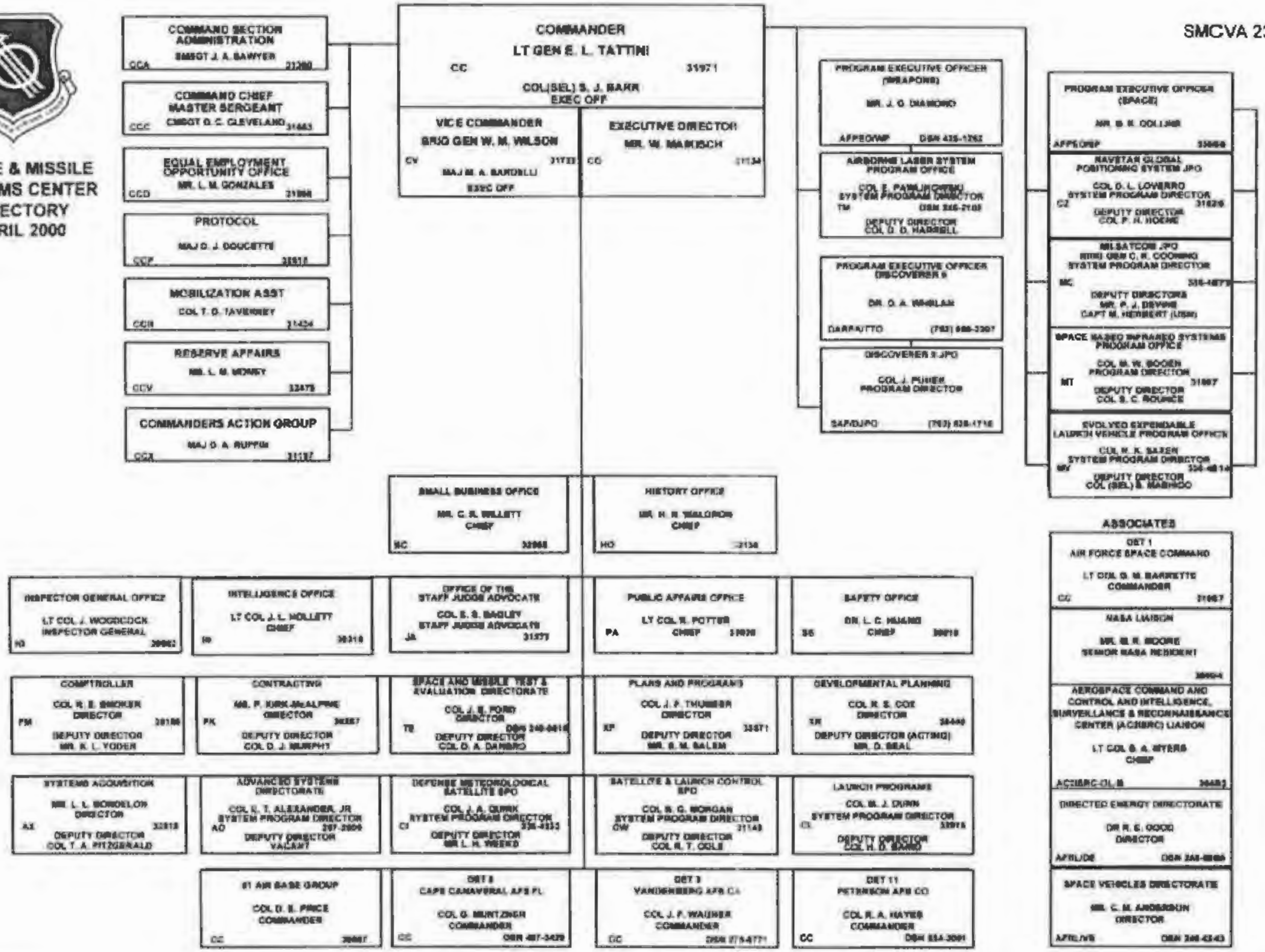
SPACE & MISSILE SYSTEMS CENTER DIRECTORY
APRIL 2000



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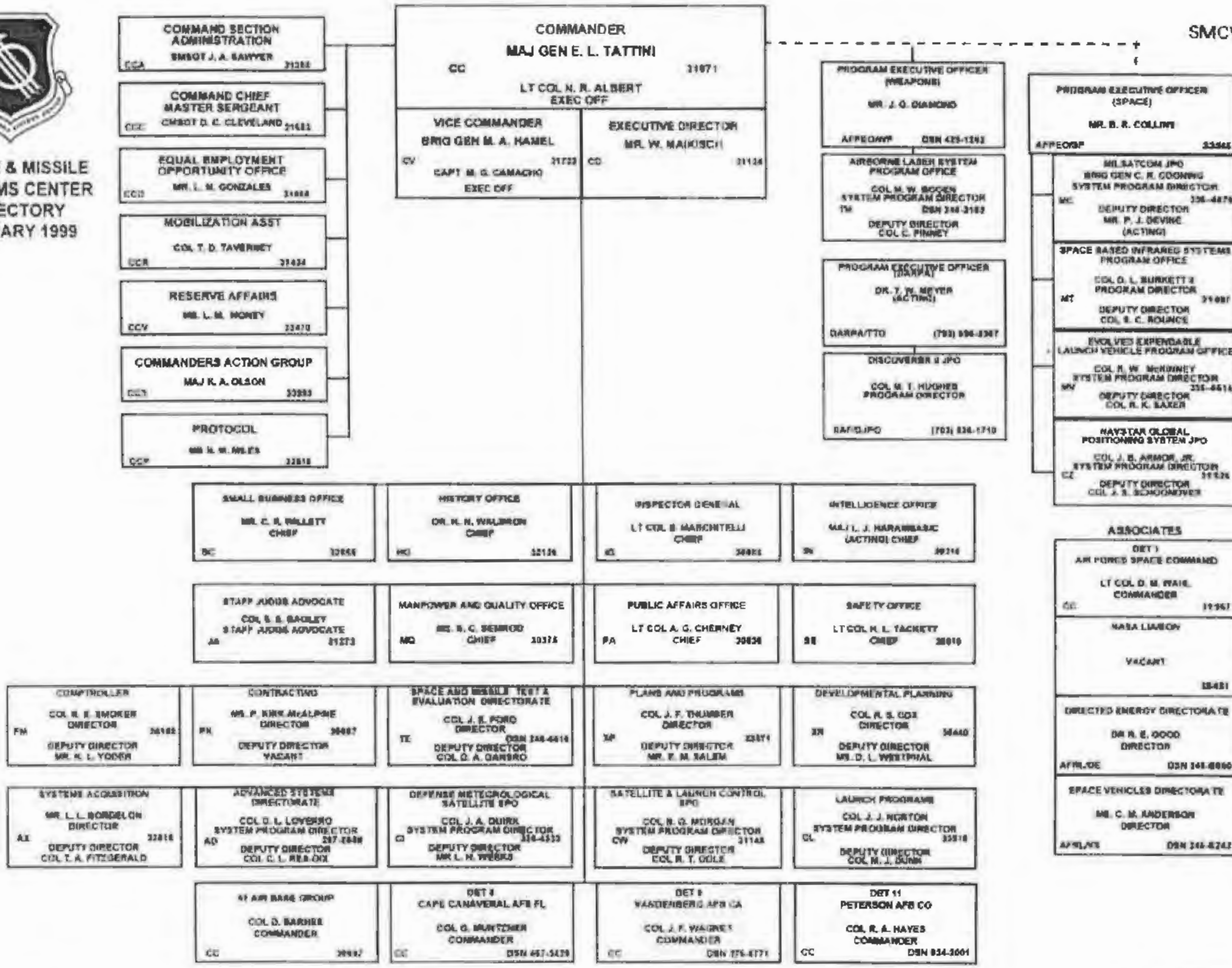

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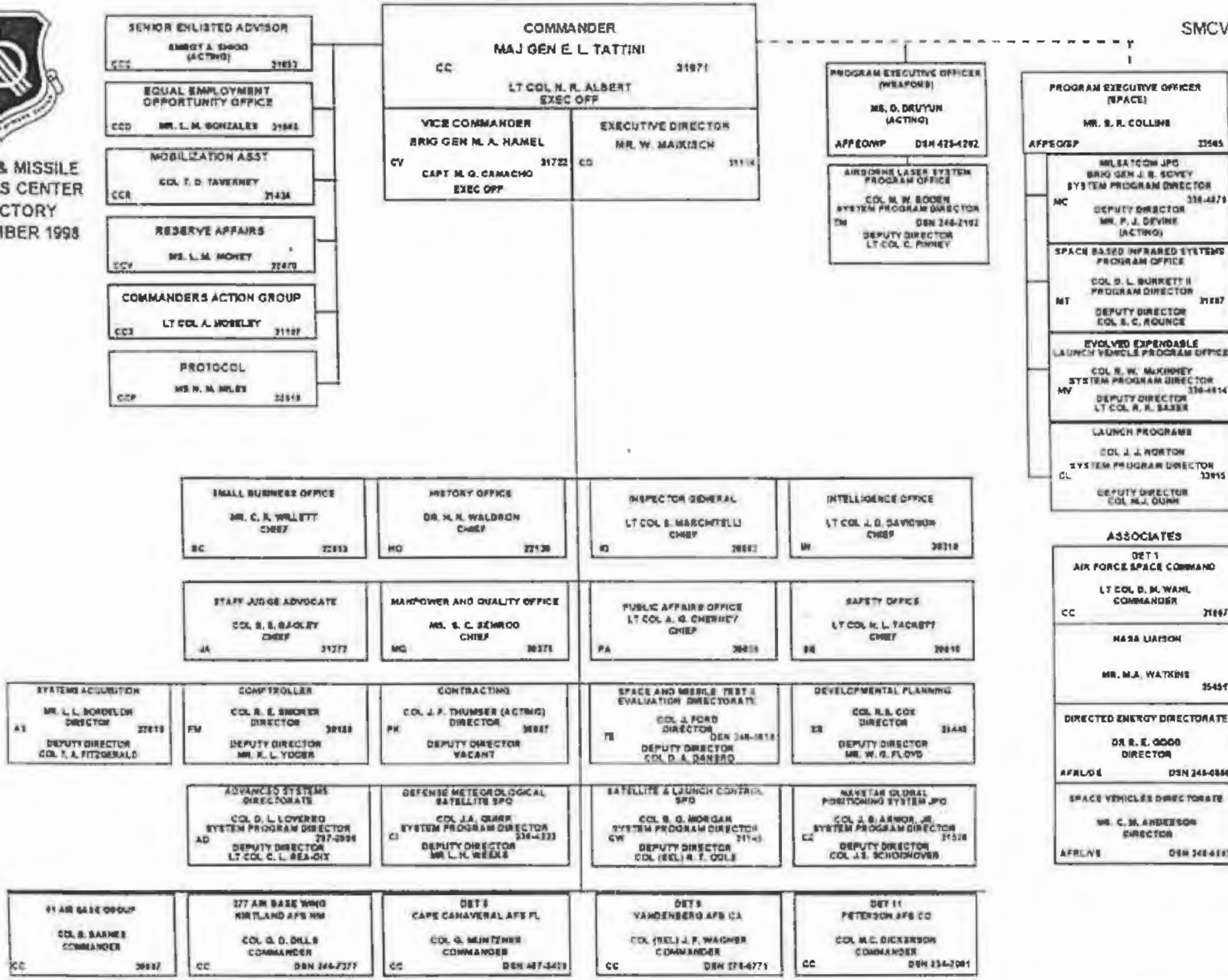

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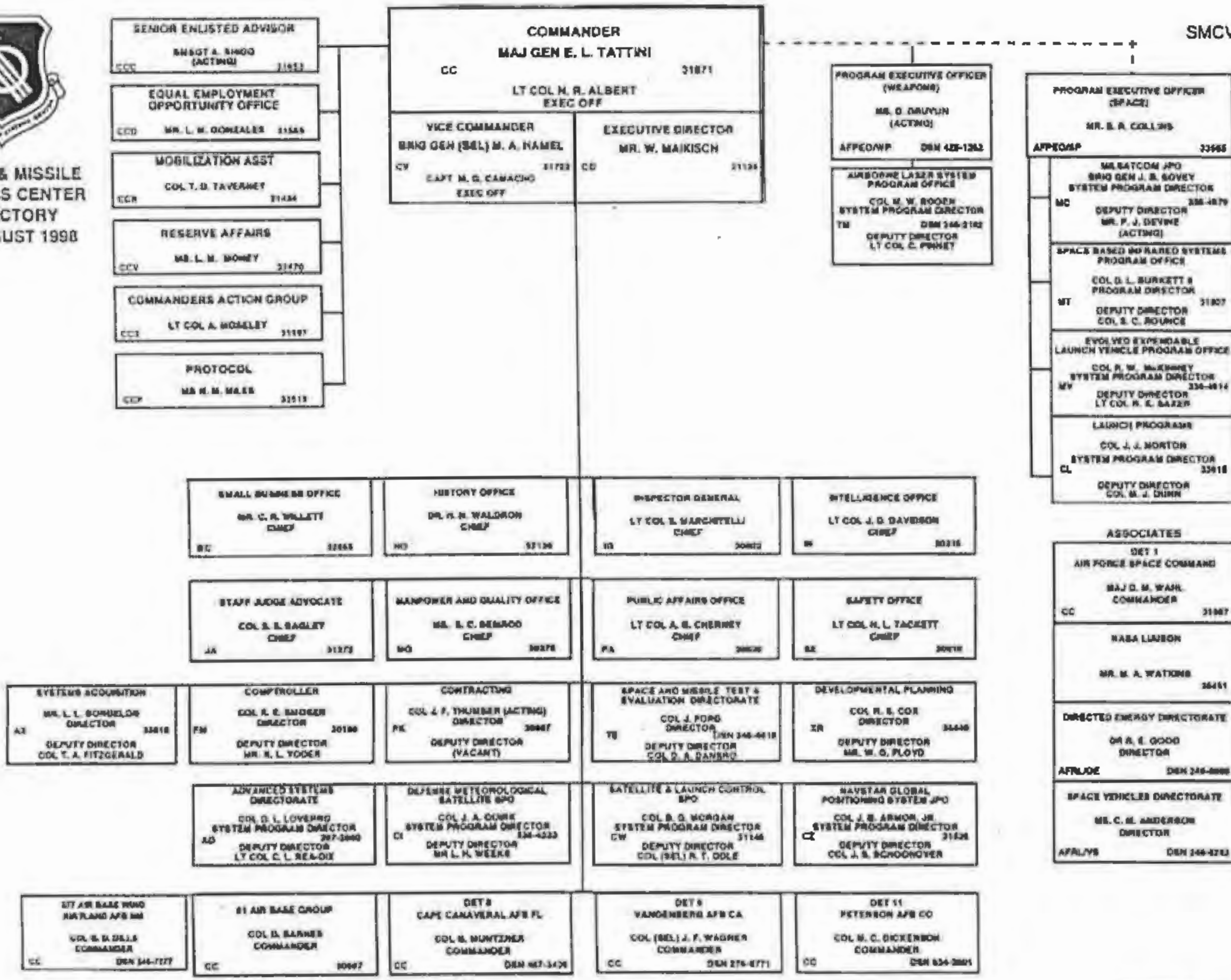

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PK 30867
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SPACE AND MISSILE TEST & EVALUATION DIRECTORATE
COL J. FORD
DIRECTOR
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CC DSN 246-7377

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DET 9 VANDENBERG AFB CA
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ASSOCIATES

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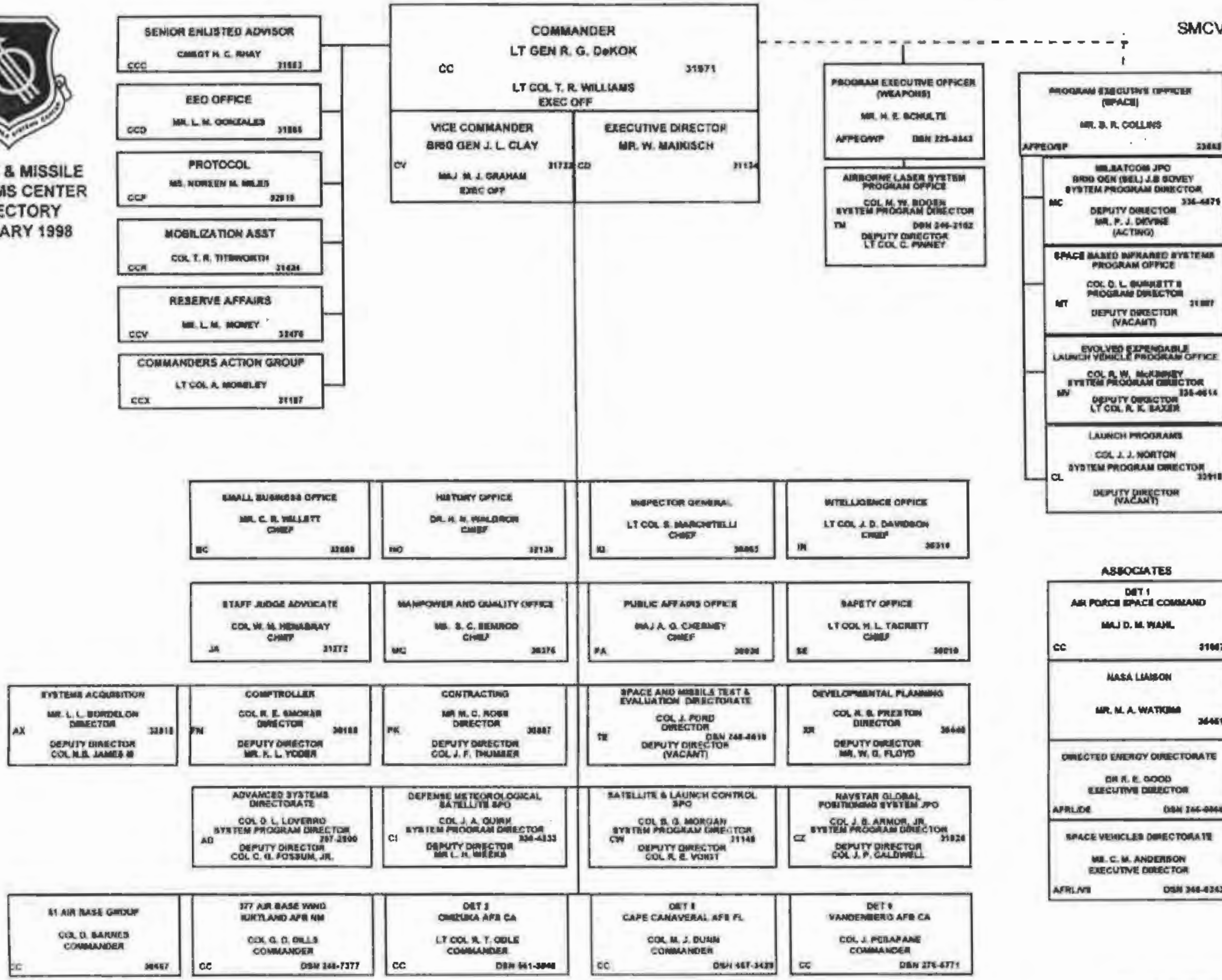
SMCVA 23-4

SPACE & MISSILE SYSTEMS CENTER DIRECTORY JANUARY 1998



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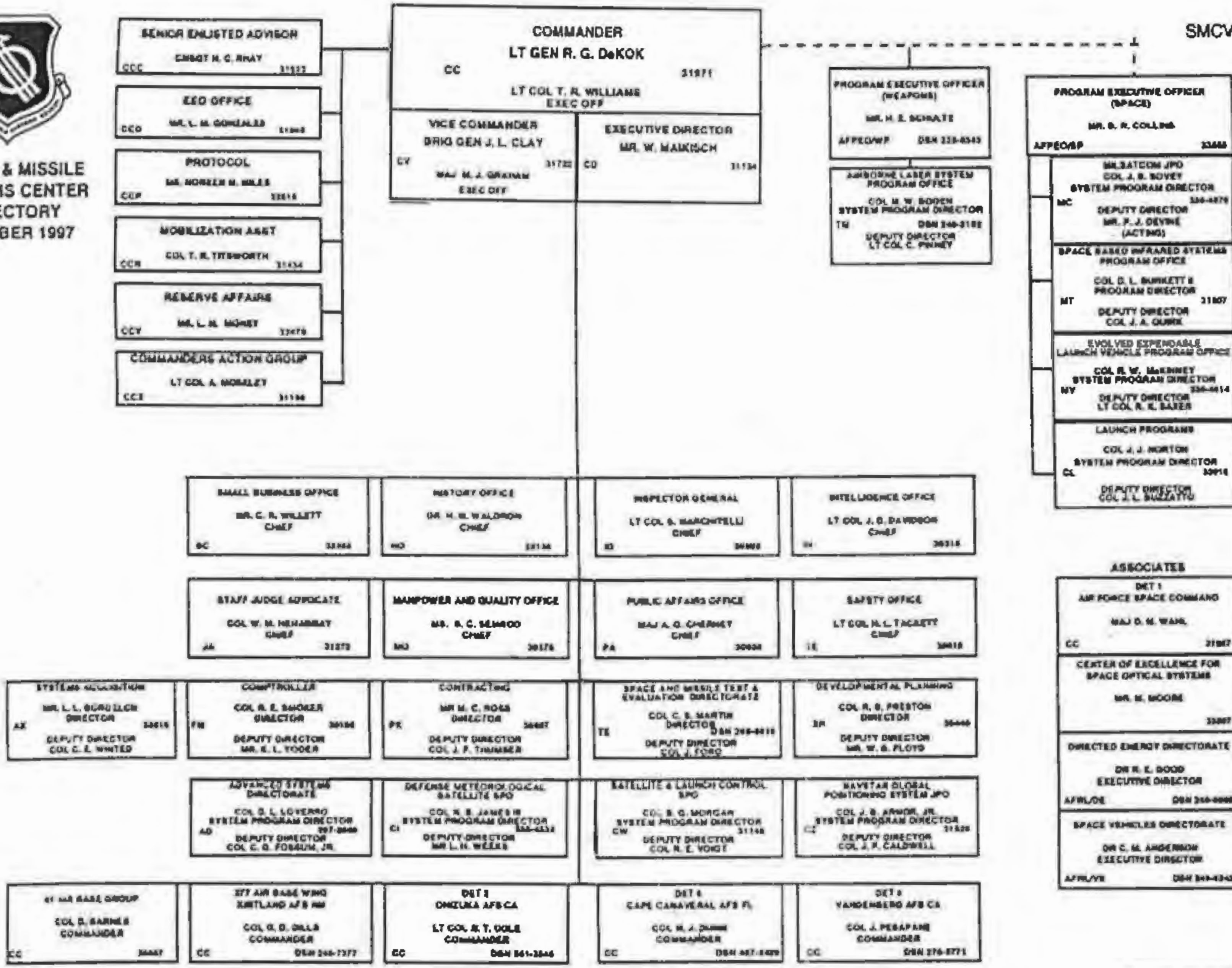

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APPENDIX E

CIVIL ENGINEERING CONSTRUCTION PROJECTS

SMC Facilities Requirements Board - 01 Dec 00

Team SMC

Facilities Requirements Board

01 Dec 00

BG Wilson, Chair

Overview

- FRG Action Items
- FY 98 Program Execution
- FY 99 Program Execution
- FY 00 Program Execution
- FY 01 Program Priorities
- Demolition Program
- MILCON Update
- Base Energy Program
- Space Allocation
- Single Facility/Building Manager

FY98 RPMC Program

PROJ NUM	PROJ TITLE		($000)	USER	START DATE	STATUS CONST
~~ACJP000201A~~	~~Renovate ABG/CC Office, Add Office, B219~~	~~$~~	~~15.3~~	~~CC~~	~~27-Mar-00~~	~~Complete~~
ACJP970020	*Install Heating System, B219*	*$*	*300.0*	*CE*	*24-Oct-98*	*81%*
HHEK998401	*North Perimeter Wall, Ft. Mac*	*$*	*292.2*	*CE*	*30-Oct-00*	*0%*
	Total	$	607.5			

As of 01 Dec 00

FY 99 Program

SMC Facilities Requirements Board - 01 Dec 00

FY01 Project Funding Strategy

- **RPMC**
  - Maintain Service Systems and Equipment
    - FY00 HVAC
    - FY01 Electric & Duct Cleaning
  - Facilities Programmed for Replacement by SAMS or MILCON
    - Maintenance only
    - Projects reprogrammed to FY02
- **MFH**
  - FY04 Whole House Improvement MILCON
  - FY01 - FY03 Infrastructure Upgrades
    - Pavements
    - Utilities
  - Necessary repairs required to maintain homes
    - Waterlines
    - Carpet
    - Minimal Upgrades (Units that can't wait to FY04)

SMC Facilities Requirements Board - 01 Dec 00

FY01 Funding Strategy

- **Preventive Maintenance (PML)**
  - Justified work to prevent future failure OR major repairs
- **Critical (CRI)**
  - SIGNIFICANT loss of mission capability OR frequent mission interruptions AND continuous work-around.
  - Minor Construction not considered CRITICAL
- **Next FY Design Requirements**
- **Base Special Interest (BSI)**
  - Limited to 10% of remaining funding
- **Command Special Interest**
- **Degraded (DEG)**
  - LIMITED loss of mission capability OR occasional mission interruptions AND work-around required often.
- **Minimal (MIN)**
  - MARGINAL or no adverse mission impact AND work-around seldom required.

FY 00 RPMC Program

PR	PROJ NUM	PROJECT TITLE		($000)	USER	FIM	MA	START DATE	STATUS CONST
	HHEA005201	Paint Exterior, B50	$	22.1	SV	PML	CS	Mar 01	0%
	ACJP001202	Install Trees, Gate 5	$	72.0	CE	MIN	BS	Jun 01	0%
	ACJP001203	Install Landscaping Area B Perimeter	$	32.0	CE	MIN	BS	May 01	0%
	ACJF011022B	Repair Circuit Breakers, Area B	$	204.5	CE	DEG	BS	Jan 01	0%
	ACJP001227A	Area B South Wall, Part A	$	274.3	CE	MIN	MS	N/A	Move to FY01-FP
	ACJP001227B	Area B South Wall, Part B	$	196.6	CE	MIN	MS	N/A	Move to FY01-FP
	ACJP001227C	Area B South Wall, Part C	$	26.1	CE	MIN	MS	N/A	Move to FY01-FP
	ACJP001218	Replace Carpet, B105, Room 4030 (PA)	$	39.0	PA	MIN	PM	N/A	Move to FY01
	ACJP001107	Gym Locker Room Carpet, B242	$	12.0	SV	MIN	BS	N/A	CANX
	ACJP001208	Gym Floor Carpet, B242	$	42.0	SV	MIN	BS	N/A	CANX
1	ACJP000712	Pave Areas, Propane Tank, B251	$	20.0	CE	DEG	BS	13 Mar 00	50%
2	ACJP002075	Replace Heat Floor 2, 3, 4 & 5, B105	$	48.3	CE	DEG	PM	Dec 00	0%
~~3~~	~~AGJP001142~~	~~Repair North Perimeter Fence, Area A~~	~~$~~	~~55.0~~	~~CE~~	~~DEG~~	~~MS~~	~~22 May 00~~	~~100%~~
4	ACJP000218	Install Window Screens, B242	$	27.9	SV	MIN	BS	13 Nov 00	20%
~~5~~	~~AGJP001311~~	~~Replace Trap Primers, Area A~~	~~$~~	~~50.0~~	~~CE~~	~~PML~~	~~BS~~	~~19 Sep 00~~	~~100%~~

Note Bold and Italicized Projects have been funded

SMC Facilities Requirements Board - 01 Dec 00

FY 00 RPMC Program

PRI	PROJ NUM	PROJECT TITLE		($000)	USER	FIM	MA	START DATE	STATUS CONST
38	ACJP002275	Install Seismic Ceiling Bracing	$	500.0	CE	DEG	BS	N/A	Move to FY02
39	***ACJP990802***	***Replace Gazebo, Area A Mall***	***$***	***13.0***	***CCC***	***MIN***	***BS***	***Jan 01***	***0%***
40	ACJP009922	Replace Zone Controls, B125	$	26.6	CE	DEG	PM	N/A	Move to FY02
41	ACJP001117	Repair Roof Air Handlers, B130	$	100.0	CE	DEG	BS	N/A	Move to FY02
42	ACJP001792	Replace Dampers, B130	$	150.0	CE	DEG	BS	N/A	Move to FY02
43	ACJP001101	Replace Dampers, B125	$	150.0	CE	DEG	PM	N/A	Move to FY02
44	ACJP001872	Replace Dampers, B115	$	150.0	CE	DEG	PM	N/A	Move to FY02
45	ACJP008852	Replace Dampers, B110	$	50.0	CE	DEG	PM	N/A	Move to FY02
46	ACJP001812	Repair Basement HVAC, B120	$	150.0	CE	DEG	PM	N/A	Move to FY02
47	ACJP001882	Repair HVAC Controls, B210	$	250.0	CE	DEG	BS	N/A	Move to FY02
48	ACJP001912	Repair HVAC Controls, B100	$	250.0	CE	DEG	PM	N/A	Move to FY02
49	ACJP001932	Repair HVAC Controls, B105	$	250.0	CE	DEG	PM	N/A	Move to FY02
50	ACJP001143	Install AC in Room, B105, Command Post	$	30.0	CE	DEG	PM	N/A	Move to FY01
51	ACJP001169	PK Office Renovation, B110	$	5.0	PK	DEG	PM	N/A	Move to FY02
52	ACJP002174	Pave Area, B220	$	18.0	CE	MIN	BS	N/A	CANX
53	ACJP011535	Install Curbs & Gutters, Area B	$	154.0	CE	MIN	BS	N/A	Move to FY01
		TOTAL	$	4,708.6					

Note: 1 Bold and Italicized Projects have been funded

As of: 01 Dec 00

FY 00 QOL Program

PRI	PROJ NUM	PROJECT TITLE		($000)	FIM	MA	START DATE	STATUS CONST
	ACJP990801	***Construct Mini Park, B220***	***$***	***37.2***	***MIN***	***BS***	***Jan 01***	***0%***
1	***HHEK970023A***	***Repair Structure, Youth Cent, B425***	***$***	***1,084.0***	***DEG***	***CS***	***7 Aug 00***	***35%***
3	***ACJP982214A***	***Renovate Rec Equip Rental, B243***	***$***	***32.0***	***MIN***	***CS***	***14 Aug 00***	***95%***
4	***HHEK001253***	***Dormitory Gazebo, B49***	***$***	***7.2***	***MIN***	***CS***	***Dec 00***	***0%***
5	***ACJP001166***	***Replace Bus Stop with Gazebo, Area B***	***$***	***15.0***	***MIN***	***CS***	***Jan 01***	***0%***
6	***ACJP002152***	***Install Gazebo, Area B***	***$***	***7.2***	***MIN***	***CS***	***Dec 00***	***0%***
7	HHEK002153	Install Gazebo, B56	$	14.0	MIN	CS	N/A	Move to FY01
8	HHEK990618	Install HVAC, Dorm, B33 (Dorm Master Plan)	$	250.0	DEG	BS	N/A	Move to FY01
9	HHEK970013	Repair Bathhouse, B401	$	300.0	MIN	CS	N/A	Move to FY01
10	HHEK990113	Convert Toilet Facility, B113	$	60.0	MIN	CS	N/A	Move to FY01
11	HHEK960003/A	Refurbish Dorm Basements, B32 & B41	$	340.0	MIN	BS	N/A	Move to FY01
12	NSAL990908	Relocate Water Faucets, FamCamp	$	15.0	MIN	CS	N/A	CANX
		TOTAL	$	2,161.6				

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00

SMC Facilities Requirements Board - 01 Dec 00

FY 00 (P722)MFH Program

PRI	PROJ NUM	PROJECT TITLE	($000)	FIM	MA	START DATE	STATUS CONST
9	***HHEX000242***	***Rpr Qtrs 10A Bathroom***	***$ 12.5***	***MIN***	***BS***	***Dec 00***	***0%***
10	***HHEX000400***	***Repair Family Room, Qtrs #1 (Design)***	***$ 11.3***	***MIN***	***CS***	***16 Oct 00***	***N/A***
11	HHEK900015	Upgrade Officers Road Park (Road Pavement)	$ 50.0	MIN	CS	N/A	Move to FY01
12	HHEK990006	Demo Qtrs. #18	$ 30.0	MIN	BS	N/A	Move to FY01
13	HHEK990404	Renovate Guard Shack Pacific Crest	$ 120.0	MIN	MS	N/A	Move to FY01
14	HHEX990405	Replace Guard Shack & Widen Road, Whites Point	$ 358.0	MIN	MS	N/A	Move to FY01
15	HHEX004202	Replace Trash Enclosures	$ 160.0	MIN	CS	N/A	Move to FY01
16	HHEX014402	Repair Utility Entrances, Multi	$ 45.0	MIN	CS	N/A	Move to FY01
							Design Status
17	***HHEX950041A***	***Pave Community Center Road, Ft Mac (Design)***	***$ 18.0***	***MIN***	***BS***	***19 Aug 00***	***5%***
18	***HHEX961014***	***Replacement Carpet, 41 Units***	***$ 206.0***	***MIN***	***CS***	***1 Oct 99***	***95%***
19	***HHEX004195***	***Install Carpet 77 Units***	***$ 385.0***	***MIN***	***CS***	***1 Oct 99***	***90%***
20	***HHEX004031***	***Patio Flooring, Qtrs 78***	***$ 8.0***	***MIN***	***BS***	***TBD***	***0%***
21	HHEX014405	Install Fences, Smallwood Dr.	$ 20.1	MIN	CS	N/A	Move to FY01
		TOTAL	$ 2,474.7				

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00

FY 00 (P721)MFH Program

PRI	PROJ NUM	PROJECT TITLE	($000)	FIM	MA	STATUS CONST	STATUS CONST
	HHEK011161	***Painting and Carpeting of Housing Office, B37***	***$ 6.0***	***MIN***	***BS***	***10 Oct 00***	***95%***
		TOTAL	$ 6.0				

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00

SMC Facilities Requirements Board - 01 Dec 00

FY 00 Medical Program

PRI	PROJ NUM	PROJECT TITLE	($000)	FIM	MA	Start Date	STATUS CONST
	HHEK001200	***Repair / Seal Basement Walls, B30***	$ 17.2	***MIN***	CS	***Jan 01***	***0%***
	HHEK001222	***Restore ADA Sidewalk & Install Railing, B30***	$ 5.5	***MIN***	BS	***Jan 01***	***0%***
1	***HHEK019432***	***Repair Boiler, B30***	$ 15.0	***DEG***	***MS***	***Dec 00***	***0%***
~~2~~	~~***ACJP001142***~~	~~***Install (3) Temp Alarms, B200 & 202***~~	~~$ 13.0~~	~~***DEG***~~	~~BS~~	~~***Aug 00***~~	~~***100%***~~
~~3~~	~~***ACJP990213***~~	~~***Install Panic Hardware, B200***~~	~~$ 3.0~~	~~***DEG***~~	~~***MS***~~	~~***Aug 00***~~	~~***100%***~~
		TOTAL	$ 53.7				

Note: Bold and Italicized Projects have been funded.

As of 01 Dec 00

FY 00 User Funded Program

PRI	PROJ NUM	PROJECT TITLE	($000)	USER	FIM	MA	Start Date	STATUS CONST
	ACJP941051	Handicap Ramp, B130	$ 19.2	CS	DEG	BS	N/A	Move to FY01
	ACJP001126	Base Consolidated Network Control Ctr, B130	$ 75.0	CS	DEG	BS	N/A	Move to FY01
~~1~~	~~***ACJP001703***~~	~~***Renovate OSI Offices, B130***~~	~~$ 55.0~~	~~OSI~~	~~***MIN***~~	~~BS~~	~~***N/A***~~	~~***100%***~~
2	ACJP990507	Install Fire Sprinklers, B251	$ 80.0	DeCA	DEG	CS	N/A	Move to FY01
4	***ACJP001083***	***Renovate Office Area, B110***	$ 35.0	CW	***MIN***	***PM***	***N/A***	***95%***
5	***ACJP990109***	***Renovate 1st Flr, Multimedia Spt, B130***	$ 130.0	CS	***MIN***	***MS***	***N/A***	***95%***
~~6~~	~~***ACJP001168***~~	~~***Replace Security Doors, B125***~~	~~$ 22.0~~	~~CL~~	~~***MIN***~~	~~***PM***~~	~~***N/A***~~	~~***100%***~~
~~7~~	~~***ACJP000061***~~	~~***Carpet Offices, B130***~~	~~$ 15.0~~	~~MZ~~	~~***MIN***~~	~~***MS***~~	~~***N/A***~~	~~***100%***~~
9	NSAL001140	Renovate Server Room, B80	$ 110.0	ADC	MIN	BS	N/A	Move to FY01
10	***HHEK009152***	***Upgrade Tot Lot, B425***	$ 15.1	SV	***MIN***	BS	***Dec 00***	***0%***
~~11~~	~~***ACJP009571***~~	~~***Paint Second Floor, B130***~~	~~$ 20.0~~	~~SG~~	~~***MIN***~~	~~***MS***~~	~~***N/A***~~	~~***100%***~~
12	ACJP009595	Remove Walls, B115	$ 15.0	MT	MIN	PM	N/A	Move to FY01
13	***HHEK991149***	***Install Satellite Dish, B425***	$ 20.0	SV	***MIN***	CS	***N/A***	***95%***
14	***HHEK995103***	***Renovate Post Office, B418***	$ 120.0	PO	***MIN***	CS	***N/A***	***85%***
15	***HHEK005115***	***Install Alarm System, B403***	$ 15.0	SV	***MIN***	CS	***N/A***	***85%***
16	ACJP009140	Replace Carpet, B105, 5th Flr	$ 7.5	JP	MIN	PM	N/A	Move to FY01
		TOTAL	$ 757.8					

As of 01 Dec 00

Note: Bold and Italicized Projects have been funded.

SMC Facilities Requirements Board - 01 Dec 00

FY 01 RPMC Program

Previous FRB Priority	Project No	Project Title	($000)	Design	PM	MA	Method of Accmp
FY01-3	*ACJP011022*	***Repair Underground Electrical Ducts, Area B***	*$ 250.0*	*45%*	*DEG*	*BS*	*Red Horse*
		SUB-TOTAL	**$ 250.0**				
	ACJP001103A-F	Replace Refrigerant Leak Detectors	$ 46.0	65%	DEG	BS	VENDOR
	ACJP001206	Restreching and Cleaning of Gym Floor Carpet, B242	$ 5.7	85%	DEG	BS	GSA
FY01-20	HHEK011512	Repair Chapel Roof, B420	$ 55.0	0%	PML	BS	IDIQ
FY01-19	HHEK991504	Paint Chapel, B420	$ 20.0	0%	PML	BS	IDIQ
FY01-23	HHEK941502	Paint Exterior B37	$ 110.0	100%	PML	BS	IDIQ
		Demolish B235 (Design)	$ 16.0	0%	DSG	BS	A&E
		Demolish B244 (Design)	$ 16.0	0%	DSG	BS	A&E
		Demolish B243 (Design)	$ 16.0	0%	DSG	BS	A&E
		Demolish B242 (Design)	$ 16.0	0%	DSG	BS	A&E
		Demolish B241 (Design)	$ 16.0	0%	DSG	BS	A&E
	ACJP001180	Restore B229 for Base Consolidation	$ 311.0	5%	DEG	BS	A&E
		SUB-TOTAL	**$ 827.7**				
	HHEK001111	Repave Road for Emergency Evacuation of Children, B31	$ 180.0	65%	DEG	BS	IDIQ
FY00-25	HHEK990041	Repave Source Selection Road	$ 427.0	5%	DEG	MS	COE
FY00-30	ACJP001143	Install AC in Room B105 Command Post	$ 30.0	0%	DEG	PM	BA
FY00-24	ACJP998617	Repair Thermostats, B100 & B105	$ 281.0	100%	DEG	PM	SABER

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00

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FY 01 RPMC Program

Previous FRB Priority	Project No	Project Title	($000)	Design	PM	MA	Method of Accmp
FY00-11	ACJP990717	Utility Distribution Study, Area B	$ 84.1	100%	DEG	MS	A&E
FY01-17	ACJP001372	Repair Exterior Lighting, Area A	$ 75.5	100%	DEG	BS	BA
FY01-21	ACJP998218	Replace Downspouts, Bldgs 240 & 244	$ 26.0	100%	MIN	BS	BA
FY01-8	ACJP990114	Renovate Prof Dev Center, B130	$ 40.0	100%	MIN	BS	SABER
FY00-21	ACJP009882	Repair Duct Work, B219	$ 484.0	100%	MIN	BS	BA
FY00-35	HHEK998709	Install Parking Lot Lights, B37	$ 36.0	100%	MIN	BS	BA
	ACJP001134	Clean HVAC Ducts, B115	$ 70.0	0%	MIN	BS	IDIQ
	ACJP001135	Clean HVAC Ducts, B120	$ 70.0	0%	MIN	BS	IDIQ
	ACJP001136	Clean HVAC Ducts, B125	$ 70.0	0%	MIN	BS	IDIQ
	ACJP001137	Clean HVAC Ducts, B130	$ 70.0	0%	MIN	BS	IDIQ
	HHEK998402	Renovate Basement, B410	$ 720.0	100%	MIN	BS	IFB
	ACJP019012	Repair Stairwell, B212	$ 15.0	0%	MIN	BS	BA
FY01-27	ACJP011535	Install Curbs & Gutters, Area B	$ 154.0	100%	MIN	BS	IDIQ
FY01-13	ACJP011521	Restore Landscape, B220	$ 15.0	CANX	MIN	BS	SABER
	ACJP998204	Install Restrooms Facilities, B240	$ 90.0	CANX	MIN	BS	CANX
		TOTAL	$ 4,346.0				

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SMC Facilities Requirements Board - 01 Dec 00

FY 01 (722) MFH Program

Previous FRB Priority	Project No	Project Title	($000)	Design	FM	MA	Method of Accmp
	HHEX995414	Paint Townhouses Ft Mac (Phase 5)	$ 101.0	100%	MN	CS	IDQ
	HHEX9600148	Housing Upgrades, Phase 3A	$ 200.0	100%	DEG	MS	IDQ
FY00-3	HHEX014232	Replace Stairs & Rails, Qrs #19B	$ 36.0	100%	CR	BS	SABER
FY00-6	HHEX014422	Replace MFH Transformers	$ 125.0	100%	DEG	MS	8A
FY00-8	HHEX963408	Repair Family Room, Qrs #1	$ 85.0	5%	MN	CS	FB
FY00-2	HHEX004171	Qrs 42 Patio	$ 7.3	100%	MN	BS	8A
FY00-2	HHEX014362	Repair Lawn Sprinklers System Qrs #2	$ 6.9	95%	MN	BS	8A
FY00-10	HHEX980015A	Upgrade Officer Road Park (Pavement), BSI	$ 50.0	100%	MN	CS	SABER
FY00-17	HHEX950041A	Repave Fort Mac, Only On MFH	$ 183.0	5%	MN	MS	COE
FY00-19	HHEX004195A1	Replacement Carpet, Ft Mac, 40 Units	$ 200.0	100%	MN	CS	GSA
FY01-7	HHEX950001	Slurry Seal Pavement, Ft Mac	$ 115.0	10%	MN	BS	COE
FY00-13	HHEX990404	Renovate Guard Shack, FC	$ 120.0	100%	MN	MS	SABER
		SUB-TOTAL	$ 1,230.2				
	HHEX9610105	Waterline Repairs, 6286 Housing, Phase 2	$ 350.0	100%	MN	CS	IDQ
FY00-21	HHEX014485	Install Smallwood Fence	$ 20.1	100%	MN	CS	SABER
	HHEX995414	Paint Townhouses Ft Mac (Phases 7 & 8)	$ 180.0	100%	MN	CS	IDQ

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FY 01 (722) MFH Program

Previous FRB Priority	Project No	Project Title	($000)	Design	FM	MA	Method of Accmp
	HHEX9600148	Housing Upgrades, Phase 3	$ 500.0	100%	DEG	MS	IDQ
FY00-15	HHEX014402	Repair Utility Entr, MJR	$ 45.0	100%	MN	CS	SABER
FY00-6	HHEX014025	Repair Qrs 10A Bedroom	$ 10.0	80%	MN	BS	8A
	HHEX001100	Renovate Qrs 6A	$ 12.0	0%	MN	BS	8A
FY00-19	HHEX004195A2	Replacement Carpet, Ft Mac, 40 Units	$ 200.0	100%	MN	CS	GSA
	HHEX977700A	Repave Fort MacArthur Road (Quartermaster Road), Phase 1	$ 315.0	0%	DEG	BS	IDQ
	HHEX977700B	Repave Fort MacArthur Road (Old Fort Road), Phase 2	$ 300.0	0%	DEG	BS	IDQ
	HHEX931051	Renovate Fence West Side, PCH	$ 25.0	50%	MN	BS	FB
FY00-14	HHEX004202	Replace Trash Enclosures	$ 160.0	100%	MN	CS	SABER
	HHEX995415	Paint Ext Historical Units, B51, 53, & 55	$ 83.0	100%	PML	CS	IDQ
FY01-15	HHEX950040	Repave CE Area, Ft. Mac	$ 325.0	0%	PML	BS	IDQ
FY00-11	HHEX940005	Demo Qrs #15	$ 30.0	10%	MN	BS	8A
FY00-7	HHEX998406	Seal Basements, Ft Mac	$ 60.0	0%	MN	CS	8A
		TOTAL	$ 3,845.3				

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SMC Facilities Requirements Board - 01 Dec 00

FY 01 NAF Program

Previous FRB Priority	Project No	Project Title	($000)	Design	FIM	MA	Method of Accmp
FY00-4	***ACJP001141***	***Remove Bar Officers Lounge, B120***	***$ 12.0***	***100%***	***MIN***	***CS***	***SABER***
FY00-5	HHEK019412	Repair Kitchen Floor, B403	$ 154.8	100%	MIN	CS	SABER
		TOTAL	$ 166.8				

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00

FY 01 Medical Program

FRB Priority	Project No	Project Title	($000)	Design	FIM	MA	Method of Accmp
	HHEK001222	***Repair Handicapped Sidewalk and Install Handrail, B30***	***$ 5.5***	***100%***	***MIN***	***BS***	***IDIQ***
		Total	$ 5.5				

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00

SMC Facilities Requirements Board - 01 Dec 00

FY00 Demolition Program

Task Name	Start
AAFES Base Exchange	Mon 2/25/02
Demo B243 (Thrift Shop/Source Selection/OSI vault)	Mon 2/25/02
Construct Parking Lot in 243 space	Wed 5/1/02
Demo Current Parking Lot	Mon 6/3/02
Demo B244 (Current AAFES BX / HAWC / NAF)	Mon 10/21/02
Demo 242 (Current Fitness Center/ NAF)	Mon 10/21/02
SAMS Consolidation Project	Mon 7/1/02
Demo B236 (Out Skilled/ SAMS)	Mon 7/1/02
Demo B240 (Logistics and Supply/ SAMS)	Mon 7/1/02
Demo B241 (SPS/ SAMS)	Mon 7/1/02
Demo B215 (Auto Hobby Shop/ SAMS)	Mon 9/1/03
Demo B227 (CDC/SAMS)	Mon 9/1/03
Demo B228 (CDC/SAMS)	Mon 9/1/03
Demo B219 (2/3) (HQ 61 ABG/ SAMS)	Mon 9/1/03
Demo B215 (Partial) (Auto Hobby Shop/ SAMS)	Mon 9/1/03

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FY00 Demolition Program

Task Name	Start
ABG Consolidation and CE LG Warehouse	Mon 5/3/04
Demo B212 (Contracting/ SAMS)	Mon 5/3/04
Demo B218 (61 ABG HQ/SAMS)	Mon 5/3/04
Demo 230 ([illegible]/SAMS)	Mon 5/3/04
Demo B229 (Civil Engineering/ SAMS)	Thu 8/26/04

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SMC Facilities Requirements Board - 01 Dec 00

Energy Conservation

- **Utilities Privatization**
  - Letter submitted to HQ AFMC/CE requesting suspending program for LAAFB until base consolidation completed
  - HQ AFMC/EC modified letter and forwarded to Air Staff in November
- **Energy Saving Performance Contract (ESPC)**
  - Honeywell Corporation concluded Phase I study of LAAFB
  - Letter requesting moving program into Phase II submitted
  - Phase II kickoff meeting scheduled for 7 December 2000
  - Bulk of energy projects will focus on Fort MacArthur and housing areas
- **HQ AFMC Energy Assistance Team completed survey in May**
  - Final report with project descriptions and economic analysis received 6 October 2000
  - Low cost projects identified from final report, ongoing development of project Work Orders

Energy Conservation (cont)

- **Recycled Water Project**
  - Project 80% designed as of 27 November 2000
  - Design review meeting held on 27 October 2000
  - Project ground breaking scheduled for December 2000
- **Energy Consumption**
  - Electrical usage elevated 7% from FY99
  - Gas usage reduced 52% from FY99
  - Energy costs elevated 3.8%; $82.3K from FY99
  - Consumption trend down for September 2000
- **Water Consumption**
  - Water consumption elevated 13.75% from FY99
  - Water costs elevated 15.9%; $27.6K from FY99

SMC Facilities Requirements Board - 01 Dec 00

Space Allocation

Requester	Current Bldg/Space	Proposed Space	Current Occupant	Recommendation
61 SFS UNION	Bldg 241	2-3 Offices	N/A	Pending location of space
LG SATO	Bldg 219	Bldg 130	N/A	Pending location of space
61 SFE Law Enforcement Desk	Bldg 120, Rm 234	Bldg 120, Rm 515	61 CS	Approval - awaiting construction
CZ	Bldg 120	Bldg 130	CZ	Bldg 130, Rms 2457, 2458, 2281, 2532
GAO	Bldg 120	Bldg 120	GAO	Remain in Bldg 120
AFAA	Bldg 120	Bldg 120	AFAA	Remain in Bldg 120
Naval Reserve, Det 1	Off Base	Bldg 130	61 CS	Bldg 130, Rms 2257 A, B, C
Career Center	Bldg 130	Bldg 130	61 CS	Bldg 130, Rm 2444D
Chaplain Office	Bldg 120	Bldg 105	N/A	First floor office space

- **Single Facility/Building Manager**
  - Most facility square footage

Recommendations

- **Approve FY 01 Projects/Priority**
- **Approve Space Re-allocations Decision**
- **Approve Single Facility/Building Manager Concept**

Mission Areas

- **Primary Mission (PM)**
  - Facilities and infrastructure integral to the installation's primary mission.
  - Ex: SPO buildings and infrastructures within them
- **Mission Support (MS)**
  - Facilities directly supporting the installation's primary mission.
  - Ex: Base Comm Center, Security Forces, Electrical Distribution System
- **Base Support (BS)**
  - Facilities not integral to the primary mission but necessary to keep the installation functioning properly.
  - Ex: Gym, Administrative Offices, CE, dormitories
- **Community Support (CS)**
  - Facilities supporting the base community, base personnel, or do not fall within the other mission areas.
  - Ex: Commissary, BX, Youth Center, family housing

Energy Conservation Project List

- **Energy Conservation Projects Developed from Air Force Audit Report**
  - **Proposed for Contract Accomplishment**
  - Ultrasonic motion sensors in basement hall ways in Area A
  - Building 120, install utility meters on "The Club" utility source points
  - Buildings 30, 403, 418, and 425, install utility meters on utility source points
  - Buildings 220, 201, 202, 209, 214, 220, 235, and 244, install utility meters on utility source points
  - Building 219, install pipe insulation on all domestic hot water lines
  - Area A buildings, install time clocks on water heater circulation pumps

SMC Facilities Requirements Board - 01 Dec 00

Energy Conservation Project List

- **Energy Conservation Projects Identified by Honeywell**
  - Fort MacArthur, retrofit lighting with T-8 lamps
  - Fort MacArthur, retrofit landscape irrigation system
  - Fort MacArthur, domestic water system upgrades
  - Fort MacArthur, pool cover retrofit
  - Fort MacArthur, pool controls
  - Fort MacArthur, domestic hot water controls
  - Fort MacArthur, HVAC controls for A/C and boiler systems
  - Area A and B, retrofit lighting with T-8 lamps

Building Mangers Listing

Area - A

Building #	Building Manager	Grade	Customer/ Commander
100	Darity, Jim	E-5	SMC
105	Tumsek, K	E-4	SMC
107	Bandy, Scott	E-6	MDS
110	Mopar, Floranie	E-6	SMC
111	Bandy, Scott	E-6	61 MDS
115	Thomas, Leon	E-6	SMC
120	Pitre, Latanya	E-4	SMC
125	Baker, Christopher G	E-3	SMC
130	Hernandez, Jerry	E-6	61 MDS
131	Bandy, Scott	E-6	61 MDS

Area - B

Building #	Building Manager	Grade	Customer/ Commander
200	Brandon, Sara	CIV	61 MDS
201	Brandon, Sara	CIV	61 MDS
202	Brandon, Sara	CIV	61 MDS

SMC Facilities Requirements Board - 01 Dec 00

Building Mangers Listing

Fort MacArthur

Building #	Building Manager	Grade	Customer/ Commander
40	Falco, John	CIV	61 ABG
41	Russ, Kelvin	E-8	61 ABG
56	Craddock, Andrew	CIV	61 ABG
64	Nobles, Robert	CIV	61 ABG
65	Nobles, Robert	CIV	61 ABG
72	Nobles, Robert	CIV	61 ABG
74	Nobles, Robert	CIV	61 ABG
75	Nobles, Robert	CIV	61 ABG
76	Nobles, Robert	CIV	61 ABG
400	Durtschi, Roy	CIV	61 ABG
401	Durtschi, Roy	CIV	61 ABG
403	Brown, Patricia	CIV	61 ABG
410	Parsons, Robert	O-4	SMC
411	Bandy, Scott	E-6	61 MDS
417	Brining, Anita	CIV	61 ABG
422	Bandy, Scott	E-6	61 MDS
425	Brown, Patricia	CIV	61 ABG
428	House, William	E-5	61 ABG
451	Brown, Patricia	CIV	61 ABG
1200	Bandy, Scott	E-6	61 MDS
1300	Bandy, Scott	E-6	61 MDS

As of: 01 Dec 00

APPENDIX F

BUDGET

					SPACE-RELATED FUNDING									
	AS OF DATE: 07/05/01				AF SPACE BUDGET - FY02 PB									
PE #	PROGRAM TITLE		APPN	Factor	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY98-07
COMMUNICATIONS															
PE 33110F	DEF SATELLITE COMM SY	APPN 14	MISSILE PROCUREM	1	81405	27573	26612	22561	27004	23003	11922	4497	0	0	226,577
PE 33110F	DEF SATELLITE COMM SY	APPN 28	RDT&E - AF	1	9118	10141	3456	7261	3895	2051	1194	1282	0	0	38,398
PE 33600F	WIDEBAND GAPFILLER SY	APPN 14	MISSILE PROCUREM	1	0	0	0	25500	390956	189815	18604	12358	14605	14789	666,627
PE 33600F	WIDEBAND GAPFILLER SY	APPN 16	OTHER PROCUREME	1	0	0	0	0	5429	21835	40802	2222	0	0	70,288
PE 33601F	MILSATCOM TERMINALS	APPN 10	AIRCRAFT PROCURE	1	15501	13094	23669	26523	45951	42417	39505	31487	21893	43933	303,973
PE 33601F	MILSATCOM TERMINALS	APPN 16	OTHER PROCUREME	1	24736	32995	33579	40231	20811	28611	51193	59198	65881	49401	406,636
PE 33601F	MILSATCOM TERMINALS	APPN 28	RDT&E - AF	1	15319	6036	7572	17634	41763	57601	98275	81748	68438	30738	425,124
PE 33601F	MILSATCOM TERMINALS	APPN 30	OPERATION AND MA	1	739	183	0	0	38095	34202	32672	34027	35483	36145	211,546
PE 33601F	MILSATCOM TERMINALS	APPN 32	MILITARY PERSONNI	1	0	0	0	0	11076	24258	25814	26726	28161	29075	145,110
PE 33602F	ADVANCED WIDEBAND SY	APPN 14	MISSILE PROCUREM	1	0	0	0	0	0	0	0	12200	89382	467513	569,095
PE 33604F	ADVANCED EHF MILSTAT(	APPN 14	MISSILE PROCUREM	1	0	0	0	0	0	334936	277673	267974	9820	6773	897,176
PE 33605F	SATELLITE COMMUNICATI	APPN 30	OPERATION AND MA	1	49837	58228	62134	84124	54390	51113	112627	128820	140031	142264	883,568
PE 33605F	SATELLITE COMMUNICATI	APPN 32	MILITARY PERSONNI	1	36673	34964	34326	38362	37352	27437	28250	29190	30394	31466	328,414
PE 33606F	UHF SATELLITE COMMUNI	APPN 32	MILITARY PERSONNI	1	544	0	0	0	0	0	0	0	0	0	544
PE 33610F	MILSATCOM TELEPORT SI	APPN 30	OPERATION AND MA	1	0	0	0	0	0	2000	2100	2100	2200	2200	10,600
PE 35903F	CINC'S MOBILE CMD CONT	APPN 16	OTHER PROCUREME	1	0	0	4050	1547	8062	9537	8009	6721	8786	10654	57,366
PE 35903F	CINC'S MOBILE CMD CONT	APPN 24	MILITARY CONSTRU	1	0	0	0	10200	0	0	0	0	0	0	10,200
PE 35903F	CINC'S MOBILE CMD CONT	APPN 30	OPERATION AND MA	1	0	0	6650	9108	15541	15115	17757	18396	19140	19425	121,132
PE 35903F	CINC'S MOBILE CMD CONT	APPN 32	MILITARY PERSONNI	1	0	0	0	1298	2885	3075	3172	3247	3390	3505	20,572
PE 63430F	ADVANCED EHF MILSTAT(	APPN 28	RDT&E - AF	1	35313	54617	89824	244135	548398	516866	345019	274653	161493	72095	2,342,413
PE 63432F	POLAR MILSTATCOM (SPA	APPN 28	RDT&E - AF	1	14415	36207	37555	25629	18724	9588	5724	981	0	0	149,023
PE 63840F	GLOBAL BROADCAST SER	APPN 28	RDT&E - AF	1	0	0	0	0	34544	25472	16916	15661	21009	7009	120,611
PE 63845F	ADVANCED WIDEBAND SY	APPN 28	RDT&E - AF	1	0	0	0	0	0	0	31534	257337	387189	174735	850,795
PE 63854F	WIDEBAND GAPFILLER SY	APPN 28	RDT&E - AF	1	70224	65152	45570	121661	96670	26670	48623	28077	0	0	502,647
PE 64479F	MILSTAR LDR/MDR SAT C(	APPN 28	RDT&E - AF	1	610774	515772	345590	235164	232084	110363	1424	1421	0	0	2,052,592
	Subtotal - Communications				**984,598**	**854,962**	**722,587**	**911,138**	**1,633,630**	**1,556,966**	**1,218,809**	**1,300,323**	**1,107,296**	**1,141,720**	**11,411,027**
NAVIGATION															
PE 35164F	NAVSTAR GLO POS SYS(U	APPN 10	AIRCRAFT PROCURE	1	42421	35626	35320	38931	29659	27894	50963	68255	79208	71000	479,277
PE 35164F	NAVSTAR GLO POS SYS(U	APPN 16	OTHER PROCUREME	1	1495	3321	2335	1637	4384	4393	4758	4360	4771	1061	32,535
PE 35164F	NAVSTAR GLO POS SYS(U	APPN 28	RDT&E - AF	1	43139	36898	39004	66360	53093	57035	50629	50814	54982	59552	511,506
PE 35164F	NAVSTAR GLO POS SYS(U	APPN 30	OPERATION AND MA	1	765	2122	1444	1951	2078	1940	6344	6311	6567	6615	36,137
PE 35165F	NAVSTAR GPS (SPACE)	APPN 14	MISSILE PROCUREM	1	162626	87827	107498	173434	201479	236103	223445	261769	161877	425158	2,041,216
PE 35165F	NAVSTAR GPS (SPACE)	APPN 16	OTHER PROCUREME	1	10665	7619	13511	7812	7989	7125	8811	9918	14231	26326	114,007
PE 35165F	NAVSTAR GPS (SPACE)	APPN 28	RDT&E - AF	1	27648	24626	106849	258592	186459	206960	72760	60135	59667	51003	1,054,699
PE 35165F	NAVSTAR GPS (SPACE)	APPN 30	OPERATION AND MA	1	24992	25323	34669	54116	51992	56488	59089	57634	59863	62841	487,007

						SPACE-RELATED FUNDING									
	AS OF DATE: 07/05/01					AF SPACE BUDGET - FY02 PB									
PE #	PROGRAM TITLE		APPN	Factor	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY98-07
PE 35165F	NAVSTAR GPS (SPACE)	APPN 32	MILITARY PERSONNI	1	7670	6257	6716	9067	12556	13319	13667	14047	14604	15118	113,021
PE 63421F	NAVSTAR GLOBAL POSITI	APPN 28	RDT&E - AF	1	0	0	0	0	78358	100575	185119	168838	227900	224516	1,005,306
PE 64480F	GLOBAL POSITION SYS-BI	APPN 28	RDT&E - AF	1	69151	76872	0	0	0	0	0	0	0	0	146,023
	Subtotal - Navigation				**390,572**	**306,491**	**347,346**	**611,900**	**628,047**	**711,832**	**676,886**	**722,101**	**683,670**	**943,190**	**6,020,734**
GROUND SUPPORT															
PE 35110F	SATELLITE CONTROL NET	APPN 16	OTHER PROCUREME	1	21471	23466	27958	38160	31301	54611	51636	51406	39441	37740	377,190
PE 35110F	SATELLITE CONTROL NET	APPN 28	RDT&E - AF	1	58555	45205	54731	58105	56349	23531	23068	23001	37502	34494	414,541
PE 35110F	SATELLITE CONTROL NET	APPN 30	OPERATION AND MA	1	80630	69884	64535	61251	10010	15527	16179	13608	17311	17743	366,678
PE 35110F	SATELLITE CONTROL NET	APPN 32	MILITARY PERSONNI	1	8080	8274	8787	8735	9256	9392	9585	9898	10241	10619	92,867
PE 35130F	AFSCN OPERATIONS	APPN 16	OTHER PROCUREME	1	0	483	0	20	0	0	0	0	0	0	503
PE 35130F	AFSCN OPERATIONS	APPN 30	OPERATION AND MA	1	129532	125418	121905	147404	209604	176379	188114	198902	205017	214171	1,716,446
PE 35130F	AFSCN OPERATIONS	APPN 32	MILITARY PERSONNI	1	48767	47969	53436	37213	18562	19653	20193	20735	21575	22328	310,431
PE 35151F	SATELLITE CONTROL NET	APPN 30	OPERATION AND MA	1	15818	22326	19638	19862	33544	33944	35623	36635	38673	34475	290,538
PE 35151F	SATELLITE CONTROL NET	APPN 32	MILITARY PERSONNI	1	12451	9304	7158	8685	12177	12871	13267	13585	14176	14656	118,330
PE 35173F	SPACE & MISSILE TEST &	APPN 16	OTHER PROCUREME	1	0	175	190	200	234	234	239	244	249	255	2,020
PE 35173F	SPACE & MISSILE TEST &	APPN 30	OPERATION AND MA	1	19192	17633	17605	20088	22390	20719	19312	19087	20610	20404	197,038
PE 35173F	SPACE & MISSILE TEST &	APPN 32	MILITARY PERSONNI	1	3265	3357	3586	3610	4063	4289	4394	4523	4695	4862	40,644
PE 35181F	WESTERN SPACELIFT RAI	APPN 16	OTHER PROCUREME	1	24743	27133	0	0	0	0	0	0	0	0	51,876
PE 35181F	WESTERN SPACELIFT RAI	APPN 24	MILITARY CONSTRU	1	26876	0	0	0	0	0	0	0	0	0	26,876
PE 35181F	WESTERN SPACELIFT RAI	APPN 30	OPERATION AND MA	1	67452	67363	64862	71101	77026	80272	84336	89528	93694	95720	791,354
PE 35181F	WESTERN SPACELIFT RAI	APPN 32	MILITARY PERSONNI	1	17954	19982	21580	21278	23955	25520	26315	26936	28116	29067	240,683
PE 35182F	SPACELIFT RANGE SYSTE	APPN 16	OTHER PROCUREME	1	54143	71665	90586	94049	135064	118537	134808	150210	171482	170829	1,191,373
PE 35182F	SPACELIFT RANGE SYSTE	APPN 28	RDT&E - AF	1	35522	27578	48303	84373	65097	74898	69924	66628	72430	72520	617,273
PE 35182F	SPACELIFT RANGE SYSTE	APPN 30	OPERATION AND MA	1	164169	153809	165408	185959	198726	183132	191056	200810	211129	212781	1,866,979
PE 35182F	SPACELIFT RANGE SYSTE	APPN 32	MILITARY PERSONNI	1	8606	9015	9794	10132	11203	11913	12207	12564	13043	13509	112,186
PE 35904F	SPACE DEF INTERFACE N	APPN 30	OPERATION AND MA	1	203	401	370	629	653	634	667	679	707	717	5,660
PE 35904F	SPACE DEF INTERFACE N	APPN 32	MILITARY PERSONNI	1	245	254	154	0	0	0	0	0	0	0	653
PE 35910F	SPACETRACK(SPACE)	APPN 16	OTHER PROCUREME	1	7489	2259	2632	9191	8812	3046	317	27	0	0	33,773
PE 35910F	SPACETRACK(SPACE)	APPN 28	RDT&E - AF	1	37977	42330	58170	2529	32591	6494	9321	18410	21457	107406	336,685
PE 35910F	SPACETRACK(SPACE)	APPN 30	OPERATION AND MA	1	41950	49412	48891	53670	65774	58715	61951	65970	63118	64777	574,228
PE 35910F	SPACETRACK(SPACE)	APPN 32	MILITARY PERSONNI	1	8450	8760	9341	10240	13285	15234	15660	16071	16732	17314	131,087
PE 35998F	MGT HEADQUARTERS - SI	APPN 30	OPERATION AND MA	1	23109	27558	30343	25185	28928	31262	32469	33510	35496	36532	304,392
PE 35998F	MGT HEADQUARTERS - SI	APPN 32	MILITARY PERSONNI	1	41343	41683	43377	48364	52997	56416	58222	60005	62204	64458	529,049
	Subtotal - Ground Support				**968,192**	**922,676**	**973,320**	**1,020,031**	**1,121,601**	**1,037,223**	**1,078,863**	**1,132,972**	**1,199,098**	**1,297,377**	**10,741,383**
LAUNCH															

						SPACE-RELATED FUNDING									
	AS OF DATE: 07/05/01					AF SPACE BUDGET - FY02 PB									
PE #	PROGRAM TITLE		APPN	Factor	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY98-07
PE 35119F	MEDIUM LAUNCH VEHICLE	APPN 14	MISSILE PROCUREM	1	195550	172268	60590	42685	42355	47059	42267	37245	31183	0	671,202
PE 35119F	MEDIUM LAUNCH VEHICLE	APPN 28	RDT&E - AF	1	1999	3195	0	0	0	0	0	0	0	0	5,194
PE 35119F	MEDIUM LAUNCH VEHICLE	APPN 30	OPERATION AND MA	1	24415	29925	31641	34397	32117	30720	20588	17581	20958	18693	261,035
PE 35119F	MEDIUM LAUNCH VEHICLE	APPN 32	MILITARY PERSONN	1	5970	6093	6542	6621	9145	11635	11902	12265	12719	13178	96,070
PE 35138F	INERT UPPER STAGE (IUS	APPN 14	MISSILE PROCUREM	1	35222	42962	0	0	0	0	0	0	0	0	78,184
PE 35138F	INERT UPPER STAGE (IUS	APPN 28	RDT&E - AF	1	10	551	0	0	0	0	0	0	0	0	561
PE 35138F	INERT UPPER STAGE (IUS	APPN 30	OPERATION AND MA	1	4321	4363	4208	0	0	0	0	0	0	0	12,892
PE 35144F	TITAN SPACE LAUNCH VE	APPN 14	MISSILE PROCUREM	1	418110	535612	399434	406047	385298	237121	7988	6856	0	0	2,396,466
PE 35144F	TITAN SPACE LAUNCH VE	APPN 28	RDT&E - AF	1	62401	67814	30824	25578	21293	0	0	0	0	0	207,910
PE 35144F	TITAN SPACE LAUNCH VE	APPN 30	OPERATION AND MA	1	64005	72220	65321	78515	85239	65864	1611	1670	1753	1914	438,112
PE 35144F	TITAN SPACE LAUNCH VE	APPN 32	MILITARY PERSONN	1	9252	9273	9212	8861	9737	10290	10558	10853	11281	11678	100,995
PE 35171F	SPACE SHUTTLE OPERAT	APPN 30	OPERATION AND MA	1	1508	1327	1535	1503	1578	1599	1651	1691	1790	1826	16,008
PE 35171F	SPACE SHUTTLE OPERAT	APPN 32	MILITARY PERSONN	1	2162	2052	2064	2056	2281	2392	2444	2522	2610	2707	23,290
PE 35953F	EVOLVED EXPENDABLE L	APPN 14	MISSILE PROCUREM	1	0	0	68127	280397	98007	569081	358791	657453	812078	706887	3,550,821
PE 35953F	EVOLVED EXPENDABLE L	APPN 30	OPERATION AND MA	1	0	0	6309	9442	28576	29034	42665	54012	56182	57003	283,223
PE 63853F	EELV D/V (SPACE)	APPN 28	RDT&E - AF	1	63904	0	0	0	0	0	0	0	0	0	63,904
PE 64853F	EVOLVED EXP LAUNCH VE	APPN 28	RDT&E - AF	1	23252	241973	321969	329897	320321	39862	0	0	0	0	1,277,274
PE 65860F	RSLP (SPACE)	APPN 28	RDT&E - AF	1	26163	14447	7288	7834	8538	8186	8355	8530	9132	9554	108,027
	Subtotal - Launch				**938,244**	**1,204,076**	**1,015,064**	**1,233,833**	**1,044,485**	**1,052,843**	**508,820**	**810,678**	**959,686**	**823,440**	**9,591,168**
METEOROLOGY															
PE 35160F	DEF METEOROLOGICAL S	APPN 14	MISSILE PROCUREM	1	35183	40607	39694	67952	47580	62058	52235	52576	47610	48359	493,854
PE 35160F	DEF METEOROLOGICAL S	APPN 16	OTHER PROCUREME	1	11722	12215	1991	0	0	0	0	0	0	0	25,928
PE 35160F	DEF METEOROLOGICAL S	APPN 28	RDT&E - AF	1	12284	19971	20339	25139	12259	7892	8716	7843	7974	8997	131,414
PE 35160F	DEF METEOROLOGICAL S	APPN 30	OPERATION AND MA	1	13909	16260	15542	8197	9212	8876	9326	9516	9952	10084	110,874
PE 35160F	DEF METEOROLOGICAL S	APPN 32	MILITARY PERSONN	1	10904	6723	2942	2988	3217	3330	3404	3510	3637	3770	44,425
PE 35162F	DEF METEOROLOG SAT P	APPN 30	OPERATION AND MA	1	2753	2470	2077	2125	2168	2024	2132	2173	2399	2432	22,753
PE 35178F	NATL POLAR-ORBITING O	APPN 14	MISSILE PROCUREM	1	0	0	0	0	0	0	0	33984	0	167230	201,214
PE 63434F	NPOESS (SPACE)	APPN 28	RDT&E - AF	1	31221	61967	56380	75950	157394	238038	308784	261918	242803	163995	1,598,450
	Subtotal - Meteorology				**117,976**	**160,213**	**138,965**	**182,351**	**231,830**	**322,218**	**384,597**	**371,520**	**314,375**	**404,867**	**2,628,912**
SCIENCE AND TECHNOLOGY															
PE 62601F	SPACE TECHNOLOGY	APPN 28	RDT&E - AF	1	112939	122404	141083	68850	61086	56479	62222	69153	71107	73263	836,586
PE 62601F	SPACE TECHNOLOGY	APPN 32	MILITARY PERSONN	1	30216	30180	31712	30013	22324	14636	15058	15486	16137	16784	222,746
PE 63302F	SPACE & MSL ROCKET PR	APPN 28	RDT&E - AF	1	15398	21946	16097	27776	0	0	0	0	0	0	81,217

						SPACE-RELATED FUNDING									
	AS OF DATE: 07/05/01					AF SPACE BUDGET - FY02 PB									
PE #	PROGRAM TITLE		APPN	Factor	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY98-07
PE 63401F	ADVANCED SPACECRAFT	APPN 28	RDT&E - AF	1	91754	57557	102511	63019	54528	50373	54115	55254	63021	64352	656,484
PE 63402F	SPACE TEST PROGRAM (S	APPN 28	RDT&E - AF	1	35841	0	0	0	0	0	0	0	0	0	35,841
PE 63410F	SPACE SYS ENVIRON INT	APPN 28	RDT&E - AF	1	2819	3215	3312	3381	0	0	0	0	0	0	12,727
PE 63438F	SPACE CONTROL TECHN	APPN 28	RDT&E - AF	1	0	7212	12258	7897	33022	9764	9753	9742	9946	10156	109,750
PE 63444F	MAUI SPACE SURVEILLAN	APPN 28	RDT&E - AF	1	0	0	0	19445	6484	6488	6491	6492	6592	6695	58,687
PE 63605F	ADVANCED WEAPONS TE	APPN 28	RDT&E - AF	0.4	20,701	20,576	20,934	17,189	17,503	15,098	16,784	18,298	18,682	19,077	184,842
PE 65864F	SPACE TEST PROGRAM	APPN 28	RDT&E - AF	1	0	40264	44769	46050	50523	54663	54247	55881	57018	58229	461,664
	Subtotal - Science and Technology				**309,868**	**303,374**	**372,676**	**283,620**	**245,470**	**207,701**	**218,670**	**230,306**	**242,503**	**248,556**	**2,662,544**
TACTICAL WARNING/ATTACK ASSESSMENT															
PE 35902F	BALLISTIC MSL TAC WNG/	APPN 30	OPERATION AND MA	1	3870	3639	3876	4418	4630	4474	4666	4715	4965	4987	44,440
PE 35902F	BALLISTIC MSL TAC WNG/	APPN 32	MILITARY PERSONNI	1	396	162	0	0	0	0	0	0	0	0	558
PE 35905F	SPACE SYSTEM SUPPORT	APPN 30	OPERATION AND MA	1	2171	3510	3130	2360	2216	2376	2362	2291	2610	2471	25,497
PE 35906F	NCMC-TW/AA SYSTEMS	APPN 16	OTHER PROCUREME	1	8758	12380	12203	17147	27734	14569	14885	15171	15472	15817	154,136
PE 35906F	NCMC-TW/AA SYSTEMS	APPN 28	RDT&E - AF	1	6678	17498	13566	19132	15797	15694	18159	18225	18585	18979	162,313
PE 35906F	NCMC-TW/AA SYSTEMS	APPN 30	OPERATION AND MA	1	94920	84319	59860	80421	93944	91599	94211	76364	80206	81952	837,796
PE 35906F	NCMC-TW/AA SYSTEMS	APPN 32	MILITARY PERSONNI	1	38804	40316	40878	31080	25340	26576	26997	27737	28845	29857	316,430
PE 35908F	TW/AA INTERFACE NETW	APPN 16	OTHER PROCUREME	1	258	443	489	597	605	673	687	701	727	744	5,924
PE 35908F	TW/AA INTERFACE NETW	APPN 30	OPERATION AND MA	1	5651	6815	5583	3059	3054	2953	3108	3168	3471	3487	40,349
PE 35908F	TW/AA INTERFACE NETW	APPN 32	MILITARY PERSONNI	1	69	72	77	79	44	0	0	0	0	54	395
PE 35909F	BALLISTIC MSL EARLY WN	APPN 16	OTHER PROCUREME	1	10283	21684	21130	13886	23471	19766	4115	0	0	0	114,335
PE 35909F	BALLISTIC MSL EARLY WN	APPN 24	MILITARY CONSTRU	1	46784	0	0	0	0	0	0	0	0	0	46,784
PE 35909F	BALLISTIC MSL EARLY WN	APPN 30	OPERATION AND MA	1	70880	70168	79899	54422	82096	44637	47914	50781	52839	53642	607,278
PE 35909F	BALLISTIC MSL EARLY WN	APPN 32	MILITARY PERSONNI	1	6174	6566	7017	6756	7188	7657	7894	8082	8436	8721	74,491
PE 35911F	DEFENSE SUPPORT PROG	APPN 14	MISSILE PROCUREM	1	65805	86964	100469	105380	112456	99309	30338	35725	34009	34867	725,322
PE 35911F	DEFENSE SUPPORT PROG	APPN 16	OTHER PROCUREME	1	181	202	14	6	0	0	0	0	0	0	403
PE 35911F	DEFENSE SUPPORT PROG	APPN 28	RDT&E - AF	1	17624	13966	7708	9374	6363	6639	0	0	0	0	61,674
PE 35911F	DEFENSE SUPPORT PROG	APPN 30	OPERATION AND MA	1	45935	48312	53278	47454	65157	23898	21442	23372	24264	24635	377,747
PE 35911F	DEFENSE SUPPORT PROG	APPN 32	MILITARY PERSONNI	1	37262	37991	21809	2045	272	289	299	306	319	330	100,922
PE 35912F	SLBM RADAR WARNING S	APPN 16	OTHER PROCUREME	1	3174	223	127	11668	15229	4102	3785	3859	4100	4208	50,475
PE 35912F	SLBM RADAR WARNING S	APPN 30	OPERATION AND MA	1	24714	26288	23329	22728	35008	22396	26473	28195	29481	29901	268,513
PE 35912F	SLBM RADAR WARNING S	APPN 32	MILITARY PERSONNI	1	12027	12334	13483	14048	15297	16245	16717	17141	17861	18474	153,627
PE 35913F	NUDET DETECTION SYST	APPN 14	MISSILE PROCUREM	1	954	2780	1470	1465	0	0	0	0	0	0	6,669
PE 35913F	NUDET DETECTION SYST	APPN 16	OTHER PROCUREME	1	7792	1265	3454	2649	8470	7990	12735	11946	12412	12748	81,461
PE 35913F	NUDET DETECTION SYST	APPN 28	RDT&E - AF	1	12878	12745	13497	11977	18823	20002	24878	23406	24413	25166	187,785
PE 35913F	NUDET DETECTION SYST	APPN 30	OPERATION AND MA	1	5067	5355	6694	7880	9437	8238	8078	8958	9317	9455	78,479
PE 35913F	NUDET DETECTION SYST	APPN 32	MILITARY PERSONNI	1	1499	1547	1647	1681	1861	1980	2040	2088	2180	2255	18,778
PE 35915F	SPACE-BASED INFRARED	APPN 14	MISSILE PROCUREM	1	0	0	0	0	93752	481020	0	6968	15652	17262	614,654

						SPACE-RELATED FUNDING									
	AS OF DATE: 07/05/01					AF SPACE BUDGET - FY02 PB									
PE #	PROGRAM TITLE		APPN	Factor	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY98-07
PE 35915F	SPACE-BASED INFRARED	APPN 16	OTHER PROCUREME	1	0	0	0	0	54347	0	0	0	0	0	54,347
PE 35915F	SPACE-BASED INFRARED	APPN 30	OPERATION AND MA	1	10387	17019	23569	55261	54343	60009	68537	69671	72487	73258	504,541
PE 35915F	SPACE-BASED INFRARED	APPN 32	MILITARY PERSONNI	1	1165	4662	25945	41462	41333	43993	45366	48543	48583	50225	349,277
PE 38699F	SHARED EARLY WARNING	APPN 16	OTHER PROCUREME	1	0	0	0	0	200	1700	200	300	1600	300	4,300
PE 38699F	SHARED EARLY WARNING	APPN 28	RDT&E - AF	1	0	0	11113	4180	3697	4041	3343	3450	3521	3581	36,926
PE 38699F	SHARED EARLY WARNING	APPN 30	OPERATION AND MA	1	0	0	0	0	7979	8224	8362	8760	8855	9327	51,507
PE 63441F	SPACE-BASED IR ARCHI(S	APPN 28	RDT&E - AF	1	210016	144898	0	0	0	0	0	0	0	0	354,914
PE 63876F	SPACE-BASED LASER	APPN 28	RDT&E - AF	1	0	32550	68926	72544	371	425	490	561	1331	2217	179,415
PE 64251F	SPACE-BASED RADAR EM	APPN 28	RDT&E - AF	1	0	0	0	0	50000	0	0	0	0	0	50,000
PE 64441F	SPACE BASED IR SYS(SBI	APPN 24	MILITARY CONSTRU	1	14000	0	0	2750	19000	6900	0	0	0	0	42,650
PE 64441F	SPACE BASED IR SYS(SBI	APPN 28	RDT&E - AF	1	337858	507554	400348	563967	405229	334753	270531	197390	246625	228855	3,493,110
PE 64442F	SPACE BASED INFRARED	APPN 28	RDT&E - AF	1	0	36601	218088	238810	0	0	0	0	0	0	493,499
	Subtotal - Tactical Warning/Attack Assessmet				1,124,034	1,261,028	1,242,676	1,450,586	1,304,743	1,383,127	768,812	695,874	773,166	767,775	10,771,721
GENERAL SUPPORT															
PE 13122F	SERVICE SPT TO NORAD /	APPN 30	OPERATION AND MA	1	549	550	1003	1145	1011	1033	1049	1067	1127	1142	9,676
PE 13122F	SERVICE SPT TO NORAD /	APPN 32	MILITARY PERSONNI	1	4432	4639	4905	4994	5387	5543	5636	5795	6022	6234	53,587
PE 13190F	SERVICE SPT TO COMBAT	APPN 30	OPERATION AND MA	1	0	0	0	990	1046	1091	1138	1191	1246	1306	8,008
PE 13190F	SERVICE SPT TO COMBAT	APPN 32	MILITARY PERSONNI	1	0	0	3656	3715	8113	8526	8720	8988	9316	9654	60,688
PE 13198F	MGMT HQ (U.S. ELEMENT	APPN 30	OPERATION AND MA	1	3138	2611	2917	4814	3106	3066	3027	2803	3199	3004	31,685
PE 13198F	MGMT HQ (U.S. ELEMENT	APPN 32	MILITARY PERSONNI	1	5938	5888	3086	3088	0	0	0	0	0	0	18,000
PE 13298F	MGMT HQ (U.S. SPACE CO	APPN 32	MILITARY PERSONNI	1	79	0	0	0	0	0	0	0	0	0	79
PE 15690F	SERVICE SPT COMBATAN	APPN 16	OTHER PROCUREME	1	0	0	0	0	16017	1510	0	0	0	0	17,527
PE 15690F	SERVICE SPT COMBATAN	APPN 30	OPERATION AND MA	1	0	0	0	5616	12714	13570	13284	13866	14465	14932	88,447
PE 15690F	SERVICE SPT COMBATAN	APPN 32	MILITARY PERSONNI	1	0	0	5751	5880	12420	12405	12479	12865	13334	13817	88,951
PE 15921F	SERVICE SPT TO SPACEC	APPN 30	OPERATION AND MA	1	0	0	0	1519	3683	6307	6581	7010	7341	7685	40,126
PE 15921F	SERVICE SPT TO SPACEC	APPN 32	MILITARY PERSONNI	1	0	0	4041	8306	10173	11650	11928	12285	12745	13202	84,330
PE 27247F	AIR FORCE TENCAP	APPN 16	OTHER PROCUREME	1	143	190	192	195	198	197	201	205	209	213	1,943
PE 27247F	AIR FORCE TENCAP	APPN 28	RDT&E - AF	1	13485	5992	14704	13699	10811	10534	10751	10975	11200	11437	113,588
PE 27247F	AIR FORCE TENCAP	APPN 30	OPERATION AND MA	1	6664	5526	6980	7752	12161	7961	8372	8556	8908	9066	81,946
PE 27247F	AIR FORCE TENCAP	APPN 32	MILITARY PERSONNI	1	3991	3810	4826	5870	4446	2746	2802	2893	2993	3104	37,481
PE 33185F	SERVICE SPT GLOBAL CM	APPN 30	OPERATION AND MA	1	0	0	0	122	130	135	141	147	154	161	990
PE 33185F	SERVICE SPT GLOBAL CM	APPN 32	MILITARY PERSONNI	1	0	0	201	325	317	337	299	306	319	330	2,434
PE 35159F	DEFENSE RECONN SUPP(	APPN 16	OTHER PROCUREME	1	0	0	7827	8902	6829	6739	14651	14966	15266	15602	90,782
PE 35159F	DEFENSE RECONN SUPP(	APPN 28	RDT&E - AF	1	0	0	36491	41218	46578	42176	46029	46933	47925	48938	356,290
PE 35174F	SPACE WARFARE CENTEF	APPN 16	OTHER PROCUREME	1	679	1247	770	774	778	756	773	788	804	822	8,191
PE 35174F	SPACE WARFARE CENTEF	APPN 30	OPERATION AND MA	1	16882	19082	19302	19036	24136	16999	17516	17613	18978	18923	188,467
PE 35174F	SPACE WARFARE CENTEF	APPN 32	MILITARY PERSONNI	1	10793	12950	15133	15459	17078	17873	18299	18845	19551	20255	166,236

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					SPACE-RELATED FUNDING										
	AS OF DATE: 07/05/01				AF SPACE BUDGET - FY02 PB										
PE #	PROGRAM TITLE		APPN	Factor	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY98-07
PE 35698F	MANAGEMENT HQ, U.S. SI	APPN 16	OTHER PROCUREME	1	0	0	7346	12512	0	0	0	0	0	0	19,858
PE 35698F	MANAGEMENT HQ, U.S. SI	APPN 24	MILITARY CONSTRU	1	0	0	33000	6826	0	0	0	0	0	0	39,826
PE 35698F	MANAGEMENT HQ, U.S. SI	APPN 30	OPERATION AND MA	1	9454	9831	11226	13215	12180	8889	8576	8072	9533	8773	99,749
PE 35698F	MANAGEMENT HQ, U.S. SI	APPN 32	MILITARY PERSONNI	1	10648	10726	5614	3965	0	0	0	0	0	0	30,953
PE 35890F	VISUAL INFO ACTIVITIES-S	APPN 16	OTHER PROCUREME	1	3077	3162	3175	1897	3275	3281	3355	3421	3489	3566	31,698
PE 35890F	VISUAL INFO ACTIVITIES-S	APPN 30	OPERATION AND MA	1	5822	5189	4776	8703	9552	9758	10554	11170	11622	12032	89,178
PE 35890F	VISUAL INFO ACTIVITIES-S	APPN 32	MILITARY PERSONNI	1	5398	5453	4284	3534	4922	5134	4674	4270	4471	4617	46,737
PE 35893F	DEMOLITION/DISP EXCES	APPN 30	OPERATION AND MA	1	677	1195	1091	1435	2354	1748	497	0	0	0	8,997
PE 35896F	BASE OPERATIONS-OTHE	APPN 16	OTHER PROCUREME	1	850	500	477	1177	1638	467	478	487	497	508	7,079
PE 35896F	BASE OPERATIONS-OTHE	APPN 30	OPERATION AND MA	1	107416	100665	95866	128958	151754	154332	159989	156440	159029	160773	1,375,222
PE 35896F	BASE OPERATIONS-OTHE	APPN 32	MILITARY PERSONNI	1	71117	69505	67417	59998	66195	72562	74941	76659	79860	82311	720,565
PE 35907F	SPACE SYSTEMS TRAININ	APPN 30	OPERATION AND MA	1	1815	1606	1559	0	0	0	0	0	0	0	4,980
PE 35914F	ENGINEERING INST SUPT-	APPN 16	OTHER PROCUREME	1	0	0	0	119	796	665	767	859	877	896	4,979
PE 35914F	ENGINEERING INST SUPT-	APPN 30	OPERATION AND MA	1	0	6099	2854	4390	4603	4356	4534	4598	4788	4858	41,080
PE 35917F	SPACE ARCHITECT	APPN 28	RDT&E - AF	1	13408	12873	10696	0	0	0	0	0	0	0	36,977
PE 35917F	SPACE ARCHITECT	APPN 30	OPERATION AND MA	1	0	0	420	530	559	584	610	637	667	698	4,705
PE 35917F	SPACE ARCHITECT	APPN 32	MILITARY PERSONNI	1	544	999	1071	1086	1185	1243	1271	1311	1358	1407	11,475
PE 35921F	SPACE COMM COMBAT OI	APPN 30	OPERATION AND MA	1	4121	4358	7285	8914	18335	15192	16096	15620	16547	16539	123,007
PE 35921F	SPACE COMM COMBAT OI	APPN 32	MILITARY PERSONNI	1	7175	7082	3829	0	0	0	0	0	0	0	18,086
PE 35925F	OPERATIONAL HQ - SPACI	APPN 30	OPERATION AND MA	1	5430	4326	4211	6038	5855	5945	6362	6610	6903	6989	58,669
PE 35925F	OPERATIONAL HQ - SPACI	APPN 32	MILITARY PERSONNI	1	8867	7112	5068	6823	9796	10329	10615	10899	11342	11738	92,589
PE 35935F	SPACE CONTROL	APPN 30	OPERATION AND MA	1	0	0	0	0	20050	0	0	0	0	0	20,050
PE 35996F	BASE OPERATIONS - SPAC	APPN 24	MILITARY CONSTRU	1	46135	27001	49150	61429	45200	12800	37820	59498	0	0	339,033
PE 53116F	SPACE/SURVEILLANCE OI	APPN 55	OPERATION AND MA	1	7635	9017	8647	11523	14504	14826	15371	13633	14081	14655	123,892
PE 53116F	SPACE/SURVEILLANCE OI	APPN 56	NATIONAL GUARD PI	1	4208	4838	8264	12505	12959	12365	12620	13124	13630	14137	108,650
PE 53121F	SPACE SQUADRON - AFR	APPN 50	RESERVE PERSONN	1	2162	3307	4199	8595	12110	12762	12265	12679	13265	13674	95,018
PE 53121F	SPACE SQUADRON - AFR	APPN 52	OPERATION AND MA	1	406	748	799	801	721	733	753	772	797	817	7,347
PE 63856F	AIR FORCE/NAT PGM COO	APPN 28	RDT&E - AF	1	0	16900	0	2348	4433	8860	3348	0	1865	1904	39,658
PE 63856F	AIR FORCE/NAT PGM COO	APPN 32	MILITARY PERSONNI	1	0	0	174	352	383	401	409	422	437	453	3,031
PE 84735F	UNDERGRADUATE SPACE	APPN 24	MILITARY CONSTRU	1	0	9209	0	0	0	0	0	0	0	0	9,209
PE 84735F	UNDERGRADUATE SPACE	APPN 30	OPERATION AND MA	1	3933	3288	3638	7888	7777	7874	8203	8435	8847	9087	68,970
PE 84735F	UNDERGRADUATE SPACE	APPN 32	MILITARY PERSONNI	1	30471	32579	35028	35362	41553	44017	45088	46417	48172	49898	408,583
	Subtotal - General Support				**417,542**	**420,053**	**612,927**	**664,342**	**649,821**	**580,279**	**622,872**	**644,130**	**607,179**	**620,167**	**5,639,302**
	All Space Missions Total (U)				**6,220,826**	**6,432,872**	**5,325,581**	**6,257,901**	**6,859,627**	**6,851,188**	**5,476,828**	**5,907,904**	**5,886,972**	**6,247,082**	**59,466,761**

APPENDIX G

AWARDS

AWARD TITLE	TITLE CATEGORY	DATES	NAME	ORGANIZATION
SMC Quarterly Award Winners	Senior Company Grade Officer	Oct - Dec 1997	Capt Ann Wong-Jiru	
SMC Quarterly Award Winners	Junior Company Grade Officer	Oct - Dec 1997	1st Lt Richard A. Contreras	
SMC Quarterly Award Winners	Senior Noncommisssioned Officer	Oct - Dec 1997	Sr Master Sgt Andrew Shigg Jr.	61 Communications Squadron
SMC Quarterly Award Winners	Noncommissioned Officer	Oct - Dec 1997	Staff Sgt Warren G. Conrow	
SMC Quarterly Award Winners	Airman	Oct - Dec 1997	Senior Airman James G. Suggs Jr.	
SMC Quarterly Award Winners	Senior-level Civilian	Oct - Dec 1997	Chau M. Phan	
SMC Quarterly Award Winners	Mid-level Civilian	Oct - Dec 1997	Anita C. Ferber	
SMC Quarterly Award Winners	Junior-level Civilian	Oct - Dec 1997	Willie May	
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Linda Drum	SMC/AX
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Sunila Narain	SMC/CI
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Gregg Kraver	Det 8
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Jane Dziedzic	SMC/MC
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Chau M. Phan	SMC/MT
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Anita Hadorn	SMC/TE
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Ramesh Chaubey	SMC/XR
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	Oct - Dec 1997	Timothy Bellings	61 CS
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Budget Analyst of the Quarter	Oct - Dec 1997	Thomas Moss	SMC/TM
SMC Senior Civilian Advisory Group Civilian Award Winners	Notable Achievement	Oct - Dec 1997	Tony Riccio	SMC/FM
SMC Senior Civilian Advisory Group Civilian Award Winners	Notable Achievement	Oct - Dec 1997	Irma Torres	SMC/FM

SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	Oct - Dec 1997	Alie Rodriquez	Det 8
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	Oct - Dec 1997	Ken Bernard	SMC/CZ
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	Oct - Dec 1997	Noami Dejesa	SMC/MC
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	Oct - Dec 1997	Susan Seute	SMC/MT
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	Oct - Dec 1997	Audrey Campbell	SMC/PK
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	Oct - Dec 1997	Nancy Lingo	SMC/TE
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	Oct - Dec 1997	Sylvia Montemayor	61 CS
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Lavivian Robinson	SMC/CL
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Robin Warren	SMC/CW
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Judy Bantz	SMC/CZ
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Dorothy Mehta	SMC/MC
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Barbara Wilkerson	SMC/MT
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Theresa Contreras	SMC/PK
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Vanessa Aragon	SMC/TE
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	Oct - Dec 1997	Michael Rappaport	SMC/XR
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	David Graham	SMC/AX
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	Bill Trombetta	SMC/CI
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	Gregg Kraver	SMC/CL
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	Warren Carlson	SMC/CZ

SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	Kathy Higgins	SMC/MC
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	Kim Vu	SMC/MT
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	Sallie Grubbs	SMC/PK
SMC Senior Civilian Advisory Group Civilian Award Winners	Senior Level	FY 1997	Anita Hadorn	SMC/TE
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	Carlos Rodrigues	SMC/CI
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	David Eaton	Det 8
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	Nancy Andrews	SMC/CW
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	Majonka Carbajal	SMC/CZ
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	John Hamilton	SMC/MC
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	Serefino Silva	SMC/MT
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	Anita Ferber	SMC/PK
SMC Senior Civilian Advisory Group Civilian Award Winners	Mid Level	FY 1997	Nancy Lingo	SMC/TE
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Susan Bretherton	SMC/AX
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Ann Fujii	SMC/CI
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Lakisha Jefferson	SMC/CL
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Dena Houston	SMC/CW
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Clair Garcia	SMC/CZ
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Yvette Rico	SMC/MC
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Phuc Murphy	SMC/MT

SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Yolanda Spears	SMC/MV
SMC Senior Civilian Advisory Group Civilian Award Winners	Junior Level	FY 1997	Allison Flanagan	SMC/PK
Air Force Association Award Winners	General Bernard A. Schriever Award	FY 1997	Rocket Systems Launch Programs	RSLP/Kirtland AFB
SMC Annual Award Winners	Senior Company Grade Officer	FY 1997	Capt Steven P. Whitney	SBIRS Program Office
SMC Annual Award Winners	Junior Company Grade Officer	FY 1997	1st Lt Woodrow Am Meeks	Advanced Systems Directorate
SMC Annual Award Winners	Senior Noncommisssioned Officer	FY 1997	Sr Master Sgt Andrew Shigg Jr.	61 Communications Squadron
SMC Annual Award Winners	Senior Noncommisssioned Officer	FY 1997	Master Sgt Ronnie D. Blankinship	VAFB, Det 9
SMC Annual Award Winners	Noncommissioned Officer	FY 1997	Staff Sgt Angela D. Smith	Comptrollers Office
SMC Annual Award Winners	Noncommissioned Officer	FY 1997	Staff Sgt Edward A. Hayes	VAFB, Det 9
SMC Annual Award Winners	Airman	FY 1997	Sr Airman Barbara J. Baker	Advanced Systems Directorate
SMC Annual Award Winners	Senior-level Civilian	FY 1997	Warren A. Carlson	NAVSTAR GPS Program Office
SMC Annual Award Winners	Mid-level Civilian	FY 1997	Carlos Rodrigues	DMSP Program Office
SMC Annual Award Winners	Junior-level Civilian	FY 1997	Anna R. Fuji	DMSP Program Office
JPO People's Choice Award		FY 1997	Darrel Weaver	SMC/CZ
AFMC Social Actions Chief of the Year		FY 1997	Capt Lisa A. Day	61 ABG
AFMS Social Actions Technician of the Year		FY 1997	Staff Sgt Ramona David	61 ABG
SMC Senior Noncommissioned Officer Security Forces of the Year		FY 1997	Master Sgt George A. Johnson	61 ABG

SMC Noncommissioned Officer Security Forces of the Year		FY 1997	TSgt James H. Luellen	61 ABG
AFMC Communication and Information Professionalism Award		FY 1997	Capt Darrell J. Clark	61 ABG
AFMC Outstanding Communication Computer Systems Managers of the Year		FY 1997	SMSgt Andrew Shigg	61 ABG
AFMC Outstanding Communication Computer Systems Managers of the Year		FY 1997	TSgt Luis Gomes	61 ABG
AFMC Visual Information Manager of the Year		FY 1997	Sr Airman Jefrey Clapper	61 ABG
AFMC Commitment to Service		FY 1997	Lt Col Gregory L. Parish	61 MSS
AFMC Field Grade Nurse of the Year		FY 1997	Lt Col Jane E. Cozier	61 MSS
AFMC Outstanding Dental Junior Officer of the Year		FY 1997	Maj Roy C. Marlow	61 MSS
AFMC Outstanding Dental NCO of the Year		FY 1997	SSgt Stephania A. Gilkey	61 MSS
AFMC Bioenvironmental Engineering Outstanding Technician of the Year		FY 1997	Sgt Brian P. Whitehouse	61 MSS
AFMC Outstanding Production, Manufacturing and Quality Assurance Award		FY 1997	Lyn K. Lecompte	Acquisition Directorate
Air Force Achievement Award		FY 1997	Tech Sgt Gerald D. Jones	61 ABG
Air Force Achievement Award		FY 1997	Tech Sgt Terry Q. Sulton	61 ABG
Air Force Achievement Award		FY 1997	Staff Sgt William House	61 ABG
Air Force Achievement Award		FY 1997	Staff Sgt Barry J. Kennett	61 ABG
Air Force Achievement Award		FY 1997	Staff Sgt Ronnell B. Ramos	61 ABG
LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	Eric Shulman	SMC/AX
LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	Candice Gill	SMC/MC
LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	Teh-Fuh Oh	SMC/MT
LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	Ray Gallagher	SMC/PK
LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	Timothy H. Prescott	SMC/SC
LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	Geleta Smith	SMC/TE

LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	Hamed G. Khozaim	SMC/XR
LAAFB Civilian Quarterly Awards	Senior Level	Jan-Mar 1998	JoAnn M. White	SMC/CL
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Marco N. Rodriguez	SMC/AX
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Noreen M. Miles	SMC/CCP
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Patricia Mahoney	SMC/CI
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	John R. Peterson	SMC/CL
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Ernestine R. Reed	SMC/CZ
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	James Batchelor	SMC/MC
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Donia Keys	SMC/MT
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Inex Canady	SMC/TE
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Barbara A. Neal	SMC/XR
LAAFB Civilian Quarterly Awards	Mid Level	Jan-Mar 1998	Debra E. Thurnser	61 MDS
LAAFB Civilian Quarterly Awards	Junior Level	Jan-Mar 1998	Laverne Williams	SMC/CL
LAAFB Civilian Quarterly Awards	Junior Level	Jan-Mar 1998	Mary V. Davis	SMC/CZ
LAAFB Civilian Quarterly Awards	Junior Level	Jan-Mar 1998	Janice M. Nicol	SMC/DP
LAAFB Civilian Quarterly Awards	Junior Level	Jan-Mar 1998	Kathleen Miller	SMC/MC
LAAFB Civilian Quarterly Awards	Junior Level	Jan-Mar 1998	Pamela Johnson	SMC/PK
LAAFB Civilian Quarterly Awards	Junior Level	Jan-Mar 1998	Johathan Leibert	SMC/TE
LAAFB Civilian Quarterly Awards	Junior Level	Jan-Mar 1998	Stephanie C. Kidd	SMC/XR
LAAFB Civilian Quarterly Awards	Senior Company Grade Officer	Jan-Mar 1998	Capt Cheryl R. Farrer	
LAAFB Civilian Quarterly Awards	Junior Company Grade Officer	Jan-Mar 1998	1st Lt Thomas C. O'Malley	
LAAFB Civilian Quarterly Awards	Annual Volunteer Excellence Award	Jan-Mar 1998	Lin S. Jensen	SMC/PK
LAAFB Civilian Quarterly Awards	Distinguished Public Service Award	Jan-Mar 1998	Lin S. Jensen	SMC/PK
LAAFB Quarterly Awards	Senior Company Grade Officer	April-June 1998	Capt Mark A. Baird	SMC/ADE
LAAFB Quarterly Awards	Junior Company Grade Officer	April-June 1998	2nd Lt Katrina L. Compton	61 ABG/CEE
LAAFB Quarterly Awards	Senior Noncommisssioned Officer	April-June 1998	Master Sgt Brent Carter	SMC/XRS
LAAFB Quarterly Awards	Noncommissioned Officer	April-June 1998	Tech Sgt Oren K. Lizana	61 MDS/SGS
LAAFB Quarterly Awards	Airman	April-June 1998	Airman 1st Class Verna L. McQueeney	61 MDS/SGSAL
LAAFB Quarterly Awards	Airman	April-June 1998	Sr Airman John P. Mere	61 MSS/CCQ
LAAFB Quarterly Awards	Senior-level Civilian	April-June 1998	Bobbie J. Aikels	SMC/PKX
LAAFB Quarterly Awards	Mid-level Civilian	April-June 1998	Melissa a. Duong	SMC/MCK
LAAFB Quarterly Awards	Junior-level Civilian	April-June 1998	Olga L. Chachere	SMC/CIK

LAAFB Quarterly Awards	Senior Company Grade Officer	April-June 1998	Capt Mark A. Baird	SMC/ADE
LAAFB Quarterly Awards	Junior Company Grade Officer	April-June 1998	2nd Lt Katrina L. Campton	61 ABG/CEE
LAAFB Quarterly Awards	Senior Noncommisssioned Officer	April-June 1998	MSgt Brent Carter	SMC/XRS
LAAFB Quarterly Awards	Noncommissioned Officer	April-June 1998	TSgt Oren K. Lizana	61 MDS/SGS
LAAFB Quarterly Awards	Airman	April-June 1998	Airman 1st Class Verna L. McQueeney	61 MDS/SGSAL
LAAFB Quarterly Awards	Airman	April-June 1998	Senior Airman John P. Mere	61 MSSCCQ
LAAFB Quarterly Awards	Senior-level Civilian	April-June 1998	Bobbie J. Aikels	SMC/PKX
LAAFB Quarterly Awards	Mid-level Civilian	April-June 1998	Melissa A. Duong	SMC/MCK
LAAFB Quarterly Awards	Junior-level Civilian	April-June 1998	Olga L. Chachere	SMC/CIK
LAAFB Quarterly Awards	Honor Guard Member of the Quarter	Oct - Dec 1998	Capt Daniel McCutchon	SBIRS Program Office
LAAFB Quarterly Awards	Senior Company Grade Officer	Oct - Dec 1998	Capt Dawn M. Coley	61 MSS
LAAFB Quarterly Awards	Junior Company Grade Officer	Oct - Dec 1998	1st Lt Allan A. Carreiro	MILSATCOM Program Office
LAAFB Quarterly Awards	Senior Noncommisssioned Officer	Oct - Dec 1998	MSgt Stuart A. Gray	61 ABG
LAAFB Quarterly Awards	Noncommissioned Officer	Oct - Dec 1998	SSgt Frank J. Baldus Jr.	SMC/CC (NCOIC)
LAAFB Quarterly Awards	Airman	Oct - Dec 1998	Airman 1st Class Aaron M. Malek	
LAAFB Quarterly Awards	Mid-level Civilian	Oct - Dec 1998	Jean Williams	Contracting Directorate
LAAFB Quarterly Awards	Junior-level Civilian	Oct - Dec 1998	David Toler	Developmental Planning Directorate
LAAFB Quarterly Awards	Clerical-level Civilian	Oct - Dec 1998	Marla P. Jordan	GPS Joint Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Irma Gonzales	SMC/AX
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	William Trombetta	SMC/CI
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Steve Brennan	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Mary Quain	SMC/CW

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	John Ruggiero	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Judy Thiele	SMC/DP
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Milly Radakovich	SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	James Gill	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Loretta Umetsu	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Bobbie Aikels	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Maria Aurora Vigil	SMC/TE
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	April-June 1998	Donald Gasner	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Della Hinesley	SMC/AX
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Renee Stenborg	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Christine Suttles	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Melissa Duong	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Janice McFarland	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Judy Parnock	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Arlene Dudley	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Mary Kruelskie	SMC/TE
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Paula Provost	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Thomas Sanders	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	April-June 1998	Harold Robertson	61 ABG

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Susan Bretherton	SMC/AX
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Jones Kim	SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Lina Litonjua	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Yolanda Spears	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Olga Chachere	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Irene Hernandez	SMC/TE
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Donna Whitman	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Doreen Robinson	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Esperanza Connor	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	April-June 1998	Cheryl Scott	61 CS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	April-June 1998	Donna Picard	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Team of the Quarter	April-June 1998	Audrey Fox	Interest Penalty Payments IPT, SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Team of the Quarter	April-June 1998	Resa Fredericks	Interest Penalty Payments IPT, SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Team of the Quarter	April-June 1998	Robert Kato	Interest Penalty Payments IPT, SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Team of the Quarter	April-June 1998	Shenell Cooper	Interest Penalty Payments IPT, SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Team of the Quarter	April-June 1998	Dennis Hass	Interest Penalty Payments IPT, SMC/FM

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Team of the Quarter	April-June 1998	Deborah Taylor	Interest Penalty Payments IPT, SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Star Quality Award	April-June 1998	Daniel Rodriguez	SMC/MO
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Naomi DeJesa	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Priscilla Duernberger	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Jackie J. Farley	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Michel M. Guthrie	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Sharon M. Lolanowski	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Rafael M. Martinez	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Rosalinda McCormick	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Karen L. Ross	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Level	Jul-Sep 1998	Robert Wilson	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Marie Burden	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Linnea L. Burris	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Robert E. Donald	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Alice M. Johnson	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Nancy C. Lingo	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Dorothy Mehta	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Mary E. Proctoer	

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Aaron L. Renenger	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jul-Sep 1998	Marta E. Villa	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Bev Campbell	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Marlon O. Coronado	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Cara J. Elder	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Maria Garcia	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Ruby A. Hawkins	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Arminda Lewis	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Leffrey G. Moline	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jul-Sep 1998	Chrishon Tiffith	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Robert M. Cappasola	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Catherine c. Dozier	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Cheryl R. Johnson	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Jan R. Krueger	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Fred H Lyles	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Margarite McDermott	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Cal M. Morioka	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Mark D. Schubert	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Marianne F. Traylor	

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Tom K. Watson	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Notable Achievement Award	Jul-Sep 1998	Femnelia D. Wilson	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Special Act Award	Jul-Sep 1998	Mary V. Davis	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Senior Budget Analyst of the Quarter	Jul-Sep 1998	Linda Jung	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level Performer	Jul-Sep 1998	Irma J. Torres	
SMC Fourth Quarter Award Winners	Senior Company Grade Officer	Oct - Dec 1998	Capt Davil A. Searle	DMSP Program Office
SMC Fourth Quarter Award Winners	Junior Company Grade Officer	Oct - Dec 1998	1st Lt Daniel R. Shingledecker	SMC Contracting Directorate
SMC Fourth Quarter Award Winners	Senior Noncommisssioned Officer	Oct - Dec 1998	MSgt Timothy D. Daron	61 MSS
SMC Fourth Quarter Award Winners	Noncommissioned Officer	Oct - Dec 1998	SSgt Jerome A. Nash	61 MDS
SMC Fourth Quarter Award Winners	Airman	Oct - Dec 1998	Senior Airman Raminah I. Hartke	SMC Launch Programs Directorate
SMC Fourth Quarter Award Winners	Honor Guard Member of the Quarter	Oct - Dec 1998	TSgt Allen C. Cromer Jr.	SMC Advanced Systems Directorate
SMC Fourth Quarter Award Winners	Mid-level Civilian	Oct - Dec 1998	Charles J. Briggs	DMSP Program Office
SMC Fourth Quarter Award Winners	Junior-level Civilian	Oct - Dec 1998	Dorothy A. Mehta	MILSATCOM Program Office
SMC Fourth Quarter Award Winners	Clerical-level Civilian	Oct - Dec 1998	Marlon O. Coronado	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	John R. Peterson	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	Jimmie Thornton	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	Donna M. Kimball	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	Michael J. Zellmer	SMC/MT

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	Ronea L. Alger	SMC/PA
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	Jean Williams	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	David O. Best	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1998	David J. Wiggins	61 CS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1998	Linda Meza-Perez	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1998	Wanda Oden Meyers	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1998	Ariel Tonnu	SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1998	Florentina R. Way	SMC/JA
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1998	Yolanda A. Spears	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1998	David R. Toler	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1998	Scott D. Kowalski	61 SFS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1998	Marla Jordan	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1998	Wendy L. Marshall	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1998	Willie L. Gourley	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1998	Iliana Briseno	61 MDS
SMC Annual Award Winners	Senior Company Grade Officer	FY 1998	Capt Donald J. Cotherr	MILSATCOM Program Office
SMC Annual Award Winners	Junior Company Grade Officer	FY 1998	2nd Lt Michelle R. Brunswick	Satellite and Launch Control Systems Programs Office
SMC Annual Award Winners	Senior Noncommisssioned Officer	FY 1998	MSgt Robin L. Williams	61 MDS

SMC Annual Award Winners	Noncommissioned Officer	FY 1998	TSgt Oren K. Lizana	61 MDS
SMC Annual Award Winners	Airman	FY 1998	Senior Airman Jeffrey W. Clapper	61 CS
SMC Annual Award Winners	Honor Guard Member of the Quarter	FY 1998	SSgt Peter R. S. Carreon	Advanced Systems Directorate
SMC Annual Award Winners	Mid-level Civilian	FY 1998	Robert T. Wilson	MILSATCOM Program Office
SMC Annual Award Winners	Junior-level Civilian	FY 1998	Barbara A. Neal	Developmental Planning Directorate
SMC Annual Award Winners	Administrative Support Level	FY 1998	Marlon O. Coronado	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Gracie A. Wantland	SMC/AX
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Patricia Mahoney	SMC/CI
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Norma F. Jackson	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Jimmie Thornton	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Jackie J. Farley	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Robert Wilson	SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Melissa Duong	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Naomi DeJesa	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Aaron L. Renenger	SMC/PA
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Dennis A. Hass	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	David O. Best	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Dina Williams	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1998	Anthony Walker	61 CS

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Susan A. Bretherton	SMC/AX
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Linda Meza-Perez	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Wanda Oden Meyers	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Ariel Tonnu	SMC/FM
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Marie Burden	SMC/JA
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Dorothy Mehta	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Yolanda A. Spears	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Barbara A. Neal	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1998	Robert E. Donald	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	FY 1998	Laverne Williams	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	FY 1998	Trina M. Scott	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	FY 1998	Nina M. Smith	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	FY 1998	Marlon O. Coronado	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	FY 1998	Iliana Briseno	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Cost Civilian of the Year	FY 1998	Cal M. Morioka	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Analysis Civilian of the Year	FY 1998	Loretta N. Umetsu	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Management Organization of the Year	FY 1998	Mary H. Alverio	GPS Modernization Program Office Estimate Team
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Management Organization of the Year	FY 1998	Kim A. Holman	

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Management Organization of the Year	FY 1998	Cal M. Morioka	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Management Organization of the Year	FY 1998	Phu-Phuong Nguyen	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Management Organization of the Year	FY 1998	Darlene P. Thompson	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Management Organization of the Year	FY 1998	Darrell L. Weaver	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Analysis Office of the Year	FY 1998	Loretta N. Umetsu	Evolved Expendable Launch Vehicle
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Analysis Office of the Year	FY 1998	Patricia J. Boatman	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Financial Analysis Office of the Year	FY 1998	Naomi Dejesa	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Special Acts and Services	FY 1998	Carla F. Parnell	Financial Management Plans and Management Division
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Fiscal 1998 Special Acts and Services	FY 1998	Tony Riccio	Financial Management Plans and Management Division
Special Act or Service Award		FY 1998	Harriet R. Fuller	
Notable Achievement Award		FY 1998	Gregory A. Kane	
Notable Achievement Award		FY 1998	Phuc T. Murphy	
Notable Achievement Award		FY 1998	Michael J. Tolliver	
Notable Achievement Award		FY 1998	Kim Vu	
Air Force, Best in the Air Force for 1998	Public Affairs Community Relations Office	FY 1998	SMC/PA	
Air Force Award	Air Force Civilian Personnel Specialist of the Year	FY 1998	Colette Alvarez	61 MSS
Air Force Award	Special Acts and Services Award	FY 1998	Carla F. Parnell	SMC/FM, CCAR/ABSS Integration Team

Air Force Award	Special Acts and Services Award	FY 1998	Tony Riccio	SMC/FM, CCAR/ABSS Integration Team
Air Force Award	Special Acts and Services Award	FY 1998	Jerry Murray	SMC/FM, CCAR/ABSS Integration Team
Air Force Award	Special Acts and Services Award	FY 1998	Dwayne Jones	SMC/FM, CCAR/ABSS Integration Team
Air Force Award	Special Acts and Services Award	FY 1998	Zonia Smith	SMC/FM, CCAR/ABSS Integration Team
Air Force Award	Special Acts and Services Award	FY 1998	David Wang	SMC/FM, CCAR/ABSS Integration Team
Air Force Award	Special Acts and Services Award	FY 1998	Nickolay Reymers	SMC/FM, CCAR/ABSS Integration Team
Air Force Award	Special Acts and Services Award	FY 1998	SSgt Terrance Smith	SMC/FM, CCAR/ABSS Integration Team
Air Force Award	Special Acts and Services Award	FY 1998	SSgt David Thompson	SMC/FM, CCAR/ABSS Integration Team
AFMC Awards	AFMC Best Internal Division in AFMC (Media Contest)	FY 1998	SMC/PA	
AFMC Awards	AFMC Best Community Relations Division in AFMC	FY 1998	SMC/PA	
AFMC Awards	AFMC Best Commander Support in AFMC	FY 1998	SMC/PA	
AFMC Awards	AFMC Best Commercial Newspaper in its class in AFMC	FY 1998	SMC/PA	
AFMC Awards	AFMC Best Planned Single Event for POW/MIA Day	FY 1998	SMC/PA	
AFMC Awards	AFMC Best Television News Program	FY 1998	61 CS Video Services	
AFMC Awards	AFMC Best Television Feature Program	FY 1998	61 CS Video Services	

AFMC Awards	AFMC Best Television Sports Program	FY 1998	61 CS Video Services	
AFMC Awards	AFMC Best Television Information Program	FY 1998	61 CS Video Services	
AFMC Award	Air Force Materiel Command Personnel Specialist	FY 1998	Colette Alvarez	61 MSS
AFMC Award	AFMC Civilian Program Manager of the Year	FY 1998	Lorett Umetsu	EELV Program Office
AFMC Award	Best in AFMC	FY 1998	Social Actions Office/Military Equal Opportunity Office	
AFMC Team Excellence Award		FY 1998	Launch Systems Environmental Team	Launch Programs System Program Office
AFMC Personnel Specialist of the Year		FY 1998	Colette Alvarez	DPC
Combined Federal Campaign Bronze and Ruby Awards		FY 1998	SMC	
Rotary National Award for Space Achievement		FY 1998	Capt Jim R. Hunter	Developmental Planning Office
Federal Executive Board Distinguished Public Service Awards	Outstanding Individual Accomplishments	FY 1998	Gerald Verduft	
Federal Executive Board Distinguished Public Service Awards	Outstanding Individual Accomplishments	FY 1998	Yolanda Spears	
Federal Executive Board Distinguished Public Service Awards	Self Development Award	FY 1998	Chau M. Phan	
Federal Executive Board Distinguished Public Service Awards	Outstanding Team Accomplishment	FY 1998	EELV Systems Program Office	
Federal Executive Board Distinguished Public Service Awards	Certificates of Merit	FY 1998	Sallie Grubs	
Federal Executive Board Distinguished Public Service Awards	Certificates of Merit	FY 1998	Saul Ortigoza	
Federal Executive Board Distinguished Public Service Awards	Certificates of Merit	FY 1998	Warren Carlson	
Federal Executive Board Distinguished Public Service Awards	Certificates of Merit	FY 1998	Joyce Mullenback	
Federal Executive Board Distinguished Public Service Awards	Certificates of Merit	FY 1998	5th Annual Run for Good Times Planning Committee	

SMC Team Excellence Award		Spring 1998	Advanced Systems Directorate's Space Application Project Office 2000 Division Team	
SMC Team Excellence Award		Spring 1998	377th Air Base Wing's Manpower and Quality Team	
Diamond Sharp Award		FY 1998	Staff Sgt Jerome A. Nash	
Ronald McDonald Fun Run Commander's Challenge		FY 1998	SBIRS Program Office	
Air Force Association Awards	Senior Officer of the Year	FY 1998	Col Michael J. Dunn	
Air Force Association Awards	Officer of the Year	FY 1998	Lt Col Gary A. Kyle	
Air Force Association Awards	EELV Program Office Award of Excellence	FY 1998	Sr Master Sgt Jay R. Mackey	Det 8
Air Force Association Awards	Unit of the Year	FY 1998	Launch Programs Systems Program Office	
Air Force Association Awards	Civilian of the Year	FY 1998	Warren A. Carlson	MILSATCOM Program Office
Air Force Association Awards	Senior Company Grade Officer of the Year	FY 1998	Capt Mark A. Baird	Advanced Systems Directorate, Contracting Division
Air Force Association Awards	Junior Company Grade Officer of the Year	FY 1998	1st Lt Nikole L. Wilson	Det 8 Launch Programs Office
Air Force Association Awards	Senior Noncommissioned Officer of the Year	FY 1998	Master Sgt Lisa M. Camp	Det 8 CLNPE
Air Force Association Awards	Noncommissioned Officer of the Year	FY 1998	Tech Sgt Duane C. Sorgaard	Advanced Systems Directorate
Air Force Association Awards	Airman of the Year	FY 1998	Sr Airman Jason A. Tuia	Launch Programs Office
Air Force Association Awards	Scientist/Engineer of the Year	FY 1998	Maj Bryan L. Kelchner	ABL Systems Program Office, Kirtland AFB

Air Force Association Awards	Support Person of the Year	FY 1998	Capt James D. McCreary	NAVSTAR GPS Program Office
Air Force Association Awards	Manager of the Year	FY 1998	Lt Col Gregory D. Glover	MILSATCOM Program Office
General Bernard A. Schriever Award		FY 1998	Darleen Druyun	Principal Deputy Assistant Secretary of the Air Force For Acquisition and Management
Air Force Chief of Staff Team Excellence Award		FY 1998	Maj Betty Bennett	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Steve Cobb	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Noble Dowling	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Dave Eidson	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Jon Francine	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Dr. Michael Jemiola	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Norm Keegan	LAAFB Launch Programs Environmental Systems Team

Air Force Chief of Staff Team Excellence Award		FY 1998	Capt Bill Kempf	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Theresa Kinzer-Varin	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Capt Brian Laine	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Margaret Lonning	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Dr. Gary Loper	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Dr. Bart Lundblad	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Leslie Meyers	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Dr. Marly Ross	LAAFB Launch Programs Environmental Systems Team
Air Force Chief of Staff Team Excellence Award		FY 1998	Andrea Ryan	LAAFB Launch Programs Environmental Systems Team

Air Force Chief of Staff Team Excellence Award		FY 1998	Dr. Phil Thorson	LAAFB Launch Programs Environmental Systems Team
Federal Executive Board Distinguished Public Service Awards		April-June 1998	Chau M. Phan	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Arthur Welton	Advanced Systems Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Phyllis Meyers	Directorate of Systems Acquisition
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Alan Wall	DMSP Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Roslyn Woods	Launch Programs Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Jackie J. Farley	NAVSTAR GPS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Phillip Sanchez	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Susan Moody	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Aaron L. Renenger	SMC/PA
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Dung Do	Directorate of Developmental Planning
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Jeraldine Herbert	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 1999	Todd Goldsmith	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Tasha Mason	Directorate of Systems Acquisition
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Debra McNeil	Launch Programs Directorate

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Carol Laechelt	Satellite and Launch Control Systems Programs Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Jennifer Grigsby	Comptrollers Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Bobra Wilkerson	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Carla Walker	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Carlen Capenos	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 1999	Federico Agcaoili	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Jan-Mar 1999	Cathy Eppright	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Jan-Mar 1999	Robert Boudrot	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Jan-Mar 1999	Jill Martin	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Joanne Russell	Systems Acquisition Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Debra Brooks	Comptrollers Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Edwin Perez	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Naomi DeJesa	EELV Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Stanley Wheeler	Contracting Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Dung Do	Developmental Planning Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Delores Lowe	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 1999	Marcie Stevens	61 CS

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 1999	Susan Bretherton	Systems Acquisition Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 1999	Olga Chachere	DMSP Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 1999	Brenda Young	DMSP Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 1999	Cheryl Cobbs	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 1999	Terri Mathis	61 CS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Apr-June 1999	Roberto Saldana	SMC/XP
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Apr-June 1999	Gerardo Fernandez	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Apr-June 1999	Kandie Morgan	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Apr-June 1999	Marlon O. Coronado	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Gracie A. Wantland	Directorate of Systems Acquisition
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Sally Petersen	DMSP Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Robert Graham	Launch Programs Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Pam Vilhauer	NAVSTAR GPS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Donna M. Kimball	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Ann Fujii	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Patricia Boatman	EELV Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Delores Duncan	SMC/XP

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Joan Kunkler	Developmental Planning Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Douglas Balhorn	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 1999	Jim Tisdale	Directorate of Contracting
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1999	Diana Lutter	Advanced Systems Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1999	Mark Alexander	Directorate of Systems Acquisition
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1999	Mary Davis	NAVSTAR GPS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1999	Joel Perrine	Directorate of Contracting
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1999	Jonnette Sadiq	61 CS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 1999	Bonnie Adkins	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1999	Isidora Taitano	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1999	Mary Barnes	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1999	Tamara Jones	Directorate of Contracting
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1999	Rasheedah Young	SMC/XP
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1999	Darlene Fretwell	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1999	Iliana Briseno	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Level	Oct - Dec 1999	Glenn Hooks	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Arthur Welton	Advanced Systems Directorate

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Thomas Huynh	Systems Acquisition Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Ching Shelton	Launch Programs Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Stanley Wheeler	Satellite and Launch Control Systems Programs Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	James Crawford	NAVSTAR GPS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Linda Ramirez	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	John McIvers	Contracting Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Edwin Perez	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Virginia Callanan	Developmental Planning Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 1999	Douglas Balhorn	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Shenell Gipson-Cooper	Advanced Systems Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Susan Bretherton	Systems Acquisition Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Brenda Young	Launch Programs Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Mary Davis	NAVSTAR GPS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Bobra Wilkerson	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Karen Duong	EELV Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Joel Perrine	Contracting Directorate

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	David Toler	Developmental Planning Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Judy Seballos	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 1999	Bonnie Adkins	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 1999	Remona McNelton	Advanced Systems Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 1999	Harriet Colder	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 1999	Isidora Taitano	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 1999	Chire Tolbert	SBIRS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 1999	Rasheedah Young	Plans and Programs Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 1999	Nancy Feist	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 1999	Jill Martin	61 MSS
LAAFB Quarterly Awards	Honor Guard Member of the Quarter	Jan-Mar 1999	1st Lt Linda Wilson	DMSP Program Office
LAAFB Quarterly Awards	Senior Company Grade Officer	Jan-Mar 1999	Capt Jeffery B. Morris	MILSATCOM Program Office
LAAFB Quarterly Awards	Junior Company Grade Officer	Jan-Mar 1999	2nd Lt Jason J. Rafferty	SBIRS Program Office
LAAFB Quarterly Awards	Senior Noncemmisssioned Officer	Jan-Mar 1999	MSgt Michael R. Douglas	Systems Acquisition Directorate
LAAFB Quarterly Awards	Noncommissioned Officer	Jan-Mar 1999	SSgt Karen E. Fabian	Chief Master Sergeant's Office
LAAFB Quarterly Awards	Airman	Jan-Mar 1999	Senior Airman Eumir C. Arceo	61 CS
LAAFB Quarterly Awards	Mid-level Civilian	Jan-Mar 1999	Arthur L. Welton	Contracting Directorate
LAAFB Quarterly Awards	Junior-level Civilian	Jan-Mar 1999	Jennifer Grigsby	SMC/FM

LAAFB Quarterly Awards	Administrative-level Civilian	Jan-Mar 1999	Jill Martin	61 MDS
LAAFB Quarterly Awards	Senior Company Grade Officer	Jul-Sep 1999	Capt Yvette Marquis	61 MDS
LAAFB Quarterly Awards	Junior Company Grade Officer	Jul-Sep 1999	2nd Lt Kevin Eckerley	61 MDS
LAAFB Quarterly Awards	Senior Noncommisssioned Officer	Jul-Sep 1999	MSgt Paula Harris	EELV Program Office
LAAFB Quarterly Awards	Noncommissioned Officer	Jul-Sep 1999	TSgt Joseph Oliver	61 MDS
LAAFB Quarterly Awards	Airman	Jul-Sep 1999	Airman 1st Class Amy Browne	61 MDS
LAAFB Quarterly Awards	Mid-level Civilian	Jul-Sep 1999	Ann Fujii	SMC/MT
LAAFB Quarterly Awards	Junior-level Civilian	Jul-Sep 1999	Joel Perrine	Contracting Directorate
LAAFB Quarterly Awards	Administrative-level Civilian	Jul-Sep 1999	Iliana Briseno	61 MDS
SMC Annual Award Winners	Company Grade Officer of the Year	FY 1999	1st Lt Christopher Burner	Det 9
SMC Annual Award Winners	Senior Noncommissioned Officer of the Year	FY 1999	MSgt Mark Hall	Airborne Laser Program Office
SMC Annual Award Winners	Noncommissioned Officer of the Year	FY 1999	TSt John Goodson	Det 9
SMC Annual Award Winners	Airman of the Year	FY 1999	Senior Airman Emuir Arceo	61 CS
SMC Annual Award Winners	First Sergeant of the Year	FY 1999	MSgt Harry Seballos	61 MSS
SMC Annual Award Winners	Individual Mobilization Augmentee of the Year	FY 1999	Lt Col John Capulli	Developmental Planning Directorate
SMC Annual Award Winners	Mid-Level Civilian of the Year	FY 1999	Bobbie Blount	Airborne Laser Program Office
SMC Annual Award Winners	Junior-Level Civilian of the Year	FY 1999	Susan Moore	Testing and Evaluation Directorate
SMC Annual Award Winners	Administrative Support Level Civilian of the Year	FY 1999	Rasheedah Young	Plans and Programs Office
Air Force Award	Missile Safety Award	FY 1999	Det 9	Vandenberg AFB
Air Force Award	Organizational Excellence Award	May 1997-April 1999	Advanced Systems Directorate	
Air Force Association Awards	Lt Gen John W. O'Neill Outstanding Program Office Director	FY 1999	Col Richard W. McKinney	EELV Program Office

Air Force Association Awards	Lt Gen Kenneth W. Schultz Award for Outstanding Program Manager	FY 1999	Col Robert K. Saxer	SMC/MV
Air Force Association Awards	Lt Gen Richard C. Henry Leadership Award for Outstanding Officer or Senior Noncommissioned Officer	FY 1999	Capt James B. Smith	SMC Contracting Directorate
Air Force Association Awards	Dr. Alfred Rockefeller, Jr. Award for Outstanding Civilian	FY 1999	Patricia J. Dean	SMC/TM
Air Force Association Awards	Lt Gen Forrest S. McCartney Award for Outstanding Company Grade Project Officer	FY 1999	Capt Andrew L. Boyd	MTAG
Air Force Association Awards	General Samuel C. Phillips Award for Outstanding Young Engineer/Scientist	FY 1999	Capt Jon M. Anderson	SMC/CZE
Air Force Association Awards	General Bernard A. Schriever Award	FY 1999	Secretary of the Air Force Whitten Peters	
Air Force Association Awards	Senior Officer of the Year	FY 1999	Col Robert Cox	
Air Force Association Awards	Officer of the Year	FY 1999	Maj Charles Kastenholz	
Air Force Association Awards	Award of Excellence	FY 1999	Capt Bruce Wilder	
Air Force Association Awards	Unit of the Year	FY 1999	Developmental Planning Directorate	
Air Force Association Awards	Civilian of the Year	FY 1999	Deborah Westphal	
Air Force Association Awards	Company Grade Officer of the Year (over 4 years)	FY 1999	Capt Donald Cothern	
Air Force Association Awards	Company Grade Officer of the Year (4 years or under)	FY 1999	2nd Lt Jason Rafferty	
Air Force Association Awards	Senior Noncommissioned Officer of the Year	FY 1999	MSgt Harry Seballos	
Air Force Association Awards	Noncommissioned Officer of the Year	FY 1999	SSgt Brett Boyum	
Air Force Association Awards	Airman of the Year	FY 1999	Senior Airman Raminah I. Hartke	
Air Force Association Awards	Scientist/Engineer of the Year	FY 1999	Mark Fagan	
Air Force Association Awards	Support Person of the Year	FY 1999	Capt George Unsinger	
Air Force Association Awards	Manager of the Year	FY 1999	Lt Col Kenneth Robinson	
Outstanding Civilian Career Service Award		FY 1999	Gerald L. Verduft	

AFMC Award	AFMC Team Quality Award	Jul-Sep 1999	MILSATCOM, Advanced EHF Program Office Estimate Team	
John L. Levitow, Commandant's and Academic Achievement Award		FY 1999	Senior Airman Daniel Cockrell	
Department of Defense David Packard Excellence in Acquisition Award		FY 1999	EELV Systems Program Office	
John L. Levitow, Commandant's and Academic Award		FY 1999	TSgt Scott A. Gregg	369th Recruiting Squadron
Spirit Award		FY 1999	61 MDS	
Angel Award		FY 1999	1st Lt Stephen Hill	MILSATCOM Program Office
Angel Award		FY 1999	Maj Jeffrey Joyce	EELV Program Office
Angel Award		FY 1999	Sheryl Karle	NAVSTAR GPS Program Office
Angel Award		FY 1999	1st Lt Jason Martini	NAVSTAR GPS Program Office
Angel Award		FY 1999	1st Lt Tara McLaren	Directorate of Developmental Planning
Angel Award		FY 1999	Janet Miller	61 MDS
Angel Award		FY 1999	Lorraine Ornelas	61 MDS
Angel Award		FY 1999	Harry Demiere	61 MDS
Angel Award		FY 1999	William Taylor	61 MDS
Angel Award		FY 1999	Ray Friend	61 MDS
Volunteer Excellence Award		FY 1999	David Brookfield	Staff Judge Advocate Office
Volunteer Excellence Award		FY 1999	Edward Maissian	Equal Employment Opportunity Office
Volunteer Excellence Award		FY 1999	Rick McGilton	Equal Employment Opportunity Office

Volunteer Excellence Award		FY 1999	Fielding Watson	Equal Employment Opportunity Office
SMC Team Excellence Award		FY 1999	NAVSTAR GPS Joint Program Office	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	Dahlia Acosta	SMC/CI
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	Barbara Arrant	Satellite and Launch Control Systems Programs Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	James Crawford	SMC/AX
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	Jeraldine Herbert	61 CE
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	Norma Jackson	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	Ian Martin	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	Sue Stratton	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Jan-Mar 2000	Gloria Watkins	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Thelma Daniels	61 SVS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Ann Frenzel	DMSP Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Diana Gilbert	NAVSTAR GPS Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Carol Laechelt	Developmental Planning Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Linda Meza-Perez	Launch Programs Directorate
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Gary Morheiser	SMC/AX

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Judith Solorzano	MILSATCOM Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Marcia Solski	61 SFS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Jan-Mar 2000	Yolanda Spears	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Jan-Mar 2000	Jeanette Bangi	61 SVS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Jan-Mar 2000	Sheri Price	EELV Program Office
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Jan-Mar 2000	Donielle Wilt	Directorate of Systems Acquisition
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 2000	Kimberly Dandridge-Drennon	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 2000	William Desmond	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 2000	Lauren Fleishman	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 2000	Sharon Kolanowski	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 2000	Elfriede Orr	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Apr-June 2000	Ariel Tonnu	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 2000	Clarena Chambers	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 2000	Joyce Howard	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 2000	Joel Perrine	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 2000	Mary Smith	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Apr-June 2000	Larry Stewart	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Apr-June 2000	Michelle Castleman	

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Apr-June 2000	Catherine Eppright	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Apr-June 2000	Remona McNelton	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Apr-June 2000	Lloyd Wills	
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Cathy Butler	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Gerald Crafton	SMC/AD
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	William Githens	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Thomas Huynh	SMC/AX
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Rafael Martinez	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Daniel McGilvray	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Dennis Nyman	61 MSS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Sally Petersen	SMC/CI
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Tanya Schoon	SMC/CZ
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	Oct - Dec 2000	Arthur Welton	SMC/TL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 2000	Lisa Caracoza	61 SFS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 2000	Mary Dew	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 2000	Tamara Jones	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 2000	Rosalinda Meza-Perez	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	Oct - Dec 2000	Dorothy Mehta	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Lina Litonjua	SMC/MT

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Vernissa McLeod	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Delia Ortiz	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Lavivian Robinson	SMC/TL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Kelly Rusticelli	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Elizabeth Tua'au	SMC/CI
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Nathaly Santin	SMC/JA
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	Oct - Dec 2000	Laverne Williams	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 2000	William Desmond	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 2000	Juanita Edwards	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 2000	Sarah Handy	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 2000	Rafael Martinez	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 2000	Daniel McGilvray	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 2000	Sally Petersen	SMC/CI
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Mid Level	FY 2000	Arthur Welton	SMC/TL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Allison Flanagan	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Karen Ho	SMC/MV
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Scot Kowalski	61 SFS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Rosie Manning	61 MDS
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Wendy L. Marshall	SMC/CZ

SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Remona McNelton	SMC/TL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Dorothy Mehta	SMC/MC
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Rosalinda Meza-Perez	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Mary Smith	SMC/CI
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Marta Villa	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Junior Level	FY 2000	Sherryl Williams	SMC/JA
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 2000	Michelle Castleman	61 ABG
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 2000	Marzella Colter	SMC/XR
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 2000	Jeraline Louis	SMC/MT
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 2000	Vernissa McLeod	SMC/CW
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 2000	Della Ortiz	SMC/PK
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 2000	Laverne Williams	SMC/CL
SMC Senior Civilian Advisory Group Quarterly Awards Winners	Administrative Support Level	FY 2000	Lloyd Wills	SMC/CZ
SMC Quarterly Award Winners	Senior Company Grade Officer	Apr-June 2000	Capt Mark T. Skosich	
SMC Quarterly Award Winners	Junior Company Grade Officer	Apr-June 2000	2nd Lt Michelle G. Bernhard	
SMC Quarterly Award Winners	Senior Noncommisssioned Officer	Apr-June 2000	MSgt Anthony G. Wood	
SMC Quarterly Award Winners	Noncommissioned Officer	Apr-June 2000	SSgt Joseph G. Streets	
SMC Quarterly Award Winners	Airman	Apr-June 2000	Senior Airman Christopher J. McGiveney	
SMC Quarterly Award Winners	Mid-level Civilian	Apr-June 2000	Silliam W. Desmond	
SMC Quarterly Award Winners	Junior-level Civilian	Apr-June 2000	Joel L. Perrine	

SMC Quarterly Award Winners	Administrative-level Civilian	Apr-June 2000	Michelle D. Castleman	
Air Force Association Awards	Gen Bernard A. Schriever Award	FY 2000	Gen Lester L. Lyles	AFMC Commander
Air Force Association Awards	Outstanding Program Director	FY 2000	Col Douglas Loverro	SMC/CZ
Air Force Association Awards	Outstanding Field Grade Officer	FY 2000	Col Peter Hoene	SMC/CZ
Air Force Association Awards	Lt Gen Richard C. Henry Leadership Award	FY 2000	Lt Col Joseph Hollett	SMC/IN
Air Force Association Awards	Chapter Award of Excellence	FY 2000	Lt Col Jane Robinson	SMC/MV
Air Force Association Awards	Outstanding Program Manager	FY 2000	Lot Col Peter Vaccaro	SMC/CZ
Air Force Association Awards	Outstanding Young Engineer/Scientist	FY 2000	Capt Kevin Carrow	
Air Force Association Awards	Outstanding CGO Project Officer	FY 2000	Capt Jay Schatz	SMC/MC
Air Force Association Awards	61st Medical Squadron COG of the Year	FY 2000	1st Lt Kevin Eckerley	61 MSS
Air Force Association Awards	Outstanding Civilian	FY 2000	George Pace	SMC/TE
Air Force Association Awards	Outstanidng NCO	FY 2000	TSgt Packtrick Britton	SMC/XP
Air Force Association Awards	Outstanding Airman	FY 2000	SSgt Raminah Hartke	SMC/CL
Air Force Association Awards	Unit of the Year	FY 2000	SMC/TE	
Special Act or Service Award		FY 2000	Dolores D. Batiste	
2000 SMC Team Winner		FY 2000	IN Recharged Intelligence Performance Improvement Team (RIP-IT)	
Air Force Awards	Outstanding Unit Award	FY 2000	61 ABG	
Air Force Awards	Organizational Excellence Award	FY 2000	MILSATCOM Program Office	
Air Force Awards	Organizational Excellence Award	FY 2000	DMSP	
Air Force Awards	Organizational Excellence Award	FY 2000	DoD Space Test Program	
Air Force Award	Organizational Excellence Award	FY 2000	MILSATCOM Program Office	
AFMC Award	Gen Jack Thomas Award	FY 2000	Lt Col Joseph Hollett	Intelligence Directorate

AFMC Award	Athlete of the Year	FY 2000	Capt Valerie Manning	Onizuka AFS
AFMC Award	Best Small Base Health Promotion Program in 2000	FY 2000	LAAFB Health and Wellness Center	
Volunteer Excellence Award		FY 2000	Dorothy Brown	
Volunteer Excellence Award		FY 2000	Kathleen M. Hall	
Volunteer Excellence Award		FY 2000	Barry Hash	
Volunteer Excellence Award		FY 2000	Norma Jackson	
Angel Award		FY 2000	Patrick E. Britton	
Angel Award		FY 2000	Edward d. Maissian	
Angel Award		FY 2000	Amy Miller	
Angel Award		FY 2000	Lt Col James Rosa	
Angel Award		FY 2000	Maj Raymond F. Warriner	
Angel Award		FY 2000	Rita Decelles	
SMC Award	Spring 2000 Team Excellence Award Winner	Spring 2000	Directorate of Intelligence	
Diamond Award (Rideshare)		FY 2000	LAAFB	
Ellis Island Medal of Honor		FY 2000	Edward M. Salem	XP Deputy Director
"Duke" Kane Award	The Blue Room Team	FY 2000	Maj Mark Powers	
"Duke" Kane Award	The Blue Room Team	FY 2000	Capt Thomas Miller	
"Duke" Kane Award	The Blue Room Team	FY 2000	1st Lt Keith Fisher	
"Duke" Kane Award	The Blue Room Team	FY 2000	SMSgt Brent Carter	
"Duke" Kane Award	The Blue Room Team	FY 2000	David Unangst	
"Duke" Kane Award	The Blue Room Team	FY 2000	Joe Cooper	
"Duke" Kane Award	The Blue Room Team	FY 2000	Joe Cooper Jr.	
"Duke" Kane Award	The Blue Room Team	FY 2000	Ron English	
SMC Quarterly Award Winners	SMC ABG/Staff Agency Category Team Award	Jul-Sep 2001	61 Air Base Defense Team	
SMC Quarterly Award Winners	SMC System Program Office Category Team Award	Jul-Sep 2001	SMC/MC-Advanced Extremely High Frequency Negotiation Team	
SMC Quarterly Award Winners	Honor Guard Member of the Quarter	Jul-Sep 2001	1st Lt Anthony B. Paulson	

SMC Quarterly Award Winners	Civilian of the Quarter, Mid Level	Jul-Sep 2001	James Culpepper	DMSP Program Office
SMC Quarterly Award Winners	Civilian of the Quarter, Junior Level	Jul-Sep 2001	Huston Walker	61 SFS
SMC Quarterly Award Winners	Civilian of the Quarter, Admin Level	Jul-Sep 2001	Tenesha Webb	61 CS
SMC Quarterly Award Winners	Senior Company Grade Officer	Jul-Sep 2001	Capt Ronnie V. Devlin	EELV Program Office
SMC Quarterly Award Winners	Junior Company Grade Officer	Jul-Sep 2001	2nd Lt Dick Wong	MILSATCOM Program Office
SMC Quarterly Award Winners	Senior Noncommissioned Officer	Jul-Sep 2001	MSgt Hugh Bonmar	
SMC Quarterly Award Winners	Noncommissioned Officer	Jul-Sep 2001	TSgt Jim C. Darity	
SMC Quarterly Award Winners	Airman	Jul-Sep 2001	Senior Airman Alethea S. Keaton	
SMC Quarterly Award Winners	Team Los Angeles Spirit Award	Jul-Sep 2001	61 CS	
SMC Quarterly Award Winners	First Sergeant's Diamond Award	Jul-Sep 2001	SSgt Rebecca Barnett	61 MSS
SMC Quarterly Award Winners	First Sergeant's Diamond Award	Jul-Sep 2001	SSgt Doug Fritts	61 MDS
LAAFB Quarterly Awards	Senior Company Grade Officer	Jan - Mar 2001	Capt Michael Lee	61 MDS
LAAFB Quarterly Awards	Junior Company Grade Officer	Jan - Mar 2001	1Lt Martine Detro	SMC/AD
LAAFB Quarterly Awards	Senior Noncommisssioned Officer	Jan - Mar 2001	MSgt George Johnson	SMC/AX
LAAFB Quarterly Awards	Noncommissioned Officer	Jan - Mar 2001	TSgt Joseph Oliver	61 MDS
LAAFB Quarterly Awards	Airman	Jan - Mar 2001	SrA Carlos Ochoa	61 ABG/CE
LAAFB Quarterly Awards	Mid-level Civilian	Jan - Mar 2001	Dahlia Mauricio	SMC/CI
LAAFB Quarterly Awards	Junior-level Civilian	Jan - Mar 2001	Trisha Middleton	SMC/PK
LAAFB Quarterly Awards	Administrative-level Civilian	Jan - Mar 2001	Elizabeth Tua'Au	SMC/CI
LAAFB Quarterly Awards	Senior Company Grade Officer	Apr - Jun 2001	Capt Michael Guetlein	SMC/MT
LAAFB Quarterly Awards	Junior Company Grade Officer	Apr - Jun 2001	Lt Robert Lyons III	SMC/MT
LAAFB Quarterly Awards	Senior Noncommisssioned Officer	Apr - Jun 2001	MSgt Edwin Cotto	61 CS/CSB
LAAFB Quarterly Awards	Noncommissioned Officer	Apr - Jun 2001	SSgt Eumir Arceo	61 CS/CSB
LAAFB Quarterly Awards	Airman	Apr - Jun 2001	Amn Tisha Amerson	61 CS/CSB
LAAFB Quarterly Awards	Mid-level Civilian	Apr - Jun 2001	Patrick Garel	SMC/MT
LAAFB Quarterly Awards	Junior-level Civilian	Apr - Jun 2001	Carlton Tucker	61 CS/SCB
LAAFB Quarterly Awards	Administrative-level Civilian	Apr - Jun 2001	Diane Huerte-Lomeli	SMC/MT

APPENDIX H

INSPECTOR GENERAL VISITS

IG Visits

19 Mar 98, Acquisition management review conducted by AF/IG on GPS, SBIRS

1 April 99, Eagle look on Human system integration in AF acquisition conducted by AF inspection agency (AFIA) on Det 11 and SMC /TM

4 Aug 99, Eagle look on Program management administration funding conducted by AFIA on SMC AX/CL/CW/FM/MC/XP

29 Jan 5 Feb 2001, Unit compliance inspection and limited operational readiness inspections conducted by AFMC/IG on SMC (ALL)

APPENDIX I

CONTRACTS ISSUED

Contract No.	Contractor	Program Name	Buyer	PK Ofc	PCO		Face Value ($)	Award Date	Expiration Date
F0470198C0207	TEXTRON SYSTEMS CORP	CMB RV	VALDEZ,YOL	PKUO	ROSS,KAREN	$	24,917,664.00	9/9/1998	2/28/2000
F0470198C0012	MCDONNELL DOUGLAS CORP	DELTA II	GRAHAM,ROB	PKVZ	QUINN,CATH	$	46,000,000.00	6/23/1998	6/2/2001
F0470198C0101	SVS R&D SYSTEMS, INC	DEV OF SMALL INERTIAL ATTITUDE	ARIAS,CIA	PKB	PEARSON,MEL	$	94,552.00	4/21/1998	3/31/1999
F0470198C0101	SVS R&D SYSTEMS, INC.	DEV OF SMALL INERTIAL ATTITUDE	ARIAS,CIA	PKB	PEARSON,MEL	$	94,552.00	4/21/1998	3/31/1999
F0470198C0019	AIREX CORP	DMSP	SMITH,CHER	PKT	MITCHELL,M	$	749,825.00	6/23/1998	12/31/2002
F0470198C0018	FOSTER-MILLER INC	DMSP	SMITH,CHER	PKT	HARRISON,N	$	399,998.00	6/23/1998	12/31/2000
F0470198D0102	MUNIZ ENGINEERING INC	DPSC	VIGIL,AURO	PKUL	DENMAN,ODE	$	3,777,111.00	6/2/1998	6/1/2003
F0470198C0039	RAYTHEON COMPANY	FMS - EORUNAV	KIMBALL,DO	PKG	WATSON,CHA	$	170,000.00	9/1/1998	10/22/1998
F0470198C0001	ROCKWELL COLLINS INC	FMS - NAVSTAR GPS	KIM,NAM H.	PKG	MCCREARY,J	$	345,000.00	1/6/1998	1/6/1999
F0470198D0010	TRIMBLE NAVIGATION LTD	FMS NAVSTAR GPS	MARSHALL,W	PKG	BROWN,GREG	$	-	4/1/1998	9/30/1999
F0470198C0002	BOEING NORTH AMERICAN INC	GPA BLOCK IIA FOLLOW-ON SUST	SCHOON,TAN	PKG	SMITH,DAVI	$	3,948,127.00	1/21/1998	12/31/2003
F0470198C0032	ROCKWELL COLLINS, INC	GPS	PARR,ANDRE	CZK	WRIGHT,DAL	$	6,440,073.00	8/7/1998	3/31/2003
F0470198C0035	ALLEN OSBORNE ASSOCIATES, INC.	GPS JPO	TOMM,MICHA	PKG	WRIGHT,DAL	$	3,561,373.00	7/23/1998	3/31/2003
F0470198C0034	INTERSTATE ELECTRONICS CORP	GPS JPO	MARSHALL,W	PKG	TROMBETTA,	$	3,735,854.00	7/23/1998	3/31/2003
F0470198C0033	INTERSTATE ELECTRONICS CORP	GPS JPO	RIPPENBAUM	PKG	WRIGHT,DAL	$	9,999,232.00	7/31/1998	3/21/2003
F0470198C0031	TRIMBLE NAVIGATION, LIMITED	GPS JPO	MARSHALL,W	PKG	WRIGHT,DAL	$	4,148,549.00	7/31/1998	3/31/2003
F0470198C0030	DYNAMICS RESEARCH CORPORATION	GPS JPO	MARSHALL,W	PKG	TRADER,ART	$	2,435,000.00	8/20/1998	11/30/2001
F0470198C0036	RAYTHEON COMPANY	GPS JPO	RIPPENBAUM	PKG	TRADER,ART	$	4,044,528.00	9/8/1998	10/31/2000
F0470198C0014	GALAXY SCIENTIFIC CORP	INFO TECHNOLOGY SERVICE SUP	FLEISHMAN,	PKR	MITCHELL,M	$	625,000.00	9/30/1998	11/30/2000
F0470198C0005	LOCKHEED MARTIN ASTRONAUTICS	LAUNCH PROGRAM	ESCOE,BLAI	PKV	PACHECO,MA	$	290,438,661.00	10/1/1997	9/30/2003
F0470198C0005	LOCKHEED MARTIN ASTRONAUTICS	LAUNCH PROGRAM	ESCOE,BLAI	PKV	PACHECO,MA	$	290,438,661.00	10/1/1997	9/30/2003
F0470198C0201	ENSIGN-BICKFORD CO THE	LINEAR SHAPED CHARGES (SRDS)	BURNS,ROBE	PKUB	SEARLE,DAV	$	1,144,618.00	7/30/1998	9/21/1999
F0470198C0006	AEROJET ELECTROSYSTEMS CO	RFP	CULPEPPER,	PKW	BROWN,GREG	$	2,249,373.00	5/4/1998	4/30/2003
F0470198C0103	CSA ENGINEERING INC	SBIR AF98-071	BLOUNT, B.	PKBB	JACKSON,MA	$	100,000.00	4/20/1998	3/31/1999
F0470198C0200	GD, GOVT SYSTEMS CORP	STEC	MAUSS,GARY	PKUO	MANN,M. (D	$	664,288.00	7/13/1998	9/30/2003
F0470198C0017	VIASAT INC	TINY TACTICAL WEATHER TERMINAL	SMITH,CHER	PKT	HARRISON,N	$	749,999.00	7/28/1998	10/31/2000
F0470199C0301	SOUTH WEST RESEARCH INST	ANALYSIS & TEST OF ROBOTS	SMITH,CHER	PKT	HARRISON,N	$	749,676.00	6/3/1999	11/22/2002
F0470199C8001	MCCORMICK SELPH INC	AODS	FIRTH,MIRA	TEKB	WEST,KENNE	$	942,670.00	7/21/1999	7/21/2003
F0470199C0205	LOCKHEED MARTIN CORP	BACKUP TARGETS DELIVERY SYSTEM	ROSS,KAREN	PKUB	BONTLY,GLE	$	7,632,294.00	2/11/1999	11/30/2000
F3361599C3800	PHYSICAL ACOUSTICS CORP	CONTINUOUS HEALTH MONITORING	NEMMERS, V	VAK	QUINN,CATH	$	358,826.00	9/29/1999	4/30/2002
F3361599C3801	TETRA TECH DATA SYSTEMS	FIBER OPTIC SENSOR	WALKER,JES	PKV	UCCIARDI,B	$	740,000.00	9/30/1999	1/30/2004
F0470199C0021	TRIMBLE NAVIGATION LTD	GONDOLA/STEL	MARSHALL,W	PKG	WATSON,CHA	$	410,900.00	5/28/1999	1/30/2000
F0470199C0024	TRIMBLE NAVIGATION LTD	GONDOLA/STEL	MARSHALL,W	PKG	WATSON,CHA	$	410,250.00	8/1/1999	2/3/2000
F0470199C0023	TRIMBLE NAVIGATION LTD	GONDOLA/STEL	MARSHALL,W	PKG	WATSON,CHA	$	262,500.00	6/1/1999	2/3/2000
F0470199C0022	TRIMBLE NAVIGATION LTD	GONDOLA/STEL	MARSHALL,W	PKG	WATSON,CHA	$	411,650.00	6/1/1999	2/3/2000
F0470199C0051	ROCKWELL COLLINS INC	GPS	TORTORELLA	PKG	BROWN,GREG	$	5,357,370.00	6/16/1999	3/21/2003
F0470198C0046	TITAN SYSTEMS CORPORATION DBA	MILSTAR	THOMAS,NIC	PKJ	BRIGGS,CHA	$	12,174,439.00	2/3/1999	12/1/2003
F0470198C0046	TITAN SYSTEMS CORPORATION DBA	MILSTAR	THOMAS,NIC	PKJ	BRIGGS,CHA	$	12,174,439.00	2/3/1999	12/1/2003

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F0470199C0317	UNIVERSITY OF SOUTH FLORIDA	MOBILE ROBOTS	SMITH,CHER	PKT	HARRISON,N	$	561,957.00	9/24/1999	9/30/2004
F0470199C0016	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	TOMM,MICHA	PKG	WATSON,CHA	$	407,460.00	8/6/1999	7/26/2001
F0470199C0057	ROCKWELL COLLINS INC	NAVSTAR GPS/FMS	MARSHALL,W	PKG	VANDERPOOT	$	480,000.00	8/30/1999	4/30/2001
F0470199C0056	ROCKWELL COLLINS INC	NAVSTAR GPS/FMS	MARSHALL,W	PKG	WATSON,CHA	$	480,000.00	8/30/1999	12/31/2002
F0470199C0055	ROCKWELL COLLINS INC	NAVSTAR GPS/FMS	RIPPENBAUM	PKG	WATSON,CHA	$	456,800.00	8/30/1999	3/21/2003
F0470199C0052	ROCKWELL COLLINS INC	NAVSTAR GPS/FMS	MARSHALL,W	PKG	WATSON,CHA	$	384,000.00	8/30/1999	12/31/2001
F0470199C0050	ROCKWELL COLLINS INC	NAVSTAR GPS/FMS	RIPPENBAUM	PKG	WATSON,CHA	$	455,800.00	8/30/1999	3/21/2003
F0470199C0061	ITT CORPORATION	NPOESS CRIS PHASE II	UPAH,KEITH	PKW	DEDRICK,JE	$	73,000,376.00	8/30/1999	8/31/2007
F0470199C0044	BALL AEROSPACE CORPORATION	NPOESS OMPS PHASE II	UPAH,KEITH	PKW	DEDRICK,JE	$	65,169,489.00	5/14/1999	9/30/2009
F0470199C0311	SAAB-ERICCSON SPACE AB	NPOESS PHASE II	DEDRICK,JE	PKW	DEDRICK,JE	$	6,699,895.00	8/27/1999	6/13/2003
F0470199C0048	SPECTRUM ASTRO	SBIRS LOW	HYNSON,LAT	PKZ	HYNSON,LAT	$	275,000,000.00	8/16/1999	2/27/2005
F0470199C0047	TRW INCOPORATED/SPC&ELEC GRP	SBIRS LOW	HYNSON,LAT	PKZ	HYNSON,LAT	$	275,000,000.00	8/16/1999	10/15/2004
F0470199C0026	TEAM SBL IFX	SBLINTEGRATED FLIGHT EXPERIME	BRYANT,PAU	PKL	APPLEBAUM,	$	125,000,000.00	2/11/1999	3/31/2003
F0470199C0030	LOCKHEED MARTIN CORP	SPACE BASED LASER	WELTON,ART	PKA	TANIGUCHI,	$	17,741,742.00	4/6/1999	12/31/1999
F0470100C0001	NORTHROP GRUMMANN	DMSP	SWAIN,HOUS	PKW	GRAHAM,ROB	$	4,970,893.00	5/3/2000	9/30/2003
F0470100C0002	LOCKHEED MARTIN	DSCS III	SCRUGGS,C	PKJ	HARBIN,SAM	$	7,464,135.00	2/1/2000	7/31/2001
F0470100C8029	SCIENCE APPLICATIONS INTL CORP	EADD II	LAECHELT,C	PKT	ALINDUGAN,	$	566,809.00	8/21/2000	8/17/2003
F0470100C8030	CSC	EADD II	LAECHELT,C	PKT	KIBBY,DARW	$	652,389.00	8/31/2000	8/31/2003
F0470100D0204	TRUAX ENGINEERING INC	EXCALIBUR	HENDERSON,	PKUB	WEST,KENNE	$	6,554,227.00	9/12/2000	12/31/2001
F0470100C0006	LMMS	IIR MODERNIZATION	SCHOON,TAN	PKG	SMITH,DAVI	$	53,000,000.00	8/18/2000	11/1/2004
F1962899C0078	RAYTHEON SYSTEMS	MILSTAR	KIMBALL,DO	PKJ	BARNARD,LI	$	11,235,000.00	2/29/2000	2/28/2003
F0470100C0005	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	RIPPENBAUM	PKG	BROWN,GREG	$	430,960.00	3/20/2000	3/21/2003
F0470100C0007	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	RIPPENBAUM	PKG	BROWN,GREG	$	120,630.00	8/11/2000	3/21/2003
F0470100C0501	LOCKHEED MISSILES & SPACE CO	NPOESS	UPAH,KEITH	PKW	DEDRICK,JE	$	20,650,000.00	12/14/1999	4/30/2002
F0470100C0500	TRW SPACE & ELECTRONICS GROUP	NPOESS	UPAH,KEITH	PKW	DEDRICK,JE	$	20,650,000.00	12/14/1999	3/30/2002
F0470100C0008	COMPUTER SCIENCES RAYTHEON	SLRSC	MAK,ALAN R	PKSC	ANDREWS,NA	$	7,538,240.00	5/15/2000	4/30/2001
F0470101C0203	SPECTRUM ASTRO S	C/NOFS	MILBURN,J.	PKUL	DENMAN,ODE	$	50,863,391.00	2/22/2001	11/29/2004
F0470101C0012	INTEGRAL SYSTEMS INC.	CCSC	RIZZA,ROSE	PKJ	COUNTEE,HE	$	3,400,000.00	2/7/2001	4/30/2006
F0470101C0015	TRW	CCSC	RIZZA,ROSE	PKJ	STENBORG,R	$	3,400,000.00	2/7/2001	11/8/2002
F0470100C8028	SPARTA INC	EADD II	HARRISON,N	PKR	KIBBY,DARW	$	355,908.00	12/4/2000	12/31/2003
F0470100C0211	LOCKHEED MARTIN MISSIN SYSTEMS	EDS	VANDERFORD	PKUO	COX,WILEY	$	3,027,915.00	12/15/2000	10/2/2028
F0470101C0019	ROCKWELL COLLINS INC	GPS FOREIGN MILITARY SALES	RIPPENBAUM	PKG	SCHLEIFER,	$	691,422.00	5/9/2001	3/21/2003
F0470101C0006	ALLEN OSBORNE ASSOC	GPS GROUND RECEIVER	SKELTON,RO	PKG	SMITH,DAVI	$	2,192,778.00	1/26/2001	3/26/2002
F0470101C0007	INTERSTATE ELECTRONICS CORP	GPS GROUND RECEIVER	SKELTON,RO	PKG	SMITH,DAVI	$	2,168,531.00	1/26/2001	3/26/2002
F0470101C0005	RAYTHEON SYSTEMS	GPS GROUND RECEIVER	SKELTON,RO	PKG	SMITH,DAVI	$	6,862,207.00	1/26/2001	3/21/2003
F0470101C0004	ROCKWELL COLLINS	GPS GROUND RECEIVERS	SKELTON,RO	PKG	SMITH,DAVI	$	6,770,864.00	1/26/2001	3/26/2002
F0470101C0010	THE BOEING COMPANY	GPS III ARCHITECTURE STUDIES	SCHOON,TAN	PKG	SCHOON,TAN	$	16,000,000.00	11/9/2000	3/21/2003
F0470101C0008	LOCKHEED MARTIN CORP	NAVSTAR GPS	SCHOON,TAN	PKG	SCHOON,TAN	$	16,000,000.00	11/9/2000	3/21/2003
F0470100C0010	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	MARSHALL,W	PKG	FUJII,ANN	$	99,266.00	10/30/2000	9/30/2003
F0470101C0016	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	RIPPENBAUM	PKG	BROWN,GREG	$	575,060.00	3/23/2001	3/21/2003
F0470101C0020	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	MARSHALL,W	PKG	FUJII,ANN	$	136,548.00	8/6/2001	12/31/2002
F0470101C0020	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	MARSHALL,W	PKG	FUJII,ANN	$	136,548.00	8/6/2001	12/31/2002

F0470101C0020	ROCKWELL COLLINS INC	NAVSTAR GPS / FMS	MARSHALL,W	PKG	FUJII,ANN	$	136,548.00	8/6/2001	12/31/2002
F0470101C0500	RAYTHEON COMPANY-ELECTRONIC SY	NPOESS	UPAH,KEITH	PKW	DEDRICK,JE	$	133,291,624.00	11/20/2000	12/15/2007
F0470101C0502	BOEING SATELLITE SYSTEMS, INC	NPOESS	UPAH,KEITH	PKW	INMAN,JOHN	$	130,794,882.00	7/30/2001	9/30/2007
F0470101C0001	ITT INDUSTRIES, SYSTEMS DIV	SPACELIFT RANGE SYSTEMS	SUTTLES, C	PKSE	EDWARDS,A.	$	81,244,339.00	11/3/2000	10/31/2006
F0470100D0206	SPACE VECTOR CORP	SRP-2	SEAMON,JOH	PKUB	WEST,KENNE	$	-	12/4/2000	
F0470101C0205	AEROASTRO CORPORATION	STPSAT-1	VIGIL,AURO	PKUL	DENMAN,ODE	$	11,166,676.00	9/11/2001	11/30/2005
F0470101C0018	IROBOT	TMR PHASE II	SMITH,CHER	PKR	MITCHELL,M	$	7,997,053.00	3/20/2001	8/31/2003
F0470100C0011	BOEING SATELLITE SYSTEM	WIDEBAND GAPFILLER SATELLITE	JAMAR,JANI	PKJ	SANCHEZ,PH	$	156,500,000.00	1/2/2001	12/27/2010

GLOSSARY

GLOSSARY

#'s	
4SOPS	4th Space Operations Squadron
A	
A&O	Acquisition and Operations
ABG	Air Base Group
ABL	Airborne Laser
ABW	Air Base Wing
ACMS	Automated Communication Management System
ACTD	Advanced Concept Technology Demonstration
ADM	Acquisition Decision Memorandum
AEHF	Advanced Extremely High Frequency
AEP	Architecture Evolution Plan
AFAA	Air Force Audit Agency
AFB	Air Force Base
AFCA	Air Force Communications Agency
AFCCP	Award Fee and Corporate Commitment Plan
AFGWC	Air Force Global Weather Central
AFMC	Air Force Materiel Command
AFOTEC	Air Force Operational Test and Evaluation Center
AFRL	Air Force Research Laboratory
AFS	Air Force Station
AFSATCOM	Air Force Satellite Communications System
AFSCN	Air Force Satellite Control Network
AFSPACECOM	Air Force Space Command, old acronym
AFSPC	Air Force Space Command, new acronym
AFWA	Air Force Weather Agency
AII	Accuracy Improvement Initiative
ALC	Air Logistics Center
ALERT	Attack and Launch Early Reporting to Theater
ALERT	Attack and Launch Early Reporting to Theater
AMARC	Aerospace Maintenance and Regeneration Center
AMCS	Alternate Master Control Station
AOC	Aerospace Operations Center
APB	Acquisition Program Baseline
APS	Aerosol Polarimeter Sensor
APT	Automatic Picture Transmission
ART	Airborne Receive Suite
AS	Air Station
ASC	Aeronautical Systems Center
ASC (C3I)	Command Control, Communications, and Intelligence
ASMCS	AEHF Satellite Mission Control Subsystem
ASOC	Atlas Spaceflight Operations Center
ASP	Acquisition Strategy Panel
ATK	Alliant Technologies
ATMS	Advanced Technology Microwave Sounder
AWS	Advanced Wideband System
B	
BAR	Broad Area Review
BC2A	Bosnia Command and Control Augmentation
BES	Budget Estimate Submission
BES	Budget Estimate Submission
BMDP	Ballistic Missile Defense Program (earlier known as Strategic Defense Initiative)

Bps	Bits Per Second
BRAC	Base Realignment and Closure Commission
BSS	Boeing Satellite System
C	
C&S	Control & Status
C/A	Coarse Acquisition
C3	Capability-3
C4I	Command, Control, Communications, Computer, and Intelligence
C4ISP	Command, Control, Communications, Computers, and Intelligence Support Plan
CACS	Command and Control Squadron
CAD	Component Advanced Development
CAIV	Cost as an Independent Variable
CBC	Common Booster Core
CC&M	Centralized Control and Monitor
CCAFS	Cape Canaveral Air Force Station
CCP	Contract Change Proposal
CCS	Constellation Control Stations
CCSC	Command and Control Sustainment Contract
CCS-C	Command and Control System-Consolidated
CDFS	Cloud Depiction and Forecast System
CDSEG	Control and Display Segment
CECOM	Communications and Electronics Command
CFON	Cape Fiber Optic Network
CGS	Continental U.S. Ground Station
CINC	Commander in Chief
CIU	Controls Interface Unit
CMIS	Conical-Scanning Microwave Imager Sounder
CMNS	Combat Mission Need Statement
CMOC	Cheyenne Mountain Operations Center
CNN	Cable News Network
CONOPS	Concept of Operations
CONUS	Continental United States
COOP	Continuity of Operations Plan
COTS	Commercial, Off-The-Shelf
CPP	Cooperative Program Personnel
CPT	Command Post Terminal
Cris	Cross-Track Infrared Sounder
CSAF	Chief of Staff of the Air Force
CSEL	Combat Survivor Evader Locator
CSOC	Consolidated Space Operations Center
CTPE	Central Tactical Processing Element
CTPS	Centralizad Talametry Processing System
D	
D1	Device 1
D2	Device 2
DAB	Defense Acquisition Board
DAC	Designated Acquisition Commander
DAE	Defense Acquisition Executive
DAGR	Defense Advanced GPS Receiver
DAMA-C	Demand Assignment Multiple Access Compatibility
DARPA	Defense Advanced Research Projects Agency
DCMC	Defense Contract and Management College
DII COE	Defense Information Infrastructure Common Operating Environment
DISA	Defense Information Systems Agency
DISIS	Defense Satellite Communications System/Satellite Control Facility Interface

	System
DMSP	Defense Meteorological Satellite Program
DNRO	Director of the National Reconnaissance Organization
DOCS	DSCS Operations Control System
DoD	Department of Defense
DOT&E	Director of Operational Test and Evaluation
DSC II	Depot Support Contract
DSCS	Defense Satellite Communications System
DSCSOC	DSCS Operations Center
DSP	Defense Support Program
DSP	Defense Support Program
DTRs	Digital Tape Recorders
E	
EAC	Estimate at Completion
EELV	Evolved Expendable Launch Vehicle
EGI	Embedded GPS Inertial
EGS	European Ground Station
EHF	Extremely High Frequencies
EM	Engineering Model
EMD	Engineering and Manufacturing Development
EOW	End-of-Week
EPLGR	Enhanced PLGR
ESC	Electronic Systems Center
ESC/MC	Office Symbol Electronic Systems Center
ESC/MCG	Office symbol for GBS JPO
ESTAR	Early Scheduling Toolkit for Automated Ranges
EUMETSAT	European Organization for Exploitation of Meteorological Satellites
Eutelsat	European Telecommunications Satellite Organization
F	
FAB-T	Family of Beyond Line of Sight Terminals
FAR	Federal Acquisition Regulation
FDS	Flight Demonstration System
FFR	Forward Facing Radiator
FFRDC	Federally Funded Research and Development Center?
FGRS	Fixed Ground Receive Suites
FLTSATCOM	Fleet Satellite Communications
FMS	Foreign Military Sales
FNOC	Fleet Numerical Oceanography Center
FOC	Full Operational Capability
FRP	Full-Rate Production
FSOC	Fairchild Satellite Operations Center
FW	Fighter Wing
G	
GAO	General Accounting Office
GBI	Ground-Based Interceptor
GBS	Global Broadcast Service
GBU	Guided Bomb Unit
GCCS-M	Global Command and Control System - Maritime
GDP	Ground Demonstration Program
GEMs	Graphite-Epoxy Motors
GEO	Geosynchronous Earth Orbit
GeoLITE	Geosynchronous Lightweight Technology Experiment
GNDCPT	Ground Command Post Terminals
GOSC	GPS OCS Support Contract
GPS	Global Positioning System

GPS	Global Positioning System
GPSOS	Global Positioning System Occultation Sensor
GRAM	GPS Receiver Application Module
GSCCE	Gapfiller Satellite Configuration Control Element
GTO	Geosynchronous Transfer Orbit
H	
HEO	Highly Elliptical Orbit
HgCdTe	Mercury Cadmium Teluride
HIF	Horizontal Integration Facility
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HSC	Hughes Space and Communications
H-STT	High Resolution STT
HVAC	Heating, Ventilation and Air Conditioning
I	
ICD	Interface Control Document
ICE	Independent Cost Estimate
IDCSP	Initial Defense Communications Satellite Program
IGEB	Interagency GPS Executive Board
IMCSB	Interim MCS Backup
IMU	Inertial Measurement Unit
INS	Inertial Navigation System
INSEG	Instrumentation Segment
IOC	Initial Operational Capability
IOT&E	Initial Operational Test and Evaluation
IOT&E	Integrated Operational Test and Evaluation
IP	International Partner
IPACS	Integrated Polar Acquisition and Control Subsystem
IPO	Integrated Program Office
IPT	Integrated Product Team
IPT	Integrated Product Team
IQT	Initial Qualification Training
ISOON	Improved Solar Observing Optical Network
IUS	Inertial Upper Stage
IUS	Inertial Upper Stage
IWIN 64	Integrated Weather Information Nephanalysis 64th Mesh
J	
JBS	Joint Broadcast Service
JCSC	Joint Chief of Staff Commander
JET	Joint Estimation Team
JPO	Joint Program Office
JRB	Joint Requirements Board
JROC	Joint Requirements Oversight Council
JROC	Joint Requirements Oversight Council
JROCM	Joint Requirements Oversight Council Memo
JSRC	Joint Search and Rescue Centers
JSSMO	Joint Service System Management Office
JTA	Joint Technical Architecture
JTAGS	Joint Tactical Ground Station
JTFST	Joint Task Force Satellite Terminal
K	
Kbps	Kilo-bits per second
KSC	Kennedy Space Center
L	
LADO	Launch and Early Orbit, Anomaly Resolution and Disposal Operations
LADS	Low Altitude Demonstration System

LC	Launch Complex
LDR	Low Data Rate
LEO	Low Earth Orbit
LMMS	Lockheed Martin Mission Systems
LMMS	Lockheed Martin Missiles and Space Company
LON	Launch on Need
LRIP-2	Low Rate of Initial Production
LSA	Logistics Support Analysis
LSAR	Logistics Support Analysis Record
L-STTs	Lightweight STTs
M	
MAGR	Miniaturized Airborne GPS Receiver
MASC	Milstar Auxiliary Support Center
Mbps	Megabits per second
M-Code	Military Code
MCS	Mission Control Segment
MCS	Master Control Station
MCS	Mission Control Station
MDR	Medium Data Rate
MGS	Mobile Ground System
MILSATCOM	Military Satellite Communications
Milstar	Military Strategic and Tactical Relay
MJPO	MILSATCOM Joint Program Office
MLP	Mobile Launch Platform
MLV	Medium Launch Vehicle
MMCCS	Milstar Mobile Constellation Control Station
MNS	Mission Need Statement
MOA	Memorandum of Agreement
MOB	Mobile Ground System Operating Base
MOC	Mission Operations Center
MOPS	Mission Operations Subsystem
MOS/PIM	Multi-Orbit Satellite/Performance Improvement Modification
MOS/PIM	Multi-Orbit Satellite/Performance Improvement Modification
MOT&E	Multi-Service Operational Test and Evaluation
MOU	Memorandum of Understanding
MPE	Mission Planning Element
MPSOC	Multi-Purpose Satellite Operations Center
MRT	Manpack Receive Suite
MSOC	Milstar Satellite Operations Center
MSRE	Monitor Station Receiver Element
MST	Mobile Service Tower
MWIR	Medium Wave Infrared
MWSSS	Missile Warning Space Surveillance Sensors
N	
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NCO	Noncommissioned Officer
NDAA	National Defense Authorization Act
NDS	Nuclear Detonation Detection System
NESP	Navy EHF SATCOM Program
NETSEG	Network Segment
NIC	Network Integration Contract
NMD	National Missile Defense
NOAA	National Oceanic and Atmospheric Organization
NOUC	Network Operations Upgrades Contract

NPOES	National Polar-orbiting Operational Environmental Satellite
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NPP	NPOESS Preparatory Project
NRE	Non-Recurring Engineer
NRO	National Reconnaissance Office
NSA	National Security Agency
NTSC	National Television System Committee
NUDET	Nuclear Detonation
O	
OA2	Operational Assessment Two
OAS	Orbital Analysis System
OCN	Operational Control Nodes
OCS	Operational Control Segment
ODOC	Objective DSCS Operating Center
OGS	Overseas Ground Station
OLS	Operational Linescan System
OMPS	Ozone Mapping and Profiler Suite
ORD	Operational Requirements Document
ORD	Operational Requirements Document
ORD	Operational Requirement
OSD	Office of the Secretary of Defense
OSR	Operational Switch Replacement
OSSE	Operations Sustainment and Support Element
OTB	Over Target Baseline
OTH	Over-the-Horizon
OUE	Operational Utility and Effectiveness
P	
PbS	Lead Sulfide
PCM	Phase Change Material Canister
PD	Program Definition
PDR	Preliminary Design Review
PDRR	Program Definition and Risk Reduction
PDRR	Program Definition and Risk Reduction
PEO	Program Executive Officer
PIM	Performance Improvement Modification
PITF	Payload Integration and Test Facility
PLGR	Precision Lightweight GPS Receiver
PMP	Program Management Plan
POES	Polar-orbiting Operational Environmental Satellite
POESS	Polar-orbiting Operational Environmental Satellite System
PPS	Precise Positioning Service
PVT	Position/Velocity/Timing
Q	
QT&E	Qualification Test and Evaluation
R	
RAD	Requirements Allocation Document
RADEC	Advanced Radiation Detection Capability
RBC	RTS Block Change
RBM	Receive Broadcast Manager
RC3M	Range and Communications Centralized Control and Monitor
RCC	Resource Control Center
RCDC	Range and Communication Development Contract
RDS	Real-time Data Smooth
RDSMO	Research and Development Space and Missile Operations
RDT&E	Research and Development Test and Evaluation

RFI	Request for Information
RFP	Request For Proposal
RGS-P1	Relay Ground Station Pacific 1
RSA	Range Standardization and Automation
RSI	Request for Statements of Interest
RSLP	Rocket Systems Launch Program
RTS	Remote Tracking Station
S	
SA	Selective Availability
SAASM	Selective Availability Anti-Spoofing Module
SABRS	Space and Atmospheric Burst Reporting System
SAF/AQ	Secretary of the Air Force for Acquisition
SAF/AQ	Secretary of the Air Force for Acquisition and Management
SAF/IA	Secretary of the Air Force International Affairs
SAMP	Single Acquisition Management Plan
SAMS	Systems Acquisition Management Support
SAR	Selected Acquisition Report
SARD	System Architecture and Requirements Definition
SATCOM	Satellite Communications
SAWS	Solar Analyst Work Station
SBIRS	Space-Based Infrared System
SBIRS High	Space Based Infrared Systems High
SBIRS Low	Space Besed Infrared Systems Low
SBL	Space-Based Laser
SBM	Satellite Broadcast Manager
SBS 6	Satellite Business Systems 6
SCA	Satellite Control Authority
SCAMP	Single Channel Anti-Jam Man-Portable
SCNC	SCN Contract
SCR	Software Change Requests
SCSR	Station Computer System Replacement
SCT	Single Channel Transponder
SDIO	SDI Organization
SDR	System Design Review
SECAF	Secretary of the Air Force
SECDEF	Secretary of Defense
SEON	Solar Electro-Optical Network
SEP	System Enhancement Program
SERD	Support Equipment Recommendation Data
SESS	Space Environment Support System
SFIR	Swept Frequency Interferometric Radiometer
SHF	Super High Frequencies
SLC	Space Launch Complex
SLCSPO	SMC Satellite and Launch Control Systems Program Office
SLEP	Service Life Enhancement Program
SLGR	Small Lightweight GPS Receiver
SLOC	Software Lines Of Code
SLR	Space Launch Range
SLRS	Spacelift Range System
SLSRC	Spacelift Renge System Contract
SMART-T	Secure Mobile Anti-Jam Reliable Tactical-Terminal
SMC	Space and Missile Systems Center
SMC/MC	Office Symbol for MILSATCOM
SMC/MCM	Office Symbol for SMC MJPO Milstar Program Office
SMC/MCW	Office Symbol WGS Program Office
SMC/MCX	Office Symbol Advanced Programs Division

SMCS	Satellite Mission Control Subsystem
SMTS	Space and Missile Tracking System
SOC	Satellite Operations Center
SOC	Space Operations Center
SOCC	Satellite Operations Control Center
SOO	Statement of Objectives
SOPS	Space Operations Squadron
SoS	System-of-Systems
Space AE	Space Acquisition Executive
SPAWAR	Space and Naval Warfare Systems
SPD	System Program Director
SPO	System Program Office
SPS	Standard Positioning Service
SRBL	Solar Radio Burst Locator
SRBs	Solid Rocket Boosters
SRMs	Solid Rocket Motors
SRMU	Solid-Rocket Motor Upgrade
SRS	Shipboard Receive Suites
SSM	System Support Manager
SSRS	Subsurface Receive Suites
SSRs	Solid State Recorders
SSSG	Space Systems Support Group
SSTS	Space Surveillance and Tracking System
STEP	Space Test and Experimentation Program
STP	Space Test Program
STS	Space Transportation System
STT	Small Tactical Terminal
SWAFS	Space Weather Analysis and Forecast System
SWarF	Senior Warfighters' Forum
SWIR	Short Wave Infrared
T	
T3	Tiny Tactical Terminal
TBMCS	Theater Battle Management Core System
TEMP	Test and Evaluation Master Plan
TENCAP	Tactical Exploitation of National Capabilities
TGRS	Transportable Ground Receiva Suites
TIP	Theater Injection Point
TRD	Technical Requirements Document
TSBM	Transportable SBM
TSPR	Total System Program Responsibility
TT&C	Tracking, Telemetry and Commanding
TTSE	Test, Training and Simulation Element
TVCF-E	Transportable Vehicle Checkout Facility East
U	
UAV	Unmanned Aerial Vehicle
UBC	Uniform Building Code
UBS	UHF Base Stations
UE	User Equipment
UFO	Ultra High Frequency Follow-On
UG	Upgrade
UHF	Ultra High Frequency
UPIF	Unified Payload Integration Follow-on
UQT	Unit Qualification Training
USAFE	U.S. Air Forces in Europe
USC	United States Code

USD (AT&L)	Under Secretary of Defense (Acquisition, Technology and Logistics)
USS	United States Ship
V	
VIF	Vertical Integration Facility
VIIRS	Visible/Infrared Imager Radiometer Suite
VTS	Vandenberg Tracking Station
W	
WANIU	Wide Area Network Interface Unit
WEFAX	Weather Facsimile
WGS	Wideband Gapfiller Satellite
WR	Warner Robins
W-STTs	Workstation STTs
X	
XDR	Extended Data Rate
Y	
Y2K	Year 2000

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UNCLASSIFIED

HISTORY

OF THE

SPACE AND MISSILE SYSTEMS CENTER

October 1998 - September 2001

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Doc I-1

ORGANIZATION AND MISSION CHARTBOOK

1998

SPACE AND MISSILE SYSTEMS CENTER

SPACE AND MISSILE SYSTEMS CENTER
LOS ANGELES AFB CA
AIR FORCE MATERIEL COMMAND

OCT 98

DOC I-1

SPACE AND MISSILE SYSTEMS CENTER (SMC)
Los Angeles Air Force Base California

FOREWORD

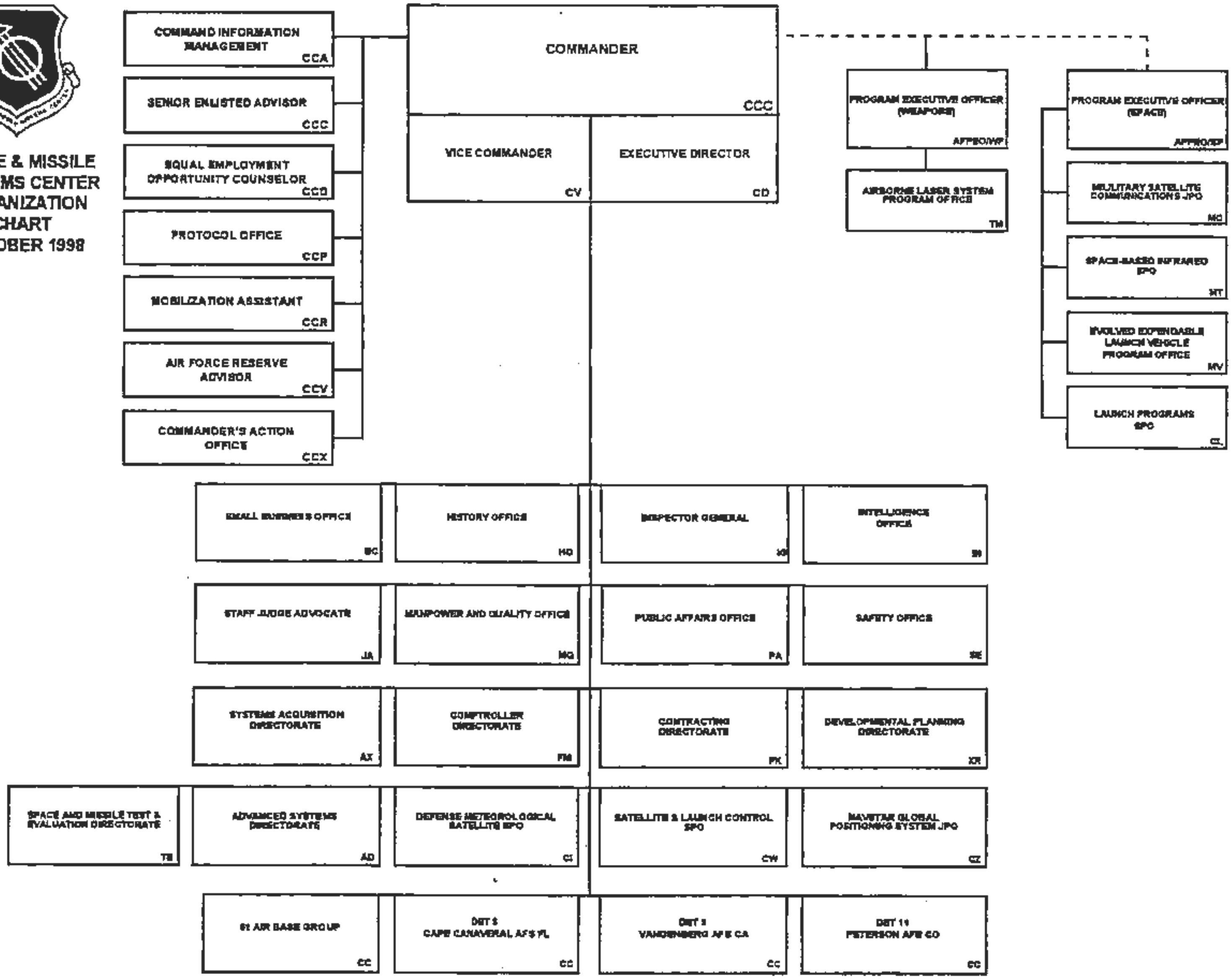
1. This chart book depicts the official organization and functions of Space and Missile Systems Center (SMC). It states the approved assignment of functions within SMC and replaces Space and Missile Systems Center Organization and Mission Chartbook, October 1998.

2. Requests for change or revision to organizational structure and/or functional responsibilities will be prepared by the organization concerned in accordance with AFI 38-101 and forwarded with justification to the Manpower and Quality Office (SMC/MQ) for processing.

3. Deviations from the authorized organizational structure will not be made without approval by the appropriate authority. Approved changes will be published and distributed as required by SMC/MQ.

SANDRA SEMROD
Chief, Manpower and Quality Office

SPACE & MISSILE SYSTEMS CENTER ORGANIZATION CHART OCTOBER 1998



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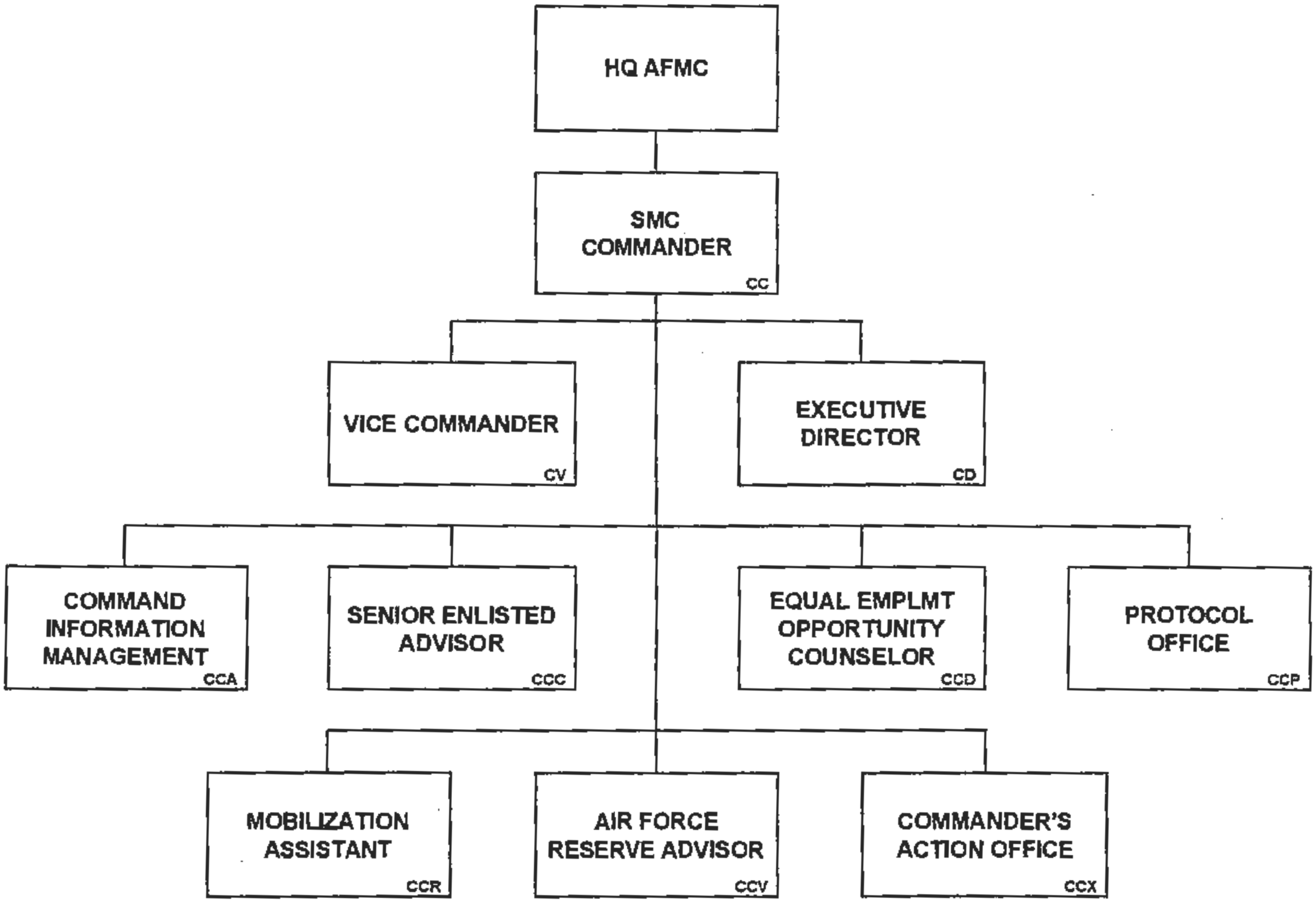

As of Oct 98

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<u>CC - COMMAND SECTION</u>: Exercises command of SMC. Equips US and allied forces with satellites on-orbit, and the capability to employ those satellites in support of global military operations. Over 3,200 personnel and 2,600 contractor man-year equivalents make up the work force with approximately $5 billion budget annually. Conducts research, development, procurement, launch, and on-orbit checkout of US military systems. Directs the formulation and establishment of policies and plans to accomplish the mission of SMC. Establishes policy and provides acquisition program direction consistent with responsibilities as Designated Acquisition Commander (DAC).

<u>CCA - COMMAND INFORMATION MANAGEMENT</u>: Advises the Commander on Information Management policy and procedures; and develops processes to ensure effective control of communications. Provides direct, daily Information Management support to the Commander, Executive Director, and Vice Commander. Controls compliance with DoD policy for foreign travel.

<u>CCC - SENIOR ENLISTED ADVISOR</u>: Senior enlisted consultant to the Commander on all enlisted issues. Ensures effective execution of Quality-of-Life, recognition, performance reporting, and decoration processes for assigned enlisted work force. Implements and adjusts programs which ensure growth, development, high morale and career progression of the enlisted force.

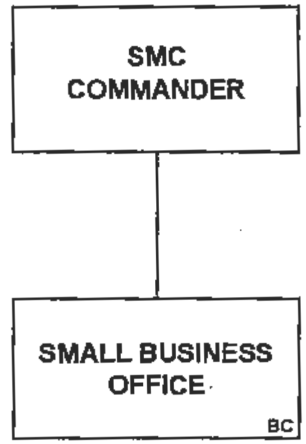
<u>CCD - EQUAL EMPLOYMENT OPPORTUNITY (EEO) COUNSELOR</u>: Provides EEO counseling services to employees, applicants, and former employees as well as EEO Advisory services to SMC management. The staff performs a full range of counseling services designed to resolve EEO complaints. Staff members conduct necessary fact-finding inquiries and Mediation Conferences in furthering the Air Force's EEO policy of non-discrimination in employment and resolution of issues at the lowest level. Responsible for overseeing overall case management of all EEO complaints, pre-complaint inquiries, investigations, EEOC Hearings, EEOC Appeals and Final Air Force Decisions (FAD's). Proactively advises commanders, managers, and supervisors on EEO concerns. Conducts periodic analyses to identify trends, barriers and possible systemic problems and to provide solutions to the Commander. Develops EEO training initiatives relating to EEO climate and managerial needs. Develops and implements SMC EEO policy and procedures.

<u>CCP - PROTOCOL OFFICE</u>: Provides protocol support for the Commander, staff, subordinate organizations, tenant organizations, and other armed services in the area. Directs, develops, and coordinates ceremonies for the Commander. Develops SMC protocol policy and interprets AF and AFMC policies. Directly supports over 200 distinguished visitors annually, including senior executives from DoD, Congress, and foreign governments. Coordinates visits of dignitaries; to include detailed itineraries, tours, and ceremonies. Directs and coordinates protocol activities for general officer conferences. Provides policy guidance and accountability for Commander's official representation funds.

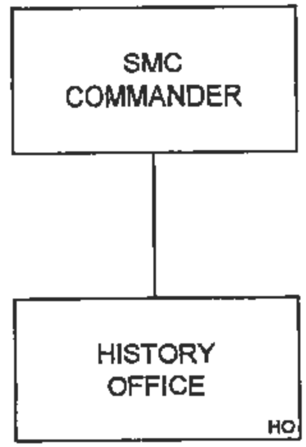
CCR - MOBILIZATION ASSISTANT: Represents the Commander in all matters relating to the acquisition of space systems, launch vehicles, and subsystems for integration into our national inventory. This also includes development, acquisition, launch, orbit and operational support of numerous spacecraft in addition to space launch vehicles, recovery and range aircraft, and tracking ships. Exercises authority in the conduct of SMC's worldwide mission and is delegated the authority to resolve those problems affecting SMC and subordinate units which do not require the personal attention of the commander.

CCV - AIR FORCE RESERVE ADVISOR: Provides support to the SMC Reserve Program in the areas of reserve assignments; ensuring reserve manning levels; processing performance reports and awards and decorations; and developing, analyzing, and maintaining statistics concerning promotions.

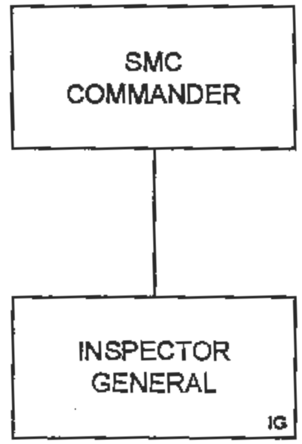
CCX - COMMANDER'S ACTION OFFICE: Provides the Commander a resource for cross-functional special interest, programmatic, or management projects. Provides the Commander analysis of events and issues relevant to the space community, AFMC, Air Force and DoD. Responsible for administrative control of communications, the Center suspense tracking system, and monitoring command policies to ensure consistency and compliance.



BC- SMALL BUSINESS OFFICE: Advises and represents the Commander on all aspects of Small Business. Develops plans, policy guidance, objectives, and procedures in implementing an effective Small Business Program. Ensures that acquisition policies, procedures, and practices will provide maximum practicable opportunity for small businesses to compete for contract awards and to promote effective outreach efforts to interest, encourage and assist small businesses in doing business with SMC.



HO - HISTORY OFFICE: Advises and represents the Commander on historical matters. Prepares annual histories of SMC for higher headquarters. Maintains an archival collection and furnishes historical information and documentary materials to the Commander and staff, subordinate units, and higher headquarters as requested. Reviews histories published by subordinate units.



IG - INSPECTOR GENERAL: Directs the Commander's Inspector General (IG) activities which include Fraud, Waste and Abuse (FW&A) Complaints, and Unit Compliance Inspections. Directly interfaces with the Air Force Inspection Agency, DoD, Air Force, and AFMC/IG, and other inspection organizations as needed to resolve issues and facilitate inspections, investigations, and review teams at SMC. Center's focal point for Congressional Inquiries. Ensures the Center's mobility, readiness and disaster preparedness by directing the development, execution, and evaluation of Center exercises; serves as the Center's Exercise Evaluation Team (EET) Chief. Performs other critical duties as assigned in support of the Commander, Vice Commander, and Executive Director.

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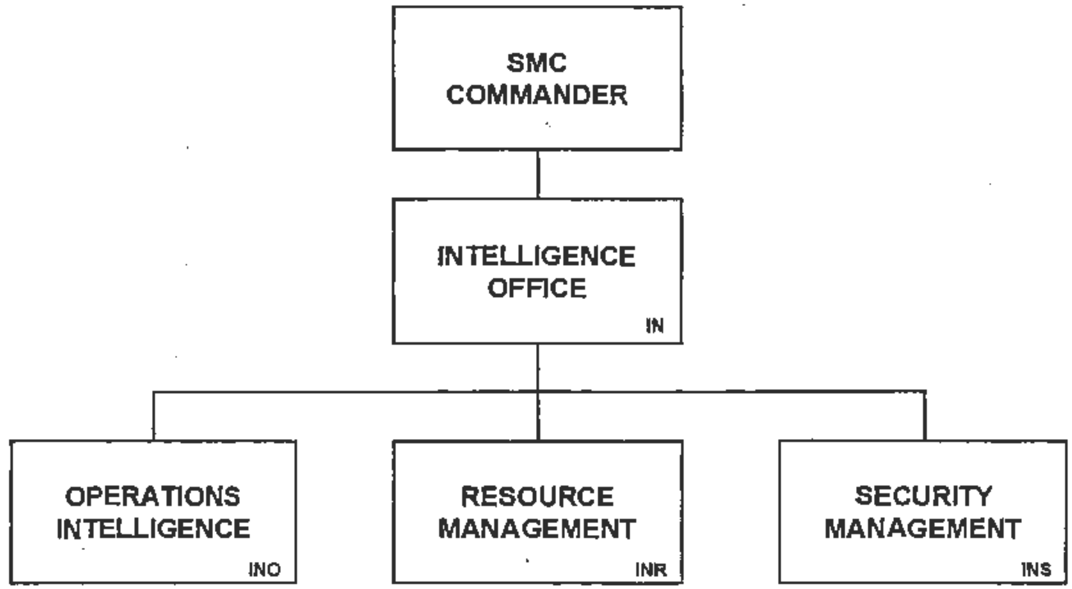
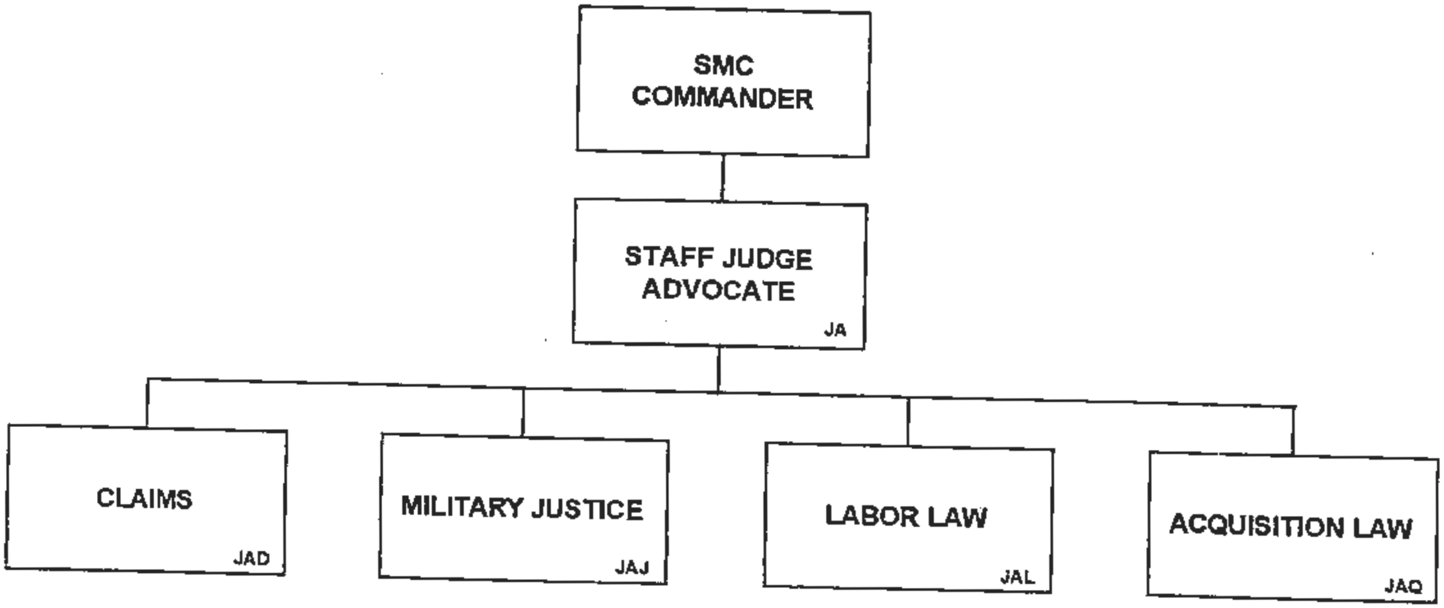


IN - INTELLIGENCE OFFICE: Conducts scientific and technical intelligence research and analysis in support of space systems acquisition. Directs general military intelligence information, special security guidance, and information services support to all SMC and Program Executive Officer (Space) elements, other governmental agencies, and aerospace contractors throughout the Western Region.

INO - OPERATIONS INTELLIGENCE: Supports system program offices, their contractors, staff agencies, and other governmental agencies and contractors by performing intelligence research and providing retrieval and dissemination services. Produces and presents intelligence briefings to the Commander, system program offices, other DoD organizations, NASA, and other federal agencies. Obtains appropriate DoD intelligence agency approval for formal threat assessment documents required to meet Air Force acquisition milestones. Maintains current and research libraries at various security levels, maintains automated and manual classified data bases to facilitate the acquisition, storage, and dissemination of intelligence information. Processes requests for originator release of classified documents. Operates and maintains cognizance of national automated intelligence data base terminals.

INR - RESOURCE MANAGEMENT: Responsible for office administration and records maintenance, management of manpower resources, financial resources, career development for both civilian and military personnel, and data management support for use by senior management.

INS - SECURITY MANAGEMENT: Manages the Sensitive Compartmented Information (SCI) Security Program through personnel, information, and physical security measures. Provides billet management, security access processing, indoctrination, debriefing, and access certification support for government and contractor employees requiring access to SCI. Ensures that Center and PK contractor SCI facilities and equipment meet regulatory, construction and operational standards, including accreditation, facility access, and communications requirements.



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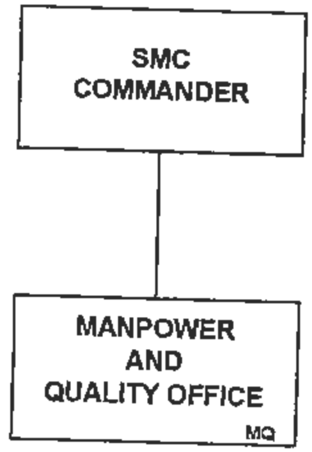
JA - STAFF JUDGE ADVOCATE: Administers and supervises entire legal program within the Center. Monitors and assists in all legal and litigation matters involving Department of Justice, Armed Services Board of Contract Appeals, Court of Federal Claims, Federal Labor Relations Authority, Merit Systems Protection Board and Equal Employment Opportunity Commission. Supervises and monitors conflict of interest matters pursuant to laws and regulations.

JAD - CLAIMS: Investigates, processes, and adjudicates claims for and against the USAF under AFI 51-501 and AFI 51-502. Processes and handles all Air Force sonic boom claims in greater Los Angeles area. Coordinates with and assists the US Attorney in all tort actions involving the USAF in Federal Court.

JAJ - MILITARY JUSTICE: Supervises military justice system and administration of military discipline within the Center. Reviews and renders opinions on proposed disciplinary matters. Administers general court-martial jurisdiction. Renders legal opinions on reports of investigation and board proceedings. Interprets and renders opinions on laws, regulations, and directives. Supervises legal assistance program for the Center, and provides legal assistance to the Los Angeles AFB personnel and other personnel IAW AFI 51-504. Supervises the Preventive Law Program within SMC.

JAL - LABOR LAW: Renders advice, assistance, and opinions. Represents SMC and other organizations serviced by Civilian Personnel Flight before various tribunals. Establishes policy on legal matters arising out of personnel and EEO/Affirmative employment activities of the Civilian Personnel Flight, the EEO Office and SMC and tenant organization commanders and managers. Plans, organizes, and conducts studies of legal problems encountered in the Employee-Labor Management Relations and EEO fields. Reviews and coordinates on individual actions prepared by management as required or requested prior to issuance. Prepares and represents AF management in administrative and Federal court personnel litigation as required by AF guidance. Represents management in civilian grievance matters. Renders legal advice to the management negotiating team in collective bargaining with respect to basic labor contract and impact and implementation issues.

JAQ -ACQUISITION LAW: Renders advice, assistance, opinions, and establishes policy on legal matters arising out of SMC contracting activities and environmental issues. Represents the government as legal advisor in conferences with contractor personnel and environmental regulators. Reviews contractual and National Environmental Policy Act documents for legal sufficiency, including assistance on patent infringement claims, copyrights, royalties, and other proprietary rights. Administers contractor compliance with invention rights clauses in SMC contracts. Determines rights in employee inventions and processes employee invention claims in accordance with laws and regulations.



MQ - MANPOWER AND QUALITY OFFICE: Advises the Commander and staff on effective allocation of mission resources. Facilitates strategic planning, functional process improvement, organizational design, war and peacetime manpower requirements determination, and public-private competition. Provides tools and training for Center-wide incorporation of Quality Air Force (QAF) principles and assessment against QAF criteria. Manages the Innovative Development through Employee Awareness (IDEA) Program, productivity programs, and implementation of resource management initiatives.

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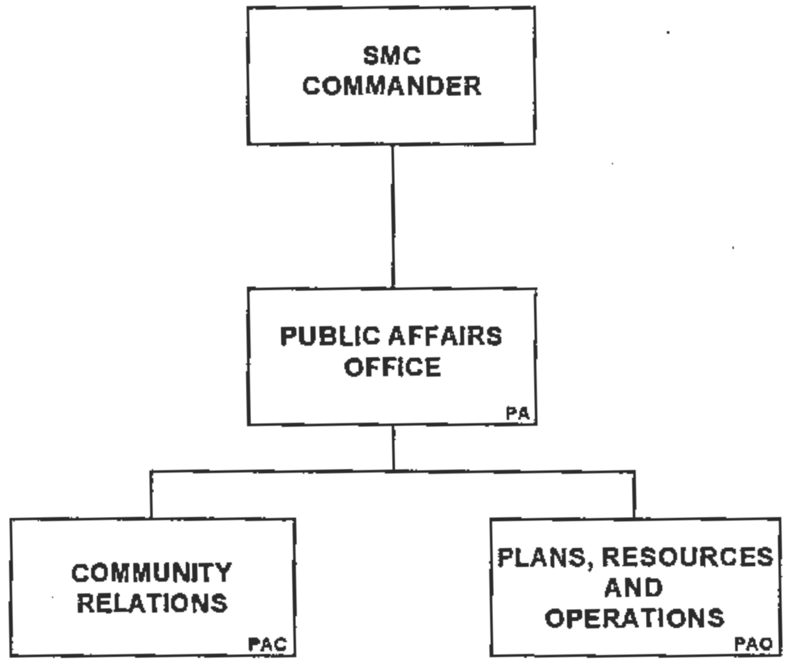
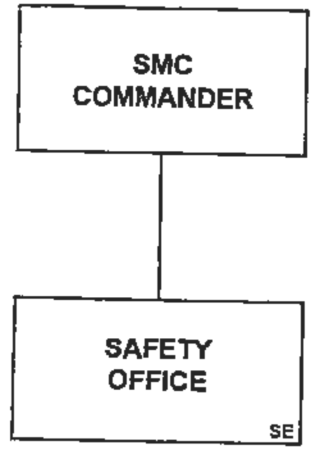


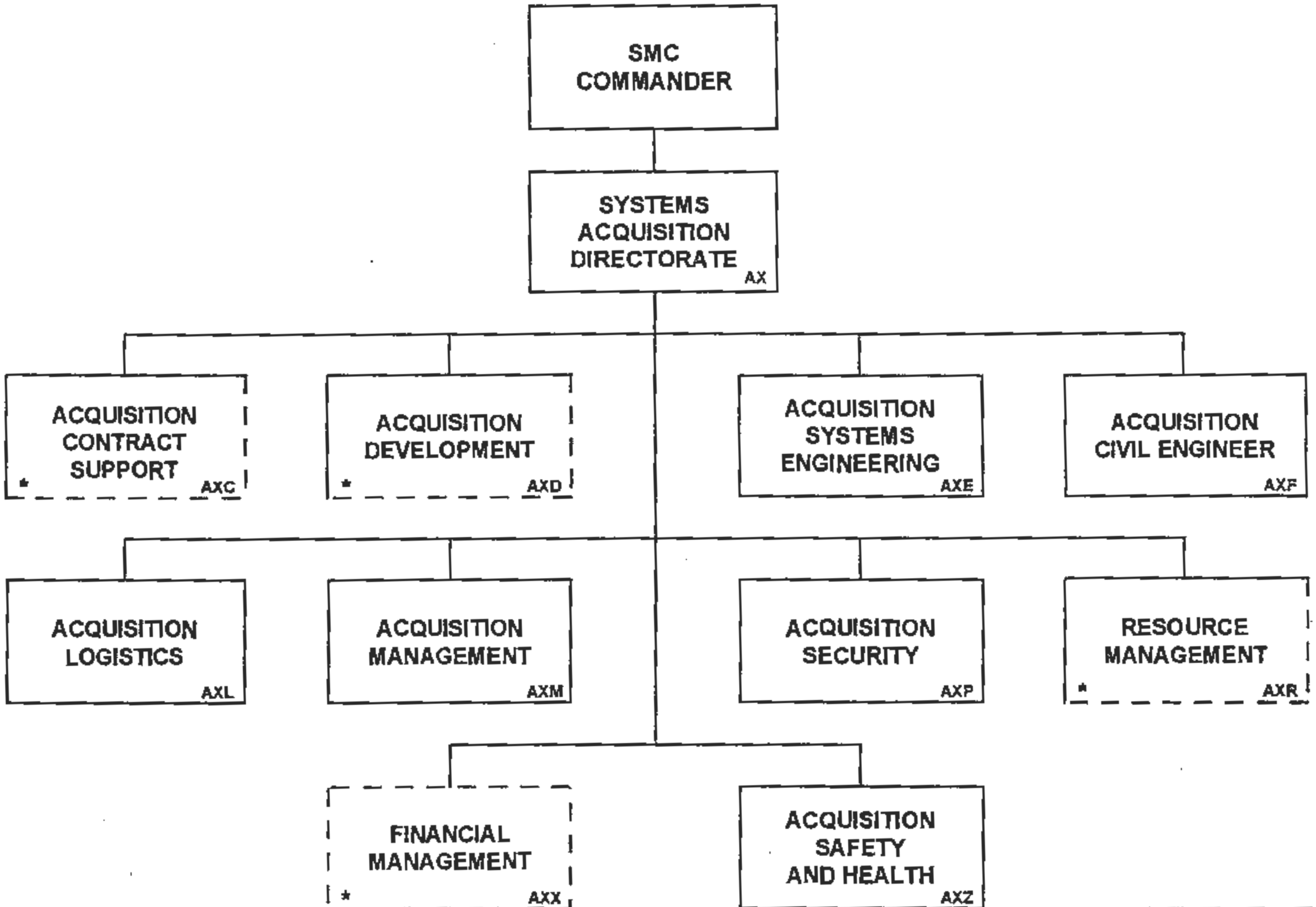
<u>PA - PUBLIC AFFAIRS OFFICE</u>: Provides public affairs counsel and speechwriting support to the Commander and senior staff. Serves as approval authority for public release of all information about SMC, its subordinate units and related units (i.e. Space Wings at VAFB and CCAS). Plans and conducts PA activities on SMC achievements and milestones with local, regional, national and international media, community leaders, and the general public. Manages the Speakers Bureau, the Community Relations program, and publishes the ASTRO NEWS.

<u>PAC - COMMUNITY RELATIONS</u>: Develops and directs community relations, internal communications and Speakers Bureau programs. Networks with five individual Chambers of Commerce and 17-member South Bay Associates of Chambers of Commerce to advise the PA Chief and SMC Commander on matters having possible impact on the SMC mission or base welfare. Plans SMC briefings to Air Force groups and community opinion leaders. Negotiates contract and publishes the base newspaper. Manages Speakers Bureau program and provides speech research assistance. Serves as SMC coordinator for annual community events; serves as escort when appropriate; and represents PA Chief at all base activities and community events. Manages AF lithograph series. Manages senior staff editorials and maintains key personnel biographies.

<u>PAO - PLANS, RESOURCES AND OPERATIONS</u>: Develops and directs planning for the Public Affairs Office, specifically media relations, security review, and special projects. Administers SMC Public Affairs Plan. Directs media activities using all available outlets to disseminate factual and timely SMC space systems information to the general public. Provides media training and counseling to SMC personnel on media-related activities. Serves as point of contact for all SMC/LAAFB environmental issues. Provides guidance on release procedures and reviews materials for SMC units and the aerospace industry. Manages personnel actions and career training program for PA staff and develops long-range budgets.



<u>SE - SAFETY OFFICE</u>: Manages the mishap prevention program for all Los Angeles AFB organizations at the direction of the Commander. Serves as the focal point for ground safety mishap prevention and performs mishap investigation and reporting.



* = Matrixed Organizations

Depicts an organization that is partially matrixed from PK

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AX - SYSTEMS ACQUISITION DIRECTORATE: Develops and implements acquisition management, civil engineering, logistics, safety, security, systems engineering, manufacturing, and quality assurance policies and practices. Manages military and civilian work forces in related technical fields. Provides products, processes, tools, and expertise to acquire and sustain air and space systems. Integrates solutions for technology problem areas common to multiple SMC organizations; includes support to the program offices in the development of technical strategies, statement of work, contract data requirements list, and specification development. Provides program management of The Aerospace Corporation contract and technical support contracts. The Chief Engineer establishes a Center focus for engineering excellence.

AXC - ACQUISITION CONTRACT SUPPORT DIVISION: Ensures availability of highly qualified contracted support to fulfill user needs for engineering, technical, and financial services. Management agency for Advisory & Assistance Services (A&AS), which includes Federally Funded Research and Development Center (FFRDC) and SMC-wide Systems Engineering and Technical Assistance (SETA) actions. SMC focal point for allocation and control of contracted technical services. Negotiates and administers all requirements with The Aerospace Corporation. Provides staff guidance on the utilization of the contracted support consistent with SMC and higher level policies.

AXD - ACQUISITION DEVELOPMENT DIVISION: Provides guidance and support to SMC programs in the development and implementation of effective acquisition planning, generation of requests for proposals, conduct of source selections and pre-contract award activities, and Integrated Product Development teaming throughout SMC. Center focal point for acquisition reform and initiatives. Manages Integrated Product Development Center and Source Selection Facility.

AXE - ACQUISITION SYSTEMS ENGINEERING DIVISION: Develops and implements engineering policies and practices throughout the Center and advises the Commander in these areas. This includes the management of Center and Aerospace Corporation independent technical assessments and reviews, identification of risks and possible options to mitigate those risks. It also includes the management of Center engineering resources, training, career development, and computer resources. Responsible for the areas of standardization development and horizontal engineering. Provides meteorological guidance and support on atmospheric conditions affecting launches and space environmental effects on space systems.

AXF - ACQUISITION CIVIL ENGINEER DIVISION: Manages, directs, controls and accomplishes Acquisition Civil Engineer functions for SMC. Maintains cognizance and management of major facility projects generated by program offices. Acts as focal point for the Commander for all Civil Engineer activities. Manages environmental protection functions and provides technical expertise required to solve engineering problems related to environmental protection and control.

AXL - ACQUISITION LOGISTICS DIVISION: Responsible for the management of acquisition logistics for space systems. Provides direction, policy, guidance, assistance, technical analysis, and training to assure that logistics and supportability policies and objectives are achieved. Directs the integration of logistics planning into the program offices and provides acquisition logistics manning via the matrix management structure. Manages the Technical Logistics Support Planning Staff.

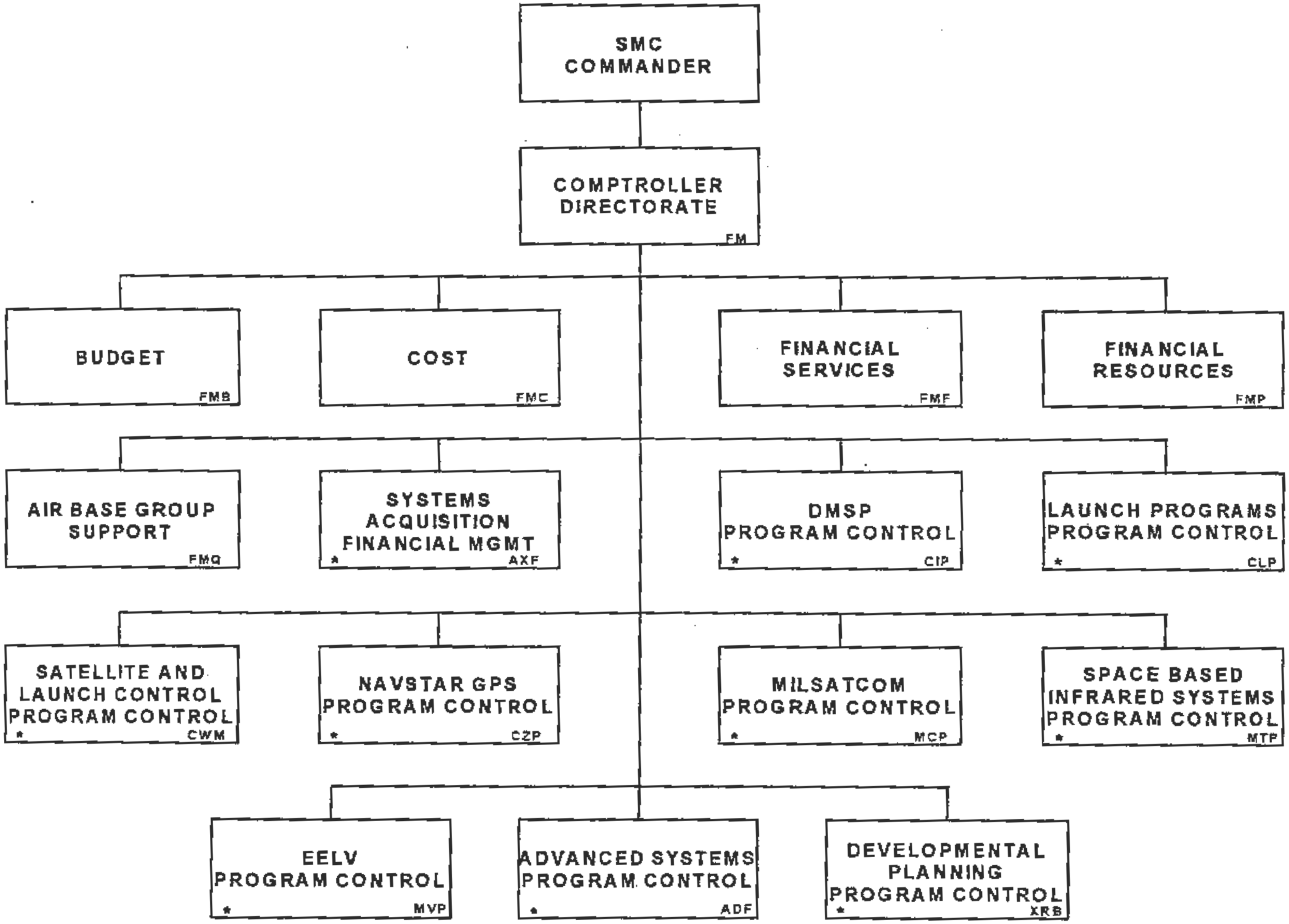
<u>AXM - ACQUISITION MANAGEMENT DIVISION</u>: Implements and manages manufacturing engineering, systems effectiveness, quality assurance and engineering, component engineering, and technical standardization functions. Develops acquisition strategies to assure that the Center and AFMC functional policies and objectives for program management, functional engineering, and technical management are achieved. Provides expertise and guidance to plan, implement, and sustain effective support of program offices. Serves as the Center's focal point for program management issues and AFMC Product Support Business Area (PSBA) participation.

<u>AXP - ACQUISITION SECURITY DIVISION</u>: Responsible for managing protection for DoD space systems acquisitions. Provides direction, policy, guidance, assistance and qualified human resources (government and contractor) to assure protection policies and objectives are achieved through the acquisition life cycle to include launch and operations. Center focal point for acquisition, information, industrial, personnel, physical, product and operations security as well as protection planning, foreign disclosure, technology transfer and treaty management activities. Performs cognizant security oversight of The Aerospace Corporation. Advises the Commander on all matters affecting acquisition security within the Center.

<u>AXR - RESOURCE MANAGEMENT DIVISION</u>: Assists the Director and division functionals in managing the personnel resources in their functional areas throughout the Center, to include placement, internal movement, and career support for both military and civilian resources. Center focal point for the Program Management and Systems, Planning, Research & Development Engineering (SPRDE) Acquisition Professional Development Program and related training and education requirements. Administers the Defense Systems Management College Board. Provides data management support for use by senior management in making decisions.

<u>AXX - FINANCIAL MANAGEMENT DIVISION</u>: Exercises controls over directorate financial resources. Prepares and executes the directorate's annual financial plan and standard support financial plan. Manages and disburses funds for program operations and maintenance, Shared Program Common Cost Support, military construction, and procurement. Oversees travel budgeting for O&M, pollution prevention, BMDO and Titan funds. Provides accounting, funding status reports, and guidance on travel orders, vouchers, funding documents, and government official travel and IMPAC credit cards. Provides financial support for contract administrative and advisory service, Raytheon engineering and contractors project at Buckley ANG, CO, Cost Plus Award Fee (level of effort), Firm Fixed Price Plus Award Fee (work requests), Federally Funded Research and Development Center (FFRDC) and Systems Engineering and Technical Assistance (SETA). Manages the directorate's Internal Management Control Program (IMCP), and serves as the focal point for the Inspector General and auditor organizations.

<u>AXZ - ACQUISITION SAFETY AND HEALTH DIVISION</u>: Performs as focal point for system safety, space safety, ground safety, acquisition pollution prevention, hazardous material/waste management, toxicology, radiation, and exposure assessment issues. Ensure mitigation of work place safety and health hazards to prevent equipment loss and personnel injury.



* = Matrixed Organizations

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FM - COMPTROLLER DIRECTORATE: Responsible for the effective financial management of the Air Force space and launch vehicle programs and serves as the principle financial executive to the Commander, staff, and all SMC business and financial management offices. Provides executive and technical guidance, effective and efficient matrix management, system program planning and control, cost estimating, scheduling, accounting, finance, budgeting, and process and statistical reporting to SMC organizations.

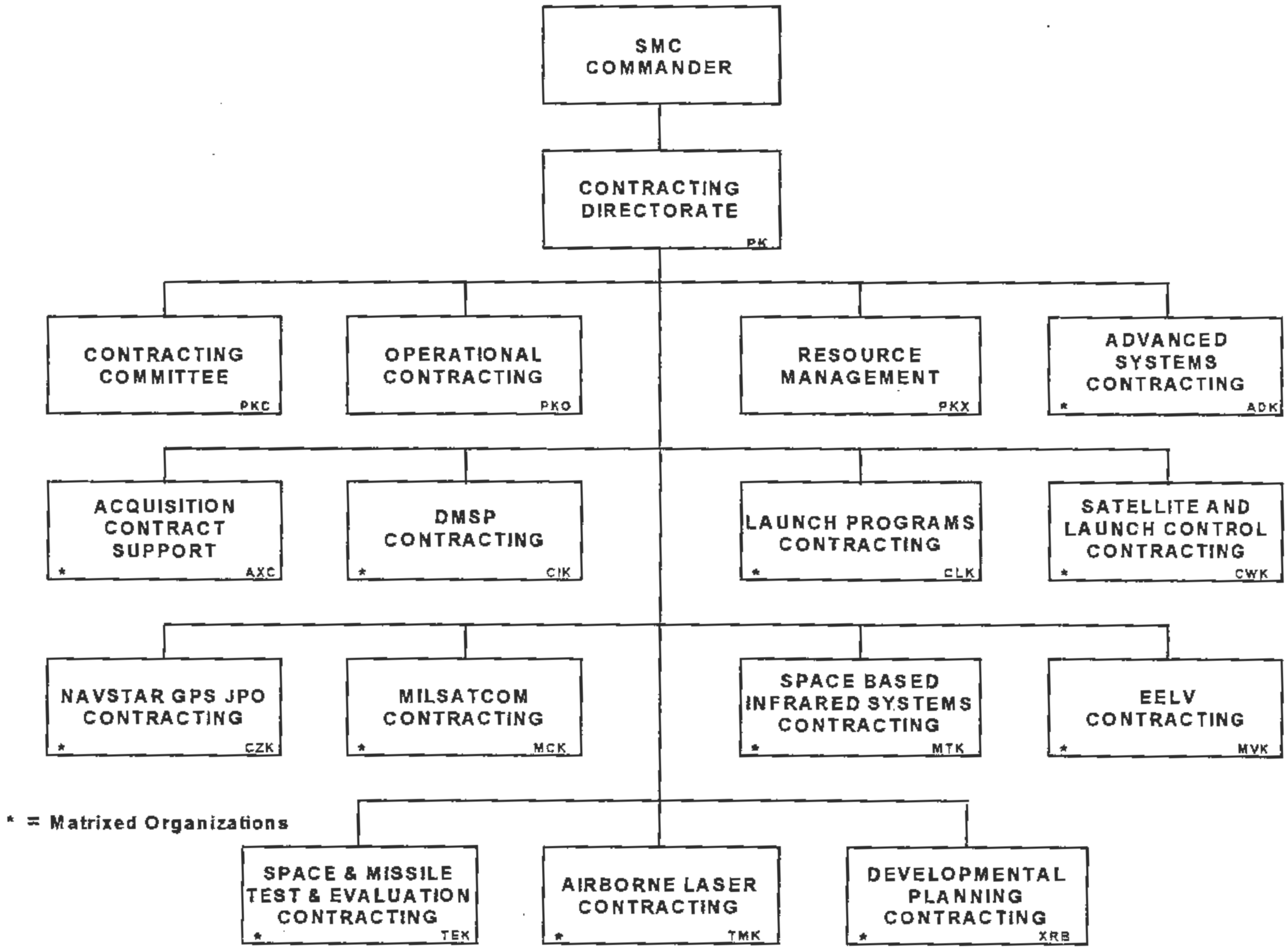
FMB - BUDGET DIVISION: Provides professional assistance and guidance to System Program Offices (SPO) team members as well as coordination and consultation with AFMC and Secretary of Air Force (SAF), in the preparation and submission of the Program Objective Memorandum (POM), Budget Estimate Submission (BES), and other budget formulation processes. Acts as the Base Budget Office for the SMC Commander. Provides similar assistance and guidance in the receipt of budget authorizations and management of program funds execution for the Commander. Acts as the SMC focal point for the preparation and submission of the Selected Acquisition Report (SAR), Defense Acquisition Executive Summary (DAES), and all other higher headquarters acquisition reporting as required by the SAF and Secretary of Defense.

FMC - COST DIVISION: Provides cost estimating/analysis processes which will provide SMC program managers with superior information to be used to make informed decisions. FMC is recognized as the center of cost support excellence.

FMF - FINANCIAL SERVICES DIVISION: Provides financial support including military and civilian pay, travel pay, and accounting liaison services to the personnel and organizations of the Space and Missile Systems Center (SMC) and greater Los Angeles area. The Financial Services Division works closely with the Defense Finance and Accounting Service (DFAS) in fulfillment of these responsibilities.

FMP - FINANCIAL RESOURCES DIVISION: Provides financial management expertise for SPO personnel resource needs. Manages training and career broadening opportunities for all financial managers. Responsible for certification and acquisition training of the Financial Management Acquisition Professional Development Program. Provides integrated financial management systems, hardware and software, associated training, and future enhancements to meet SPO needs. Overseas and controls the GAO/DoD-IG/AFAA audit process and Internal Management Control process for the Commander. Serves as the Total Quality advocate for the Comptroller.

FMQ - AIR BASE GROUP SUPPORT DIVISION: Provides financial management expertise and services in support of the 61 ABG activities.


SMC COMMANDER
CONTRACTING DIRECTORATE PK
CONTRACTING COMMITTEE PKC
OPERATIONAL CONTRACTING PKO
RESOURCE MANAGEMENT PKX
ADVANCED SYSTEMS CONTRACTING * ADK
ACQUISITION CONTRACT SUPPORT * AXC
DMSP CONTRACTING * CIK
LAUNCH PROGRAMS CONTRACTING * CLK
SATELLITE AND LAUNCH CONTROL CONTRACTING * CWK
NAVSTAR GPS JPO CONTRACTING * CZK
MILSATCOM CONTRACTING * MCK
SPACE BASED INFRARED SYSTEMS CONTRACTING * MTK
EELV CONTRACTING * MVK
* = Matrixed Organizations
SPACE & MISSILE TEST & EVALUATION CONTRACTING * TEK
AIRBORNE LASER CONTRACTING * TMK
DEVELOPMENTAL PLANNING CONTRACTING * XRB

PK - CONTRACTING DIRECTORATE: Serves as principal advisor to the Commander on all contracting matters. Exercises specific Federal Acquisition Regulation delegated contracting authorities and responsibilities for all SMC DAC and PEO contracting actions. Directs all aspects of the acquisition process including legislative initiatives, policy implementation, strategy development, and contract execution. Provides matrix support to all SMC organizations and is responsible for the career development of all contracting personnel.

PKC - CONTRACTING COMMITTEE DIVISION: Provides expert advice to contracting and program management customers on the latest FAR requirements, acquisition reform initiatives, higher headquarters policy, SMC process guidance and corporate lessons learned/best practices and their impact on the contracting process. Ensures that contractual documents implement approved acquisition strategies and are consistent with law and regulation through a variety of reviews over the duration of the acquisition cycle. Responsible for assessment, interpretation, implementation, and execution of higher headquarters policy; serves as the central repository for contracting policy affecting SMC.

PKO - OPERATIONAL CONTRACTING DIVISION: To enhance readiness by providing timely acquisition and delivery of quality goods and services through the most efficient means to the SMC/LAAFB community. Maintains a highly professional work force dedicated to providing the highest level of customer service and satisfaction.

PKX - RESOURCE MANAGEMENT DIVISION: Provides professional assistance and guidance to contracting organizations on systems and operational acquisition matters. Serves as Competition Advocate for the SMC Commander and the PEO (Space). Participates in Acquisition Strategy Panels (ASPs) and Solicitation Review Boards (SRBs). Provides pricing support, office automation, total quality, and human resource matrix management for all SMC contracting personnel.

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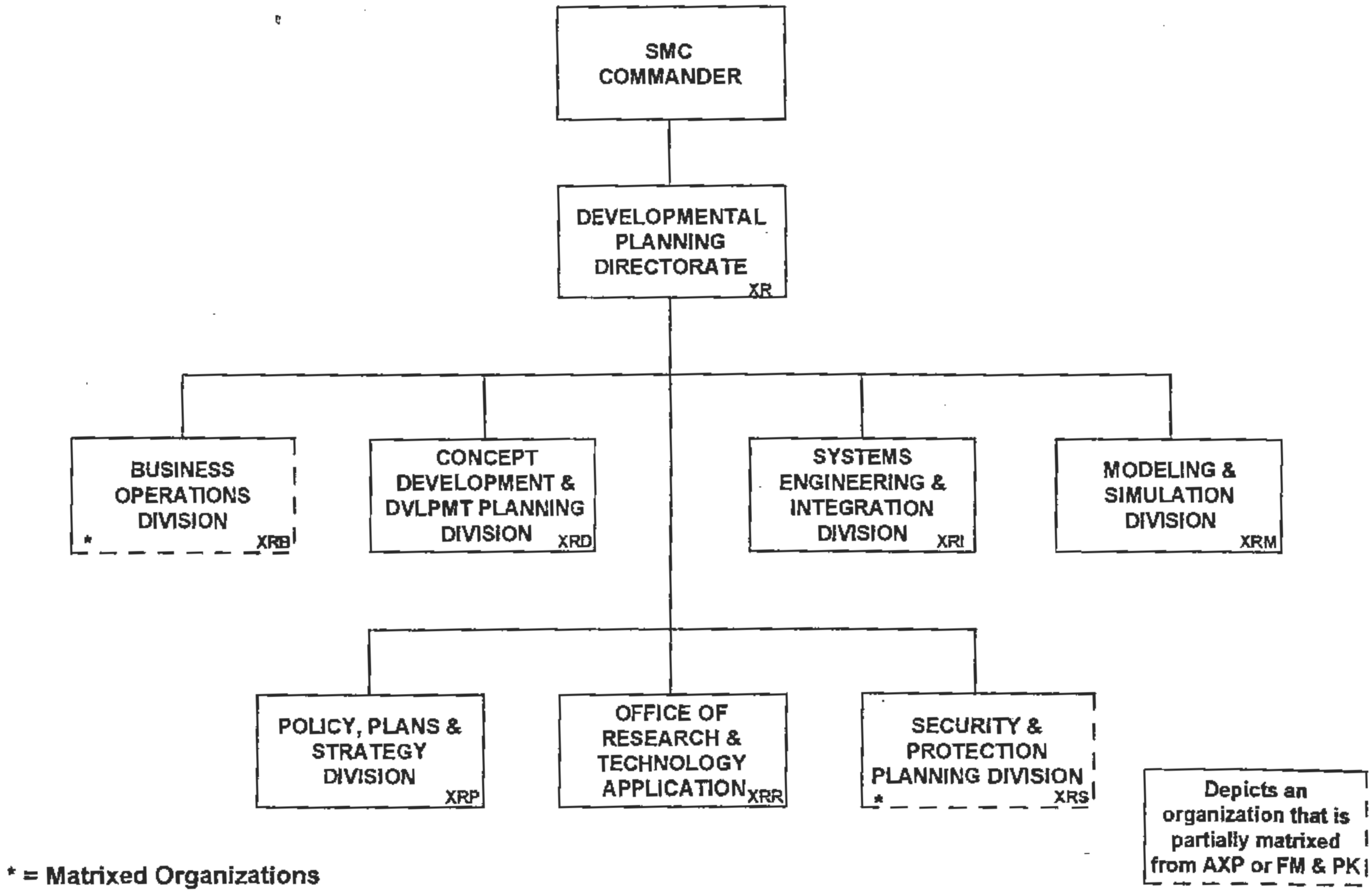

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Developmental Planning Directorate (XR): Plans research, development, technology, and future acquisition of space systems for the control and exploitation of air and space. Implements the Directorate's goals to: 1) plan for the enduring military advantage to U.S. and allied forces through the use of space, 2) provide responsive and accurate analytical, engineering and concept design products to decision makers, 3) provide systems of systems engineering and architecture analysis for use by the Center and the corporate Air Force, consistent with National and DoD Space Policy 4) provide timely and effective transfer of space technology, 5) nurture a capable, effective, and valued workforce.

Business Operations Division (XRB): Provides consolidated business management operations to include contractual, financial, human resource, administrative and information system support. Provides financial and contracting support for engineering analysis, design, and development contracts. Acts as the air force agent for the Ballistic Missile Defense Organization (BMDO) Program Management Agreements (PMA) for program support. Provides computer Wide Area Network (WAN) and Local Area Network (LAN) computer services for BMDO and XR activities. Budgets for base operating support funds, tracks all funds received from all sources as well as funds execution. Manages the XR personnel and training activities for 169 authorized positions.

Concept Development and Development Planning Division (XRD): Establisbes and maintains a strong long-range planning foundation, which addresses U.S. Space requirements over the next 25 years. Ensures that future concepts and technology roadmaps are analytically based regarding system engineered performance, design, and cost trades to determine future space system concepts and architecture viability. Develops and evaluates advanced space concept alternatives, identifies and defines required technologies, identifies range of system and operational solutions to meet deficiencies in AFSPC's Mission Area Plans and Requirements Generation System under the Air Force Modernization Planning Process. Responsible for the implementation and execution of the Technical Planning Integrated Product Team (TPIPT) process.

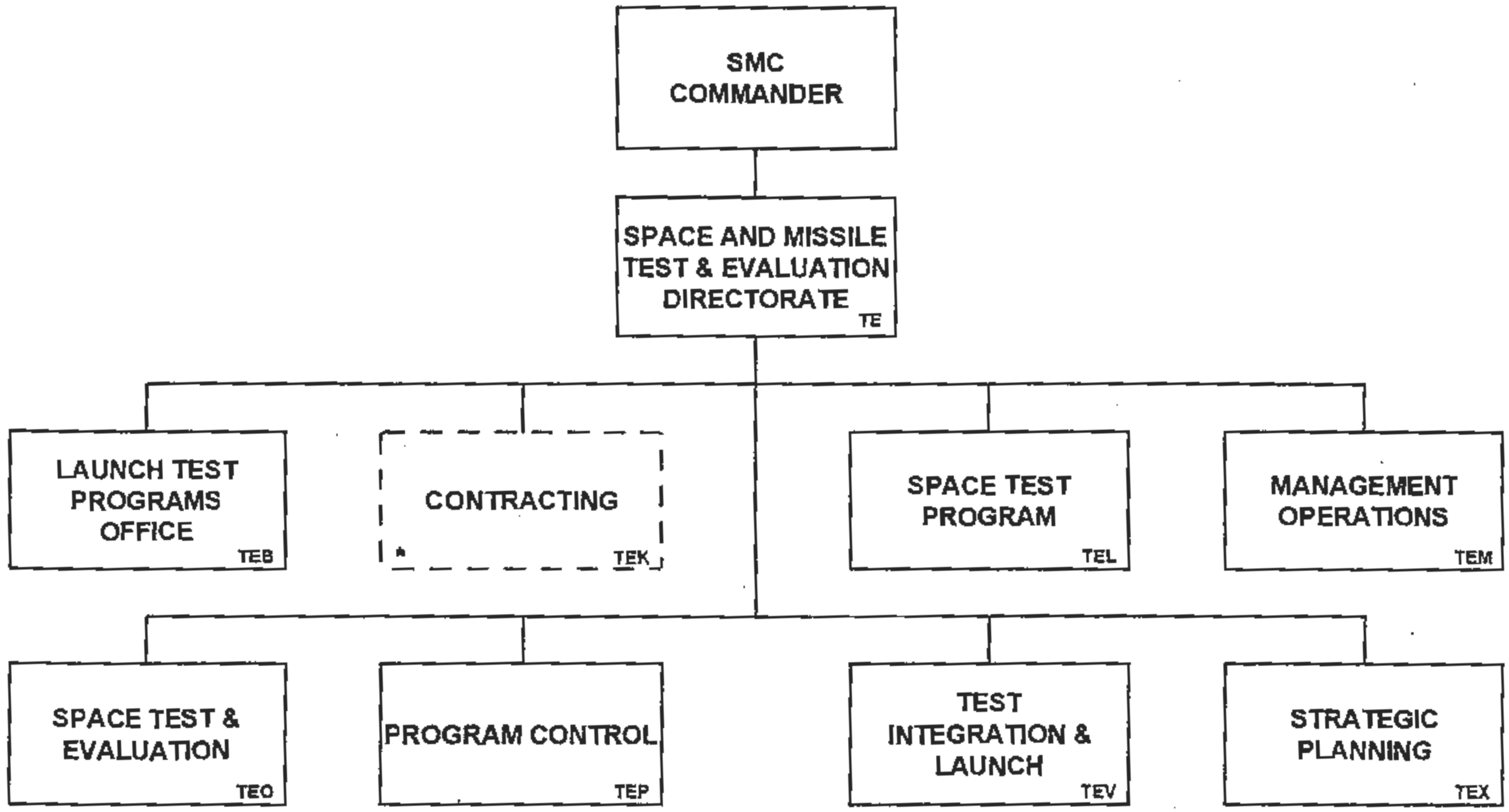
Systems Engineering and Integration Division (XRI): Provides system engineering, and system of systems architecture level analysis quantifying the military worth of space systems to the warfighter and key decision makers. The division conducts long-range planning activities for key, high interest space projects and thrust areas by conducting military worth analysis studies, maintaining core area business cases, and managing core area issues. The six initial core thrust and project areas are: 1) Commercial and International Space, 2) National Security Space Architecture, 3) Air and Space Integration, 4) Survivability & Vulnerability/Space Control, 5) Space Based Radar/Hyper-Spectral Imagery, and 6) Aerospace Vehicle. Forms new thrusts/projects in response to significant interest or proposals from the White House, Congress, OSD, NRO, SECAF/CSAF, AFSPC, or SMC/CC.

Modeling and Simulation Division (XRM): Provides models and simulations of future space systems and capabilities to support military worth analysis and Center participation in exercises and wargames. Supports USAF and joint DOD exercises and wargames with simulations of future space systems. Supports planning of future space systems through military utility analysis, cost analysis, and wargames. Develops, modifies, upgrades, and maintains software models and simulations. Establishes processing equipment high-security interconnections and protocols. Integrates systems across AFMC, the Air Force, other military services, and the US National Security establishment.

Policy, Plans and Strategy Division (XRP): Provides focus for Center contributions to National, DoD and Air Force space policy, planning and strategy developments to include legislative affairs and Air Force space Program Objective Memorandum (POM) activities. Represents the Center Commander, prepares and coordinates Center inputs on national security space policies, plans and strategies. Interfaces through SAF with the national security space community to include White House, Congress, Commerce, OSD, interagency organizations and commercial space product and service providers to identify, define and resolve national security space policy, planning and strategy issues. Conducts SMC strategic business and management planning and assessments in support of space systems acquisition. Develops approaches for an integrated planning context across all Space areas of interest. Responsible for: 1) developing and coordinating SMC strategic planning; 2) supporting business area reviews and integration of business area plans to include establishing business performance indicators; 3) Planning, Programming, & Budget System (PPBS) oversight for SMC's future years defense program development process; 4) performing legislative liaison functions to identify, analyze, and track legislative information to provide corporate level situational awareness; 5) supporting the DoD integrated road map by providing Air Force input to the DoD Space Architect; 6) identifying and disseminating information on Space policy and initiatives that pertain to systems acquisition; 7) supporting the Center's Commercial Space Integrated Product Team by assessing commercial business practices for application to DoD.

Office of Research and Technology Application (XRR): Implements and supports the AFMC Technology Transfer Program, Dual-Use Application Program, Operations-Other-Than-War, and law enforcement support activities. Provides SMC with assistance in transferring DoD, USAF, and AFMC technology to California state and local governments; provides responsive channels for coupling outside users to federal technology; promotes transfer agreements with private companies, universities, state and local governments, foundations, not-for-profit, and consortia; supports the National Law Enforcement and Corrections Technology Center-Western Region (NLECTC-WR); and encourages employee activities for facilitating scientific or technical advancements and for facilitating transfer of technology from the SMC/Air Force Research Laboratory (AFRL) to the private sector.

Security and Protection Planning Division (XRS): Provides full-dimension protection to the integrated modernization planning process across all security disciplines including: physical, industrial, information, computer, communications, and operational security. Protects space systems capabilities, technologies, and information. Ensures a secure working environment.



* = Matrixed Organizations

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TE - SPACE AND MISSILE TEST AND EVALUATION DIRECTORATE: Responsible for the research and development test and evaluation (RDT&E) for all space systems, launch vehicles, and ballistic missiles and sub-orbital/orbital flights of "one-of-a-kind" systems. Manages DoD Tri-Service Space Test Program; Air Force Small Launch Vehicle; Rocket Systems Launch Program; Space Test and Evaluation Division; and Test Integration and Launch Division. Integrates payloads with launch vehicles, and provides global on-orbit command, control and tracking for Air Force RDT&E systems.

TEB - LAUNCH TEST PROGRAMS OFFICE: Maintains, stores, and refurbishes excess de-activated ballistic missiles such as Minuteman II vehicles for support of DoD RDT&E objectives. Integrates targets, RDT&E payloads and technology demonstration flights using sounding rockets, Minuteman II Multi-Space Launch System and the Orbital/Suborbital Launch Vehicles contract. Manages the acquisition of Pegasus and Taurus small launch vehicles to support Space Test Program RDT&E payloads. Develops orbital and suborbital small launch capabilities using de-activated ballistic missile assets.

TEK - CONTRACTING DIVISION: Directs, controls, and accomplishes acquisition of critical space tests and experiments in support of the Space and Missile Test & Evaluation Directorate. Reviews, evaluates, and recommends programming of facilities and equipment in support of contractors for R&D acquisitions. Responsible for close-out of all division contracts.

TEL - SPACE TEST PROGRAM: Manages the DoD Tri-Service Space Test Program (STP). Conducts space test missions to provide space flight opportunities for DoD research and development experiments and prototype operational systems via STP-acquired freeflyer satellites, piggyback opportunities on non-STP satellites, and NASA's Space Shuttle. Responsible for the development and acquisition of satellites and their, mission integration and operations in support of national security objectives.

TEM - MANAGEMENT OPERATIONS DIVISION: Provides internal support for all SMC/TE programs as a liaison with the respective base, SMC and AFMC organizations in the areas of training, security, facilities, manpower and personnel resource management, logistics, local area network (LAN), ADPE, safety and supplies. Provides full and limited service to SMC/TE organizations located at Kirtland AFB, Shriever AFB, Vandenberg AFB, Huntsville AL, Arlington VA, and NASA-Johnson Space Center. Manages SMC/TE manpower resources including active duty, civilian, reserve and contractor support personnel. Responsible for the maintenance, repair, and modification to TE facilities. Manages the TE security and information protection programs including systems security engineering, certification and accreditation. Functions as the single point of contact for all external audits and Inspector General inspections.

TEO - SPACE TEST AND EVALUATION DIVISION: Plans and executes telemetry, tracking and control functions for DoD, NASA, BMDO and other national program RDT&E satellites. Provides training; conducts mission readiness simulation and rehearsals; and activates support teams and facilities to provide initial RDT&E support for transition to operators. Operates deployable TT&C systems worldwide to support DoD, NASA, BMDO, and other national program boosters and space systems. Plans and acquires systems which increase safety and capacity to accomplish on-orbit testing.

TEP - PROGRAM CONTROL DIVISION: Responsible for overall planning and financial management, including planning, budgeting, implementing and reporting all financial aspects relating to SMC/TE programs and activities.

TEV - TEST INTEGRATION AND LAUNCH DIVISION: Plans and conducts research and development (R&D) ground and flight testing, and sustaining engineering for space and missile systems. Processes and launches space and ballistic test payloads. Provides flight test support, program test management, and launch services to meet national customer requirements. Operates and maintains $35M processing, integration, and test complex.

TEX - STRATEGIC PLANNING DIVISION: Functions as the Air Force's Single Face To the Customer for Space RDT&E. Responsible for SMC/TE long range strategic planning to develop RDT&E test services to meet new and expanding Air Force mission requirements. Coordinates space test infrastructure requirements and reliance efforts for the Air Force. Provides test and evaluation management and support for SMC program offices.

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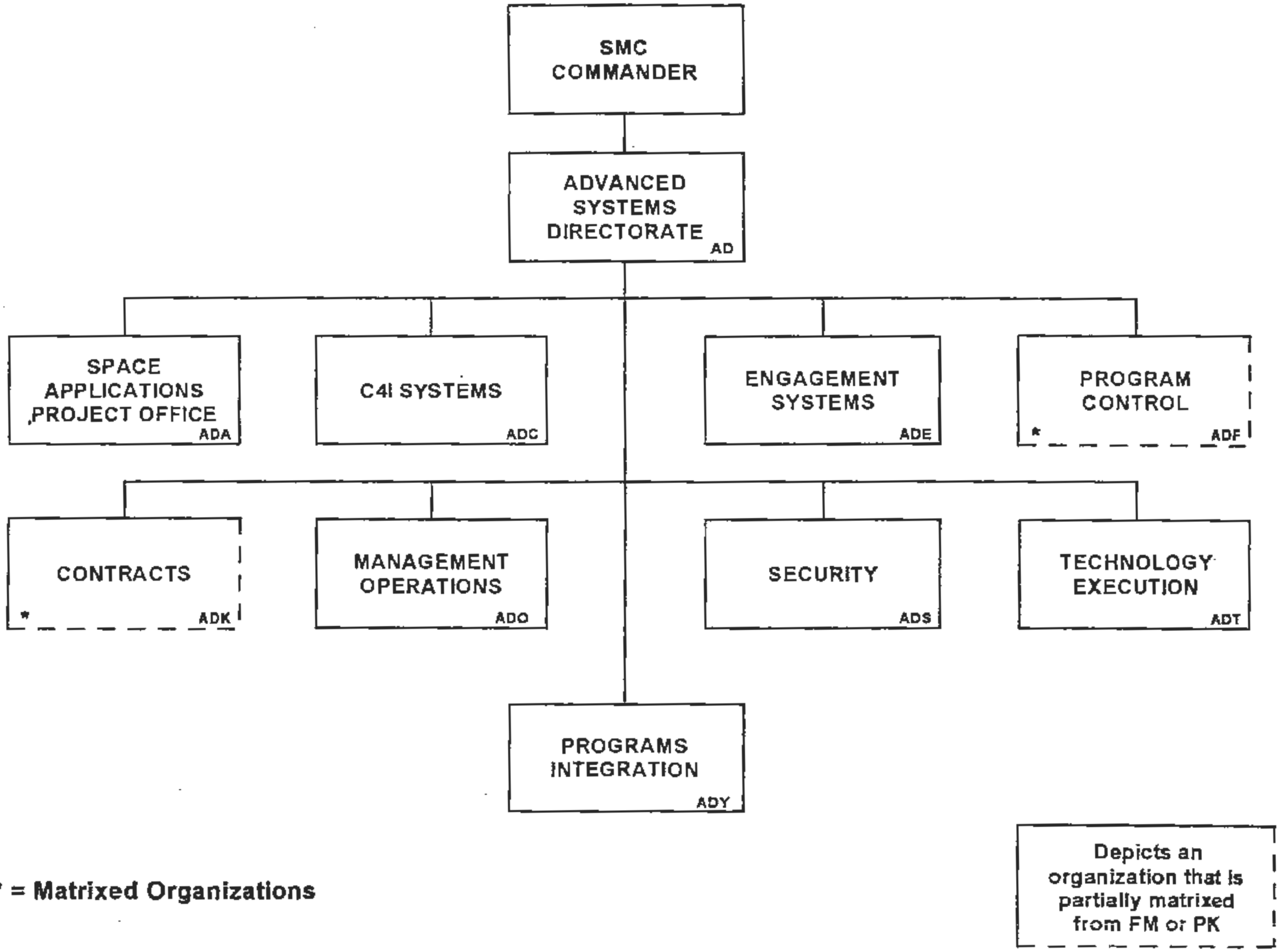

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AD - ADVANCED SYSTEMS DIRECTORATE: Executes and manages selected Air Force space and intelligence-related operational concept demonstrations, prototype projects, and demonstration/validation dem/val projects as well as directed development programs. AD demonstrates potential solutions to national defense needs and transitions successful projects to Program Offices for development and deployment--or directly to the field.

ADA - SPACE APPLICATIONS PROJECT OFFICE: Provides technical, acquisition, and contracting support to the Air Force Tactical Exploitation of National Capabilities (TENCAP) program to improve Air Force combat capabilities and ensure that the full potential of space systems is realized in supporting the war fighter. Provides program management, control, analysis and planning, and system integration for the TENCAP mission.

ADC - COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS AND INTELLIGENCE (C4I) SYSTEMS DIVISION: Responsible for evaluating and equipping the US with advanced space-related C4I systems. These programs include command and control systems, satellite communication systems, satellite control networks and intelligence capabilities directly supporting unified commanders and the National Command Authority. Directs all acquisition activities from concept formulation and technical demonstrations to system prototyping and dem/val as well as directed development and production programs.

ADE - ENGAGEMENT SYSTEMS DIVISION: Responsible for the direction and management of space forces applications such as ballistic missile interceptor programs. Current programs include the Space Based Laser (SBL) and National Missile Defense (Minuteman) demonstrations.

ADF - PROGRAM CONTROL DIVISION: Responsible for financial management and program control oversight for the Director, Advanced Systems Directorate. Functions as the financial focal point, providing advice, guidance and policy to the Director and staff on business strategies, and budget formulation and execution. Manages the execution of all funding for the directorate. Consolidates, analyzes and maintains financial data for all projects. Coordinates and consolidates various inputs and reviews for all programs.

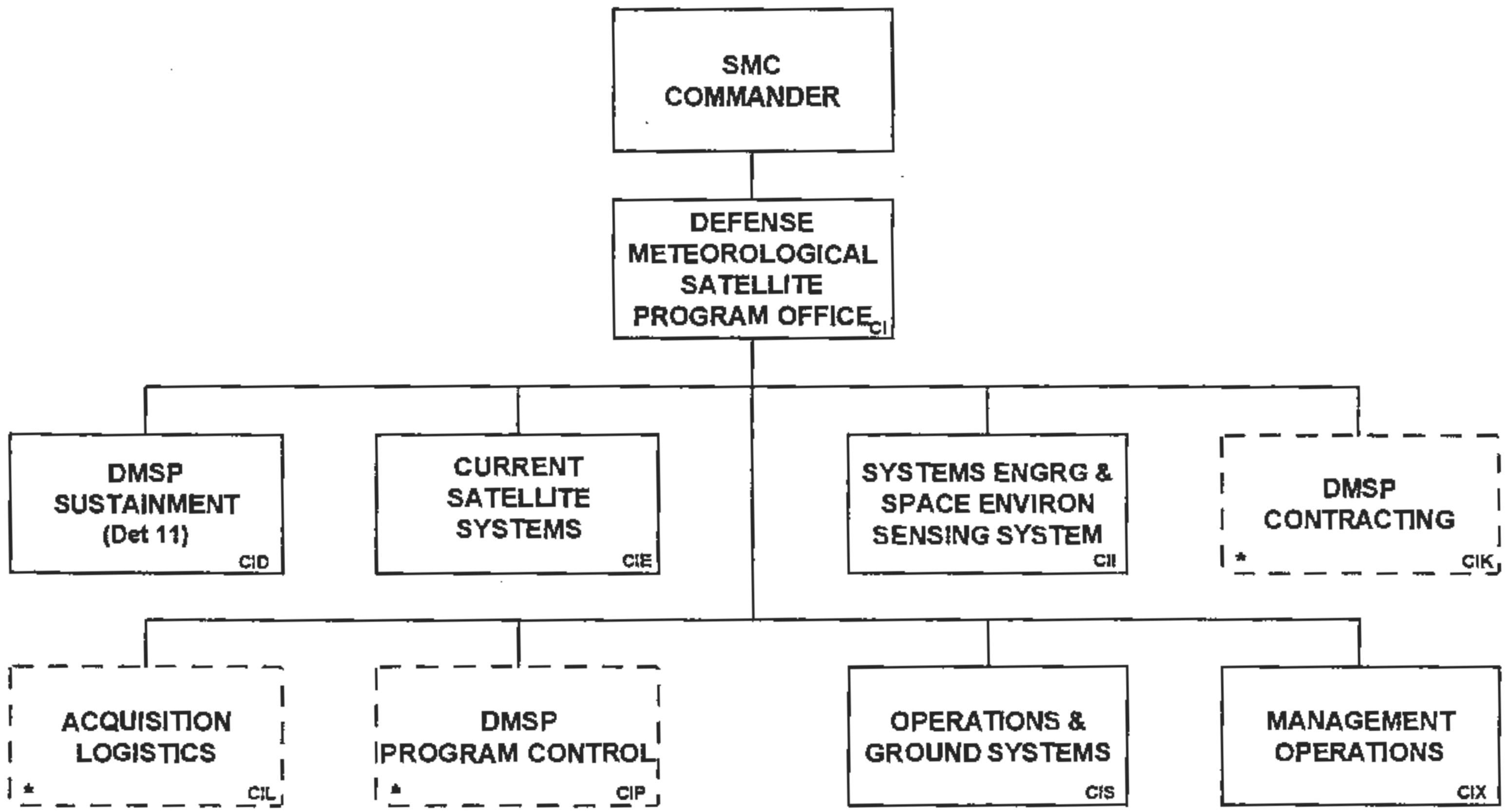
ADK - CONTRACTS DIVISION: Responsible for ensuring that program office requirements are acquired in accordance with statutes and regulations and at a fair and reasonable price to both the Government and the Contractor. Support includes acquisition planning, contract administering and negotiation, and accomplishing all necessary reporting requirements.

ADM - MANAGEMENT OPERATIONS DIVISION: Responsible for management of communications, computer, manpower, and personnel resources in their areas throughout the directorate. Provides information support to Directorate management decision making.

ADS - SECURITY DIVISION: Responsible for directing and managing all security related activities and policies in direct support of the Directorate. Plans and integrates all security disciplines into all phases of the acquisition process using Systems Security Engineering and Program Protection Planning concepts. Acting as a cognizant security office, directs policy, training, security processes and inspection oversight for applicable contractor facilities nation-wide. Acts as the single security manager for all Special Access Required (SAR) and Air Force TENCAP activities for both AD and the SMC Backplane.

ADT - TECHNOLOGY EXECUTION DIVISION: The Division is the AD interface for developmental planning technology activities. ADT executes, manages, and monitors research to meet selected technology deficiencies. ADT provides planning and program management to support technology insertion.

ADY - PROGRAMS INTEGRATION DIVISION: Integrates all system acquisition activities from concept through fielding using a multifunctional team to simultaneously optimize system engineering, provide intelligence support, do modeling and simulation, and acquire logistics support to satisfy customer requirements for system performance and supportability.



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CI - DEFENSE METEOROLOGICAL SATELLITE SYSTEM PROGRAM OFFICE: Directs the Defense Meteorological Satellite Program (DMSP) which equips and sustains worldwide strategic and tactical forces with the capability to receive meteorological, oceanographic, and space environmental data from satellites. Performs as the systems integrator for this multi-service, DoD 1-1 precedence program. Develops, tests, and acquires satellites and ground equipment valued in excess of $3 billion. Supports launch, early orbit operations, and anomaly resolution of satellites on-orbit.

CID - DMSP SUSTAINMENT DIVISION (DET 11): Manages all sustainment activities for DMSP, including the C3 segment, AFSPC's Space Environment Operation Center (SEOC), deployed meteorological tactical terminals, and all elements of the Space Environmental Sensing System (SESS) ground-based solar, geomagnetic, and ionospheric sensor systems. Supports the transition of the C3 segment to NOAA. Provides operational software support and configuration management to all fielded SESS, DMSP C3, and tactical terminals elements. Responsible to the SPD for advice, counsel, and review on all sustainment and policy direction issues affecting acquisition and life cycle management.

CIE - CURRENT SATELLITE SYSTEMS DIVISION: Manages the acquisition of DMSP space segment including spacecraft, space-borne sensors and ground test equipment. Includes the design, development, systems engineering, integration and test, including operational satellite sensors, launch processing, early-orbit checkout and satellite anomaly resolution.

CII - SYSTEMS ENGINEERING AND SPACE ENVIRONMENTAL SENSING SYSTEM DIVISION: Manages specialty engineering functions, including interface control, safety, configuration management, data management, test and evaluation. Also, manages the Space Environmental Sensing System (SESS), directing the development, acquisition, and modernization of space and ground-based solar, geomagnetic, and ionospheric sensor systems and AFSPC's Space Environment Operations Center (SEOC).

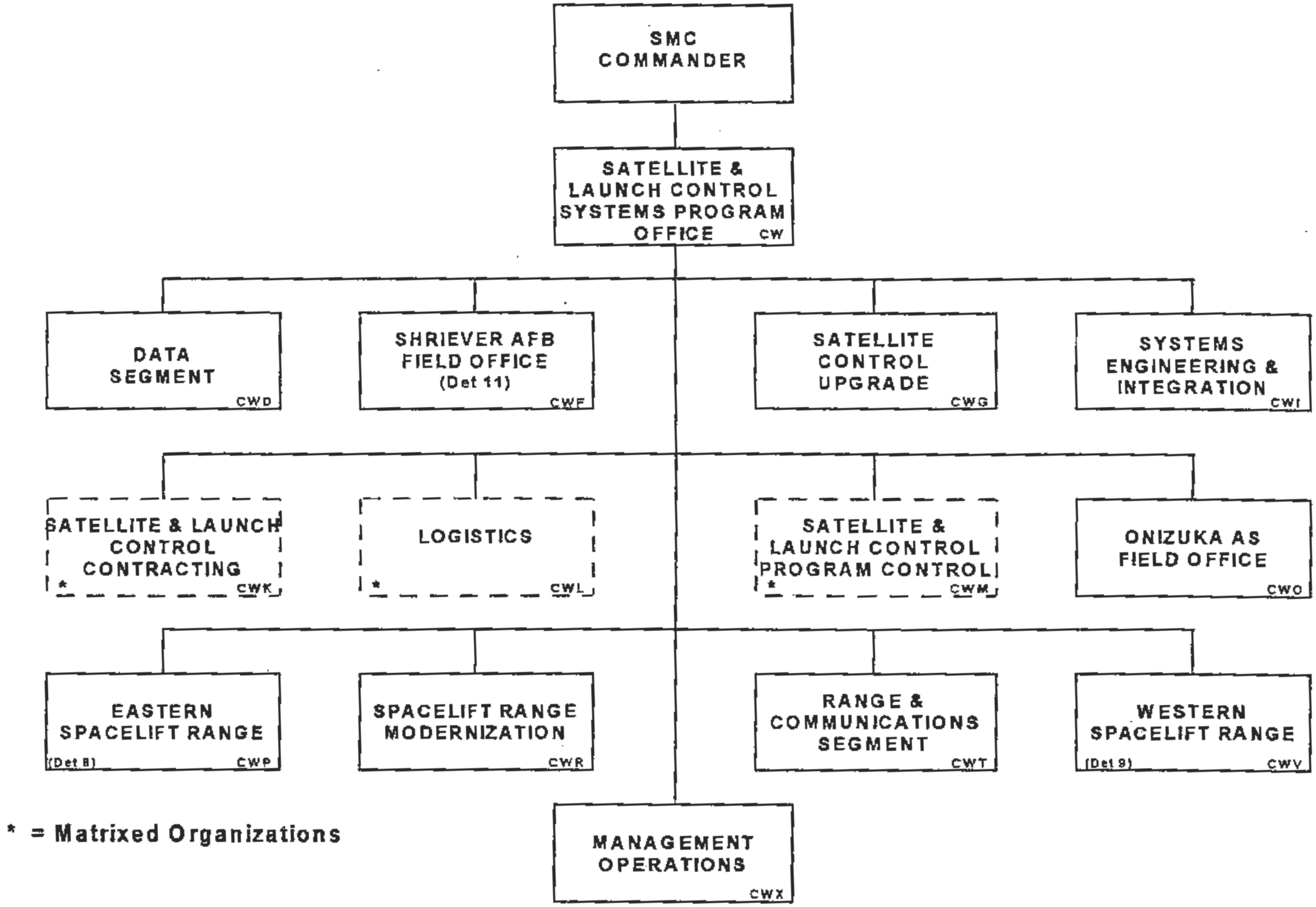
CIK - DMSP CONTRACTING DIVISION: Manages the acquisition of systems, subsystems, and related supplies and services. The office provides acquisition policy, strategy, and execution of contracts for DMSP. Responsible to the System Program Director (SPD) for advice, counsel, and review on systems acquisition, policy direction and legislative requirements affecting competition, procurement integrity and methods of contracting.

CIL - ACQUISITION LOGISTICS DIVISION: Manages supportability planning and implementation. Includes supportability analysis, support concepts, support data and resources. Ensures contractor compliance for integrated logistics support and integrated product development. Responsible to the System Program Director for advice, counsel and review on systems acquisition and policy issues affecting acquisition logistics.

CIP - DMSP PROGRAM CONTROL DIVISION: Manages planning, programming, financial management, and cost estimating. Responsible for budget requirements, funds appropriation and execution, and high level reporting. Insures contractor compliance with cost for Inspector General (IG), General Accounting Office (GAO), and Air Force Audit Agency (AFAA). Responsible to the SPD for advice, counsel and review on all acquisition issues affecting funding policy/guidance.

CIS - OPERATIONS AND GROUND SYSTEMS DIVISION: Manages the acquisition of meteorological tactical terminals and cloud depiction and forecasting systems. Includes the design, development, systems engineering, integration and test, site deployment and modernization of world-wide terminals to provide forward area weather data. Operates field office for support to daily satellite operations , launch, early orbit operations, and anomaly resolution of satellites on-orbit.

CIX - MANAGEMENT OPERATIONS DIVISION: Manages human resources including manpower resource allocations, training and APDP certification, awards, and administrative policies and practices. Serves as focal point for Quality Air Force program, strategic plan implementation, customer satisfaction survey, unit self assessments, security and executive briefing support. Responsible for desktop computer support, Local Area Network (LAN), and Wide Area Network (WAN).



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CW - SATELLITE AND LAUNCH CONTROL SYSTEMS PROGRAM OFFICE: Responsible for management of programs and projects to design, develop, acquire, modify and sustain systems of the Air Force Satellite Control Network (AFSCN) and Eastern and Western Spacelift Ranges (SLR). Delivers ground systems for tracking, orbital and trajectory analysis, receiving and processing telemetry data and commanding of satellites, launch vehicles and space experiments.

CWD - DATA SEGMENT DIVISION: Responsible for program and project level control of the current Command and Control systems. Controls, maintains, and modifies the current systems and related systems that enable Shriever AFB and Onizuka AS to operate satellites allowing satellite operators to collect and distribute raw mission data. Maintains the associated systems that train, assist, and enable the operators to perform the functions listed above.

CWF - SHRIEVER AFB FIELD OFFICE (Det 11): Responsible for managing on-site integration and engineering of modifications for the Common User Element of the AFSCN at SAFB. Ensures the availability of systems required to provide telemetry, tracking, commanding, mission data dissemination, data processing, communication, and range support for assigned satellite programs. Assists other program offices in planning for launch and on-orbit satellite support. Ensures the integrity of developmental and operational capabilities at SAFB to support and control space missions.

CWG - SATELLITE CONTROL UPGRADE DIVISION: Manages the evolution of the AFSCN's satellite control and network operations systems to an open-distributed architecture. Coordinates requirements with AFSCN users and developers. Develops architectures, program plans, and studies. Prepares detailed project and acquisition plans, solicits and evaluates contractor proposals, and manages projects for technical performance, schedule, and cost. Develops contract budgets and forecasts project/studies workload.

CWI – SYSTEMS ENGINEERING AND INTEGRATION DIVISION: Responsible for technical integrity, engineering oversight and intersegment integration of the AFSCN. Provides a system vision and the migration path to a future space architecture. Provides cohesive, traceable and user-validated network level requirements. Performs standards development, design and performance analyses, interface definition, test planning and management, configuration management, network-to-space vehicle integration and site integration.

CWK - SATELLITE AND LAUNCH CONTROL CONTRACTING DIVISION: Responsible for the systems acquisition planning, placement, and business/contract management for all new CW competitive, sole source contracts, and modifications to existing contracts, as a integral part of each CW acquisition IPT. These areas of responsibility and focus span the two Satellite & Launch Control Systems Program Office acquisition programs: (1) the Air Force Satellite Control Network (AFSCN) and the Space Launch Range Modernization Program (SLR), in addition to any other acquisition/contracting requirements deemed appropriate and required by the Systems Program Director (SPD).

CWL - LOGISTICS DIVISION: Responsible for planning, developing, and acquiring integrated logistics support for all Air Force Satellite Control Network and Spacelift Range systems. Ensures program director and system support manager one hundred percent logistics support capability for systems turnover.

CWM - SATELLITE AND LAUNCH CONTROL PROGRAM CONTROL DIVISION: Responsible for overall financial management within the Satellite and Launch Control SPO. Facilitates the planning, programming and budgeting process, and is responsible for executing of all program funds. Integrates budget, cost, schedule, and technical data into the Program Objective Memorandum (POM), Budget Estimate Submission (BES), and President's Budget. Develops and maintains Program Management Directives, Acquisition Program Baselines, and other critical acquisition planning, programming, and budget documents. Performs cost estimates and contract/schedule analyses. Responsible for managing major SCN and SLR contracts and administers the SPOs award fee process.

CWO - ONIZUKA AS FIELD OFFICE: Responsible for managing on-site integration and engineering of modifications for the Common User Element of the AFSCN at OAS. Ensures the availability of systems required to provide telemetry, tracking, commanding, mission data dissemination, data processing, communication and range support for assigned satellite programs. Assists other program offices in planning for launch and on-orbit satellite support. Ensures the integrity of developmental and operational capabilities at OAS to support and control space missions.

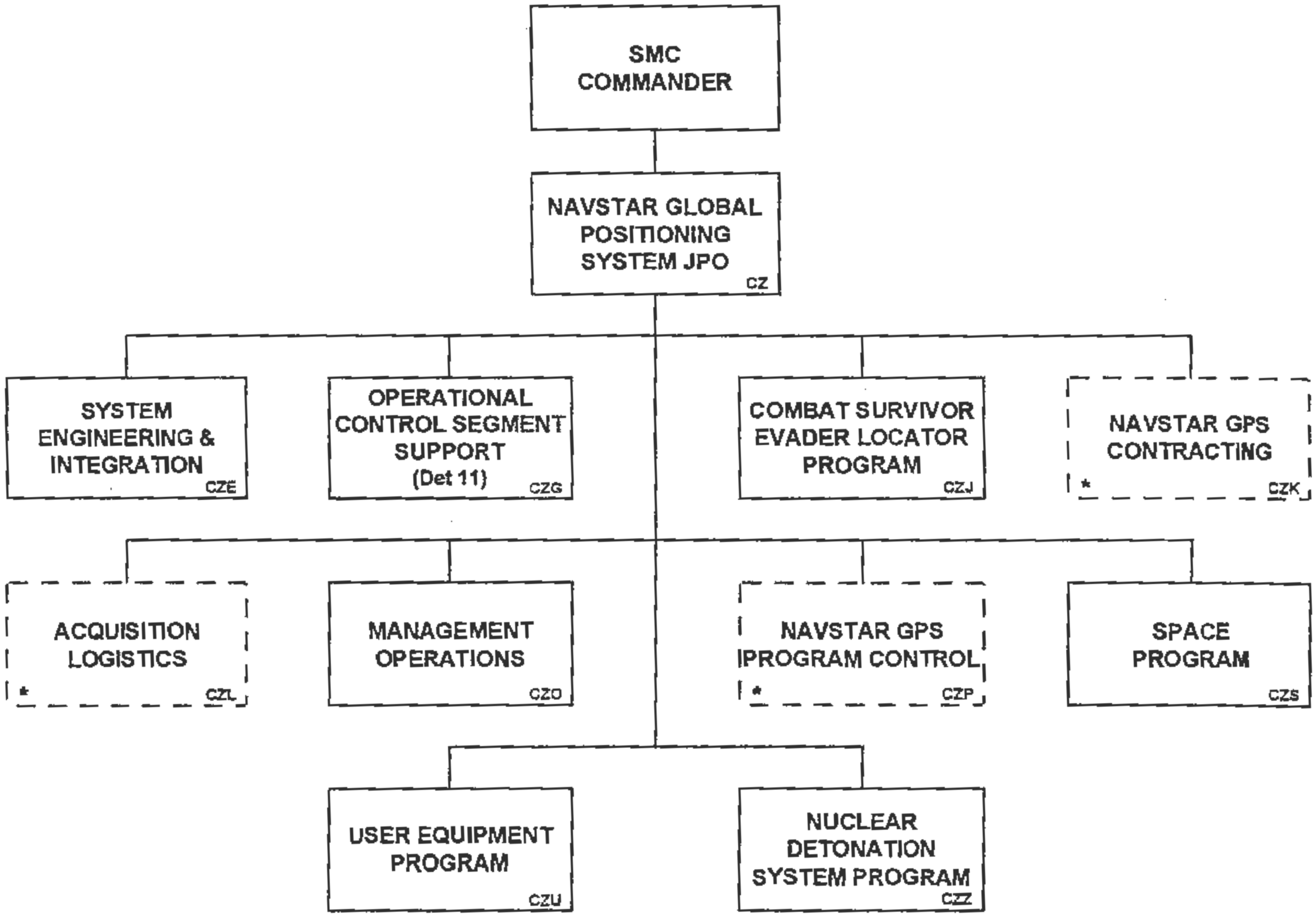
CWP - EASTERN SPACELIFT RANGE PROGRAM OFFICE (Det 8): Provides acquisition and sustainment management services to the 45th Space Wing (AFSPC) to support its mission of operating the Eastern Spacelift Range. Executes delegated development, investment, and sustaining engineering projects on behalf of the Satellite Launch and Control System Program Director (SPD) and Support System Manager (SSM). Delivers required range systems to ensure the safe and effective launch, testing, and tracking of ballistic missiles and DoD, civil, and commercial spacelift vehicles. Responsible for on-site test and integration of Range Standardization and Automation (RSA) delivered systems into the operational range. Responsible for Eastern Spacelift Range configuration management and depot level maintenance.

CWR - SPACELIFT RANGE MODERNIZATION DIVISION: Responsible for the major development efforts of the Spacelift Range System (SLRS). Responsible for satisfying the Range Standardization and Automation (RSA) ORD, developing overall SLRS acquisition strategy, and related budget planning documents. Delivers products from two major development contracts (RSA Phase I and Phase IIA) to the ranges. Develops and implements future acquisition strategy for SLRS beyond the current contract effort. Ensures effective integration of range assets delivered by contractors, assets from Improvement and Modernization projects, and existing range assets.

CWT - RANGE AND COMMUNICATIONS SEGMENT DIVISION: Directs the planning, design, development, acquisition, and integration support of upgrades to the AFSCN communications systems. Plans, develops, acquires, integrates, and delivers advanced satellite tracking station systems to meet the space vehicle tracking and control requirements of the AFSCN.

<u>CWV - WESTERN SPACELIFT RANGE PROGRAM OFFICE (Det 9)</u>: Provides acquisition management and sustaining engineering needed to support the AFSPC Space Wing mission of operating the Western Range. Plans, coordinates, designs, develops, acquires, integrates, and maintains systems for meeting Western Range mission requirements to ensure the safe and effective launch, testing, and tracking of ballistic missiles and DoD, civil, and commercial spacelift vehicles, as well as aeronautical test and evaluation support. Responsible for supporting implementation of the Range Standardization and Automation (RSA) Program which will improve operability while significantly lowering range operations and maintenance cost through a system redesign which will automate and standardize procedures and systems across the Eastern and Western Ranges. Responsible for managing the improvement and modernization (I&M) program. Responsible for the Western Range Configuration Management Program. Responsible for the Independent Verification and Validation (IV&V) of critical Western Range safety support systems.

<u>CWX - MANAGEMENT OPERATIONS DIVISION</u>: Develops and manages the infrastructure that enables an efficient operation of the entire program office. Designs, acquires and maintains the management information and data exchange systems to provide the means for rapid, accurate information flow between our geographically separated locations, the program office, and the numerous users of both AFSCN and Launch Ranges. Administers all military and civilian training to include the management of Individual Training Plans (ITP) and the Acquisition Professional Development Program (APDP). Manages all personnel actions to include the officer, enlisted and civilian evaluation systems; personnel movements and separations; and the awards and recognition programs.



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CZ - NAVSTAR GLOBAL POSITIONING SYSTEM JOINT PROGRAM OFFICE (JPO): Responsible for the management of the NAVSTAR Global Positioning System Joint Program Office which is a DoD designated joint program supporting global navigation for all of the DoD, other governmental agencies and allied countries. Plans, controls, coordinates, organizes, and directs the developments, production, sustainment, and financial management of the program. Determines detailed performance specifications, pertinent physical characteristics, and functional criteria for GPS to satisfy the specific operational user requirements. Directs activities of two logistics organizations for sustainment of GPS user equipment and control segment equipment. The Deputy Program Managers that support the GPS from the other services are: US Army Service Deputy, Civilian Application (DOT) Deputy, National Imagery & Mapping Agency (NIMA) Deputy, US Navy Service Deputy.

CZE - SYSTEM ENGINEERING AND INTEGRATION DIVISION: Responsible for system performance and system requirement allocations among segments. Orchestrates long term system evolution, establishes GPS strategic vision, implements OSD policy, and delivers acquisition milestone decision analysis to HQ AF and OSD. Responsible for development and maintenance of system specification, system interface control documents, and threat documentation. Chairs system integration and interface control working groups. Responsible for integration across segments and Integrated Product Teams (IPTs). Implements software security, system safety and OSD policy. Responsible for system development test planning, schedules, budgets and resources. Responsible for managing, directing, and coordinating all configuration management and systems effectiveness activities in support of all segments of the program. Interfaces with joint service and allied nation operational test agencies. Supports NATO working groups and subgroups. Establishes automated data processing equipment (ADPE) policy and budgets. Acquires (ADPE) equipment, maintains JPO electronic data network, and integrates all electronic data network activities.

CZG - OPERATIONAL CONTROL SEGMENT SUPPORT (OCS) DIVISION (Det 11): Responsible for sustainment of all operational control systems hardware and software in support of existing and newly developed GPS satellites, acquisition of ground segment maintenance resources, and development and test of new OCS hardware and software for full functionality up to the Block IIR system. Responsible for planning, programming, budgeting, organizing, and managing all OCS modification and sustainment contracts, and the OCS development contract up to full functionality for the Block IIR system. Responsible for implementing software normalization agreements between AFSPC and AFMC. Located at SMC Det 11, Peterson AFB, CO for proximity to primary ground site at Shriever AFB, CO.

CZJ - COMBAT SURVIVOR EVADER LOCATOR PROGRAM DIVISION: Responsible for development, test, production, and sustainment of the Combat Survivor Evader Locator (CSEL) system. Performs as a joint program to provide the next-generation combat search and rescue communication capability for the entire DoD.

CZK - NAVSTAR GPS CONTRACTING DIVISION: Responsible for overall planning, negotiating, and managing all JPO contracting actions. Provides support for FMS cases and to all IPTs.

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CZL - ACQUISITION LOGISTICS DIVISION: Responsible for planning, developing, and acquiring integrated logistics support (ILS) for the GPS and the Nuclear Detonation Detection System (NDS). Develops, with joint service program managers, operational and logistics support requirements for participating services, operational users, and allied countries. Provides logistics support for FMS cases and all IPTs. Implements security and system safety policy.

CZO - MANAGEMENT OPERATIONS DIVISION: Provides human resource management and infrastructure support for the program office. Responsible for maintaining JPO information management, manpower, training, and personnel support requirements, including: in/out processing, forms and publications requirements, supply discipline, telephone requirements, correspondence distribution, and orders processing.

CZP - NAVSTAR GPS PROGRAM CONTROL DIVISION: Responsible for the overall system financial planning and management including the entire planning/programming/budgeting/execution cycle, for all aspects relating to development and procurement of the NAVSTAR GPS. Provides support to IPTs. Acts as principal point of contact for Inspector General, Air Force Audit Agency, and General Accounting Office visits.

CZS - SPACE PROGRAM DIVISION: Responsible for development, test, production, and operational support of GPS satellites. Manages contractor support for launch base satellite processing, launch, and early orbit operational support. Manages major satellite production contract and replenishment satellite contract. Responsible for satellite integration with launch vehicle. Responsible for integrated satellite and ground system acquisition under the Total System Performance Responsibility concept beginning with Block IIF.

CZU - USER EQUIPMENT PROGRAM DIVISION: Manages development, acquisition, and fielding of the entire line of DoD standard GPS User Equipment (UE), including navigation data receiver systems, ancillary equipment, and support equipment and systems. Manages and conducts DT&E to ensure the UE and commercial technical objectives are met. Qualifies alternate sources from standard DoD UE and commercial sources for DoD use. Conducts procurement and engineering activities leading to the integration of UE on Army, Navy, and Air Force platforms. Manages JPO UE assets used in survey, demonstration, and engineering activities. Conducts a multinational, joint service test program supporting the UE performance evaluation, vendor qualification, and preparation for acquisition milestones. Provides technical and policy support for Foreign Military Sales (FMS) cases. Responsible for system test planning, schedules, budgets, and resources. Interfaces with joint service and allied nation operational test agencies. Responsible for the system maturity matrix, and the multi-service test and evaluation master plan. Provides support to IPTs and to FMS cases as required. Responsible for the planning, development, acquisition, and turnover of a cost effective and secure NAVSTAR architecture to adaptively respond to an evolving threat and emerging civil and military requirements.

CZZ - NUCLEAR DETONATION DETECTION SYSTEM PROGRAM DIVISION: Responsible for procuring, controlling and maintaining a 24-satellite Nuclear Detonation Detection System (NDS), a nuclear survivable GPS secondary payload. Provides worldwide, highly survivable capability to detect, locate, and report nuclear detonations in the earth's atmosphere or near space in near real time. Equips Joint Chiefs of Staff, unified and specified commands, and key civilian decision makers to support test ban treaty monitoring, nuclear force management, integrated tactical warning and attack assessment, force survivability, and military/national recovery decisions.

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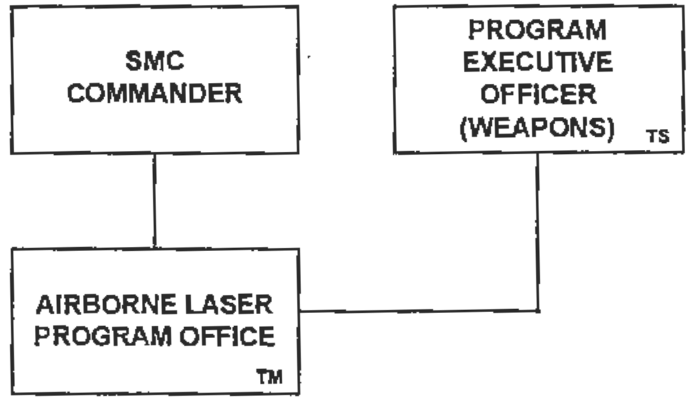
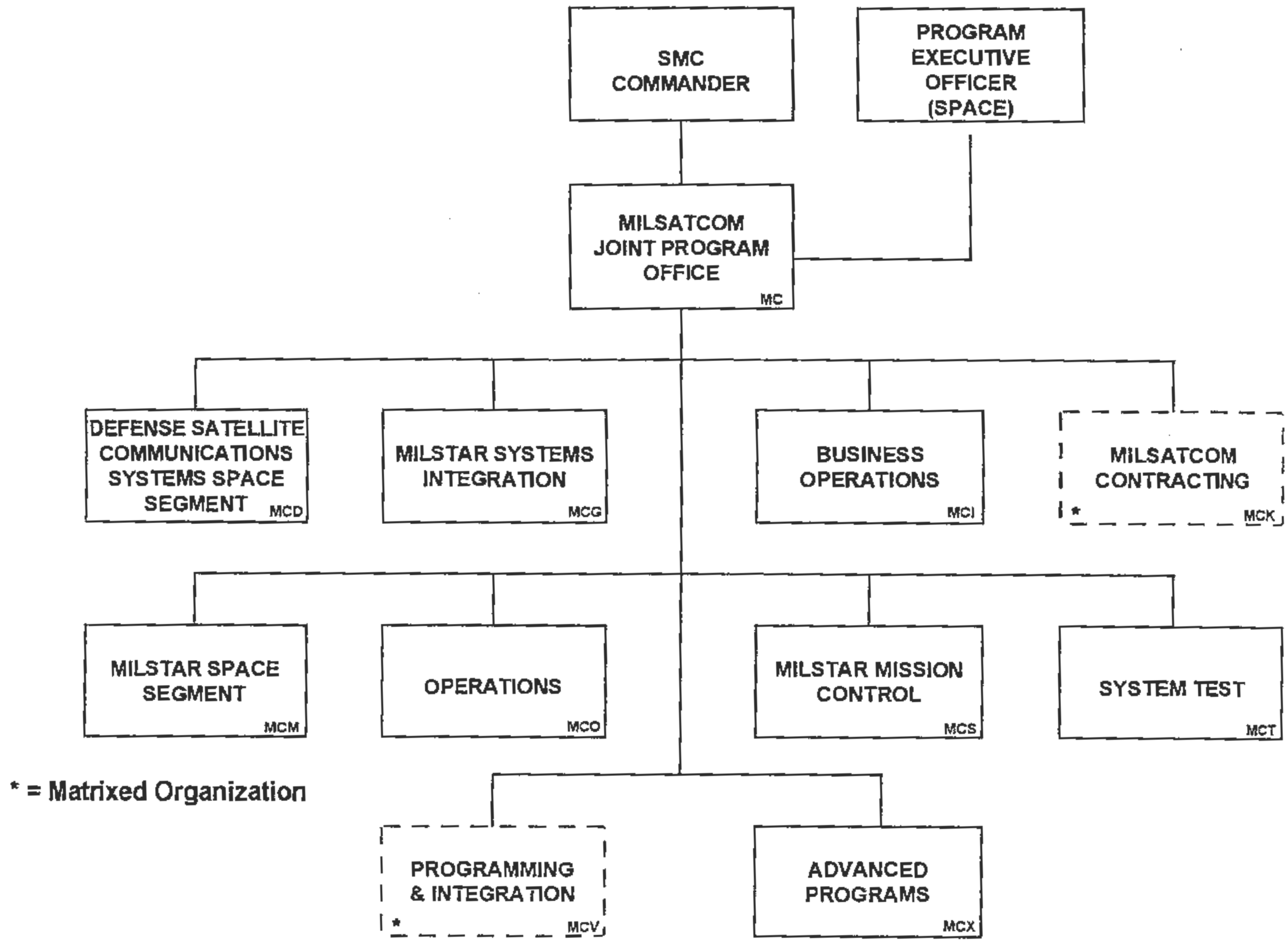


TM - AIRBORNE LASER PROGRAM OFFICE: Designs, develops, integrates and demonstrates an Airborne High Energy Laser Weapon System which consists of a 747-400F airframe, a multi-megawatt laser device, a battle management C4I system and a beam control/fire control system. Manages the Airframe-Engine Platform modifications including the necessary avionics for communications and navigation and all BMC4I. Manages the development of the high energy laser with its associated controls, power supplies, fuels, pressure recovery system and cooling systems. Manages the development of optics/coatings, computers, and control loops necessary for controlling the transfer and stabilization of the high energy laser beam as well as the acquisition, tracking and pointing subsystems. Manages the development of total system simulations as well as planning and implementing a series of subsystem and system checkout tests both on the ground and in the air at DoD test ranges.



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MC - MILITARY SATELLITE COMMUNICATIONS (MILSATCOM) JOINT PROGRAM OFFICE (JPO): Responsible for the acquisition and operational activation of space-based survivable communications systems for the DoD. The JPO is currently responsible for the MILSTAR system, the Defense Satellite Communications System (DSCS) III, and the Air Force Satellite Communications System (AFSATCOM). The organization also directs planning, development, and acquisition of follow-on satellites for DoD wideband communications well into the next century. Provides direction on program management of all phases of system acquisition of the three MILSATCOM Satellite programs from concept through orbital operations.

MCD - DEFENSE SATELLITE COMMUNICATIONS SYSTEM SPACE SEGMENT: Responsible for development, production, test, storage, reactivating, performance enhancement efforts, launch support and on orbit activities of the DSCS III and Integrated Apogee Boost Subsystem (IABS) spacecraft. Manages cost, schedule, and performance for the DSCS III/IABS program.

MCG - MILSTAR SYSTEMS INTEGRATION DIVISION: Responsible for leading the multi-service development community to ensure that the MILSTAR communication system satisfies validated user requirements. Maintains constant communications with users, assesses the system's design and demonstrated performance to satisfy requirements, maintains inter-segment compatibility of design and performance, and develops cost-effective solutions to system deficiencies.

MCI - BUSINESS OPERATIONS DIVISION: Responsible for developing and implementing policy for daily activities involving information management, automated information systems, program protection, and systems security engineering. Manages personnel training programs to include Acquisition Professional Development Program.

MCK - MILSATCOM CONTRACTING DIVISION: Responsible for planning and managing contracts related to acquisition of systems within the JPO, including acquisition planning, negotiation, management, and administration of contracts. Provides advice and guidance on contracting matters to all elements of the program office.

MCM - MILSTAR SPACE SEGMENT DIVISION: Responsible for providing Extremely High Frequency (EHF) satellites to satisfy validated national, strategic, and tactical customer needs for robust, survivable, low probability of intercept, dependable, low data rate (LDR), and medium data rate (MDR) communications.

MCO - OPERATIONS DIVISION: Responsible for integrating satellites to launch vehicles, managing launch base processing, conducting launch training to include exercises and rehearsals; coordinating launch facility activities, and managing all activities from satellite vehicle departure from factory, launch base processing, satellite mate with booster, launch operations, and satellite turnover to AFSPC.

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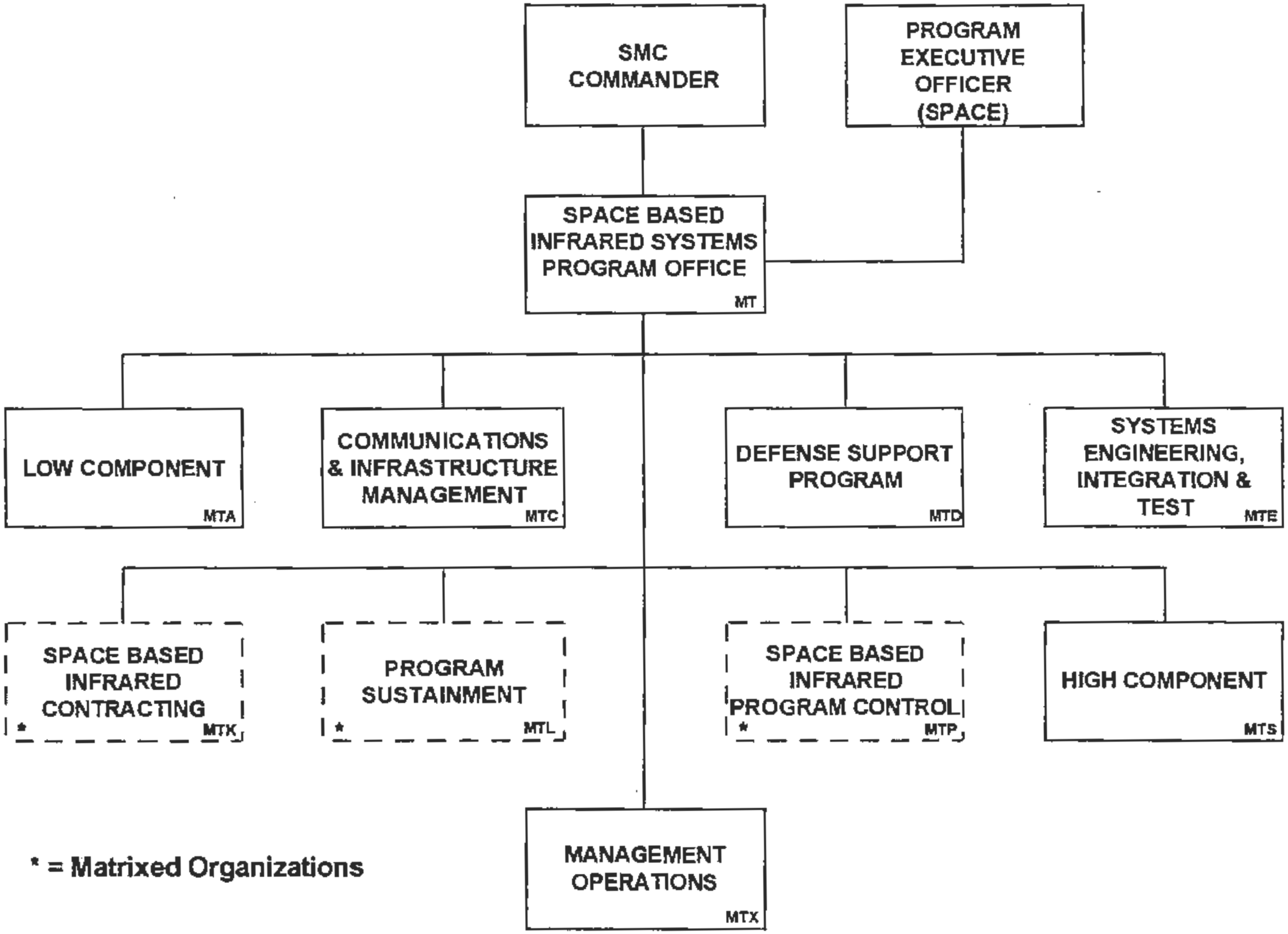
MCS - MILSTAR MISSION CONTROL DIVISION: Responsible for developing and transitioning to Air Force Space Command a secure, maintainable fixed and transportable command and control capability for the MILSTAR system. Serves as the MILSATCOM lead for the Integrated Weapons Systems Management concept. Network management and control is responsible for acquiring integrated MILSATCOM planning tools, decision support systems, and network control tools that provide the users with effective means to optimize and control their communications resources.

MCT - SYSTEM TEST DIVISION: Responsible for System Level Developmental Test (DT) and Operational Test (OT). Leads the Space, Mission Control, and Terminal Segment assets in preparation for Initial Operational Test and Evaluation (IOT&E). Works with the user community to prepare for IOT&E. Manages the MILSTAR Test and Evaluation Master Plan (TEMP), validates contractors' test procedures, witnesses the demonstration of specifications defined by the MILSTAR contract and requirements listed in the Operational Requirements Document (ORD).

MCV - PROGRAMMING AND INTEGRATION DIVISION: Responsible for the integration of out-year fiscal planning and programming of MILSATCOM Joint Program Office to include system level test (Development Testing and Operational Testing), initial operational testing and evaluation, and satellite turnover to AFSPC. Ensures MILSATCOM communications systems satisfy user requirements, design and performance specifications, inter-segment compatibility with cost effective solutions and timely launches and systems operations. Assists in formulation of systems concepts, prepares program documentation, and program assessment reviews.

MCX - ADVANCED PROGRAMS DIVISION: Responsible for the planning, coordination, execution, and overall management of the acquisition process for next generation of MILSATCOM systems. Develops technologies for program insertion to reduce program risks and improve performance. Interfaces with users to refine communications requirements. Translates requirements into system concept and designs. Performs performance and cost tradeoffs on alternatives for higher headquarters.



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MT - SPACE BASED INFRARED SYSTEMS (SBIRS) PROGRAM OFFICE: Develops, deploys and sustains a portfolio of infrared surveillance satellite and ground processing systems composed of the Defense Support Program, Shield/Attack and Launch Early Reporting to Theater (ALERT), Space Based Infrared Systems Low Component Program, and Space Based Infrared Systems High Component Program. These systems provide missile warning, missile defense, technical intelligence, and battlespace characterization information for warfighting decisions by the National Command Authority and Commanders-In-Chief and for the Intelligence Community.

MTA - LOW COMPONENT DIVISION: Leads a multi-agency, DoD, and industry team to develop, test, and deploy the Low component of the SBIRS architecture. SBIRS Low complements the High by adding precision midcourse guidance, space surveillance, and blue range capabilities and enhancing SBIRS performance in missile warning, missile defense, battlespace characterization, and technical intelligence in support of the National Command Authorities, war fighting CINCs, and the intelligence community. Ongoing risk reduction efforts include the Flight Demonstration System (FDS), Low Altitude Demonstration System (LADS), and various technology development projects. Program definition efforts for the operational system will begin in FY99 to support a FY01 Engineering and Manufacturing Development (EMD) start and first launch for deployment in FY04.

MTC - COMMUNICATIONS AND INFRASTRUCTURE MANAGEMENT DIVISION: Responsible for the planning, development, operations, and maintenance of the SBIRS Local Area Network (LAN) and Wide Area Network (WAN) infrastructure for both effective internal data communications and improved efficiency of data interchange with contractors and other external government agencies.

MTD - DEFENSE SUPPORT PROGRAM DIVISION: Equips US Space Command with a space based surveillance system that provides early warning of ballistic missile attack. Acquires satellites and ground stations, supports AFSPC satellite launches and on-orbit test, and sustains a highly reliable operational system for use by National Command Authorities. Also manages Shield/ALERT, which provides support to theater CINCs for warning of passive defense and cueing for attack operations.

MTE - SYSTEMS ENGINEERING, INTEGRATION AND TEST DIVISION: Provides "single-face" to infrared surveillance customers for defining architectures in response to user requirements for missile warning, missile defense, technical intelligence, and battlespace characterization. Establishes and represents the SBIRS long range plans and technology roadmap. Interprets user needs by establishing and managing an affordable, executable, and verifiable requirements baseline. Predicts, measures, and verifies system performance against the baseline. Provides specialized engineering, system integration analysis, and integrated test planning for program implementation and functional execution to ensure an integrated "system of systems."

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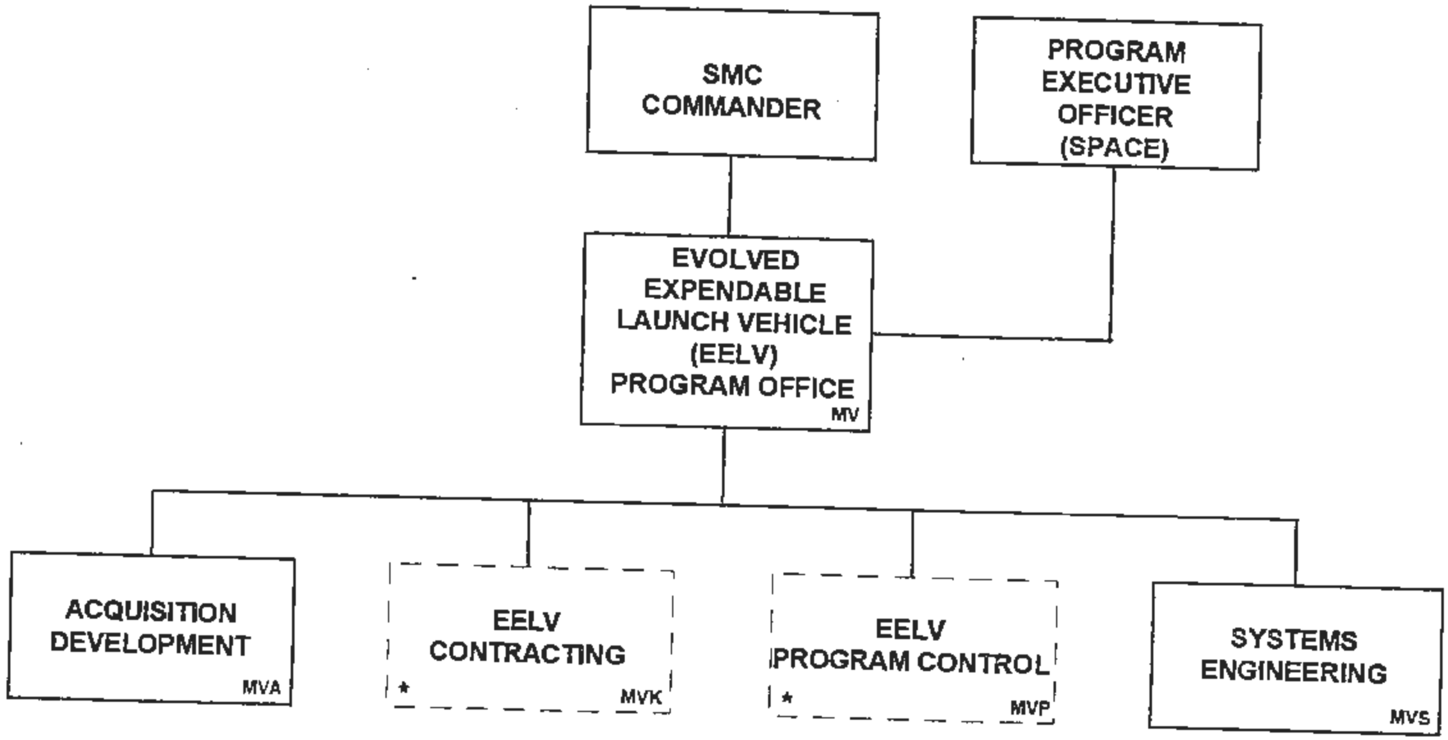
MTK - SPACE BASED INFRARED CONTRACTING DIVISION: Responsible for the acquisition of operational and developmental surveillance satellites and ground processing stations composed of the Defense Support Program, Shield/ALERT, Space Based Infrared Systems Low Component Program, and Space Based Infrared Systems High Component Program at a total contract value of $8.0 billion. Requests proposals and exercises contracting authority after all applicable requirements of laws, regulations, and business clearances have been obtained. Responsible for acquisition planning, negotiations, management, and administration of contracts. In all contracting aspects, MTK is responsible for planning, initiation, management, and completion of the program actions assigned.

MTL - PROGRAM SUSTAINMENT DIVISION: Provides direct support to the Program Director for planning and executing sustainment management of Space Based Infrared Systems. Employs acquisition logistics management to influence new system designs and focuses on reliability, maintainability, and availability to achieve lower life cycle costs. Provides direct interface with system operators and employs proactive engineering management to fielded systems to achieve cost effective sustainment and readiness improvements.

MTP - SPACE BASED INFRARED PROGRAM CONTROL DIVISION: Performs strategic planning, and develops financial plans, schedules, estimates, and budgets, and analyzes and reviews financial execution of the Space Based Infrared Systems Program Office. Insures compliance with higher headquarters program direction and coordinates program financial execution with all users of the systems.

MTS - HIGH COMPONENT DIVISION: Leads a multi-agency, DoD, and industry team to develop, test, and deploy SBIRS High Component Space and Ground Elements. Provides missile warning, missile defense, battlespace characterization, and technical intelligence to the National Command Authorities, warfighting CINCs, and the Intelligence Community.

MTX - MANAGEMENT OPERATIONS DIVISION: Provides resources and services needed to manage and operate the SBIRS programs organization. Responsible for organization, manpower, personnel, training, office space, equipment, executive, and administrative functions. Provides expertise in strategic planning, quality process modernization, and information systems.



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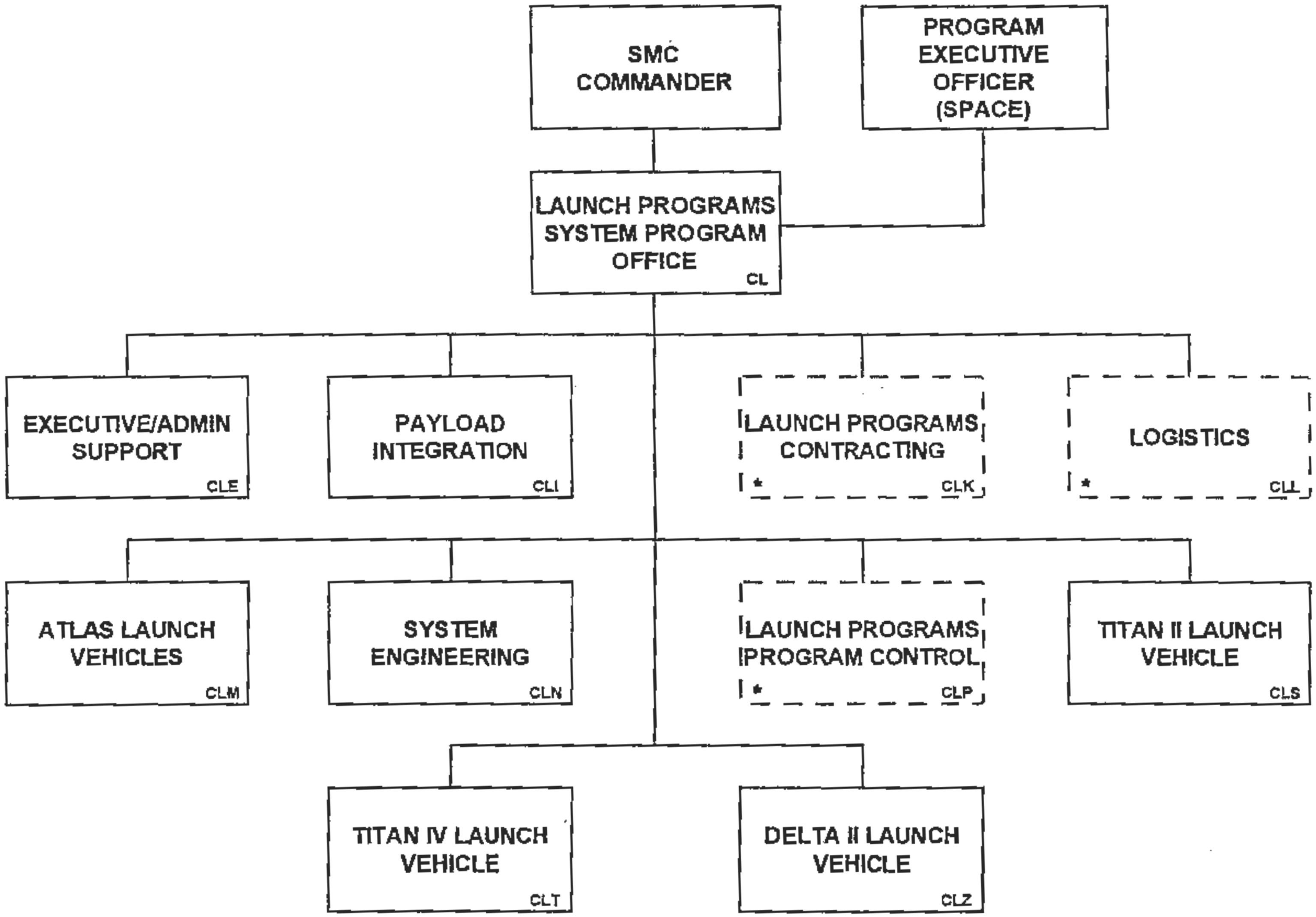
MV - EVOLVED EXPENDABLE LAUNCH VEHICLE (EELV) PROGRAM OFFICE: Acquires and fields the $2B next generation, low-cost space launch system; a family of medium and heavy lift expendable launch vehicles to satisfy DoD war-fighter, national security and other government spacelift requirements. Engineers, manufactures and tests system. Serves as model for acquisition reform; formulates and implements new streamlining initiatives. Identified as a SECAF-designated Air Force Lead Program.

MVA - ACQUISITION DEVELOPMENT DIVISION: Manages the Contractor Integrated Product Teams and acquisition planning to field the EELV system in direct service of Space Launch mission needs. Develops new and implements current acquisition reform initiatives.

MVK - EELV CONTRACTING DIVISION: Provides acquisition strategy planning, support and contractual expertise and direction to the program office in direct service of Space Launch mission needs.

MVP - EELV PROGRAM CONTROL DIVISION: Provides financial management services and analyses to field the EELV system in direct service of Space Launch needs.

MVS - SYSTEMS ENGINEERING DIVISION: Performs concept evaluation and systems engineering to field the EELV system in direct service of Space Launch mission needs.



* = Matrixed Organizations

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CL - LAUNCH PROGRAMS SYSTEM PROGRAM OFFICE: Responsible for the development, acquisition, and operational launch of the Titan IV (including its Centaur and Inertial Upper Stage), Titan II, Atlas II (including its Centaur Upper Stage), and Delta II launch vehicles to deliver the nation's medium and heavy satellites to their final mission orbits.

CLE - EXECUTIVE/ADMINISTRATIVE SUPPORT DIVISION: Provides executive support to the program director, as well as administrative support and guidance across the program office, to include implementing Air Force policy regarding information and records management. Provides information management services as chief focal point or interface with base information management functional offices. Ensures the timely processing and dissemination of Air Force policies and procedures in publications, forms, correspondence, and other media. Responsible for distribution and suspense control of all incoming/outgoing correspondence, publications and forms management, special orders authentication, and records management in support of the Launch Programs mission.

CLI - PAYLOAD INTEGRATION DIVISION: Responsible for integrating DoD and NASA satellites onto the Titan IV, Titan II, Atlas II, and Delta II launch vehicles, and launching these satellites into orbits ranging from low earth polar to geosynchronous. Manages all satellite-to-launch vehicle interfaces and prelaunch activities. Manages all launch system-to-facility interfaces. Briefs mission readiness status to the Commander.

CLK - LAUNCH PROGRAMS CONTRACTING DIVISION: Responsible for the complete execution and oversight of all contracting activities relating to the Titan IV, Titan II, Atlas II, and Delta II launch programs. Provides contracting expertise to the System Program Director and each Division Chief.

CLL - LOGISTICS DIVISION: Responsible for planning, developing, implementing, and sustaining an integrated logistics support program for all medium and heavy launch vehicles to include Titan IV, Titan II, Delta II and Atlas II. Responsible for logistics, sustainment, and operational support reporting to the program director and higher headquarters. Ensures program and user logistics requirements are addressed in contractual documents, schedules and program budgets.

CLM - ATLAS LAUNCH VEHICLES DIVISION: Responsible for the overall program management, development, production, integration, and launch readiness of the Atlas II and family of expendable launch vehicles. Manages cost, schedule, technical performance of the Atlas II production and launch contract. Supports the Defense Satellite Communications System, NASA, Air Force, Space Command, and classified users.

CLN - SYSTEM ENGINEERING DIVISION: Responsible for engineering activities and special projects common to the Titan IV, Titan II, Atlas II, and Delta II launch systems. Manages product and mission assurance, quality, environmental and safety activities, as well as configuration and data management. Responsible for validating program requirements and maintaining horizontal integration.

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CLP - LAUNCH PROGRAMS PROGRAM CONTROL DIVISION: Responsible for policies, procedures and operational concepts for program office financial and information management. Focal point for coordinating responses to external inquiries, including audits, and IG visits. Responsible for development and documentation of acquisition strategies, long and short range planning and scheduling. Develops, implements and maintains automated Management Information System components, including financial management modules. Coordinates program status reporting and program reviews/briefings. Directs all facets of program cost estimating/documentation and cost/schedule performance analysis and surveillance.

CLS - TITAN II LAUNCH VEHICLE DIVISION: Responsible for overall program management of the Titan II Space Launch Vehicle Program which provides launch capability for medium satellites. Manages cost, schedule and technical performance of Titan II production, integration and launch contracts. Supports launch of the Defense Meteorological Satellite Program (DMSP) and National Oceanographic and Atmospheric Administration (NOAA) weather satellites.

CLT - TITAN IV LAUNCH VEHICLE DIVISION: Responsible for the overall program management, acquisition, development, production, and launch readiness of the Titan IV Space Launch Vehicle, Titan Centaur Upper Stage, and Inertial Upper Stage. Manages cost, schedule, technical performance of production, integration, and launch contracts. Supports Defense Support Program (DSP) Division, MILSTAR, and classified DoD payloads.

CLZ - DELTA II LAUNCH VEHICLE DIVISION: Responsible for the overall program management and launch of the Delta II expendable launch vehicle. Manages cost, schedule, and technical performance of the Delta II production and launch contracts. Supports the NAVSTAR Global Positioning System (GPS) Program Office, Space Test Program, NASA, AF Space Command, and other agencies.

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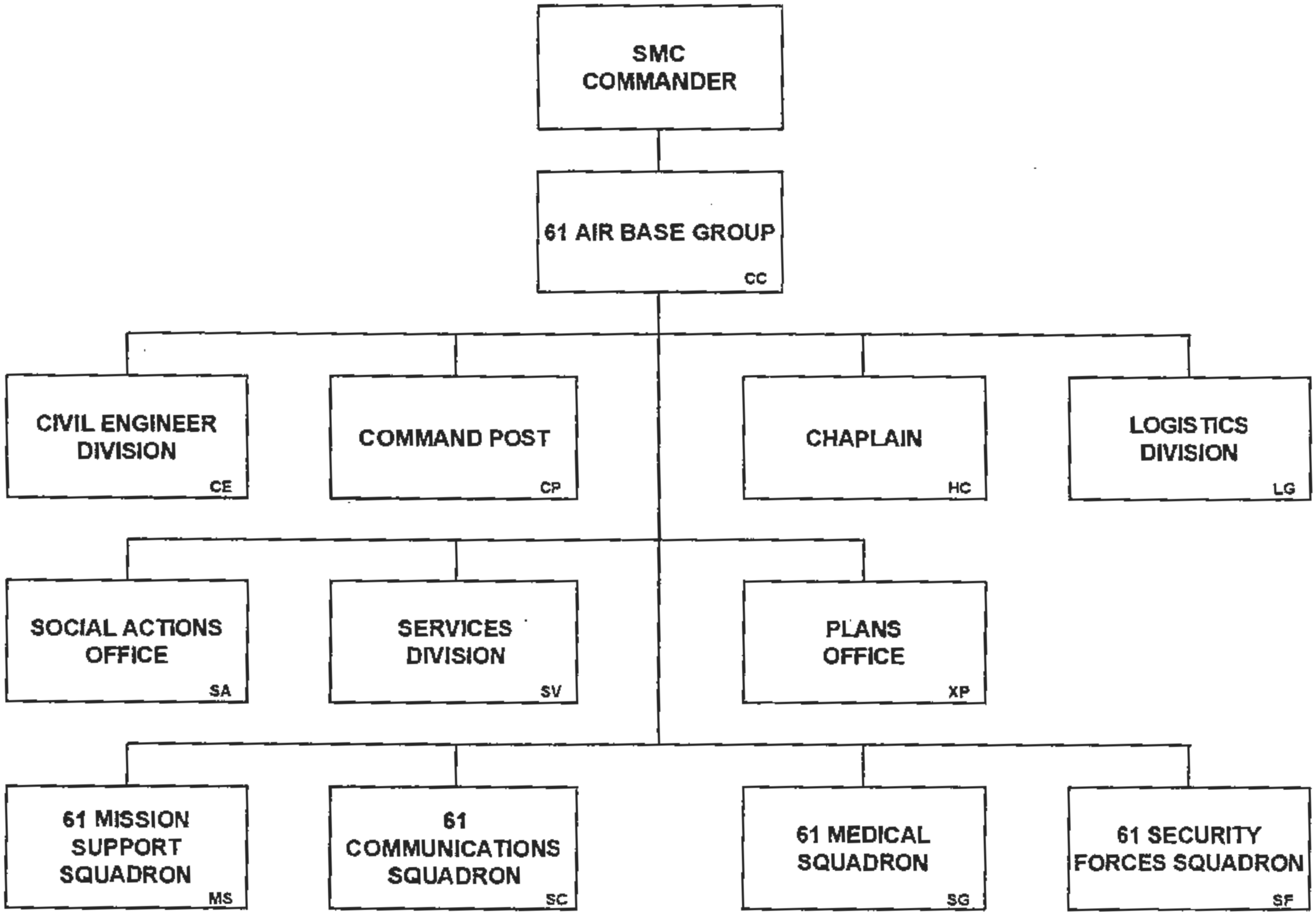

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61 AIR BASE GROUP

61 ABG/CC - COMMANDER: Provides personnel, command and control, administration, engineering, medical, communications/computer, security, logistics, and quality of life base support services to over 2,700 military and civilian employees of Space and Missile Systems Center (SMC) who equip the US and allied forces with on-orbit satellites and launch vehicles. Manages resources and facilities covering over 238 acres with 760 buildings and an annual budget exceeding $64 million.

61 ABG/CE - CIVIL ENGINEER DIVISION: Performs as the Civil Engineering staff for 61 ABG. Manages resources to accomplish base facility, infrastructure, and grounds maintenance. Develops base comprehensive plan and uses various design and construction programs to improve base facilities, appearance, and quality of life. Administers and monitors the government quality assurance evaluation program for contracted services of base maintenance, custodial services, and other contracts for base facilities at Los Angeles AFB, Lawndale, and Fort MacArthur and other housing annexes. Provides oversight for the base energy management and conservation program. Manages housing referral and equal opportunity in housing rental and lease programs at Los Angeles AFB and provides base housing assignments at Fort MacArthur and other housing annexes. Manages and administers the hase disaster preparedness office to minimize the loss of operational capability caused by wartime contingencies and peacetime disaster operations. Manages all real property concerns and support agreements which provide civil engineering support for on- and off-base units and tenants and maintains the building manager program. Manages the various environmental compliance, prevention, and restoration programs for all Los Angeles AFB real property. Provides fire protection inspections and engineering oversight in facility fire detection and suppression systems and coordinates with local fire departments for emergency responses. Determines and allocates facility space assignments in Area B and Fort MacArthur based on commander's priorities and policies.

61 ABG/CP - COMMAND POST: Provides continuous command and control support to the Commander in accordance with USAF Emergency Action Procedures. Serves as a consolidated operations center for the 61 ABG and SMC ensuring readiness to coordinate activities during national emergencies, crises, civil disturbances, disasters, and significant peacetime incidents. Manages, prepares, and submits Status of Resources Training anomalies to SMC and associated units. Coordinates and tracks SMC launches and monitors schedules for potential conflicts and problems. Acts as liaison for all ground support provided to Presidential, Foreign Heads of State, and other Special Assignment Airlift Missions transiting Southern California.

61 ABG/HC - CHAPLAIN: Assists in the free exercise of religion, provides denominational sacraments and rites, responds to all peacetime contingencies and wartime deployments, provides education and training in moral and ethical issues, and enhances the quality of life for the people of Los Angeles Air Force Base.

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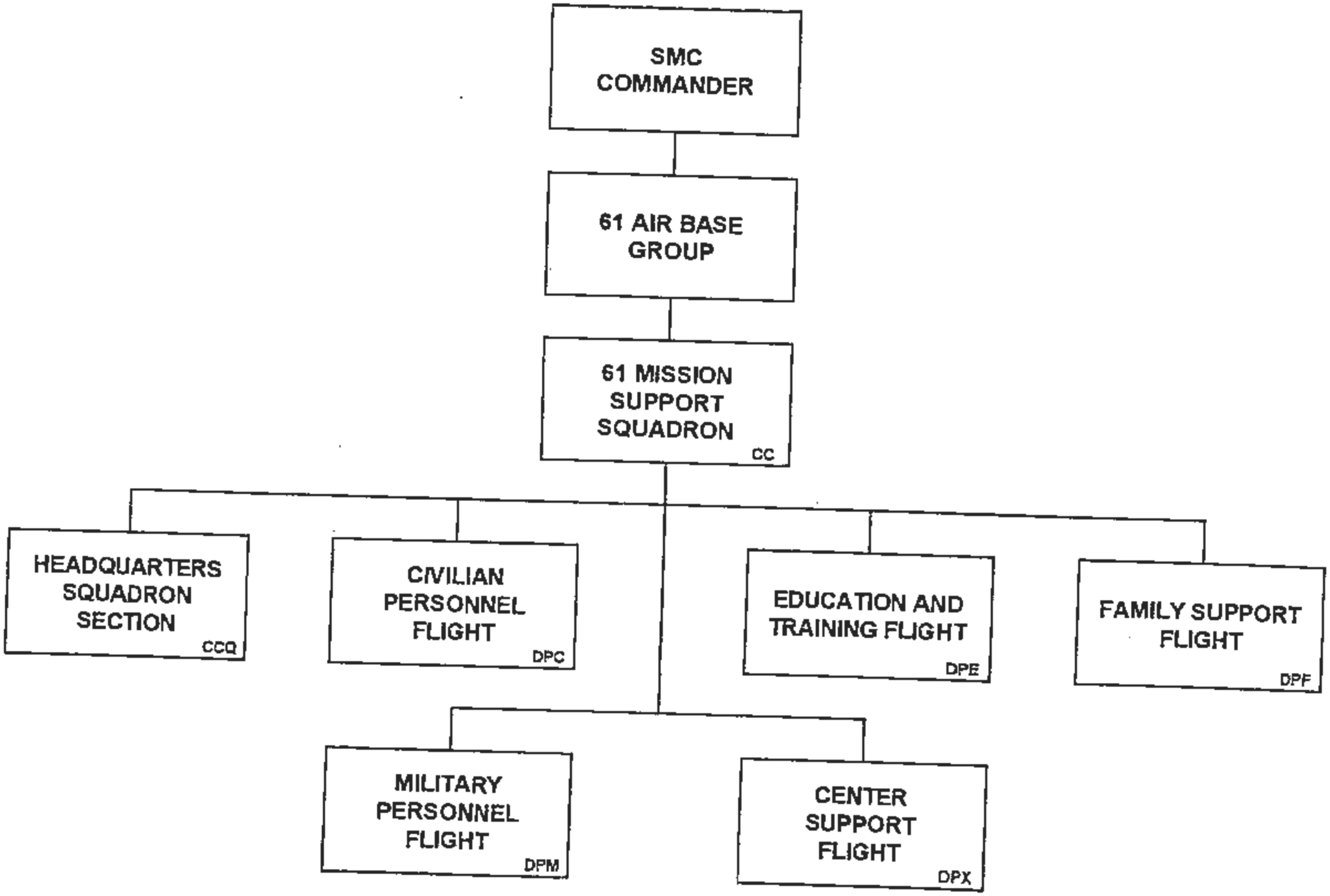
61 ABG/LG - LOGISTICS DIVISION: Supports the 61 ABG Commander in providing logistical support and guidance to Los Angeles AFB organizations and other local DoD agencies. Administers and monitors the Air Force Quality Assurance Evaluation program for the contract operated base supply, transportation and related services at Los Angeles AFB. Manages a Traffic Management Office along with a contracted official travel office which provides passenger travel support to all assigned military and government employed civilians. Provides counseling services for the movement of personal property to all area military and government employed personnel. Manages the base mobility and deployment program.

61 ABG/SA - SOCIAL ACTIONS OFFICE: Exercises staff supervision of the SMC Equal Opportunity and Treatment (EOT) and Human Relations Education (HRE) programs. Advises SMC and 61 ABG Commanders, as well as all 2-Letter Directors, on matters pertaining to human relations, such as HQ AF mandated Human Relations Training (to include First Duty Station Training, EOT-2000 Awareness Training, Diversity Training and Sexual Harassment Awareness Training), EOT Complaints Processing, and Unit/Base Climate Assessments.

61 ABG/SV - SERVICES DIVISION: Maintains readiness through programs promoting fitness, esprit de corps, and enhancing the quality of life for the entire Los Angeles AFB community. Provides high quality services and maximum opportunities for active duty military and their families to participate in activities that stimulate, develop, and maintain their mental, physical, and social well being. Manages activities at Los Angeles AFB and Fort MacArthur to include Child Development Centers, Youth Center, Lodging, Fitness Centers, Community Center, Equipment Rental, Tickets and Tours, Automotive Skills Development Center, and Club operations. Provides Mortuary Affairs and Search and Recovery capabilities. Provides base recovery support during disasters and contingencies.

61 ABG/XP - PLANS OFFICE: Provides war and contingency support to 61 ABG Commander. Develops and maintains war and base contingency support plans to AFMC OPLANS. Administers technical support and guidance to Los Angeles AFB units on various base support plans. Assists the SMC/IG in preparation for and conduct of JCS exercises. Advises and assists the SMC/IG on Exercise Evaluation Team readiness exercise scenarios. Coordinates readiness and Battle Staff operations for Los Angeles AFB. The logistics planners assigned perform duties as base focal point for support agreements (SA); coordinating, staffing, and finalizing documents. They also are the responsible agency for the deployment planning functions (training, unit deployment managers, and personnel readiness). This includes the logistics plans representative within the deployment control center (DCC).



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61 MSS: Reports to the 61 ABG Commander. Provides personnel support and guidance to the SMC Commander and staff, units assigned to SMC and the active, civilian retired, and family member population of Los Angeles AFB and the greater Los Angeles area. Directs all personnel activities for SMC including the Commander's Support Staff, Center Support Flight, Civilian and Military Personnel Flights, Education and Training Flight, and the Family Support Center.

61 MSS/CCQ - HEADQUARTERS SQUADRON SECTION: Provides personnel support to SMC, 61 ABG, and 61 MSS. Administers weight management, family care program, and leave program. Maintains duty rosters and unit leave control logs. Coordinates on all enlisted retirements, separations, reenlistments, assignments, and training actions. Schedules annual dental/physical exams and base details. Monitors the status of personnel in upgrade training and qualification training. Selects enlisted personnel to attend Professional Military Education (PME) courses. Reviews all EPRs. Conducts enlisted Commander's Calls. Maintains base dormitories. Exercises Article 15 UCMJ authority and prepares administrative discharge packages on enlisted personnel.

61 MSS/DPC - CIVILIAN PERSONNEL FLIGHT: Serves as the staff advisor to the SMC Commander for civilian personnel. Plans and directs the Civilian Personnel program for SMC and serviced tenant activities including staff advisory services on matters pertaining to civilian personnel management and administration in labor and employee management relations (including grievances and appeals), classification, data management support, resource management, staffing and placement, and equal employment opportunity.

61 MSS/DPE - EDUCATION AND TRAINING FLIGHT: Serves as the focal point for all base-level military and civilian education and training functions, to include formal training, local training, computer training, distance learning, testing, officer, enlisted professional military education programs, officer commissioning programs, and off-duty education programs. Provides oversight for the SMC Commander of the center's Acquisition Professional Development Program through coordination with nine acquisition functional managers. Manages the base training budget, civilian training budget, and tuition assistance funding.

61 MSS/DPF - FAMILY SUPPORT FLIGHT: Provides information and policy assistance to the installation commander and unit leadership in their responsibility for the health and welfare of military families. Helps families adapt to the demands of military life by providing a full range of preventive programs and activities designed to strengthen the Air Force community and promote self-sufficiency. The services include Air Force Aid Society, family readiness, and Relocation, Transition, Personal Financial Management, Spouse Employment, and Family Life Education programs to effectively address individual and family concerns impacting the family life cycle. Services are provided to active duty military members and their families in the greater L. A. area, guardsmen and reservists on active duty, military retirees and their eligible family members, and DoD civilians and their spouses.

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61 MSS/DPM - MILITARY PERSONNEL FLIGHT: Responsible for military records maintenance, data processing and reporting, career development, individual mobilization augmentee administration, evaluations, reenlistments, promotions, retirements, separations, casualty services, personal affairs, mobility processing, quality force, and assignments for Los Angeles AFB and its tenant organizations; including all military dependents and retired military personnel in the greater Los Angeles area. Performs quality reviews on personnel actions for SMC and advises and assists host and tenant units on personnel plans and programs.

61 MSS/DPX - CENTER SUPPORT FLIGHT: Serves as the focal point for SMC-wide military and civilian personnel actions. Provides personnel support to SMC detachments and operating locations worldwide. Prepares and submits the SMC Civilian Employment Plan. Responsible for managing the Human Resource Corporate Integrated Product Team (HR-CIPT) and providing support to the Product Support Business Area Board (PSBAB). Serves as focal point for all senior officer and senior civilian personnel actions. Coordinates personnel crossflow between AF Space Command and SMC.

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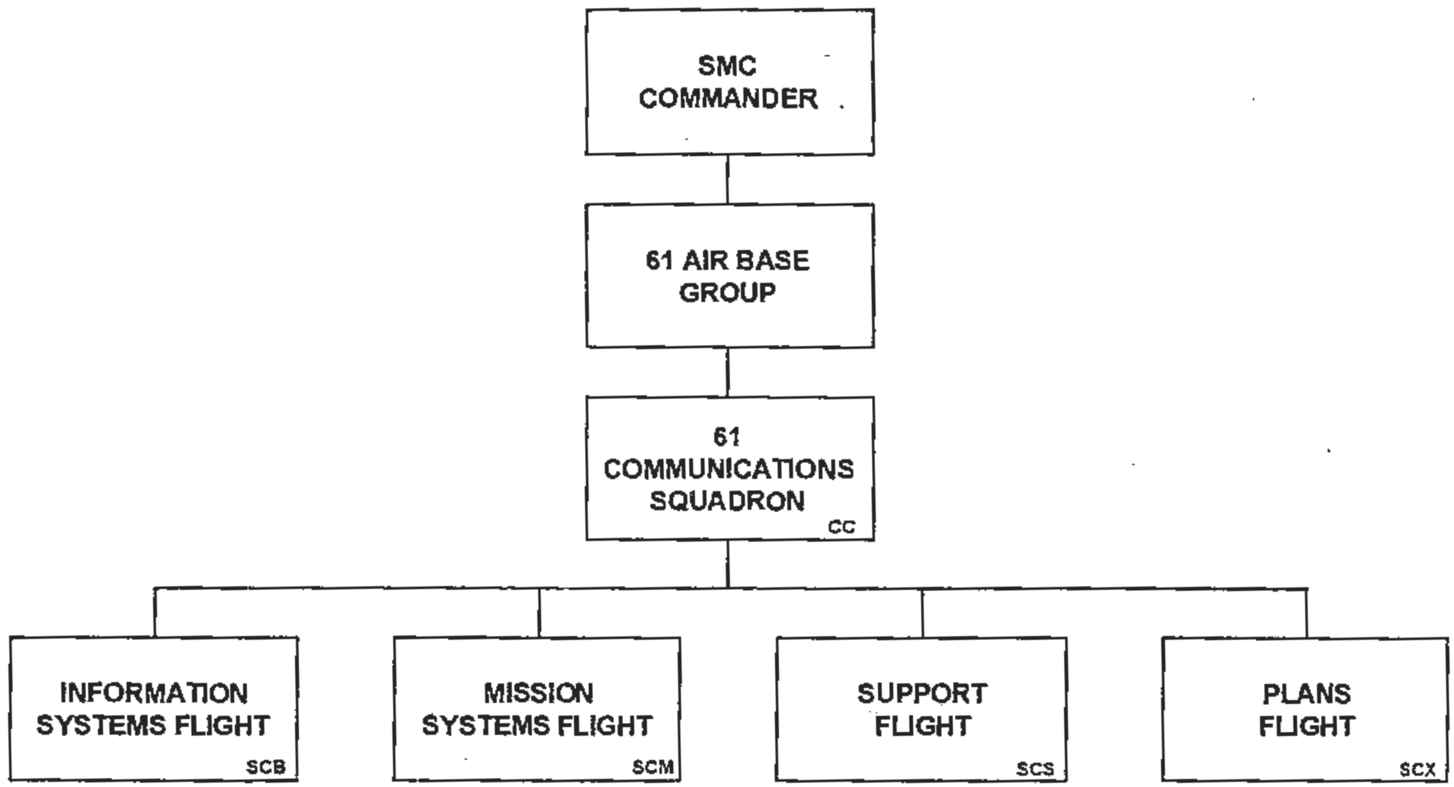

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61CS - COMMUNICATIONS SQUADRON: Provides infrastructure for communications, computer, information, and media services to support the acquisition and sustainment of Space and Missile Systems Center organizations. Manages and maintains desktop computers, mail and file servers, network equipment, base cable plant and associated software. Responsible for operating and maintaining local and wide area networks, information protection, component maintenance and information systems management. Responsible for functional address systems, mail management, message center, and records management for Los Angeles AFB. Provides all administrative telephones, voice mail, mobile and secure communications systems, public address systems, and manages frequency spectrum requirements SMC-wide. Designs, implements, operates, manages, and maintains the SMC Command Section multimedia systems, including presentation, audiovisual, graphic, still photography, video production and video teleconferencing support. Provides base publications and reprographic support and manages the base publications library. Engineers, develops, and maintains software systems for decision support, office automation, and information management.

61 CS/SCB - INFORMATION SYSTEMS FLIGHT: Manages and maintains desktop computers, mail and file servers, network equipment, base cable plant, and associated software; develops and implements network security procedures; ensures equipment accountability; and provides for information dissemination. Sustains a reliable network infrastructure to support the SMC community requirement for immediate access to all network resources. Responsible for operating and maintaining local and wide area networks, information protection, component maintenance, and information systems management.

61 CS/SCM - MISSION SYSTEMS FLIGHT: Provides all approved administrative telephone, voice mail, mobile and secure communications systems, and public address system support to SMC, Los Angeles AFB, and DoD activities throughout the greater Los Angeles area, while simultaneously improving communications systems to support migration to an electronic digital communications environment. Manages the frequency spectrum requirements SMC-wide.

61 CS/SCS - SUPPORT FLIGHT: Designs, implements, operates, manages, and maintains the SMC Command Section multi-media systems, including presentation, audiovisual, graphic, still photography video production and video teleconferencing support. Provides all standard visual information requirements for SMC, LAAFB, and tenant customers. Responsible for information management including mail management, records management, publications and forms management, reprographic support, and the publications library. Provides information management, requirements while simultaneously migrating to a paperless, electronic production and distribution environment.

61 CS/SCX - PLANS FLIGHT: Responsible for computer-communications (C-CS) acquisition. Develops, implements and maintains C-CS policy, total quality program, war readiness plans, and current and target architecture. Manages the squadron's critical resources: finance, manpower, training, contractors, and DoD specialized telecommunications. Engineers, develops, and maintains software systems for decision support, office automation, and information management.

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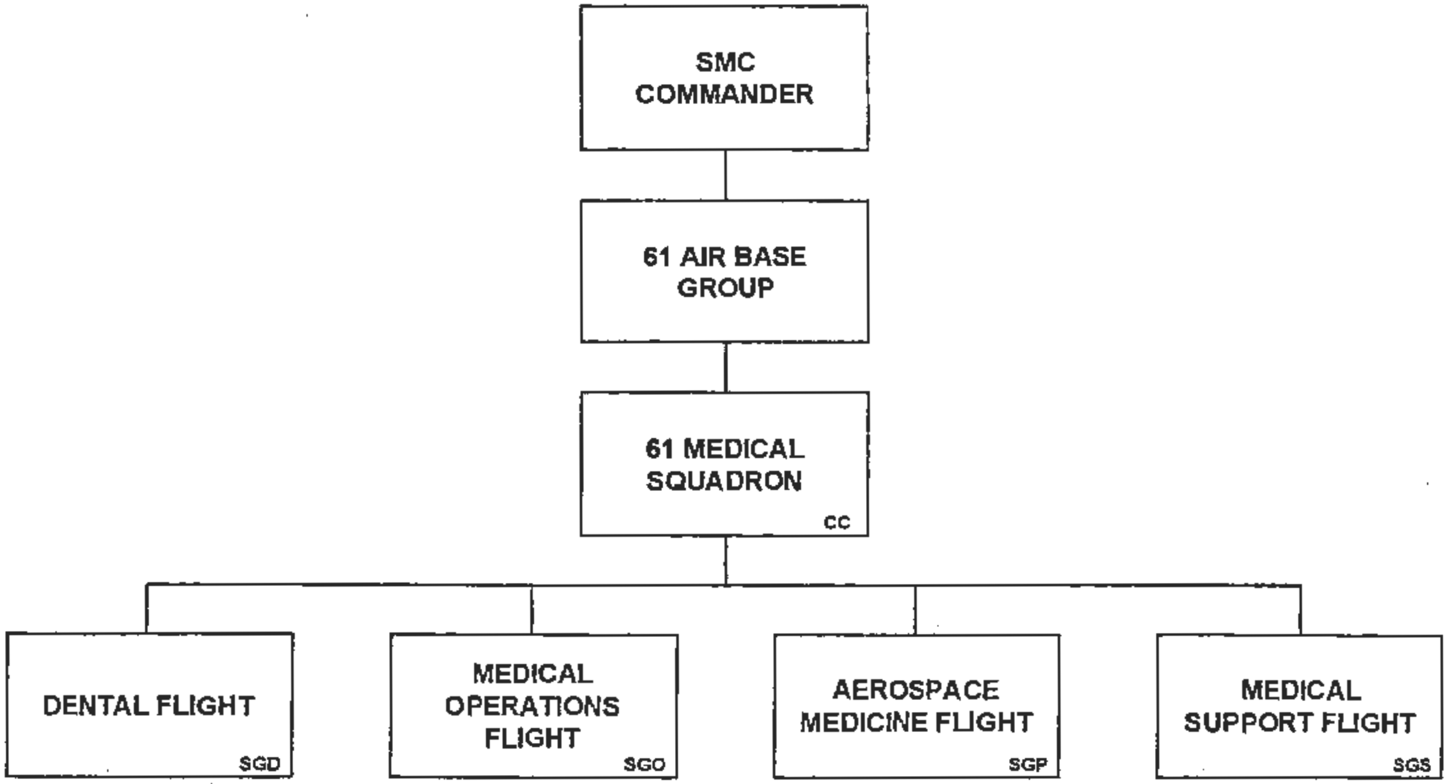

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<u>61 MDS</u>: Reports to the 61 ABG Commander. Provides or arranges quality, timely, and cost effective medical and dental care for approximately 3,000 active duty military personnel and their dependents in the Los Angeles area. Promotes healthy lifestyles and environments through aggressive community education and monitoring.

<u>61 MDS/SGD - DENTAL FLIGHT</u>: Responsible to the Director, Base Medical Services on matters pertaining to the operation of the base dental services. Provides Air Force personnel and authorized beneficiaries with oral health care in support of the Air Force medical mission.

<u>61 MDS/SGO - MEDICAL OPERATIONS FLIGHT</u>: Responsible for directing medical, nursing, mental health, and administration staff toward the highest standard of professional practices and ethics within established operating policies. Directs the development and conduct of all health care training programs for assigned and attached personnel. Establishes medical guidelines for the outpatient clinic operations for Pediatric through Geriatric beneficiary population, Primary Care, and Mental Health at the Main Clinic at Los Angeles AFB, and the satellite Clinic at Fort MacArthur.

<u>61 MDS/SGP - AEROSPACE MEDICINE FLIGHT</u>: Responsible for the flight medicine physical examination and standards functions, public health, immunizations, bioenvironment engineering, health promotions, medical readiness, and optometry programs. Provides care for flyers and their families. Promotes and maintains the physical and mental health and well being in Air Force occupants and environments.

<u>61 MDS/SGS - MEDICAL SUPPORT FLIGHT</u>: Directs and controls financial programs, health care statistical reports, medical logistics, and facility management. Provides administrative and personnel support, radiology, laboratory, and pharmacy services. Administers the control of patients and performs aeromedical evacuation coordination for the medical treatment facility. Administers the patient appointment system and arranges referrals to specialty services. Manages TRICARE support and the medical information system.

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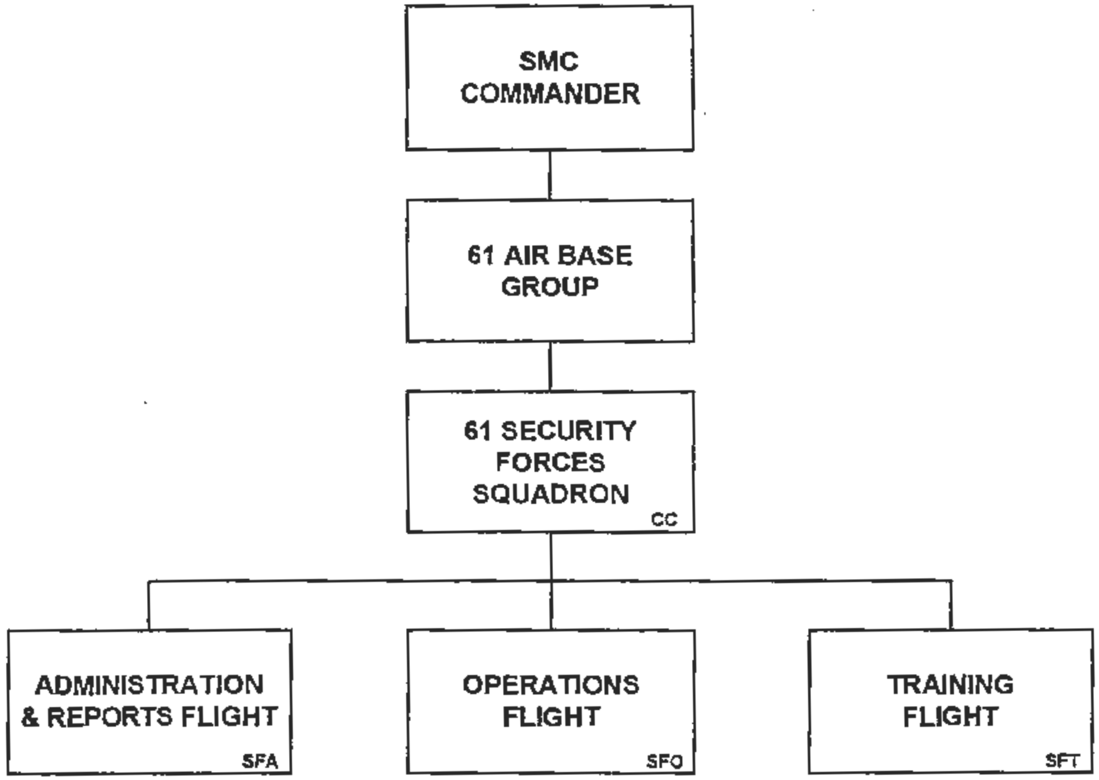

<u>61 SFS</u>: Provides professional force protection and law enforcement services for Los Angeles AFB personnel, resources, and information.

<u>61 SFS/SFA - ADMINISTRATION AND REPORTS FLIGHT</u>: Provides pass and registration, reports and analysis, and visitor control services to support the Los Angeles AFB community.

<u>61 SFS/SFO - OPERATIONS FLIGHT</u>: Provides force protection, police services, physical security and investigative services.

<u>61 SFS/SFT - TRAINING FLIGHT</u>: Provides training, armament and equipment support.

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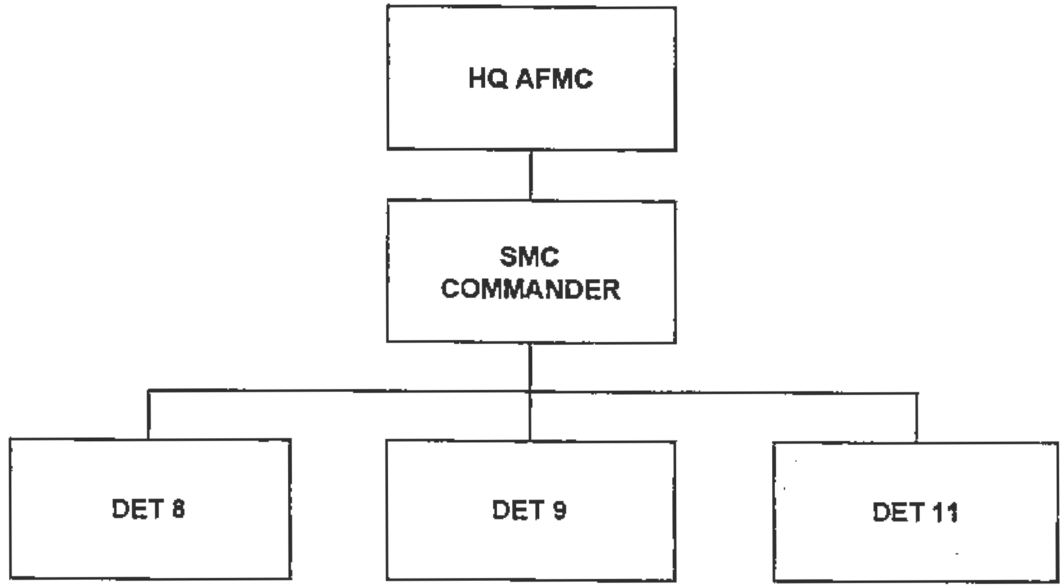

DET 8 - Command focal point for Air Force space and space-related activities at Cape Canaveral Air Station and Patrick Air Force Base, FL. The single point of contact with the host base command structure for all matters affecting SMC. Provides administrative, orderly room, training, and other support to all assigned personnel.

DET 9 - Provides SMC's single face to AFSPC at Vandenberg AFB. Acquires, tests and sustains state-of-the-art space and missile systems, facilities and range assets. Provides launch support to space and ballistic missile systems programs, on-site support for the 30th Space Wing range systems, and facility and environmental support. Also provides test expertise for the planning, execution, and systems analysis of research and development (R&D) space and missile launch vehicles and satellites.

DET 11 - The single point of contact with the host base command structure for all matters affecting SMC. Provides acquisition, sustainment, and software support related to the operations of AFSCN, SLC, DMSP, SESS, MILSTAR, GPS and SBIRS systems. Command focal point for Air Force space and warning systems activities at Peterson AFB CO and Shriever AFB CO.

MFO 98

(Doc I-2)

Waldron Harry N GS-13 SMC/HO 833-2988

From: SMC/CCX CC's Action Office 833-3593
Sent: Thursday, December 24, 1998 8:54 AM
To: SMC Secretaries 833-1350; SMC XOs 833-1350; SMC/CCX All
Cc: SMC Directors 833-1350; SMC Deputies 833-1350
Subject: FW: SMC Unit Mission Description

The unit mission description sent out yesterday will not fit on the forms if you are using less than an HP5 printer driver. To ensure that everyone is able to use the description, the words "direct" and "other" were deleted. Please use the corrected version below. This version has been tested with multiple printer drivers.

V/R

Maj Kim Olson
Chief, Commander's Action Group
(310) 363-3593 DSN 833
fax (310) 363-1232 DSN 833

Equips US and allied forces with operational satellites and the capability to launch and employ those satellites in support of global military and national security operations. Product Center with 6,700 people; manages over $5B annually in system development and acquisition. Conducts research, development, procurement, launch, and on-orbit sustainment/maintenance of US military space and space-related systems.

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Our Mission

SMC's Vision:

"Forging the shape of space for tomorrow's conflicts"

SMC's Mission:

As the space Center of Excellence, SMC strengthens our nation's security by providing integrated, affordable systems for the control and exploitation of air and space.

SMC's Strategic Goals:

- Make space mission execution, ground support, and launch affordable, reliable, timely and routine for the warfighter
- Create capabilities for an integrated national security air and space architecture
- Enhance the excellence of our business practices
- Enable our people to excel
- Operate quality installations efficiently and affordably

SMC's Objectives:

- Establish automated management systems which identify, track and facilitate control of SMC output costs
- As the space Center of Excellence, maintain a system engineering baseline for the lifetime of SMC acquired weapon systems
- Identify and exploit opportunities across civil, commercial, military and intelligence communities
- Improve and consolidate Los Angeles AFB, providing environmentally responsible facilities to enhance the safety, security and efficiency of our personnel
- Strengthen pride, professionalism and unity throughout SMC
- Reduce cost of product support, to include program life cycle costs, while meeting performance, service and quality standards
- Develop initiatives that contribute to SMC becoming the assignment of choice
- Reduce cost of infrastructure while meeting performance, service and quality standards

(Current as of February 8, 2000)

Return to the **Team SMC** home page or the **Public Affairs** web page

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FACT SHEET

USAF Fact Sheet

Air Force Materiel Command

Air Force Materiel Command, with headquarters at Wright-Patterson Air Force Base, Ohio, was created July 1, 1992. The command was formed through the reorganization of Air Force Logistics Command and Air Force Systems Command.

Mission

AFMC's mission is to develop, deliver and sustain the best products for the world's best Air Force. It is the Air Force's largest command in terms of employees and funding. AFMC supports other U.S. military forces and allies and handles major aerospace responsibilities for the Department of Defense. This includes research, development, testing, and evaluation of satellites, boosters, space probes and associated systems needed to support specific National Aeronautics and Space Administration projects.

AFMC researches, develops, tests, acquires, delivers and logistically supports every Air Force weapon system as well as other military non-weapon systems. AFMC works closely with its customers - the operational commands - to ensure each has the most capable aircraft, missiles and support equipment possible. AFMC uses five goals to help build a better Air Force:

- Satisfies its customers' needs in war and peace
- Enables its people to excel
- Sustains technological superiority
- Enhances the excellence of its business practices
- Operates quality installations

Personnel and Resources

AFMC employs a highly professional and skilled command work force of about 108,000 military and

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civilian employees. It is the Air Force's largest command in terms of employees and funding, as it manages 57 percent of the total Air Force budget. The command's work force operates major product centers throughout the United States.

AFMC fulfills its mission of equipping the Air Force with the best weapons systems through a series of facilities that foster "cradle-to-grave" oversight for aircraft, missiles, munitions and the people who operate them. Weapon systems, such as aircraft and missiles, are developed and acquired through four product centers, using science and technology from the research sites that make up the Air Force Research Laboratory. The systems are tested in AFMC's three test centers, then are serviced and receive major repairs over their lifetime at the command's five air logistics centers. The command's specialized centers perform many other development and logistics functions. Eventually, aircraft and missiles are "retired" to AFMC's Arizona desert facility.

Product Centers

Aeronautical Systems Center, at Wright-Patterson AFB, Ohio, is responsible for research, development, test, evaluation and initial acquisition of aeronautical systems and related equipment for the Air Force. Its major active programs are the B-2 and B-1B bombers, C-17 airlifter, F-22 fighter and continuing work on the F-117A fighter, F-15 Eagle and F-16 Fighting Falcon.

Electronic Systems Center, at Hanscom AFB, Mass., develops and acquires command, control, communications, computer and intelligence systems. Among the systems developed by the center are mission planning systems, the Airborne Warning and Control System, the Ballistic Missile Early Warning System, the Joint Surveillance Target Attack Radar System and the North American Aerospace Defense Command Center in Cheyenne Mountain, Colo.

Space and Missile Systems Center, at Los Angeles AFB, Calif., designs and acquires all Air Force and most DOD space systems. It oversees launches, completes on-orbit checkouts, then turns systems over to user agencies. It supports the Program Executive Office for Space on the Navstar Global Positioning, Defense Satellite Communications and Milstar systems. SMSC also supports the Titan IV, Defense Meteorological Satellite and Defense Support programs, and Follow-on Early Warning System. In addition, it supports development and acquisition of land-based intercontinental ballistic missiles for the Air Force Program Executive Office - Strategic Systems.

Human Systems Center, at Brooks AFB, Texas, has the role of integrating and maintaining people in Air Force systems and operations. The center concentrates on crew-system integration, crew protection, environmental protection and force readiness (human resources and aerospace medicine). It develops and acquires systems such as life support, chemical warfare defense, air base support and aeromedical casualty.

Air Force Research Laboratory

The **Air Force Research Laboratory's** mission is to identify and provide advanced, affordable, integrated technologies to keep the U.S. Air Force the best in the world. As a full-spectrum laboratory, it is responsible for planning and executing the Air Force's entire science and technology budget. The headquarters, located at Wright-Patterson AFB, directs the activities of research facilities across the nation.

Test Centers

Arnold Engineering Development Center, at Arnold AFB, Tenn., has the nation's most advanced and largest complex of flight simulation test facilities. The center has more than 50 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, arc heaters, ballistics

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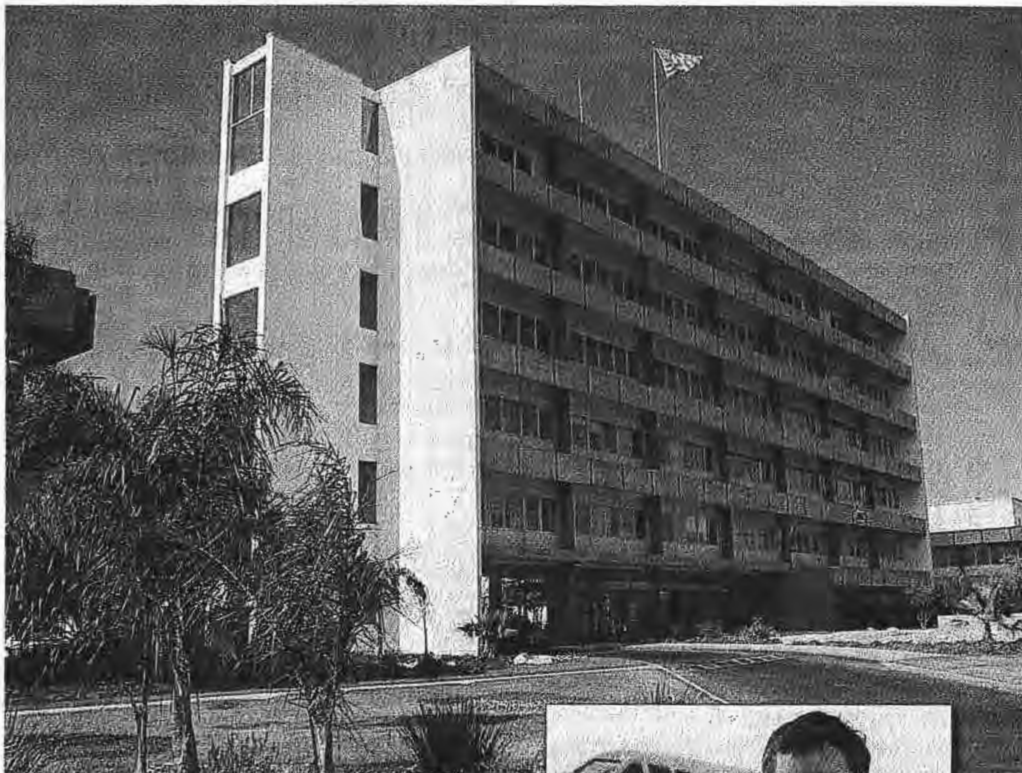
[DOC I-5]

Los Angeles Air Force Base



COURTESY LOS ANGELES AFB

The Space and Missile Systems Center headquarters at Los Angeles Air Force Base.

BY ROBERT MULCAHY

LOS ANGELES AIR Force Base is located in El Segundo, California, a few miles south of Los Angeles International Airport. The mission of the 95-acre base near Interstate 405 is not generally known among the many thousands of locals who drive by it daily. Los Angeles AFB is located on two city blocks, and it doesn't even have a runway, but it has one of the most vital aircraft-support missions in the military.

The base is the home of the Space and Missile Systems Center (SMC) where Air Force space systems are researched, developed and acquired. The SMC space programs include military satellites and their ground-based command posts, plus the launch vehicle rockets that transport the satellites into orbit. Satellites are essential to the modern warfighter, and they provide the Air Force with indispensable worldwide communication, navigation, meteorological information, ground surveillance and early warning of global missile launches. Space systems are no longer optional for the modern Air Force, and Los Angeles AFB is the center that helps ensure our military space superiority.

The Air Force purchased the land and facilities for its current El Segundo headquarters in 1960. Los Angeles was a prominent center for aircraft production during World War II (Douglas, Lockheed and North American were local), and it is now a major aerospace hub, with numerous contractors (Aerospace, Boeing, Hughes, Lockheed Martin, TRW...) maintaining central offices in the immediate area.

The support mission at Los Angeles AFB is conducted by the 61st Air Base Group. Although the SMC continues to use the word "missile" in its title, there hasn't been a missile program assigned to the base since the early 1990s. Many of the Air Force's space requirements are determined by the Air Force Space Command out of Peterson AFB in Colorado. SMC then develops the highly technical space assets and negotiates contracts with the aerospace companies to produce the desired space systems and their launch vehicles.

SMC manages the newly launched space assets after they've been launched into orbit from various ground-based command posts until the satellites are evaluated and gain operational status. The Air Force Space Command then takes control of the space assets after they become operational. SMC retains authority over the orbiting Air Force experimental satellites. SMC currently manages (and previously contracted for) more than $56 billion in space assets.

In an article in the March 31, 2000, issue of *Astro News* (the base newspaper), SMC commander Lt. Gen. Eugene Tattini was quoted about the mission at Los Angeles AFB. "We are living in the most challenging times of military space. From medium- to heavy-lift rockets and boosters to satellites and orbiting spacecraft, it all starts here. We buy and deploy the military space systems that provide warfighting capabilities to our nation and allied forces."

The space and missile mission began in Los Angeles during the Cold War in 1954. The original objective was to develop an operational intercontinental ballistic missile (ICBM) system before the Soviets. The project had the highest national priority. In 1956 the Air Force was also given the task of developing the first military satellite system. The Department of Defense was especially interested in producing satellites for reconnaissance purposes to gain intelligence about the Soviet military and its potential threat. Gen. Bernard Schriever was in charge of developing these initial programs from the Los Angeles area, and he is currently considered the foremost pioneer of the Air Force missile and space programs due to his many achievements.

On Oct. 4, 1957, the Soviet Union became the world's first nation to successfully launch a spacecraft into orbit. *Sputnik 1* was a 22.8-inch satellite that transmitted radio signals back to Earth

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for 21 days. This event shocked the American public in a way it had not experienced since Pearl Harbor. The Soviets were able to reach space before America and appeared to gain an edge in dominating space. It was a common belief that the nation who controlled space would eventually control the world with space-based weapons. The American public, the press and politicians demanded action. *Sputnik 1* started the competitive space race between the United States and the Soviet Union.

The United States greatly accelerated its space program by 1958 due to the Soviet threat. Along with the widespread anxiety brought on by *Sputnik 1*, there was also a common fear in the United States that the Soviets had superior ICBM technology, which created an imaginary "missile gap" that the United States had to overcome. On Jan. 31, 1958, the United States successfully launched its first satellite (*Explorer 1*) from Cape Canaveral in Florida. This was followed in 1959 when the Air Force declared that the ICBM program was operational after three Atlas missiles were placed on strategic alert at Vandenberg AFB in California.

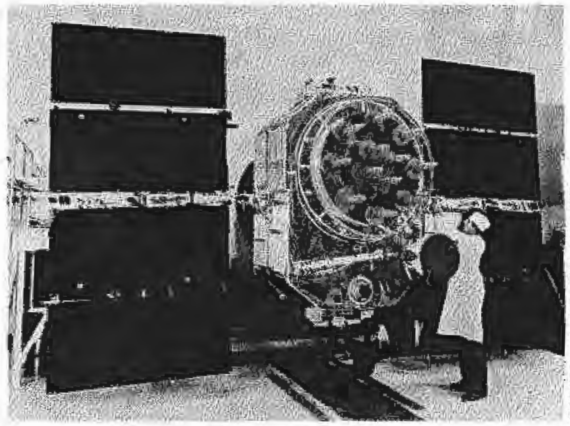
The Air Force-developed CORONA reconnaissance satellite made a major impact on American military policy after it was successfully launched in 1961. It proved that the missile gap was a farce. The photos produced by CORONA showed that the Soviet missile arsenal was not nearly as threatening as previously suspected.

In the 1970s, the Defense Support Program (DSP) early warning missile-launch satellites were able to detect foreign ICBM launches. DSP removed the possibility that the Soviets could launch a surprise ICBM attack without receiving massive retaliation from the United States. The satellite had a significant role in maintaining the peace during the Cold War. The Air Force was making the transition from being an air force to becoming an "aerospace force."

During the initial Space Age, the Air Force, Army, Navy and the CIA all competed to be the organization in charge of the nation's space programs. They would all benefit from the technology that was gained, but the Air Force became the central organization to develop, launch and operate most of the military space assets after 1970.

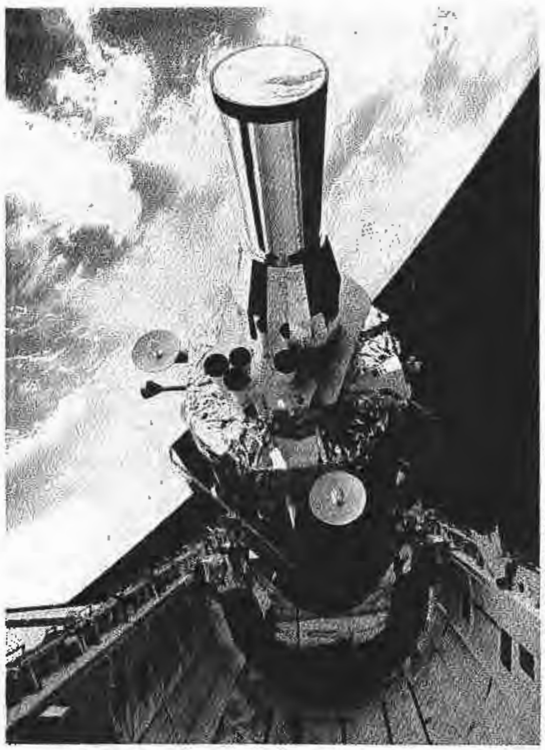
The space rivalry between the United States and the Soviet Union continued for more than 40 years. The anxiety created by the Cold War greatly accelerated the progress of space technology in a manner that has not been matched since. By 1990 Soviet communism was disintegrating, but the U.S. military space program would be put through its biggest test.

Operation Desert Storm proved the importance of the Air Force space programs developed through Los Angeles AFB. It was the first thoroughly integrated "space war." Information obtained from military satellites was essential to determine the plan of attack in the air, on the gronnd and over the sea. Hardly a decision was made withont first consulting with information acquired from space. The activities at Los Angeles AFB notably escalated during the war with increased space support operations.



COURTESY LOS ANGELES AFB

A Navstar global positioning system (GPS) satellite. The GPS provided navigation data to air, ground and naval forces during Operation Desert Storm.



COURTESY LOS ANGELES AFB

The only Defense Support Program (DSP) satellite to be deployed into orbit from a space shuttle, Nov. 24, 1991. DSP satellites provided early warnings of Iraqi Scud missile launches during Operation Desert Storm.

The Navstar global positioning system (GPS) uavigation and time satellites are considered the most important space system used during the war. The U.S. ground forces depended on GPS to pinpoint their locations so they could navigate through the featureless desert. Thousands of GPS receivers were distributed to the ground forces that outmaneuvered the Iraqi troops (which depended on traditional maps and compasses). Artillerymen also used GPS to direct precision barrages against Iraqi positions. Air Force and Navy aircraft used GPS in their flight navigation, and GPS-guided "smart" bombs were accurately directed to their targets. The time signals provided by GPS assisted in organizing precisely timed attacks and maneuvers.

The Defense Meteorological Satellite Program (DMSP) satellites were used to forecast the weather conditions over the war zone. The military used the information to plan its air attacks around the poor weather that was often present. With this data, the Air Force was able to avoid countless air sorties that would've been aborted in flight due to bad weather.

The DSP satellites provided early warnings of Iraqi Scud missile launches against Israel and Saudi Arabia. The Scud launches were spotted within moments of liftoff, so the Army was warned (through satellite communication) to prepare their Patriot missiles to intercept the incoming Scuds. Civilians were also provided warning of the Scud launches, giving them time to take cover. DSP rednced the number of casualties and the damage that would have beeu inflicted by the Scud missiles

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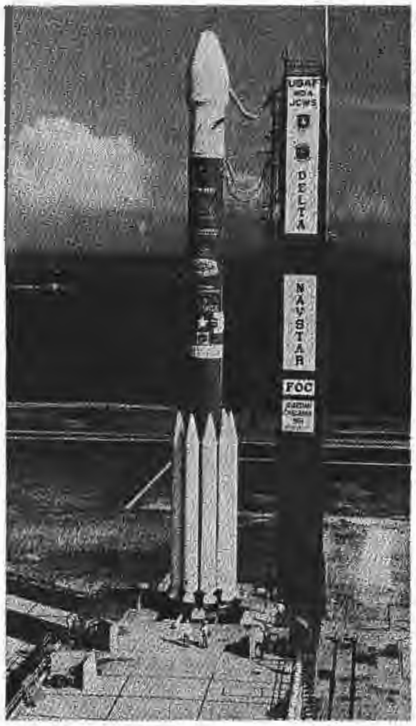
and helped increase the number of Scuds that were intercepted.

A few different satellites were used for rapid communications to and from the war zone. The Air Force's Defense Satellite Communications System (DSCS), the Navy's Fleet Satellite Communications System (FLTSATCOM) and one Navy Leased Satellite (LEASAT) were utilized during the conflict. They provided swift communications through radios, telephones, faxes, TV signals and computers. Battlefield commanders could receive almost immediate information to help them conduct their military operations. Satellite communications were used by aircraft, ships, ground forces and the various headquarters.

Military space systems truly came of age during Operation Desert Storm. Their value was unquestionable. Satellites made significant contributions to hastening the end of the war.

In 1999 the Air Force's space systems played a major role in the air war over Kosovo. The satellites produced information faster and more accurately than they did during Desert Storm. The GPS was now available 24 hours a day for aircraft navigation. During Desert Storm, about 10 percent of the aircraft munitions were smart bombs. During the Kosovo campaign, most of the munitions were smart bombs that were guided to their targets with remarkable precision.



COURTESY LOS ANGELES AFB

A Delta II launch vehicle rocket at Cape Canaveral. This Delta transported a GPS satellite into orbit in 1994.

The DMSP meteorological information was used to predict and exploit the consistently bad weather over Yugoslavia. The high-quality DMSP cloud imagery and forecasts allowed strike planners to more confidently identify opportunities for precision weapon employment. Images from surveillance satellites helped to carefully choose the targets to be bombed and assess the damage after they were attacked. Communications satellites provided contact to and from the aircraft while they were over the war zone. After the 78-day campaign, the Air Force pilots received their well-deserved glory, but they had some assistance from space to get the job done and make a ground attack unnecessary.

The United States is the world's superpower in space, and satellites have become essential to the U.S. military. A space commission is currently researching the possibility of creating a separate military space service. Regardless of what is decided, the military personnel and civilians at Los Angeles AFB will continue to develop and acquire the most modern, innovative space systems in the world. Having air superiority is no longer enough for the modern Air Force; maintaining military space supremacy is the other vital goal.

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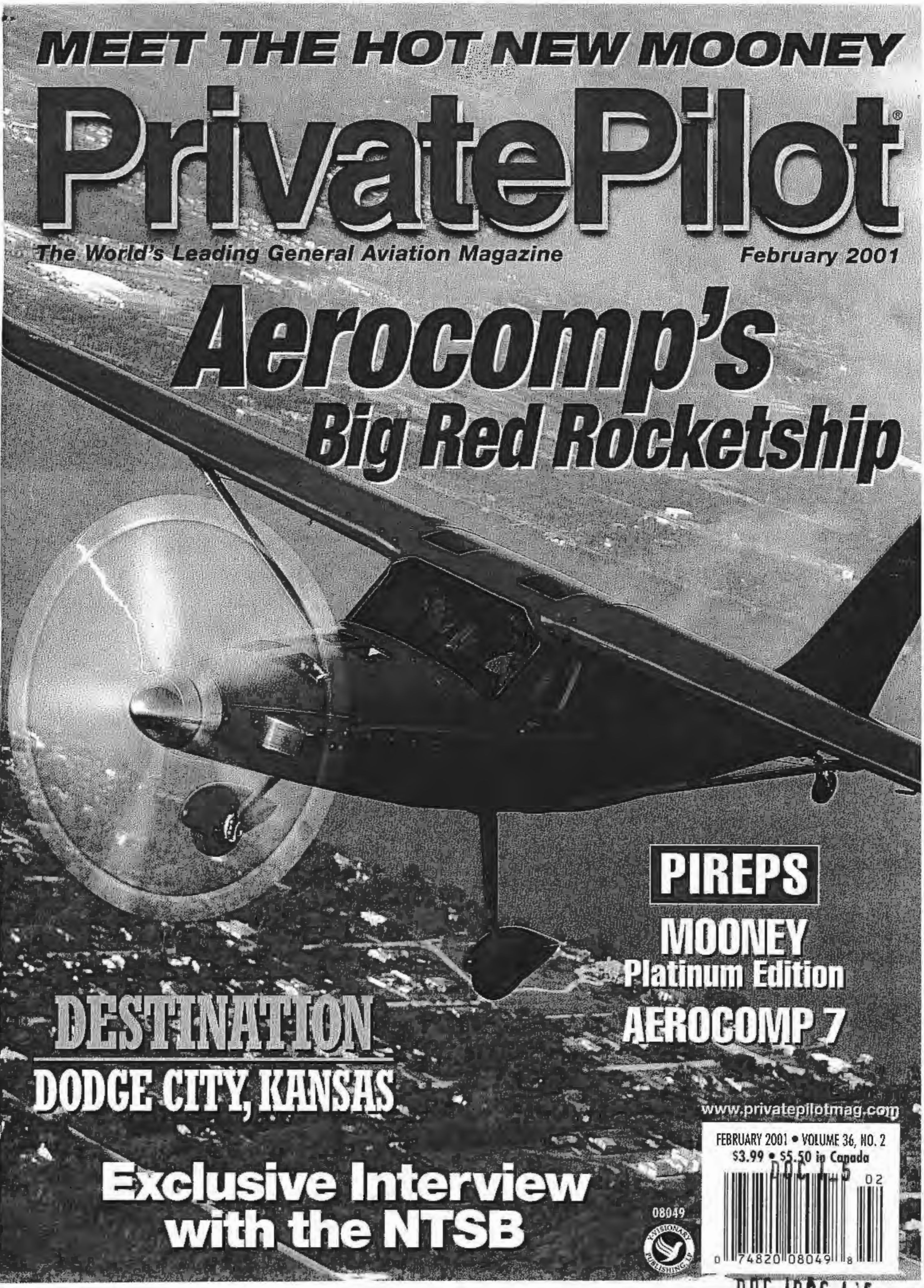
I certify that the statements made by me above are correct and complete.
Jim Margetich, Circulation Director. Dated 09/30/00



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(Doc I-6)

SMC Acquisition Programs

PROGRAM NAME	PMD	DATE	ACAT	PHASE	MDA	SPD	PEM
AFPEO/SP (Mr Collins)							
LAUNCH PROGRAMS - CL							
TITAN II	0938 (7)	15-May-95	II	IV	AFAE	SMC/CL (Col Norton)	Maj Pedigrio, SAF/AQSL, (703) 693-3291
TITAN IV	0938 (7)	15-May-95	ID	III	DAE	"	"
MLV I (DELTA II)	2138A (46)	4-May-95	II	III	AFAE	"	Lt Col Keck, SAF/AQSL, (703) 614-8574
MLVII (ATLAS II)	2138B (46)	4-May-95	II	III	AFAE	"	"
MLV III (DELTA II)	2138C (46)	4-May-95	II	III	AFAE	"	"
UPPER STAGES	9283 (7)	24-Apr-95	II	III	AFAE	"	Lt Col Keckt, SAF/AQSL, (703) 614-8573
MILSATCOM - MC							
MILSTAR	2325A (4)	25-Nov-96	ID	II/III	DAE	SMC/MC (Col Sovey)	Maj Drozd, SAF/AQSS, (703) 693-3361
DEFENSE SATELLITE COMMUNICATIONS SYSTEM (DSCS)	2325B (4)	25-Nov-96	II	III/IV	AFAE	"	"
MILSATCOM TERMINALS (@ ESC)	2325C(4)	25-Nov-96	*	III/IV	AFAE	"	"
* See PMD for ACATs							
ADVANCED MILSATCOM	2325D (4)	25-Nov-96	P-ID	Pre-EMD	DAE	"	Maj Calabretta, SAF/AQSS, (703) 693-3362
GLOBAL BROADCAST SERVICE (GBS)	2325E (4)	25-Nov-96	ID	EVOL	DAE	"	Capt Rierse, SAF/AQSS, (703) 693-3361
INTERIM POLAR SATCOM	2325F (4)	25-Nov-96	II	Dem/Val	AFAE	"	
SPACE BASED INFRARED SYSTEM (SBIRS) - MT							
SBIRS HIGH COMPONENT	2362A (3)	4-Nov-96	ID	II	DAE	SMC/MT (Col Burkett)	Maj Rivera, SAF/AQS, (703) 693-3389
DEFENSE SUPPORT PROGRAM (DSP)/ALERT	2362B (3)	4-Nov-96	IC	III	AFAE	"	Maj Isenhour, AF/XOR, (703) 697-3715
SBIRS LOW COMPONENT	2362C (3)	4-Nov-96	ID	I	DAE	"	Maj Rivera, SAF/AQS, (703) 693-3389
COBRA BRASS (CB) DEMO	2362D (3)	4-Nov-96	ID	I	DAE	"	
MINIATURE SENSOR TECH INSERTION (MSTI-3)	2362E (3)	4-Nov-96	ID	I	DAE	"	
EVOLVED EXPENDABLE LAUNCH VEHICLE (EELV) - MV							
EELV	2385 (1)	29-Jun-95	ID	Pre-EMD	DAE	SMC/MV (Col McKinney)	Lt Col Chorney, SAF/AQSL, (703) 693-4256
AFPEO/WP (Mr Schulte)							
AIRBORNE LASER (ABL) SYSTEM - TM							
ABL	2335 (3)	4-Jun-97	ID	I	USD(A&T)	SMC/TM (Col Boeen)	Capt Mol, SAF/AQPT, (703) 695-0328
DAC (Lt Gen DeKok)							
ADVANCED SYSTEMS - AD							
BMD/SPACE BASED LASER (SBL)	PMA 1360	(?)	P-I	Pre-I	N/A	SMC/AD (Col Loverro)	Lt Col Karner, SAF/AQSI
TENCAP	TEN1 (02)	12-Sep-95	MS**	N/A	SWC/CC	"	Capt Kutyna, AF/XOR, (703) 697-3715
** Mission Support							
DEF METEOROLOGICAL SAT PROG (DMSP) - CI							
DMSP BLOCK 5D2 & 5D3	3015 (38)	1-Oct-96	IC	III	AFAE	SMC/CI (Col James)	Maj Bedford, AF/XOR, (703) 697-3715
CLOUD DEPICTION & FORECAST SYSTEM (CDFS II)	3015A (38)	1-Oct-96	III	II/III	SMC/CI	"	
SATELLITE AND LAUNCH CONTROL - CW							
AFSCN	9038 (21)	11-Jul-95	II	EVOL	DAC	SMC/CW (Col Morgan)	Maj Schrock, AF/XOR, (703) 693-8310
EASTERN & WESTERN RANGE PROC PRGMS	2330 (3)	28-Jun-95	II	II***	AFAE***	"	Maj Perkins, SAF/AQSL, (703) 614-8574
*** Phase II and AFAE will be changed to EVOL and DAC respectively at next PMD update							
NAVSTAR GLOBAL POSITIONING SYSTEM (GPS) - CZ							
GPS	4075 (33)	26-May-94	IC	III	AFAE	SMC/CZ (Col Armor)	Maj DeCou, SAF/AQSS, (703) 693-3354
COMBAT SURVIVOR EVADER LOCATOR (CSEL)	2320 (2)	5-Sep-96	III	II	SMC/CC	"	Maj Lolils, SAF/AQSC, (703) 695-9644
NUCLEAR DETONATION DETECTION SYSTEM (NDS)	6112 (18)	25-Apr-94	III	III	AFAE	"	Capt Luke, SAF/AQSS, (703) 693-4254
SPACE AND MISSILE T&E DIRECTORATE - TE							
ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)	2313I (8)	26-Mar-97	III	II	SMC/CC	SMC/TE (Col Martin)	Maj Mobley, SAF/AQSD, (703) 697-5890
CONVENTIONAL BALLISTIC MISSILE (CBM) PROGRAM	2313K (8)	26-Mar-97	II	I	SMC/CC	"	
AF SPACE & MISSILE TEST & EVAL CENTER	9267 (6)		LOE****		SMC/CC	"	Maj Schrock, AF/XOR, (703) 697-3715
SPACE TEST PROGRAM	2140 (42)		LOE****		SMC/CC	"	Capt Walton, SAF/AQSL, (703) 693-4258
**** Mission Support, level of effort programs							

Dec 1997

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Mulcahy Robert D Civ SMC/HO

From: Evans William M Civ SMC/AXRX
Sent: Thursday, January 18, 2001 11:18 AM
To: Mulcahy Robert D Civ SMC/HO
Subject: SMC Program Lists

Mr Mulcahy -

The SMC Program Lists as of Jun 97 and Dec 97 are contained in the attached e-mails:

SMC Acquisition Programs   SMC Acquisition Programs

Bill Evans
AXRX
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(Doc I-7)

SMCVA 23-4

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CC 30867

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COMMANDER
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COL J. F. WAGNER
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DET 11 PETERSON AFB CO
COL L. M. JOHNSON
COMMANDER
CC DSN 834-2001

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CC DSN 246-6616

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DOC 1.8

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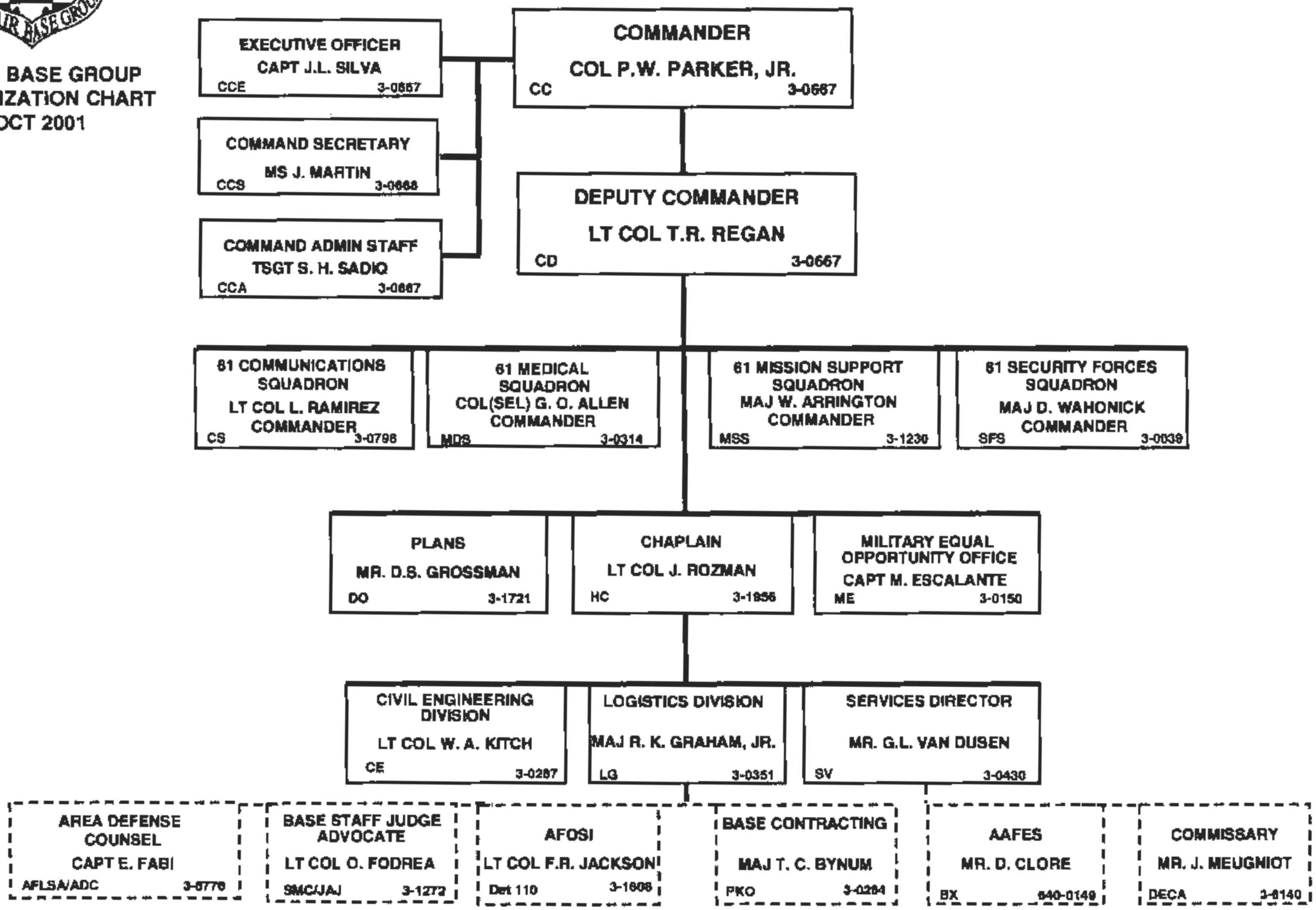
61 AIR BASE GROUP ORGANIZATION CHART OCT 2001



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DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

U.S. AIR FORCE 1947 - 1997

(Doc I-10)

MEMORANDUM FOR HQ USAF/XP

FROM: AFMC/CV
4375 Chidlaw Road, Suite 1
Wright-Patterson AFB OH 45433-5001

SUBJECT: Los Angeles AFB Security Forces Contract

1. The attached package is forwarded for your review and approval. The current Los Angeles AFB Security Forces contract operation has been rated as "Unsatisfactory" by HQ AFMC/IG due to conflict with the California Business and Professions Code which sharply restricts the activities of private security contractors. SMC/JA and HQ AFMC/JA have reviewed this package, and their opinion is that "no contractor could, as a matter of law, perform the Performance Work Statement without violating state law (impossibility of performance)" and "even if exclusive federal jurisdiction was obtained for Los Angeles AFB, to the extent the law enforcement functions currently under contract are inherently governmental functions, they could not be contracted out, leaving SMC with substantially the same problem it now faces.

2. SMC/CC directed an Integrated Product Team to study all potential options (a total of 18) to address this deficiency and recommend a fix that permanently resolves this issue. The recommended option was to set up a military and DoD civilian Security Forces Squadron of 8 military and 84 DoD civilians with an accompanying Base Operating Support tail of four (96 authorizations total). The small military cadre (seven senior NCOs and one officer) is absolutely essential to ensure the expertise needed to stand up a new Security Forces Squadron. There are sufficient contract dollars available in our program for conversion to cover the 96 positions.

3. The existing security forces contract expires in June 1998. It cannot be recompeted or renewed. ***We need your concurrence to bring the function in-house and your approval for allocation of the authorizations for the organic workforce no later than November 1997.*** This will allow enough lead time to hire the personnel and ensure the appropriate training requirements are met before the contract expires. I urge your support for three critical reasons: *First,* as a matter of policy, the Air Force cannot and should not continue to violate California law. *Second,* this request serves to normalize the security force at Los Angeles AFB and provide the same degree of force protection and law enforcement capability found at all other major Air Force installations. *Third,* this request maximizes our return on investment and provides enhanced capabilities with 96 military personnel and DoD civilians – a reduction of 27 man-year equivalents vis-à-vis the current contract security force. We appreciate your assistance in helping to resolve this long-standing and potentially embarrassing problem.

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4. If you have any additional questions, please have your staff contact Mr. Harvey Brewster or Mrs. Tammie DiTommaso, HQ AFMC/XPMQ, DSN 787-3933. Your point of contact at SMC is Colonel Dieter Barnes, 61 ABG/CC, DSN 833-0667.

MICHAEL C. KOSTELNIK
Major General, USAF
Vice Commander

Attachments:
1. SMC/CC Memo, 9 Jun 97 wo Atch
2. HQ AFMC/JAQ/JAG Memo,
   14 Jul 97 w/Atchs

cc:
SMC/CC
HQ AFMC/CE/JA/SF/FM

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MQ

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

U.S. AIR FORCE
1947 - 1997

17 October 1997

MEMORANDUM FOR AFMC/CV

FROM: SMC/CC
2430 East El Segundo Boulevard, Suite 6037
Los Angeles AFB
El Segundo CA 90245-4659

SUBJECT: Los Angeles AFB Security Forces Contract (HQ AFMC/XP SSS, 10 Oct 97)

1. I concur with the proposed memorandum to HQ USAF/XP. I have some reservations about the bottom-line number of 96 organic personnel (including a support "tail" of four), but the fact is we cannot afford to delay this process any further. We must begin recruiting, hiring, and training DoD police officers in the near future or face the prospect of a train wreck when the final option on the current contract expires in June 1998. Suffice to say, I remain concerned, as does my staff, that 96 personnel constitute the absolute minimum force necessary to accomplish the security force mission with any likelihood of success.

2. Our prior request for 101 authorizations was based on the manpower work-up accomplished by HQ AFMC/XPM. We understand the need to revalidate some of these 96 positions "after the workforce is in place." We have surveyed other AFMC bases, however, and remain convinced that our prior requests track both the actual workload and manning at other installations throughout the command. SMC has made a consistent effort to reduce Security Force manning throughout this evolutionary process – from 123 under the current contract to 112 in our initial proposal and 101 in my last input. We can do the job with 96 people, but everyone involved should understand that this bottom line leaves little margin for safety.

3. I appreciate HQ AFMC/CE's commitment to fund technical security enhancements at SMC. As I stated in my 27 September 1997 memorandum, we need more insight from HQ AFMC/SF on the nature of the technology enhancement projects and the anticipated manpower savings. While we are committed to seizing any manpower reductions which can be realized from technology, such reductions must be premised on actual, documented savings – not projections.

4. In any event, I believe that we have made substantial progress. I want to extend my personal thanks to the AFMC staff for their efforts to overcome the many obstacles we have encountered enroute to a successful resolution.

ROGER G. DEKOK
Lieutenant General, USAF
Commander

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(Doc I-12)

(MQ)

OK

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

18 May 1998

FILE ______
DATE 18 May 98
OPR ______
SUSP ______
~~INFO~~ Read CC
CO
CV

MEMORANDUM FOR HQ AFMC/DP
HQ USAF/DP
USD (P&R)
IN TURN

FROM: SMC/CC
2430 East El Segundo Boulevard, Suite 6037
Los Angeles AFB
El Segundo CA 90245-4659

SUBJECT: Request for Law Enforcement Officer (LEO) Coverage and Special Pay Pursuant to the Federal Law Enforcement Pay Reform Act of 1990

1. On 1 July 1998, the responsibility for law enforcement and force protection at Los Angeles AFB will transition from a contracted function to an organic force composed primarily of DoD Police. This transition is driven by the requirement to bring law enforcement activities at Los Angeles AFB into compliance with state law. Without belaboring the point, the California Business and Professions Code prohibits private security contractors from performing the range of law enforcement services required at this installation and subjects contractor personnel to criminal penalties for performing the statement of work now on contract. For this reason, HQ AFMC/JA rendered a formal opinion to the effect that this contract may not be recompeted when it expires on 30 June 1998. By memorandum dated 12 December 1997, HQ USAF/XP approved bringing the law enforcement mission in-house and allocated a total of 88 civilian authorizations to perform the law enforcement and force protection missions at Los Angeles AFB. Seventy-three of these personnel will be sworn DoD Police Officers, classified in the GS-083 Police Officer job series. These officers will perform law enforcement duties as defined in 5 U.S.C §§ 5541(3), 8331(20) (CSRS), and/or 8401(17) (FERS). In accordance with 5 C.F.R. §§ 831.901-11 (CSRS)_& 842.801-09 (FERS) and DoD 1400.25-M, Subchapters 830 & 840, we request that these police officers be approved for law enforcement officer retirement and special pay coverage entitlements.

2. We note at the onset that our current Security Police contract cost Space and Missile Systems Center (SMC) $6.3 million this year. By downsizing the unit from 123 contractor personnel to 88 Government personnel and reducing contractor overhead, ***we expect that bringing the law enforcement function in-house will save SMC between $1.5 and $2M in O&M dollars each year.***

3. Our Police Officers will investigate crimes and suspected criminal activity by military personnel in violation of the Uniform Code of Military Justice and civilians under federal and state criminal laws. In the course of their normal duties, they conduct investigations, compile evidence, advise suspects of their Article 31 and/or Miranda rights, interrogate, arrest, and book suspects, and testify against them in military and civilian courts, as required. They also provide force protection for SMC personnel and resources, including Sensitive Comparted Information Facilities. In transiting between facilities that are located more than 17 miles apart, some of them situated, as noted below, in high crime areas, our police officers are also required to come to the

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aid of local police officers requiring immediate assistance. Our officers will also conduct preliminary investigations regarding alleged security breaches. Investigative efforts routinely carry over into the next shift and occasionally over a period of days. These duties, as detailed in the relevant GS-083 position descriptions, meet the criteria for designating law enforcement officer positions set forth in 5 U.S.C. §§ 8331(20) & 8401(17) and 5 C.F.R. §§ 831.902 & 842.802. In recent cases, the Merit System Protection Board has held that the performance of these duties by federal Police Officers entitles them to law enforcement officer coverage.

4. Typically, an Air Force Security Police Officer may only detain civilians and turn them over to local authorities for disposition. Our Police Officers will, however, have additional police powers granted by the state. California Penal Code § 830.8 recognizes federal police officers as peace officers when "they are engaged in enforcing applicable state or local laws on property owned or possessed by the United States government, ***or on any street, sidewalk, or property adjacent thereto*** . . ." [emphasis added]. Under this statute our Police Officers may actually arrest civilians engaged in drug transactions, for example, adjacent to the installation. This extraterritorial jurisdiction distinguishes our DoD Police Officers from the normal installation where we have no authority or jurisdiction over civilians off the installation. This distinction warrants the law enforcement officer designation.

5. I am convinced, as the commander on the ground, that providing law enforcement coverage for Police Officers at Los Angeles AFB is crucial to success of our force protection mission. Our base industrial and military family housing facilities are located in or adjacent to high crime areas with significant crime, street gang, and drug problems. Our industrial area is about 1.5 miles from Los Angeles International Airport. The fringe of the 1992 riots came to within about 1.5 miles east of the base, and areas less than a mile from the base are now notorious for violent street crime and gang activity. Our housing areas are about 17 miles south of the main base in San Pedro. Los Angeles Police Department statistics show San Pedro is one of the higher crime areas in Los Angeles County. The area immediately outside Fort MacArthur is currently being disputed by three separate street gangs to control drug trafficking in the area. In 1997, there were 14 homicides within close proximity to our base, and all categories of crimes against persons saw increases rates in 1997. Our Contract Security Police personnel, for example, have discovered dead bodies dumped against the base perimeter wall, intervened in a rape in progress, and provided a deterrent "show of force" during a planned gang fight less than 50 yards from a base gate. Local drug dealers armed with shotguns confronted two Air Force OSI agents conducting a narcotics surveillance on a main street adjacent to Fort MacArthur. The agents fled the scene and had to seek the assistance of our Contract Security Police.

6. Prudent force protection measures against these considerable threats require us to deploy a professional police force composed of motivated, highly trained members. Before I can recruit and retain this professional force, I ***must*** be able to offer a salary structure and grades that are competitive with other law enforcement agencies in the Los Angeles area. The current security contractor starts their "Security Police Officers" at $35,734 annually, and we have observed, first-hand, the extreme difficulty they had in recruiting and retaining good people at that salary – especially given the limited health and retirement benefits available to contractors. Those problems contributed to the poor showing by our Contract Security Police during our most-recent AFMC Operational Readiness Inspection. This unsatisfactory performance was a secondary but contributing factor to our decision to allow the contract to terminate and establish a Security Forces Squadron manned with fully trained, professional police officers. We also know that local police departments pay their entry level officers $38,400 or more annually. With the Law Enforcement Officer Special Pay Adjustment for Los Angeles, our GS-7 Step 5's will receive $36,338 annually. Since our police officer positions are structured to provide civil service medical benefits, LEO retirement coverage, and the opportunity for advancement, we believe they will be attractive enough to allow us to "compete" with other police departments to recruit top-quality people into our ranks. If this request is denied, I fear we will become a "feeder base"

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that hires and trains good quality people, only to see them leave for higher paying jobs with other local police departments. I know of at least one other base situated in a high cost area that routinely experiences a 20 percent vacancy rate due to the constant turnover as officers leave to take better paying positions. As the responsible commander, I ***cannot*** accept the degraded force protection and increased liability risks inherent in constantly cycling trainee police officers through the 61st Security Forces Squadron.

7. I am aware of the potential for litigation brought by DoD police officers at other installations seeking LEO status. I believe, however, that crime, gang, and drug problems we face create challenges that are unique to Los Angeles AFB. We cannot, due to fundamental conflicts with state law, continue to use Contract Security Police. Likewise, for a number of very specific reasons, we do not have the ability to staff this function with military personnel. Our Security Police IPT explored these reasons in detail. In a generic sense, they include the shortfall in Security Forces personnel across the Air Force coupled with the ongoing requirement to support deployments in Bosnia and the Middle East. Were we to stand up a military unit, the normal manpower analysis would result in an 110-person squadron with a mobility requirement. Los Angeles AFB lacks the infrastructure to support a military Security Force organization without funding for a major military construction project. We have neither the dormitory nor messing facilities to accommodate a large number of junior enlisted personnel. We would need MAJCOM funding to purchase infantry weapons and other mobility equipment that would not otherwise be required at this location.

8. Therefore, only the DoD Police option remains viable. We must invest the resources necessary to allow that option to succeed – to upgrade the quality of our law enforcement personnel by recruiting, training, and retaining active, vigorous, professional police officers. We have invested heavily in screening the applicants for these positions. They have undergone psychological screening, extensive background checks, physical fitness testing and interviews. We need to hire law enforcement professionals, and granting LEO coverage will help us to retain them. In an urban environment, force protection is critical to mission success. I urge you to look at this request on its individual merits, as an exception, if necessary, rather than a precedent. In the strongest possible terms, I request your support for this mission-critical, time sensitive request.

ROGER G. DEKOK
Lieutenant General, USAF
Commander

Attachment:
Background Paper, 13 May 98 (w/Atchs)

Doc I-12

(Doc I-13) 61 ABG

MQ

mil Los Angeles Air Force Base, Calif.

Astro News

Page 1 19 June 1998

Los Angeles AFB to reactivate 61st Security Forces Squadron July 1

John Ryan
Public Affairs Office

Los Angeles Air Force Base will reactivate the 61st Air Base Group Security Forces Squadron, and Maj. Larry Bartlett will assume its command July 1.

The squadron was activated exactly 50 years earlier at Rhein Main Air Base, Germany.

The squadron activation is the result of more than a year's worth of study and planning, Bartlett said.

More than 500 applicants applied to become one of 88 civilian police officers and administrative personnel. With eight military positions, the 61 SFS will have a total strength of 96 personnel.

"By changing the way we do business, there will be 35 less personnel working in security, and the base will incur a savings of nearly $2 million a year," said Master Sgt. George Johnson, Security Forces superintendent. Although the SFS will have fewer personnel, "we will provide a higher level of protection, using several innovative and technological techniques. We take our force protection and police services missions very seriously," Johnson said.

Although the squadron is new, the federal police officers are not rookies.

"Each of the individuals selected has at least one year of law enforcement experience, and most have several years of experience and have completed a formal police academy," Johnson said. "We will also provide four weeks of intense training and one week of California Penal Code 832, law enforcement training, at Rio Hondo Community College. We already completed a criminal background check, a physical agility test and a psychological written test and interview. Our officers are the 'cream of the crop.'"

There will no longer be a receptionist in Buildings 80, 105 and 120. Employees may still gain access by using their controlled area badge at the electronic reader located outside the entrance to these buildings. All visitors will have to be cleared through the Visitor Control Office in Building 110. Call 363-2676 for more information.

"This change is really a quality-focus type of improvement. We have consolidated visitor processing from four separate and redundant locations to one convenient location. With the four separate receptionist areas, we had to have 14 people; now we will only need three," Johnson said.

"This is an exciting time for Security Forces," said Bartlett. "Our motto is 'Defensor Fortis,' Defenders of the Force. We consider that motto to be a solemn charge and responsibility."

MQ

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

(Doc I-14)

Special Order
GA-7

30 June 1998

The 61st Security Forces Squadron (61 SFS), Space and Missile Systems Center (SMC), is activated at Los Angeles AFB, California, effective 1 July 1998. Authority: DAF/XPM letter 012s, 29 June 1998, Activation of the 61st Security Forces Squadron, and AFI 38-101.

Mailing Address

61st Security Forces Squadron
205 Columbia, Suite 101
Los Angeles AFB CA 90245-2810

FOR THE COMMANDER

Jacob Kessel

JACOB KESSEL, Colonel, USAF
Chief, Manpower and Organization
Directorate of Plans and Programs

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1 – 61 ABG/CC
1 – 61 SFS/CC

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SMCVA 23-4

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F1686/01.PPT

SUPERSEDES: SMCVA 23-4, OCTOBER 98
OPR: SMC/MQ, D. RODRIGUEZ
CERTIFIED BY: SMC/MQ, MS. S. SEMROD
PAGES: 1/DISTRIBUTION:F

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News Briefs

Commissary lot resurfacing

The parking area surrounding the base commissary is scheduled for complete resurfacing beginning today. This work will take place in two phases with the estimated completion being in April. Patrons are asked to abide by posted signs and park at alternate designated areas. For more details call, Michelle Marquez at 363-8356.

XP becomes two-letter

A new plans and programs directorate is operating at Space and Missile Systems Center to better align SMC functions with those at Headquarters Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio.

Maj. Gen. Eugene L. Tattini, SMC commander, made the announcement Jan 8.

The new organization, XP, includes the office of strategic planning, manpower and quality offices, the commander's action group and the protocol office.

Tattini has named Col. Joseph Thumser, who was the SMC Contracting Office deputy director, as the XP director; Ed Salem, of XRP, is the deputy for the new organization.

National Prayer luncheon

The Los Angeles Air Force Base Annual National Prayer Luncheon is Feb. 11 at 11:30 a.m. in The Club's Ballroom.

The guest speaker will be Frank Pastore, director of Talbot Impact Ministries, Biola University and former Cincinnati Reds pitcher.

This luncheon is open to all Space and Missile System Center's personnel and their families and reserve and retired military members. The cost for club members is $6 and $8 for nonmembers. Tickets may be obtained through executive officers, first sergeants, orderly rooms and the 61st Air Base Group Chaplains' Division Office. For additional information, please call 363-1956.

Carpool sticker renewal

The Commuter Services Program Office is in Building 240, Room 11 until Feb. 1, where it will move to Building 229, Room 210. Personnel with closing year 1998 carpool stickers are valid until Jan. 31.

For more information call Capt. George Unsinger at 363-0351.

Establishment of XP (supporting docs 1999-2001)

Doc I-16

Doc I-17

XP MQ

STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	SMC/ CCX	Process		6			
2	SMC/ CV	Coord		7			
3	SMC/ CD	Coord		8			
4	SMC/ CC	Sign	[initials] 6/9/00	9			
5				10			

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INITIALS	SUSPENSE DATE
JAY, GS-13	SMC/XPM	3-0375	dmj	

SUBJECT	DATE
Establishment of SMC Plans and Programs Directorate	19 Mar 99

SUMMARY

1. HQ USAF approved the AFMC request to establish Plans and Program Directorates at all centers. HQ AFMC/XPM requested our XP structure be submitted (Tab 2).

2. Tab 1 depicts the proposed organization for SMC/XP and includes the Colonel Position Description for the director.

3. Recommendation: Approve the XP organization and sign the proposed memo at Tab 1.

/s/

JOSEPH F. THUMSER, Col, USAF
Director, Plans and Programs

2 Tabs
1. Proposed Memo
2. HQ AFMC/XPM Memo, 14 Oct 98

The Colonel PD is no longer in this package since it was sent up separately - Donna Jay

#12640

AF FORM 1768, SEP 84 *(EF-V4)* *(FORM FLO2)* PREVIOUS EDITION WILL BE USED.

DOC I-17

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

SEP 0 6 2000

MEMORANDUM FOR HQ AFMC/XPM

FROM: SMC/CC
2430 E. El Segundo Blvd, Suite 6037
Los Angeles AFB
El Segundo CA 90245-4659

SUBJECT: Establishment of SMC Plans and Programs Directorate (SMC/XP)

1. I have established a Plans and Programs Directorate (SMC/XP) at SMC within my center resources. Attached are the organizational structure, mission statements, and data code changes.

2. Questions on this package may be addressed to Ms Sandra Semrod, Chief, Manpower and Organization Division, SMC/XPM, DSN 833-0375.

EUGENE L. TATTINI
Lieutenant General, USAF
Commander

3 Attachments
1. Proposed Organizational Chart
2. Proposed Mission Statements
3. Data Code Requests

Doc I-17

(Doc I-18)

XP
MQ

OPR: XP
Info:
CD

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

25 SEP 2000

MEMORANDUM FOR SMC/CC

FROM: HQ AFMC/XPM
4375 Chidlaw Road, Room B204
Wright-Patterson AFB OH 45433-5006

SUBJECT: Establishment of SMC Plans and Programs Directorate (SMC/XP)
(Your Memo, 6 Sep 00)

28 Sep 00

1. Your Plans and Programs Directorate (XP) organization structure is approved as proposed. We will update the SMC organization Blueprint to include the realignment of your Protocol Office and Commander's Action Group to the Commanders Support Division (XPC).

2. Your staff may address any questions to Mr. Bill McLean, HQ AFMC/XPMO, DSN 787-6643.

RONNIE D. SULLIVAN, Colonel, USAF
Chief, Manpower and Organization Division
Directorate of Plans and Programs

cc:
HQ AFMC/CCX/CVP
SMC/XPM

DOC I-18

(Doc I-19)

Mulcahy Robert D Civ SMC/HO

From: Hale Alicia Civ SMC/XPM
Sent: Thursday, January 24, 2002 4:14 PM
To: Mulcahy Robert D Civ SMC/HO
Subject: FW: History Report FY00

Mr. Mulcahy,

Directorate of Plans and Program (SMC/XP) was approved on 25 Sep 2000 as a 2-ltr the actual stand up date was 6 Jan 2001 and MQ became XPM at that time.

Hope this helps.

Alicia

Doc I-19

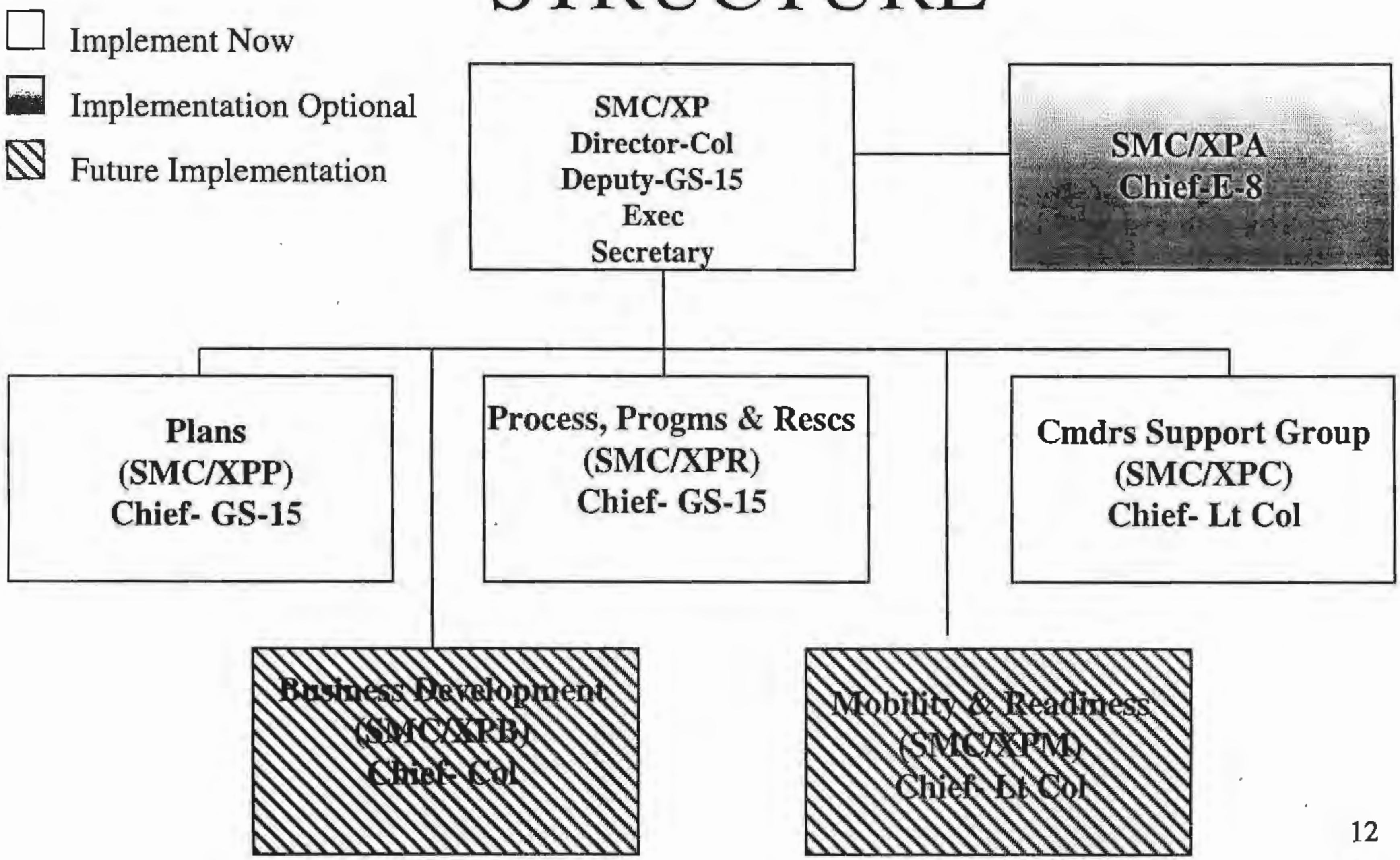
Doc 1-19-1

SMC/XP STAND UP ACTIVITIES

XP Mission

To provide the Commander the institutional, center-wide leadership and management capabilities necessary to effectively provide integrated, affordable systems for the control and exploitation of air and space.

SMC/XP ORGANIZATIONAL STRUCTURE



DOC 1_19_1

SMC/XP CONSTRUCT

- SMC/XP Key Responsibilities
  - Corporate Leadership
  - "Strategic" Corporate Planning & Surveillance
  - "Tactical" Execution Of Center Functional Support And Programs Via Corporate Level Resource & Process Management
  - Support The Commander's Data Collection, Assessment & Action Relative To Decision Making
  - Provide Integrated Administrative Support To The Command Section
  - Plan & Execute Innovative I&S Strategies And BRAC Activities

DOC 1_19_1

Plans Division
(SMC/XPP)

- Integrates Corporate Strategic Planning
- Supports Corporate Market Research
- Assesses Corporate Strategic Plan And Activities
- Develops Organizational Concepts & Policies
- Integrates Center's POM Activities
- Conducts And Supports Misc Studies & Analysis

Programs, Processes And Resources Division (SMC/XPR)

- **Integrates/Executes Corporate Process Planning & Resource Control**
- **Supports Corporate Manpower Requirements; Definition, Allocation & Control**
- **Manages A76 & Direct Conversion Programs**
- **Provides Process & Productivity Improvements & Resource Management Innovation**
- **Institutionalizes Corporate Quality Concepts, Processes, Tools & Training**
- **Center Focal Point For Activity Based Costing**
- **Conducts Organizational Diagnostic Services**

Commander's Support Group Division (SMC/XPC)

- Supports Commander Via Misc. Taskings
- Data Collection & Analysis For Decision Making
- Provides Legislative Liaison & Analysis
- Manages Staff Meetings & "CMRs"
- Plans & Executes DV/Protocol Activities/Ceremonies
- Controls DV/VIP Cottage Assignments

Executive Support Division (SMC/XPA)

-Performs Admin Functions Supporting Comn'd Sect'n
-Controls SMC Calendar
-Increases CC & XP Productivity, Output & Effectiveness By Applying Technology
-Reviews & Assesses Latest H/W, S/W Developments & Determines Applicability To XP & CC
-Supports CC & Directorate In Resolving S/W Problems

Business Development Division (SMC/XPB)

-BRAC Planning & Implementation
-Area "A/B" Consolidation "Deal"
-"Creative" Infrastructure Business Planning
--Generate Revenue
--Reduce Operating Costs
--Increase Center-wide Efficiency Via Facility Initiatives

XP Home Work Assignment

- Review XP View Of 3 Ltr Responsibilities
- Develop/Discuss 3 Ltr's View Of Responsibilities
- Propose 3 Letter Mission Statement
- Identify/List Key Processes Needed To Accomplish Mission & Responsibilities
- Suggest Use Of A "Quality Circle" & Possible Use Of A Facilitator
- Schedule Review With XP Within 7 Workdays

Doc 1-19-2

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT PATTERSON AIR FORCE BASE OHIO

14 OCT 1998

MEMORANDUM FOR AAC/CD
AEDC/CD
AFFTC/CD
ASC/CD
ESC/CD
SMC/CD

FROM: HQ AFMC/XPM
4375 Chidlaw Road, Suite 6
Wright-Patterson AFB OH 45433-5006

SUBJECT: Proposal to Establish a Plans and Programs Directorate (XP) (HQ AFMC/XP Memo, 12 Jan 98)

1. HQ USAF has approved our request to establish a Plans and Program Directorate (XP) at all centers. Some centers have already established XPs. Those that have not may establish the two-letter directorate at your discretion. However, for all addressees, we need information on your proposed structure below the two-digit level. Request you send us your XP structure for review by 26 Oct 98. Please include current and proposed organization charts and authorized manpower by officer, enlisted and civilian. Brief functional statements are provided for your information (Atch). The reorganization must be accomplished within approved manpower resources.

2. We will review and staff your submittals by 30 Oct 98. If you have any questions or require additional information, your staff may contact Mr. Bill McLean, HQ AFMC/XPMO, DSN 787-2471.

RONNIE D. SULLIVAN, Colonel, USAF
Chief, Manpower and Organization Div.
Directorate of Plans and Programs

Attachment:
XP Functional Statements

cc:
311 HSW/CD, w/Atch

DOC 1-19-2

MANPOWER ORGANIZATION AND FUNCTION CHART
HQ AIR FORCE MATERIEL COMMAND

AS OF: 4 APR 98
OPR: XP

PAS: FC7F ORG: 0000 MTC CM 0000 XP00 LOCATION: WRIGHT PATTERSON AFB OH

XP Provides strategic direction and command integration for AFMC. Manages planning processes, quality implementation/awards program. Focal point for command goals/objectives metrics, and commander policies. Operates AFMC resource allocation process for facility, manpower and money issues. Focal point for infrastructure planning, BRAC activity, national security negotiation activities, and the mission assignments process. Manages AFMC manpower programs and maintains organizational control. Provides policy guidance for war/contingency plans/operations. Focal point for AFMC managment sciences program, JLC, and congressional activities. Supports AFMC/CC/CV through commander's action division.

XPM Manages AFMC manpower management programs, to include requirements determination, resource allocation, organizational control, process analysis, productivity improvement programs, management engineering models and standards development. Manages the Command Manpower Data System. Serves as the AFMC functional manager for manpower, organizational and quality functions.

XPP Integrates and presents the command's Program Objective Memo (POM). Prepares AFMC programming guidance and policy. Facilitates POM development by providing required support to AFMC Business Areas and Centers. Conducts the command's Program Review Panel (PRP) to define key issues which cut across Business Areas or Centers and proposes resolution of those issues within the POM process. Provides single point of contact on programming issues with the Air Staff, the Secretariat, and other MAJCOMS. Maintains cognizance of and provides command input to USAF programming policy and strategy and ensures USAF policy is reflected within the AFMC POM. Serves as focal point for all congressional activities affecting AFMC.

XPX Develops and manages the command strategic and infrastructure planning processes, to include command long-range planning; future year defense program planning and integration with the programming process; command posturing; and mission assignments. Povides the single point of contact for all planning issues and integration of planning processes with the Air Staff, other MAJCOMs, AFMC Business Areas, and the Centers. Manages the Commander's policy program; develops and implements command performance measurement processes, and coordinates joint and Air Force doctrine.

Atch 1

DOC 1-19-2

Doc 1-19-3

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

MEMORANDUM FOR HQ AFMC/XPM

FROM: SMC/CC
2430 E. El Segundo Blvd, Suite 6037
Los Angeles AFB
El Segundo CA 90245-4659

SUBJECT: Establishment of SMC Plans and Programs Directorate (SMC/XP)

1. The organizational structure for the Plans and Programs Directorate (SMC/XP) is attached. The organization structure is being established within existing resources; however, we have submitted a request for an additional Core Colonel grade for the Director's position.

2. Questions on this package may be addressed to Ms Sandra Semrod, SMC/XPM, DSN 833-0372.

EUGENE L. TATTINI
Major General, USAF
Commander

3 Attachments
1. Proposed Organizational Chart
2. Proposed Mission Statements
3. Data Code Requests
4. Colonel Position Description (AF Form 81)

AIR FORCE MATERIEL COMMAND
SPACE AND MISSILE SYSTEMS CENTER
PLANS AND PROGRAMS DIRECTORATE
Proposed Organization

Plans and Programs Directorate
Colonel
CXP 2-1-1-4

- **Manpower and Quality Div**
  GS-14
  CXPM 3-4-14-21
- **Programs Div***
  GS-15
  CXPP 6-0-3-7
- **Plans Div**
  GS-14
  CXPX 0-1-1-2

*Authorizations include matrixed personnel

SMC/XP Mission Statements

Plans and Programs Directorate (SMC/XP): Provides strategic direction and center integration of all business areas to enable the Commander to effectively management the mission. Manages planning processes, quality implementation/awards program. Focal point for center goals/objectives, metrics, and commander policies. Areas of responsibility include strategic corporate planning, business area integration, resource allocation and control, organizational planning, etc. Provides process management from a corporate perspective for implementation across all functions and organizations. Provides policy guidance for war/contingency plans/operations. Focal point for congressional activities.

Manpower and Quality Division (SMC/XPM): Advises the Command and staff on effective allocation of mission resources. Facilitates strategic planning , functional process improvement, organizational design, ware and peacetime manpower requirements determination, and public-private competition. Provides tools and training for Center-wide incorporation of Quality Air Force (QAF) principles and assessment against QAF criteria. Manages the Innovative Development through Employee Awareness (IDEA) Program, productivity programs, and implementation of resource management initiatives.

Programs Division (SMC/XPP): Provides focus for Center contributions to National, DoD and Air Force space policy, planning and strategy developments to include legislative affairs and Air Force space Program Objective Memorandum (POM) activities. Represents the Center Commander, prepares and coordinates Center inputs on national security space policies, plans and strategies. Interfaces through SAF with the national security space community to identify, define and resolve national security space policy, planning and strategy issues. Conducts SMC strategic business and management planning and assessments in support of space systems acquisition. Develops approaches for an integrated planning context across all Space areas of interest. Responsible for developing and coordinating SMC strategic planning; supporting business area reviews and integration of business area plans to include establishing business performance indicators; Planning, Programming, & Budget System (PPBS) oversight for SMC's future years defense program development; identifying and disseminating information on Space policy and initiatives that pertain to systems acquisition; and supporting the Center's Commercial Space Integrated Product Team by assessing commercial business practices for application to DoD.

Plans Division (SMC/XPX): Provides planning and oversight for business development efforts at SMC. Manages the Center Support Agreement program and ensures agreements are in place for all tenants. Responsible for space allocation and control for the Center, and ensures planning for future requirements.

Data Code Requests

TITLE	OSC	SHORT TITLE
Plans and Programs Directorate	CXP	Plans/Programs Dir
Manpower/Quality	CXPM	Manpower/Qual Div
Programs	CXPP	Programs Div
Plans	CXPX	Plans Div
Plans and Programs Matrix	CFMQP	Plans/Programs

Functional Account Codes

TITLE	FAC
Plans/Programs	1400XP
Manpower/Quality	108AXP
PrgCont Plans/Pgms	1530XP
Cntrct/Plans/Pgms	1250XP

DOC 1_19_3

ATCH 3

COLONEL POSITION DESCRIPTION	COMMAND MANPOWER DATA SYSTEM (CMDS) POSITION NUMBER	*Report Control Symbol*

I. POSITION OVERVIEW

POSITION TITLE	UNIT OR ACTIVITY
Director, Plans and Programs	Space and Missile Systems Center (SMC) Directorate of Plans and Programs (SMC/XP)
BASE AND LOCATION	RESERVED *(Multiple Position Description Numbers)*
Los Angeles Air Force Base El Segundo, CA	

MAJCOM	POSITION NUMBER	AFMEA ID NUMBER	FUNCTION	AFSC	OSC	TYPE POSITION	FUNCTIONAL CATEGORY
MTC			1400	63A4	CXP		A

SHORT POSITION TITLE/UNIT DESIGNATION
Dir, Plans and Programs, SMC/XP

FOR AFMEA USE ONLY

POSITION OF RATER
Commander, Space and Missile System Center, Lt General

POSITION OF ADDITIONAL RATER

PRINCIPAL SUBORDINATES
Chief, Plans (GM 15), Chief, Manpower and Quality (GM-14), Chief, Programs (GM-14)

REQUIRED CONTACTS
Interfaces daily with senior representatives of OSD, JCS, USSPACECOM, DOE, FAA, BMDO, Air Staff, AFMC, NRO, and Industry. Interfaces regularly with representatives of the House and Senate Armed Services Committees, the House and Senate Appropriations Committees, Members of the Senate and House of Representatives, local government and chamber of commerce officials, SMC/CC, CD, CV, the Air Base Group Commander, system program directors and directors of the functional staff. Represents Commander in frequent contacts with distinguished visitors. All contacts are in person, by telephone or in writing.

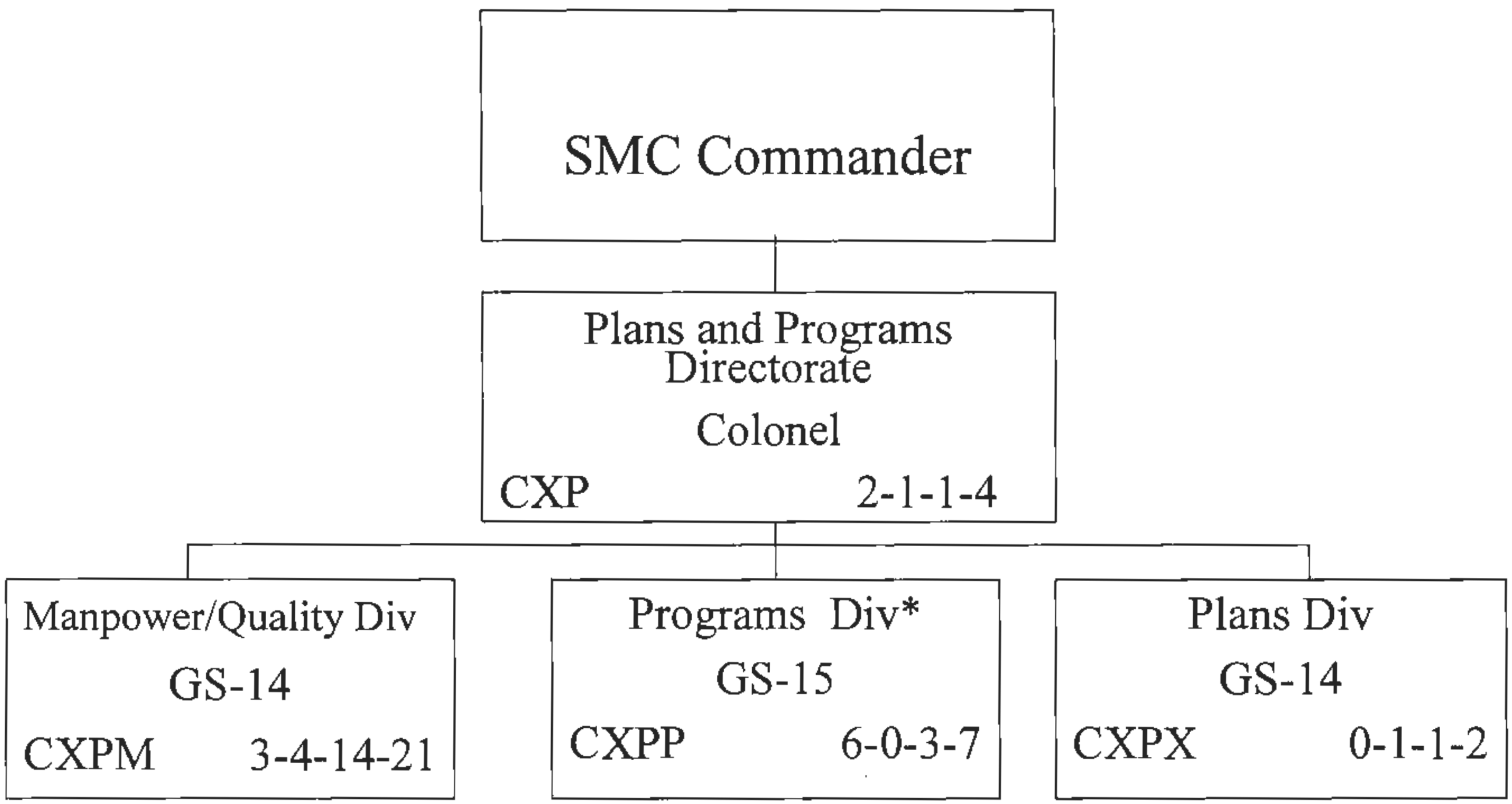
AUTHORITY
The Director has complete authority and responsibility to make technical, financial and schedule decisions in executing the planning and programming and corporate processes of the Center within the limits established by law, regulation and policy. Develops and executes center policy and processes impacting all corporate processes. Directs the Program Objective Memorandum (POM) and Adjusted POM (APOM) activities to ensure adequate funding for SMC and its mission.

RESOURCES
The Director, Plans and Programs manages processes and activities impacting the 3300 person workforce of SMC, directly managing approximately 60 positions. Directs the planning and programming efforts of the Center, to include manpower, organizational structure, programming duties in conjunction with the Program Objective Memoranda (POM), and Adjusted POM (APOM), Legislative Liaison and strategic planning. The XP workforce develops the funding profiles for over $5 Billion in program and operations and maintenance funds that support the acquisition of the full range of military space programs.

MOST DIFFICULT TYPE PROBLEMS
The most difficult problems encountered include successful strategic planning, organization, staffing, and training for a dynamic organization (SMC), developing and deploying a comprehensive and meaningful strategic plan to meet the processes and programmatic needs of the diverse elements and functions of SMC, the execution of corporate processes that support planning, research, development and acquisition of critical components of the US military space program, and continually defining and redefining organizational structures necessary, and resources required, to carry out the mission. Optimizing distribution of declining manpower and financial resources between program and staff offices to meet increasing workloads.

SUPPLEMENTAL INFORMATION
Ensures planning and resources are programmed and allocated to the organization responsible for complementary functions. Responsible for mid-long range strategic planning and assurance of adequate resources, both human and fiscal, to ensure Center remains capable of executing its mission. Advises the Center Commander on legislative issues impacting the future of the Center. Center lead for all Base Realignment and Closure actions and data analysis.

Space And Missile Systems Center
Plans And Programs Directorate



*Authorizations include matrixed personnel

Doc I 20

SMCVA 23-4

SPACE & MISSILE SYSTEMS CENTER DIRECTORY JULY 1999

COMMANDER
LT GEN E. L. TATTINI
CC 31971
LT COL N. R. ALBERT
EXEC OFF

COMMAND SECTION ADMINISTRATION
SMSGT J. A. SAWYER
CCA 31350

COMMAND CHIEF MASTER SERGEANT
CMSGT D. C. CLEVELAND
CCC 31653

EQUAL EMPLOYMENT OPPORTUNITY OFFICE
MR. L. M. GONZALES
CCD 31565

MOBILIZATION ASST
COL T. D. TAVERNEY
CCR 31434

RESERVE AFFAIRS
MS. L. M. MONEY
CCV 32470

COMMANDERS ACTION GROUP
CAPT D. PIPER (ACTING)
CCX 33593

PROTOCOL
MAJ D. J. DOUCETTE
CCP 32515

VICE COMMANDER
BRIG GEN M. A. HAMEL
CV 31722
CAPT M. A. SARDELLI
EXEC OFF

EXECUTIVE DIRECTOR
MR. W. MAIKISCH
CD 31134

PROGRAM EXECUTIVE OFFICER (WEAPONS)
MR. J. G. DIAMOND
AFPEO/WP DSN 425-1262

AIRBORNE LASER SYSTEM PROGRAM OFFICE
COL M. W. BOOEN
SYSTEM PROGRAM DIRECTOR
TM DSN 246-2102
DEPUTY DIRECTOR
COL (SEL) D. D. HARRELL

PROGRAM EXECUTIVE OFFICER (DARPA)
DR. T. W. MEYER
DARPA/TTO (703) 696-2307

DISCOVERER II JPO
COL M. T. HUGHES
PROGRAM DIRECTOR
SAF/DJPO (703) 526-1710

PROGRAM EXECUTIVE OFFICER (SPACE)
MR. B. R. COLLINS
AFPEO/SP 33565

MILSATCOM JPO
BRIG GEN C. R. COONING
SYSTEM PROGRAM DIRECTOR
MC 336-4879
DEPUTY DIRECTOR
MR. P. J. DEVINE (ACTING)

SPACE BASED INFRARED SYSTEMS PROGRAM OFFICE
COL D. L. BURKETT II
PROGRAM DIRECTOR
MT 31807
DEPUTY DIRECTOR
COL S. C. ROUNCE

EVOLVED EXPENDABLE LAUNCH VEHICLE PROGRAM OFFICE
COL R. K. SAXER
SYSTEM PROGRAM DIRECTOR
MV 336-4614
DEPUTY DIRECTOR
VACANT

NAVSTAR GLOBAL POSITIONING SYSTEM JPO
BRIG GEN (SEL) J. B. ARMOR, JR.
SYSTEM PROGRAM DIRECTOR
CZ 31526
DEPUTY DIRECTOR
COL J. S. SCHOONOVER

SMALL BUSINESS OFFICE
MR. C. R. WILLETT
CHIEF
BC 32855

HISTORY OFFICE
DR. H. N. WALDRON
CHIEF
HO 32136

INSPECTOR GENERAL
MS. D. BROWN (ACTING)
IG 30802

INTELLIGENCE OFFICE
LT COL J. L. HOLLETT
CHIEF
IN 30316

STAFF JUDGE ADVOCATE
COL S. S. BAGLEY
STAFF JUDGE ADVOCATE
JA 31272

MANPOWER AND QUALITY OFFICE
MS. S. C. SEMROD
CHIEF
MQ 30375

PUBLIC AFFAIRS OFFICE
LT COL R. POTTER
CHIEF
PA 30030

SAFETY OFFICE
LT COL H. L. TACKETT
CHIEF
SE 30010

COMPTROLLER
COL R. E. SMOKER
DIRECTOR
FM 30188
DEPUTY DIRECTOR
MR. K. L. YODER

CONTRACTING
MS. P. KIRK-McALPINE
DIRECTOR
PK 30887
DEPUTY DIRECTOR
COL D. L. MURPHY

SPACE AND MISSILE TEST & EVALUATION DIRECTORATE
COL J. E. FORD
DIRECTOR
TE DSN 246-6616
DEPUTY DIRECTOR
COL D. A. DANSRO

PLANS AND PROGRAMS
COL J. F. THUMSER
DIRECTOR
XP 33571
DEPUTY DIRECTOR
MR. E. M. SALEM

DEVELOPMENTAL PLANNING
COL R. S. COX
DIRECTOR
XR 35440
DEPUTY DIRECTOR
VACANT

SYSTEMS ACQUISITION
MR. L. L. BORDELON
DIRECTOR
AX 33812
DEPUTY DIRECTOR
COL T. A. FITZGERALD

ADVANCED SYSTEMS DIRECTORATE
COL D. L. LOVERRO
SYSTEM PROGRAM DIRECTOR
AD 297-2800
DEPUTY DIRECTOR
COL C. L. REA-DIX

DEFENSE METEOROLOGICAL SATELLITE SPO
COL J. A. QUIRK
SYSTEM PROGRAM DIRECTOR
CI 336-4333
DEPUTY DIRECTOR
MR L. H. WEEKS

SATELLITE & LAUNCH CONTROL SPO
COL B. G. MORGAN
SYSTEM PROGRAM DIRECTOR
CW 31145
DEPUTY DIRECTOR
COL R. T. ODLE

LAUNCH PROGRAMS
COL M. J. DUNN
SYSTEM PROGRAM DIRECTOR
CL 33815
DEPUTY DIRECTOR
VACANT

61 AIR BASE GROUP
COL D. E. PRICE
COMMANDER
CC 30687

DET 8 CAPE CANAVERAL AFS FL
COL G. MUNTZNER
COMMANDER
CC DSN 467-3429

DET 9 VANDENBERG AFB CA
COL J. F. WAGNER
COMMANDER
CC DSN 276-6771

DET 11 PETERSON AFB CO
COL R. A. HAYES
COMMANDER
CC DSN 834-2001

ASSOCIATES

DET 1 AIR FORCE SPACE COMMAND
LT COL D. M. WAHL
COMMANDER
CC 31967

NASA LIAISON
MR. M. MOORE
SENIOR NASA RESIDENT
38604

DIRECTED ENERGY DIRECTORATE
DR R. E. GOOD
DIRECTOR
AFRL/DE DSN 246-0880

SPACE VEHICLES DIRECTORATE
MS. C. M. ANDERSON
DIRECTOR
AFRL/VS DSN 246-6243

LOS ANGELES AFB CA 90245
COMMERCIAL (310) 363-XXXX
DSN 833-XXXX

F1686/01.PPT

SUPERSEDES: SMCVA 23-4, APRIL 99
OPR: SMC/XPM, F. JONES
CERTIFIED BY: SMC/XPM, MS. S. SEMROD
PAGES: 1/DISTRIBUTION:F

DOC I - 20

Doc I-21

XP and MQ

STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	SMC/XPM	Coord	Ms Semrod Concur e-mail date: 17 Dec 99	6	SMC/PK	Coord	Ms McAlpine Concur e-mail date: 21 Dec 99
2	SMC/ADE	Coord	Major Jordan Concur e-mail date: 20 Dec 99	7	SMC/XPA	Process	
3	SMC/AD	Coord	LtCol Weidenheimer Concur e-mail date: 20 Dec 99	8	SMC/CV	Coord	Wilson BG 29Dec99
4	SMC/AX	Coord	Mr Bordelon Concur e-mail date: 20 Dec 99	9	SMC/CD	Coord	APPROVED per TELECON WITH MR MAIKISCH
5	SMC/FM	Coord	Col Smoker Concur e-mail date: 22 Dec 99	10	SMC/CC	Approve	W. Posey

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INITIALS	SUSPENSE DATE
Wyatt, 2Lt	SMC/XPM	3-2871	pw	

SUBJECT
Establish a Space Based Laser (SBL) Project Management Office (PMO)

DATE

SUMMARY

1. The request to establish a Space Based Laser (SBL) Project Management Office as directed per SAF/AQ and AFMC/CC is attached. Parts of the SBL Project Management Office will be co-located at Kirtland AFB, NM.

2. The request establishes the SBL PMO as a 2-Ltr organization. The intent of the package is to initiate the actions necessary to put the organization on our Unit Manning Document (UMD). This will allow the PMO to stand-up and start operating in the Feb '00 timeframe, but will not impact any further decisions that are still pending.

3. RECOMMENDATION: SMC/CC approve the release of the proposed transmittal letter at Tab 1.

Joseph F. Thumser

JOSEPH F. THUMSER, Colonel, USAF
Director, Plans and Programs

1 Tab
Proposed Transmittal Letter

ACTION ITEM / ~~UNSOLICITED~~
TRACKING #: 12020
~~CCX~~/CCA POC: RY

AF FORM 1768, 19840901 *(EF-V5)* PREVIOUS EDITION WILL BE USED.

DOC I-21

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

MEMORANDUM FOR HQ AFMC/XPM

25 JAN 2000

FROM: SMC/XPM
2430 El Segundo Blvd, Suite 3028
Los Angeles AFB, CA 90245-4687

SUBJECT: Establish a Space Based Laser (SBL) Project Management Office (PMO)

1. SAF/AQ has requested a Space Based Laser (SBL) Project Management Office be established. This request is to establish the structure of the organization while other issues are still being determined.

2. The projected effective date to stand-up SMC/TL, per the Program Director, is Feb '00 timeframe.

3. Questions should be directed to Ms Donna Jay, DSN 833-0744 or 2Lt Paige Wyatt, DSN 833-2871.

Sandra Semrod

SANDRA SEMROD
Chief, Manpower and Organization Division

Attachments:
1. Organizational Change Request
2. Colonel Position Description, AF Form 81

Doc I - 21

JUSTIFICATION

1. What is the proposed action?

   To establish a Space Based Laser (SBL) Project Management Office (PMO).

2. Why is the action needed?

   Per SAF/AQ and AFMC/CC direction (pages 3 and 4 of this attachment).

3. What is the structure of the new organization?

   Current and proposed organizational charts are provided (pages 5 and 6 of this attachment).

4. How does the structure compare with the standard structure and nomenclature?

   The structure is in compliance with the AFMC Objective Blueprint.

5. Are standard data code/data element changes required?

   N/A

6. What are the potential impacts on other organizations?

   None

7. Why is it better?

   The SBL PMO currently resides within another SMC directorate chartered to springboard new technology. This organization has completed its mission. The SBL project has reached a stage of maturity in which it must be recognized as a separate program within SMC. The Air Force and the Ballistic Missile Defense Organization are jointly funding this high leverage project for ballistic missile defense. SBL is a major science, technology, research and development activity. As a separate program, reporting directly to the DAC, this project will benefit from the talented and integrated workforce – dedicated to the system engineering and integration of a single product, the SBL project.

8. What is the impact the organization request has on unit history?

   None

9. What is the cost of the request in terms of dollars and resources?

   All authorizations are being funded out of existing resources.

Doc I-21

Doc I-22

TL MQ

af.mil Los Angeles Air Force Base, Calif.

31 March 2000

Page 3

No author

Astro News

...ches.
.5 billion annual operating budget
sition of military space systems.
annual military and government
f approximately $203 million. The
1,535 military members and 2,890
...es, including contractor personnel
...ce Corporation, a co-located, non-
-funded research and development

AFB also has 54 acres just north-
...n campus with facilities to support
...y retirees. Here, you'll find a clinic,
...se exchange and gas station. An
...res with one building, a softball field
...ng lot are located in Hawthorne, a
south of the main SMC complex.

SMC/TL, new 2-letter, stands up May 1

A Department of Defense research project to improve national missile defense will begin reporting directly to the Space and Missile Systems Center commander here May 1.

The change reflects the Air Force's increased priority on the space-based laser integrated flight experiment, a subordinate project of SMC's advanced systems directorate, and the maturation of space-based laser technologies.

"Missile defense is a national priority," said Lt. Gen. Eugene Tattini, SMC commander. "The space-based laser integrated flight experiment is important to the future of national security space missions."

"This project's success so far is a result of the outstanding job SMC and its advanced systems directorate have done in executing military space programs and nurturing advanced development efforts into their own programs," said the general.

Colonel William "Neal" McCasland is the project's first director. He comes from SMC's NAVSTAR Global Positioning System joint program office where he was the chief engineer. The office will be designated SMC/TL.

The SBL IFX is a jointly-funded Air Force and Ballistic Missile Defense Organization research effort executed by SMC to demonstrate the feasibility of the SBL concept and its technologies.

The experiment will conclude with a ballistic missile defense demonstration in space in compliance with the Antiballistic Missile Treaty. *See related story on Page 16* (*Information courtesy of SMC Public Affairs.*)

DOC I-22

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

FILE
DATE 9 Jun 00
OPR XP
SUSP
INFO CC
CD
CV

JUN 06 2000

MEMORANDUM FOR SMC/CC

FROM: HQ AFMC/XPM
4375 Chidlaw Rd, Room B204
Wright-Patterson AFB OH 45433-5006

SUBJECT: Establishment of HR at SMC (Your Memo, 15 May 00)

1. Your request to establish a Human Resources Office at SMC is approved for immediate implementation with the following provisions.

2. We suggest that you revise the HR functional statement to clarify exactly which roles HR will perform. We suggest revising the statement as follows, "...integrated human resource policies... across SMC, such as: colonel core, civilian pay, and overall end-strength". Using these examples in the functional statement will help clarify what HR does, and will differentiate the desired differences in mission.

R D Sullivan

RONNIE D. SULLIVAN, Colonel, USAF
Chief, Manpower and Organization Division
Directorate of Plans and Programs

received
XP - 12 Jun 00

cc: XPM

Doc I - 23

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

15 MAY 2000

MEMORANDUM FOR HQ AFMC/XPM

FROM: SMC/CC
2420 Vela Way, Suite 1467
El Segundo CA 90245-4659

SUBJECT: Organization Change Request -- Establishment of Human Resources Office (SMC/HR)

1. I have approved the establishment of the Human Resources Office at SMC to ensure an integrated corporate approach for managing resources at the Center. This structure will provide linkage between the Center's priorities and the management of personnel resources. It will also provide a centralized focal point for resource issues to ensure streamlined processes, reduced processing time and a more focused approach to meeting senior management goals and objectives. The justification, proposed organization chart, and mission statement are provided as attachments 1, 2, and 3.

2. My point of contact for this request is Ms Donna Jay, SMC/XPM, DSN 833-0375.

EUGENE L. TATTINI
Lieutenant General, USAF
Commander

3 Attachments
1. Justification
2. Proposed Organization Chart
3. Proposed Mission Statement

Doc I-23

Doc I-24

Astro New[s]

www.losangeles.af.mil 18 May 2001 Page 1 "Forging the shape of military space for the 21st century" - Los Angeles Air F[orce Base]

SMC to realign under AFSPC

SecDef: Full speed ahead with Space Commission recommendations

WRIGHT-PATTERSON AFB, Ohio (AFMCNS) – The Space and Missile Systems Center will realign under Air Force Space Command by Oct. 1, according to officials.

This comprehensive planning effort by the two major commands is one element of the Air Force's overall implementation of the Commission to Assess United States National Security Space Management and Organization. Chartered by Congress, the Commission provided specific recommendations to improve oversight, management, acquisition and operation of U.S. military space systems and capabilities.

The Department of Defense recently completed a review of the Space Commission report and agreed with its recommendations, and the Air Force is preparing to implement all congressionally approved actions.

Realigning SMC under space command consolidates space acquisition and operations functions in one organization under one commander—creating a strong center of advocacy for space systems and resources, according to Gen. Lester Lyles, AFMC commander.

"This realignment will better meet operational requirements for space," he said. "Space priorities will be set by a single command – Air Force Space Command – ensuring the Air Force continues to provide quality stewardship for America's space assets. AFMC will still provide acquisition and science and technology support to AFSPC after SMC has been realigned."

AFSPC Commander Gen. Ed Eberhart said combining space acquisition and operations functions is an important part of the "transformation" of military space, as envisioned by the Space Commission.

"For example, the same people who acquire our satellites may now be flying the satellites. This closer working relationship will benefit the entire life cycle of a space system," Eberhart explained. "Most importantly, blending these communities will grow space leaders who can better nnderstand and translate technical and operational requirements into the world's premiere space systems."

The SMC realignment does not change the status or importance of Los Angeles AFB, and command officials expect no change in SMC's current mission of acquiring and sustaining America's quality space systems.

There will be limited physical movement of people and organizations. There could, however, be manpower and process changes as command responsibilities are reexamined and refined in ways that make "cradle-to-grave" space operations and acquisition more efficient, effective and coherent.

"The Air Force believes space-related functions are being performed in the right locations, and SMC is ideally suited to execute its space acquisition mission in Los Angeles," said Lt. Gen. Eugene Tattini, SMC commander.

See REALIGNMENT, Page 3

Tattini wins Schr[iever]

Space and Missile Systems C[enter] Eugene Tattini, right, is prese[nted] Schriever Award from retired [...] chairman of the board of Cha[pter] Association, at their Salute to [...] the chapter's highest honor a[...] ing achievements in support [...] programs." *More award winne[...]* tion on the AFA; stop by its m[...] today from 11:30 a.m. until 12

Lyles: Realignment a 'positive' move for space co[...]

DOC I-24

Realignment, from Page 1

Currently, a comprehensive programming plan for initial phases of the SMC realignment is being jointly developed by AFSPC and AFMC. The plan has detailed steps to be taken to give AFSPC overarching responsibility to execute space acquisition and operations efficiently and effectively.

Functional experts from AFSPC, AFMC and SMC have been working closely together on the plan to ensure the realignment is accomplished as smoothly as possible.

As the process of reengineering military space organization and management begins, uninterrupted delivery, operation and sustainment of space-based capabilities to the joint warfighter will continue in support of our national security.

DOC I-24

Waldron Harry N Civ SMC/HO

From: Jay Donna M Civ SMC/XPM
Sent: Thursday, September 06, 2001 5:27 PM
To: Bagley S Scott Col SMC/JA; Parker Phil Col 61 ABG/CC; Regan Terrence F LtCol 61 ABG/CD; Miliano Stephen V Maj 61 MSS/DPM; Waldron Harry N Civ SMC/HO; Smith Patrick T LtCol SMC/CCE
Cc: Crawford Jeffery S Capt 61 MSS/DPMP; Smith Michael A Maj SMC/XPP; Smith Kathryn B Maj 61 MSS/DPX; Murphy David Jr Col SMC/DS; Hale Alicia Civ SMC/XPM; Salem Edward M Civ SMC/XP; Neumeister James A Col SMC Det 12/CC; Wagner John Col SMC Det 9/CC; Baker Michael Col SMC Det 8/CC; Johnson Louis M Col SMC DET 11 /CC
Subject: Special Orders for SMC realignment to AFSPC

Attached is the DAF letter authorizing the transfer of SMC from AFMC to AFSPC and the special orders.

DAFLTR250s.tif GD019.tif

V/R,
Donna

Doc I-25

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, DC

CORRECTED COPY - DESTROY ALL OTHERS

16 AUG 2001

DAF/XPM 2508

SUBJECT: Reassignment of Certain Air Force Materiel Command Units

TO: AFMC/CC AFSPC/CC

1. By order of the Secretary of the Air Force, the following units are relieved from their present assignment to Air Force Materiel Command and are assigned to Air Force Space Command on or about the dates shown.

Units Reassigning	Date
HQ Space and Missile Systems Center	1 October 2001
HQ 61st Air Base Group	1 October 2001
61st Communications Squadron	1 October 2001
61st Medical Squadron	1 October 2001
61st Mission Support Squadron	1 October 2001
61st Security Forces Squadron	1 October 2001

2. Take the following actions regarding the above units.

a. Issue G-series orders per AFI 38-101, Air Force Organization.

b. Prepare or revise mission directives per AFI 10-101, Format and Content of Mission Directives.

3. HQ US Air Force will accomplish any future redesignations or inactivations.

4. Report completed action using RCS: HAF-HO(M)7401, Air Force Organization Status Change Report, and Status of Resources and Training System (SORTS) per the current instructions.

FOR THE CHIEF OF STAFF

Paul W. Smith

PAUL W. SMITH
Chief, Organization Division
Dir of Manpower and Organization

CORRECTED COPY - DESTROY ALL OTHERS

Doc I-25

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE SPACE COMMAND
PETERSON AIR FORCE BASE, COLORADO 80914-4510

SPECIAL ORDER
GD-019

22 August 2001

1. HQ Space and Missile Systems Center, having been relieved of assignment from Air Force Materiel Command, is assigned to Air Force Space Command effective 1 October 2001. Address: HQ SMC, 2420 Vela Way, Suite 1467, El Segundo CA 90245-4659. Authority: DAF/XPM letter 250s, dtd 16 Aug 01, and AFI 38-101.

2. The following detachments, having been relieved of assigment from Air Force Materiel Command and assigned to Air Force Space Command effective 1 October 2001, remain assigned to HQ Space and Missile Systems Center. Authority: DAF/XPM letter 250s, dtd 16 Aug 01, and AFI 38-101.

   a. Det 3, Space and Missile Systems Center. Address: SMC Det 3, 1050 S. Academy, Colorado Springs CO 80910.

   b. Det 8, Space and Missile Systems Center at Cape Canaveral AFS. Address: SMC Det 8, Stop 2028, 15385 Phillips Pkwy (CCAFS), Patrick AFB FL 32925.

   c. Det 9, Space and Missile Systems Center. Address: SMC Det 9, 1515 Iceland Ave, Suite 2, Vandenberg AFB CA 93437-5320.

   d. Det 11, Space and Missile Systems Center. Address: SMC Det 11, 1050 E. Stewart Ave, Peterson AFB CO 80914-2902.

   e. Det 12, Space and Missile Systems Center. Address: SMC Det 12, 3550 Aberdeen Ave, Suite E, Kirtland AFB NM 87717-5776.

3. HQ 61st Air Base Group, having been relieved of assigment from Air Force Materiel Command and assigned to Air Force Space Command effective 1 October 2001, remains assigned to HQ Space and Missile Systems Center. Address: HQ 61 ABG, 2420 Vela Way, Suite 1467, El Segundo CA 90245-4659. Authority: DAF/XPM letter 250s, dtd 16 Aug 01, and AFI 38-101.

4. The following units, having been relieved of assigment from Air Force Materiel Command and assigned to Air Force Space Command effective 1 October 2001, remain assigned to HQ 61st Air Base Group. Authority: DAF/XPM letter 250s, dtd 16 Aug 01, and AFI 38-101.

   a. 61st Communications Squadron. Address: 61 CS, 2420 Vela Way, Suite 1467, El Segundo CA 90245-4659.

Doc I - 25

b. 61st Medical Squadron. Address: 61 MDS, 2420 Vela Way, Suite 1467, El Segundo CA 90245-4659.

c. 61st Mission Support Squadron. Address: 61 MSS, 2420 Vela Way, Suite 1467, El Segundo CA 90245-4659.

d. 61st Security Forces Squadron. Address: 61 SFS, 2420 Vela Way, Suite 1467, El Segundo CA 90245-4659.

FOR THE COMMANDER

PAMELA K. HOWELL, GM-15
Dep Chief, Manpower & Organization Division
Directorate of Plans & Programs

DISTRIBUTION
E

DOC I-25

Plan to attend SMC Dining Out Oct. 12. 2-letter reps have tickets!

Astro News

Doc I-26

www.losangeles.af.mil "Forging the shape of military space for the 21st century" Los Angeles Air Force Base, Calif., Oct. 5, 2001

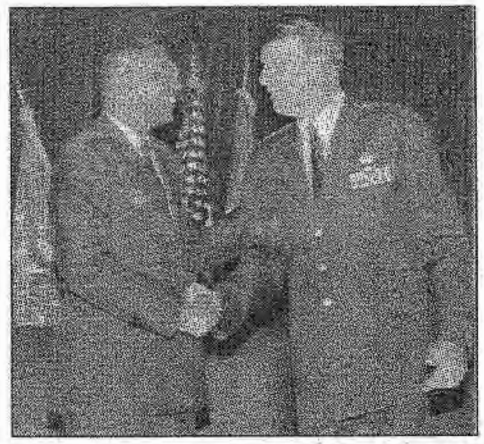
'It's official!' AFSPC welcomes SMC into family

By Peggy Hodge
Public Affairs

History was made Monday as the Space and Missile Systems Center became part of the Air Force Space Command, putting both space acquisition and operations under one umbrella. The commander of SMC, Lt. Gen. Brian Arnold, looked on as the flag was passed from Gen. Lester Lyles, the commander of the Air Force Materiel Command, to Lt. Gen. Roger DeKok, AFSPC vice commander, signfiying the realignment of command.

"We are creating an organization that has no counterpart anywhere else in the Armed Forces – a cradle-to-grave powerhouse that's exactly the right organization for the 21st century," DeKok said.

Preparations have been underway for months but now "it's official – we are now part of Air Force Space Command," Arnold said. "This is very exciting. What a wonderful opportunity the Space Commission has provided us in bringing Air Force Space Command and SMC together.



Photos by Joe Juarez

The command of SMC was passed from AFMC to AFSPC at a ceremony Monday at Fort MacArthur, putting space acquisition and operations under the same major command. Left: Lt. Gen. Brian Arnold says it's an exciting time to be part of SMC. Right: Gen. Lester Lyles, left, and Lt. Gen. Roger DeKok, congratulate each other after the reins of SMC are transferred.

"Today, we become one team of space professionals with one goal in mind – to continue to provide the necessary tools for the warfighter to do their job," said Arnold. "Space is perhaps even more important now than ever before. We are faced with a new enemy, a new kind of warfare and war against terrorism. Space will be at the forefront in providing us the capability to win this war," he said.

This realignment will enhance the Air Force's efforts in space management and operations. It consolidates space acquisition and operations functions in one organization, creating a strong center of advocacy for space systems and resources to better meet operational requirements. These closer relationships between people will benefit the entire life cycle of a space system.

"I see exciting new opportunities on the horizon to strengthen our national security space activities as a result of this realignment," DeKok said. "From space acquisition to space operations officers, we'll have a wide range of new space professionals."

This realignment also allows the Air Force to implement streamlined acquisition authority and execution processes in which AFSPC plays a critical role in national security space management and operations. With a streamlined focus on space, the American people can expect developments to be integrated into future space systems at an accelerated pace.

"This organization, and all its incarnations, whether you talk about the Western Development Division, SMC, Space Systems Division, Ballistic Missile Division or its past associations with Air Force Systems Command or AFMC, it has a very proud history," Lyles said. "And now with its association with AFSPC, it will have an even more important, prouder and glorious future."

DOC I-26

U.S. AIR FORCE Doc I-27

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT PATTERSON AIR FORCE BASE OHIO

1947 - 1997

Special Order
GA-2

29 October 1997

1. The following units are inactivated effective 31 October 1997. Concurrently, unit designation will revert to the Department of the Air Force. The Director of Personnel, HQ AFMC, will reassign personnel. Upon inactivation, consult AFI 84-101 to dispose of flags and other historic artifacts. Dispose of supplies and equipment per current directives. Dispose of organizational records and submit a final report under current directives. Authority: DAF/XPM letter 974r, 28 October 1997, Inactivation of Certain Air Force Materiel Command Units, and AFI 38-101.

Unit	Location
Armstrong Laboratory	Brooks AFB TX
Phillips Laboratory	Kirtland AFB NM
Rome Laboratory	Rome NY
Wright Laboratory	Wright-Patterson AFB OH

2. The Air Force Materiel Command Technology Transition Office (AFMC TTO) is inactivated at Wright-Patterson AFB, Ohio, effective 31 October 1997. Concurrently, unit designation will revert to the Department of the Air Force. The Director of Personnel, HQ AFMC, will reassign personnel. Upon inactivation, consult AFI 84-101 to dispose of flags and other historic artifacts. Dispose of supplies and equipment per current directives. Dispose of organizational records and submit a final report under current directives. Authority: DAF/XPM letter 974r, 28 October 1997, Inactivation of Certain Air Force Materiel Command Units, and AFI 38-101.

FOR THE COMMANDER

Jacob Kessel

JACOB KESSEL, Colonel, USAF
Chief, Manpower and Organization
Directorate of Plans and Programs

I-19

Distribution
1 - HQ USAF/SG, Wash DC 20330-5133
1 - HQ USAF/DPG, Wash DC 20330-1040
1 - HQ USAF/JAEC, Wash DC 20330-5120
2 - HQ USAF/XPMO, Wash DC 20330-1070
1 - HQ USAF/ILXB, Wash DC 20330-1480
1 - AFPCA/DOVR, Wash DC 20330-1600
1 - AUL/LDEA, Maxwell AFB AL 36112-5564
1 - AFHRA/RS, Maxwell AFB AL 38112-6424
1 - HQ AFMC/HO/JA/PA/SCDP/XPM/XPMQ/XPMR
1 - AFMC QMIO
1 - HQ AFMC/DP/DPA/DPC/DPO
1 - AFRL/CC
1 - ASC/CC/HO/MQ
1 - ESC/CC/HO/MQ
1 - HSC/CC/HO/MQ
1 - SMC/CC/HO/MQ
1 - 377 ABW/CC
1 - Dets 1-12, AFRL

Golden Legacy, Boundless Future... Your Nation's Air Force

Doc I-27

STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	AFMC/DP	Coord		6	SM-ALC/CC	Coord	
2	AFMC/FM	Coord		7	SMC/CC	Coord	Kole 24 Apr 98
3	AFMC/XP	Coord		8	SSSG/CC	Coord	
4	ESC/CC	Coord		9	AFMC/DR	Review	
5	OO-ALC/CC	Coord		10	AFMC/CV	Coord	

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INITIALS	SUSPENSE DATE
MUNTZNER, Col Greg	HQ AFMC/DRS	DSN 986-3929	gm	

SUBJECT	DATE
Space Systems Support Group (SSSG) Inactivation	8 APR 1998

SUMMARY

1. The purpose of this staff summmary sheet is for AFMC/CC to formally approve the inactivation of the SSSG as a headquarters field operating agency (FOA) and realignment of the SSSG functions and associated manpower into two new detachments at Peterson AFB CO (belonging to ESC and SMC).

2. In Sep 97, AFMC/CC directed a review of the SSSG organizational alignment because he felt this FOA was not performing headquarters activities. A team composed of representatives from HQ AFMC, ESC, OO-ALC, SM-ALC, SMC, and SSSG was chartered to review organizational options and obtain concurrence from the center commanders and HQ AFMC staff.

3. Concurrence could not be obtained from all centers, and HQ AFMC/DR developed additional options which were presented to AFMC/CC. AFMC/CC chose the option which would put the SSSG functions under the product centers. The centers and headquarters staff then refined the AFMC/CC option to two detachments and included associated manpower changes due to the realignment and BRAC moves.

4. The two-detachment proposal was briefed at AFMC/AFSPC Day on 27 Jan 98 and accepted in principle by AFSPC/CC. The proposed realignment is summarized as follows:

a. Inactivate the SSSG as a FOA and establish two detachments (one ESC, one SMC).

b. The two detachments will share common infrastructure and support. Details are being worked in an MOA for ESC/CC and SMC/CC signatures.

c. The SMC detachment will be lead in providing infrastructure support and common staff functions for the ESC detachment.

d. The SMC detachment commander will also serve as the AFMC command liaison to HQ AFSPC.

5. The manpower changes associated with this proposal are attached. The current SSSG slots will all align under either ESC or SMC. The SM-ALC slots moving because of BRAC will align under ESC, OO-ALC, or SMC and be located at Peterson AFB, Hanscom AFB, Hill AFB, or Los Angeles AFB.

6. The centers and headquarters are working the details of inactivating the SSSG and standing up the two detachments, to include MOAs, host-tenant support agreements, P-Plan updates, etc. The target date for standup of the two detachments is currently 1 Jun 98. * INACTIVATION OF SSSG WILL BE 1 OCT 98.

7. A center-level IPT between the various players, led by OO-ALC and facilitated by SM ALC, will develop a "business CONOPS" MOA which will address how space and C4I programs will be sustained under this new structure. It will cover roles, responsibilities, processes, etc.

(Doc I-29)

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

12 May 98

FILE ______
DATE 8 May 98
OPR ______
SUSP ______
INFO CC
CD
CV
HO
MQ

Special Order
GA-5

30 April 1998

1. Detachment 5, Electronic Systems Center (ESC), is activated at Peterson AFB, Colorado, effective 1 Jun 98. Authority: AFI 38-101.

2. Detachment 11, Space and Missile Systems Center (SMC), is activated at Peterson AFB, Colorado, effective 1 Jun 98. AFI 38-101.

FOR THE COMMANDER

Jacob Kessel

JACOB KESSEL, Colonel, USAF
Chief, Manpower and Organization
Directorate of Plans and Programs

Distribution
1 - HQ USAF/SG, Wash DC 20330-5133
1 - HQ USAF/DPG, Wash DC 20330-1040
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1 - HQ USAF/ILXB, Wash DC 20330-1480
1 - AFPCA/DOVR, Wash DC 20330-1600
1 - AUL/LDEA, Maxwell AFB AL 36112-5564
1 - AFHRA/RS, Maxwell AFB AL 36112-6424
1 – HQ AFMC/DO/DR/HO/JA/PA/SCDP/XPMO/XPMQ/XPMR
1 - AFMC QMIO
1 - HQ AFMC/DP/DPA/DPC/DPO
1 – ESC/CC/HO/MQ
1 – SMC/CC/HO/MQ

DOC I-29

Doc I-30

MQ

Det 11

STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	SMC/JA SMC/AX	Coord Coord	See attached	6	SMC/PK Det11/CC	Coord Coord	See attached
2	SMC/CI SMC/CW	Coord Coord		7	61ABG/ CC	Coord	
3	SMC/CZ SMC/MC	Coord Coord		8	SMC/ CCX	Process	29 May
4	SMC/MT SMC/TE	Coord Coord		9	SMC/CV SMC/CD	Coord Coord	*SEEN 3 JUN JUN
5	SMC/AD SMC/FM	Coord Coord		10	SMC/CC	Sign	

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INITIALS	SUSPENSE DATE
JAY, GS-13	SMC/MQ	3-0375	dmj	18 May 98

SUBJECT	DATE
Activation of SMC Detachment 11	13 May 98

SUMMARY

1. The activation of SMC Detachment 11 will be effective 1 Jun 98. The Commander requested the proposed memorandum at tab 1 be prepared to clarify command management relationships at Det 11.

2. The memorandum addresses UCMJ authority, rating chain for Det 11 and the Operating Location (OL) at Falcon, management of resources and interface with center resource management team.

3. Please return to SMC/MQ when coordinated. FAX DSN 833-1268.

4. RECOMMENDATION. SMC/CC sign proposed memorandum at tab 1.

Sandra Semrod

SANDRA SEMROD
Chief, Manpower and Quality Office

1 Tab
Proposed Memorandum

* GEN CLAY CONCURS WITH LTR.
3 JUN 98

AI# [illegible]

POC [illegible] FOG [illegible]

AF FORM 1768, SEP 84 (EF-V4) (FORM FLO2) PREVIOUS EDITION WILL BE USED.

DOC I-30

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

8 JUN 1998

MEMORANDUM FOR SEE DISTRIBUTION

FROM: SMC/CC
2430 E. El Segundo Blvd, Suite 6037
Los Angeles AFB
El Segundo CA 90245-4687

SUBJECT: Activation of Space and Missile Systems Center (SMC) Detachment (Det) 11

1. SMC Det 11, Peterson AFB CO, will be activated effective 1 Jun 98. In order to clarify command management relationships on how Det 11 will operate, including the Operating Location (OL) at Falcon AFB CO, the following direction will apply:

a. The Det Commander will exercise UCMJ authority over military personnel assigned to Det 11 and the subordinate OLs.

b. The OL Chief at Falcon AFB CO will be dual hatted as the OL Chief and the CW senior program focal point. This position will provide the SMC interface with the customer, 50th Space Wing. The incumbent of this position will be rated by the Det Commander. Program personnel in the OL will be rated within their program office rating chain.

c. The Support System Managers (SSMs) at Det 11 will be rated by their respective Program Directors. Personnel subordinate to the SSMs will be rated within the program office rating chain. Senior rater will be in accordance with SMC published policy.

2. The Det Commander will chair a Human Resources Board (HRB) to facilitate equitable distribution of resources to support assigned workloads in conjunction with the corporate structure at SMC and within Business Area procedures. All actions that involve realignment of authorizations will be coordinated with the appropriate organizations at SMC. No decisions that change resource allocation among two-letter organizations will be approved without consensus or SMC/CC direction. The HRB charter will be forwarded for coordination and approval by the SMC Human Resources Corporate Integrated Process Team (HR-CIPT) Chair and the Product Support Business Area (PSBA) Chief Operating Official (COO).

3. Detachment 11 will be included in the SMC Civilian Employment Plan (CEP), civilian high grade management, and the Financial Plan, including civilian pay budget. The CEP for SMC is centrally managed by the Resource Team at Los Angeles AFB. Monthly reports on CEP execution will be required. All civilian fill actions will be submitted for approval prior to processing SF-52 actions. Any changes to civilian high grade positions require prior approval.

DOC I-30

The Resource Team and Det 11 will develop processes/procedures to ensure the management of all resources is optimized including organic, FFRDC, A&AS and funding.

ROGER G. DeKOK
Lieutenant General, USAF
Commander

DISTRIBUTION:
All SMC 2-Ltrs
Det 11/CC
61 ABG/CC

your needs and budget

Doc I-31

MQ

Detachment 11 becomes part of Team SMC

Airman 1st Class Chris McGiveney
Public Affairs Office

The Space and Missile Systems Center received a new member to Team SMC June 1 with the splitting of the Air Force Materiel Command Space Systems Support Group at Peterson Air Force Base, Colo., into two separate detachments.

Detachment 11, commanded by Col. Mark Dickerson, reports to the commander of Space and Missile Systems Center here; and Detachment 5, commanded by Lt. Col. Larry Brown, reports to the commander of Electronic Systems Center, Hanscom Air Force Base, Mass.

The coupling of resources between SMC and ESC is an important building block in ensuring close integration of systems between the centers, said Lt. Gen. Roger G. DeKok, SMC commander, at an activation ceremony June 30. SMC and ESC must work together to assure the space command and control systems are well suited to support the warfighters' decision-making process.

"The missions of the detachments are to provide an AFMC command liaison to headquarters Air Force Space Command and to support the acquisition and sustainment of space systems operated by AFSPC units," said Mike R. Caracillo, director of resource management at Detachment 11.

The detachments will also interact with AFSPC and AFMC laboratories and product and air logistics centers to resolve research and development, acquisition, logistics and sustainment issues.

Although the detachments are new, AFMC and its predecessor organizations have long offered on-site support to AFSPC.

Customers include the Space Warfare Center, Space Battle Lab and the 21st, 30th, 45th and 50th Space Wings, AFMC system program directors, lab commanders and center commanders.

Several studies between 1984 and 1986 concluded that space and warning systems would benefit from maintaining normalized system logistics support, rather than "individualized" contractor maintenance, distribution and materiel support.

In 1987 the Air Force Logistics Command, Air Force Systems Command and Air Force Space Command reached an agreement on the concept, called Pacer Frontier, which included a centralized integration support facility in Colorado Springs, Colo., for all AFSPC space and warning systems. "Pacer Frontier is a tri-command memorandum of agreement," Caracillo said.

In addition to the normalized logistics initiatives, the MOA dealt with levels of hardware/software logistics, common-user software for satellite control and communication and mission unique software needed for AFSPC satellite systems. In 1988, at the Sacramento Air Logistics Center, McClellan Air Force Base, Calif., Detachment 25 was established to spearhead the consolidation.

Under the direction of the former Air Force Chief of Staff Gen. Merrill McPeak, AFMC merged 19 separate detachments and operating locations, including Detachment 25, into one HQ AFMC field operating agency called the AFMC Space Systems Support Group in October 1994.

"To increase efficiency and focus of our support, we have taken those elements of SSSG that supported each center of excellence and reorganized them into two lean and focused detachments," said Lt. Gen. Ronald T. Kadish, ESC commander.

MQ

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AX

STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	SMC/ CCX	Process	Olson, Maj 12/4/98	6			
2	SMC/CV	Coord	14 Dec 98	7			
3	SMC/CD	Coord	18 Dec	8			
4	SMC/CC	Sign		9			
5				10			

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INITIALS	SUSPENSE DATE
Adams, Carl G., GM-15	AXL	3-1974	TYM	

SUBJECT	DATE
AFMC Liaison MOA	2 Dec 98

SUMMARY

1. In Jun 1998, AFMC realigned the Space Systems Support Group (SSSG) in Colorado Springs into two new Detachments – Det 11 under SMC and Det 5 under ESC. To retain AFMCs "single face to the customer" for AFSPC, this Center proposed that Det 11/CC be designated to serve as the AFMC Liaison. This approach was agreed to by Gen Dekok and Gen Kadish and was approved by HQ AFMC.

2. The AFMC Liaison MOA at Tab1 documents this role for SMC and the Det 11/CC. It is basically the standard MOA for AFMC Liaison assignments tailored for AFSPC and SMC Det 11. It has been signed by AFMC/DR, Gen Bongiovi, and will be forwarded to AFSPC/DR and XP after review and signature by SMC/CC.

Recommendation: SMC/CC sign MOA

Leslie L. Bordelon

LESLIE L. BORDELON, SES
Director of Systems Acquisition

1 Tab
AFMC Liaison MOA Document

Sir,

Col Dickerson coordinated prior to Gen Bongiovi signing off on 4 Nov98 - Just spoke with Col Hayes, he also has no problems w/ this MOA.

VR

AI# 10337

POC ______ FOG ______

DOC 1-32

MEMORANDUM OF AGREEMENT

BETWEEN

THE DIRECTOR OF REQUIREMENTS (HQ AFSPC/DR),

THE DIRECTOR OF PLANS AND PROGRAMS (HQ AFSPC/XP),

THE COMMANDER, SPACE AND MISSILE SYSTEMS CENTER

(SMC/CC),

AND

THE DIRECTOR OF REQUIREMENTS (HQ AFMC/DR)

FOR THE

AFMC LIAISON (SMC DET 11/CC) SUPPORTING

AIR FORCE SPACE COMMAND

1. **PURPOSE:** This memorandum of agreement (MOA) discusses organization, concept of operations, responsibilities, and terms for the Air Force Materiel Command (AFMC) Liaison (Space and Missile Systems Center Detachment 11 Commander [SMC Det 11/CC]) supporting HQ Air Force Space Command (AFSPC).

2. **MISSION:** Serves as AFMC/CC's personal representative to HQ AFSPC. Directs all AFMC activities at HQ AFSPC. Assists AFSPC in refining requirements depicted in Mission Needs Statements (MNS) and Operational Requirements Documents (ORD). Works with HQ AFMC, AFMC single managers, product centers, air logistics centers, test centers, and Air Force Research Laboratory (AFRL) directorates to develop and sustain weapon systems responsive to user requirements. Advises HQ AFSPC staff on program and technology development to improve operational capabilities.

3. **ORGANIZATION:**

a. SMC Det 11 is a detachment of AFMC's Space and Missile Systems Center. SMC Det 11/CC functions as the AFSPC liaison for the Air Force Materiel Command. SMC Det 11/CC discharges the duties of the AFMC liaison by providing representation to HQ AFSPC on AFMC capabilities.

b. In addition to the liaison function, AFRL has located an Assistant for Technology (AFT) position within HQ AFSPC/XP. A separate MOA describes the organization, concept of operations, and responsibilities for the AFT position.

4. **CONCEPT OF OPERATIONS:**

a. Chain of Command.

(1) SMC Det 11/CC reports to SMC/CC; however, for the liaison duties, he reports to the Director of Requirements, HQ Air Force Materiel Command (HQ AFMC/DR) maintaining direct communication and coordination of HQ AFSPC requirements, acquisition, logistics and sustainment, and science and technology. SMC/CC will have the responsibility for promotion recommendations, retention recommendations, PME service school recommendations, and awards and decorations for assigned military personnel with input from HQ AFMC/DR. The civilian employees will be serviced by the host MAJCOM personnel office (21 MSS/DPC).

(2) SMC/CC will advertise all vacancies and nominate candidates for the AFMC liaison positions in concert with HQ AFMC/DR. HQ AFMC/DR will request HQ AFSPC concurrence on all nominated candidates before choosing them for the assignment.

(3) SMC will provide funding for travel, supplies, training, awards and decorations for the AFMC liaison as part of the SMC Det 11 budget. SMC will fund the necessary civilian pay as part of the SMC Det 11 budget.

b. Operational Control. The AFMC liaison will function as follows:

(1) Key Duties:

(a) Assisting in the day-to-day interface between HQ AFMC and HQ AFSPC in integrated weapon systems management to include needs formulation; requirements refinement; technology planning, development, and evaluation; and sustainment requirements formulation and refinement.

(b) Advising HQ AFMC, Program Executive Officers, the Technology Executive Officer, product center commanders, air logistics center commanders, test center commanders, AFRL directors, systems program directors, product group managers, materiel group managers, and their staff on issues identified by HQ AFSPC and assisting in resolving the issues.

(c) Advising and assisting HQ AFSPC with requirements generation, acquisition and sustainment management of systems, and technological applications to HQ AFSPC requirements.

(d) Maintaining cognizance of all the AFMC activities at HQ AFSPC.

(2) Other AFMC liaison tasks include:

(a) Managing the AFMC Top Priority Acquisition/Support Issues Process identifying issues for increased management attention.

(b) Assisting in managing periodic four-star MAJCOM day preparation to include agenda review meetings and processes. Acting as an advisor and OCR to the HQ AFSPC and HQ AFMC project officers for MAJCOM day.

(c) Monitoring HQ AFSPC combat readiness indicators/issues and provide AFMC guidance and/or identification of single manager to facilitate resolution of concerns.

(d) Coordinating with/assisting the AFT for all AFRL technical support to HQ AFSPC and advocacy of HQ AFSPC requirements to the AFRL.

(e) Coordinating with/assisting the AFT in the transfer of technology from AFRL to operational systems to improve combat capability.

(f) Coordinating with/assisting the AFT to ensure the accomplishment of Advanced Technology Demonstrations (6.3A) scoring and prioritization by HQ AFSPC.

(g) Assisting, as required, on all formal visits between HQ AFSPC staff and AFRL.

5. **RESPONSIBILITIES:**

a. HQ AFSPC/DR responsibilities include providing (on a nonreimbursable basis) adequate office space, office furniture, office supplies, telephone support, and computer networking services normally provided to the HQ AFSPC staff offices for the AFMC liaison representative.

b. HQ AFSPC/XP responsibilities include:

(1) Locating the AFT representative within its staff activity.

(2) Providing (on a nonreimbursable basis) adequate office space, office furniture, office supplies, telephone support, computer equipment, computer support, and associated computer networking services normally provided to the HQ AFSPC staff offices.

c. SMC will notify HQ AFMC/DR on projected reassignments of the assigned liaison officers.

6. **TERMS:**

a. This memorandum takes effect on the date of the last approval signature.

b. Changes in the provisions of this agreement will be coordinated between SMC/CC, HQ AFMC/DR, and HQ AFSPC/DR/XP.

c. This memorandum supersedes all previous MOAs on AFMC liaison support to HQ AFSPC.

ROBERT P. BONGIOVI
Brigadier General, USAF
Director, Requirements (HQ AFMC/DR)

4 Nov 98
Date

EUGENE L. TATTINI
Major General, USAF
Commander, Space and Missile Systems Center (SMC/CC)

24 Oct '98
Date

BRIAN A. ARNOLD
Brigadier General, USAF
Director of Requirements (HQ AFSPC/DR)

Date

DONALD P. PETTIT
Colonel, USAF
Director, Plans and Programs (HQ AFSPC/XP)

Date

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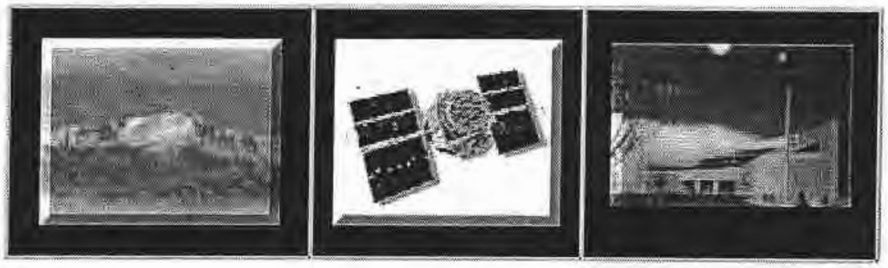
Welcome to SMC Det 11

*W*elcome to Space and Missile Systems Center's (SMC) ***Detachment 11***, home of the Air Force's center of excellence for acquiring and sustaining Air Force space satellite ground systems.

Partnered in building 2025 at Peterson AFB with Electronic Systems Center's (ESC) Det 5, we are AFMC's "single face to the space customer - USSPACECOM and AFSPC". Together we are ***AFMC Team Colorado.***



The mission of Detachment 11 is to acquire and sustain the premier Air Force Space Satellites Space-Based Infrared System (SBIRs), Defense Meteorological Space Program (DMSP), MILSTAR, GPS, Satellite Control Network (AFSCN), and Space Launch Range (SLR) ground systems. Detachment 11 also supports the Space Applications Project Office (SAPO) at Schriever AFB, and the Space Mission Integration Office (SMIO) at Peterson AFB.

The Detachment 11 Commander also serves as the AFMC Command Liaison to AFSPC/CC and HQ AFSPC. The AFMC Command Liaison assures the AFSPC/CC the required support from Air Force Materiel Command to meet its mission. The command liaison also provides a window for AFMC organizations to HQ AFSPC. The command liaison runs the top issues process between the two commands, and, with AFMC/DR, runs the annual Command Day between AFMC/CC and AFSPC/CC.

For more information, feel free to email or call the SMC Detachment command staff at (719) 556-2005 or DSN 834-2005.

Richard A Hayes, Colonel, USAF
Commander

Doc I-33
printed Aug 2000

Unit Mission

Air Force Materiel Command focal point for Air Force space-related activities at Cape Canaveral AS and Patrick AFB. The single point of contact with the host base command structure for all matters affecting the Space and Missile System Center. Provides acquisition and engineering support for Titan IV, Delta, Atlas and EELV space boosters, MILSTAR, DSCS, DSP and GPS satellites, and the Eastern Range operations.

Quality Mission

Provide on-site space systems acquisition and technical support to the 45th Space Wing

Quality Vision

Space and Missile Systems Center professionals working together to field successful operational systems at the eastern spacebase

Quality Goals

Provide critical bridge between Space and Missile Systems Center and 45th Space Wing Make launch and range support integrated, affordable reliable, and routine

Enable our people to achieve outstanding success Sustain excellent business practices

Quality Objectives

Exceed Air Force and Air Force Materiel Command training and personnel standardsImprove base and center-level recognition for Detachment 8 people

Encourage a Detachment 8 organizational identity

Establish regular communications among customers and supported System Program Offices (SPOs)

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F Space A Policy S Project

Military Space Programs

Discoverer II (DII)
STARLITE

The Discoverer II (DII) program is an Air Force, Defense Advanced Research Projects Agency (DARPA),and National Reconnaissance Office (NRO) joint initiative. The program is based on Defense Advanced Research Projects Agency (DARPA) work on a new lightweight satellite called STARLITE. The STARLITE concept was advanced in early 1997 following the completion of a DARPA-sponsored study. This study reported the feasibility of developing, deploying and operating a constellation of relatively inexpensive radar satellites designed to affordably provide near-continuous, day/night, all-weather, synthetic aperture radar (SAR) imaging support to the warfighter that could be directly tasked by the warfighter and directly downlinked to theater for processing and exploitation. Shortly thereafter, the concept was modified to incorporate a low cost approach to space-based High Range Resolution Ground Moving Target Indication (HRR-GMTI) collection as well as SAR imaging capabilities in response to Air Force interest in complementing the Unmanned Air Vehicle (UAV), U-2 and Joint Surveillance Targeting Attack Radar System (JSTARS) battlefield HRR-GMTI surveillance with near-continuous, deep-look HRR-GMTI coverage from space.

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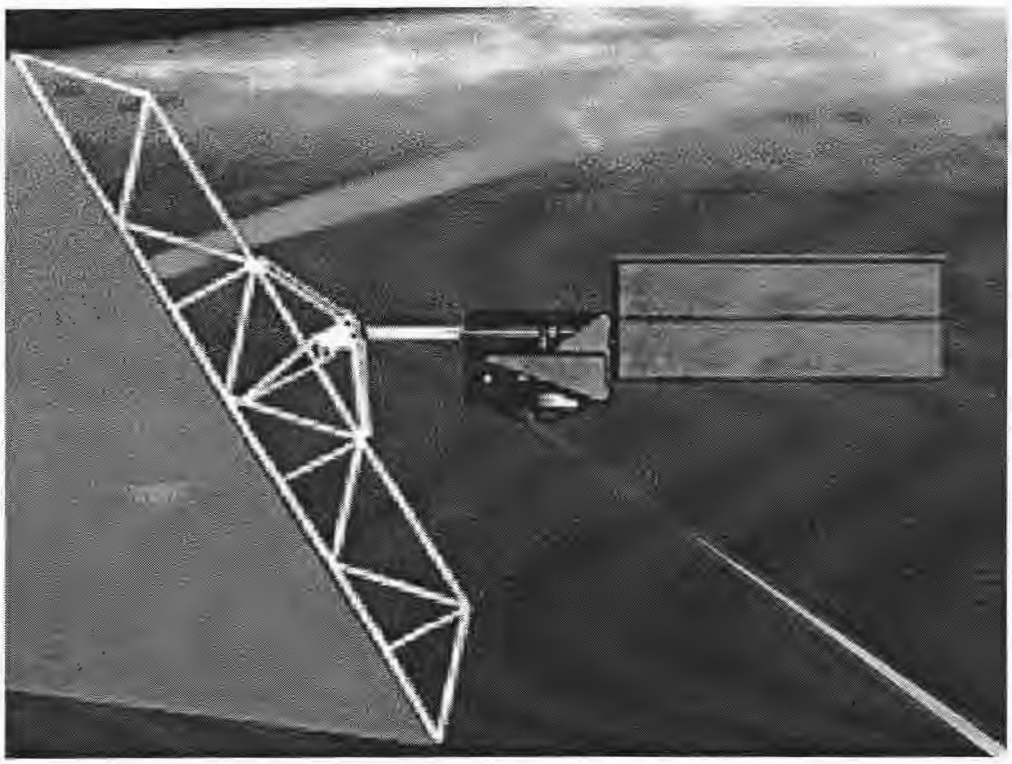

At the time STARLITE was proposed, the NRO was in the midst of defining its Future Imagery Architecture (FIA) intended to serve as the basis for acquiring the next generation of imaging satellite systems. The Department of Defense, the Directors of DARPA and the NRO asked the Defense Science Board (DSB) to establish a Task Force on Satellite Reconnaissance (the so-called "Hermann Panel") to review the operational, technical, industrial and financial aspects of both the STARLITE and FIA initiatives. In January 1998, the DSB Task Force on Satellite Reconnaissance issued its report. The Task Force recommended that a modified STARLITE program be initiated, as a "Military Space Radar Surveillance Program," in an effort to achieve broad-area, all-weather, near-continuous radar access that could be integrated with military operations.

In late February 1998 DARPA, the Air Force and the NRO signed a Memorandum of Agreement (MOA) establishing a joint program to undertake a "Space-based Radar Risk Reduction and Demonstration Program" and a Joint Program Office (JPO) to execute the program. In April the joint SBR HRR-GMTI/SAR demonstration program was designated Discoverer II. This new objective constellation of 24 satellites configured with Synthetic Aperture Radar (SAR) will allow for direct tasking control to a deployed Joint Task Force [JTF] tactical commander. The constellation would allow for a very rapid revisit rate (about 15 minutes) to most areas of the earth. The Discover II system would be capable of generating very high resolution elevation data (1 meter post spacings) and highly accurate radar imagery. The preliminary list of demo objectives include a determination of the feasibility and utility of delegated collection management authority to a tactical (i.e. joint task force) commander; and a demonstration of SAR data downlink using lightweight

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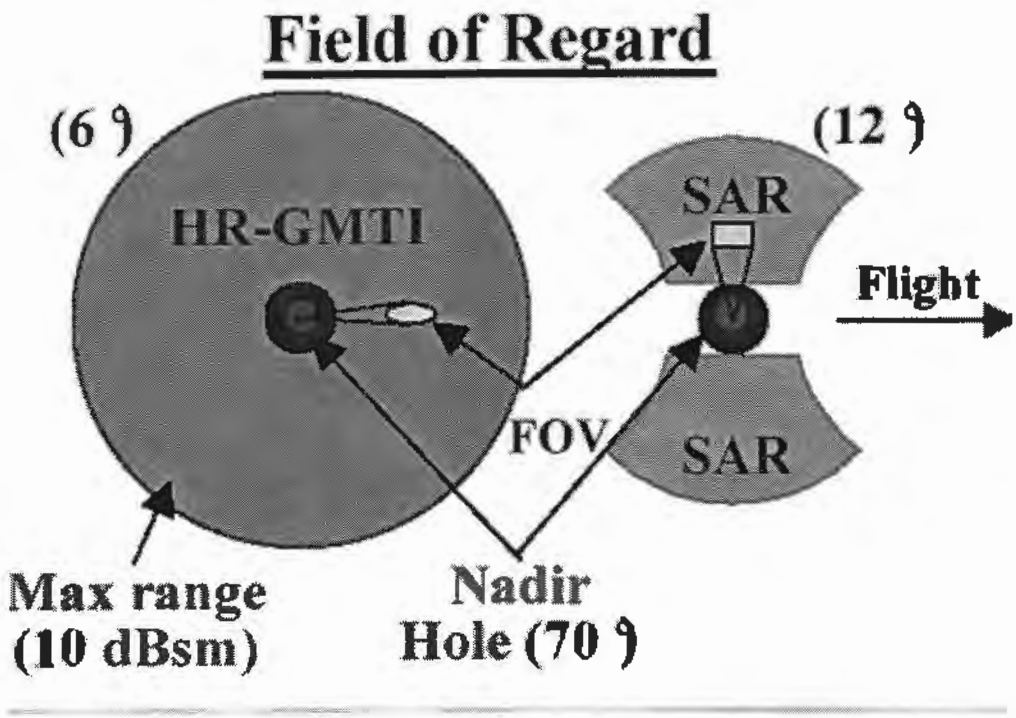
satellites. It will develop and demonstrate an affordable space-based radar (SBR) with High Range Resolution Ground Moving Target Indication (HRR-GMTI), Synthetic Aperture Radar (SAR) imaging capabilities and Digitized Terrain Mapping Elevation Data (DTED) that will provide reconnaissance, surveillance and precision geolocation support to the tactical warfighter.



On February 22, 1999, three contractor teams were selected for Phase One of the Discoverer II space-based radar technology demonstration program. The selected contractor teams are lead by Lockheed Martin Astronautics, Littleton, Colo., Spectrum Astro Inc., Gilbert, Arizona, and TRW Defense Systems Division, Redondo Beach, Calif. Each Phase One team has been awarded a firm, fixed-price, initial contract valued at about $10 million. A contract option is planned to complete the 18-month Phase One effort. The total Phase One effort is estimated at about $60 million. Each team will perform concept definition, system capabilities and performance trade studies, cost-performance trade-off analyses and preliminary system design. Phase One of the Discoverer II program will last about 18 months and allows the most promising contractor teams to complete preliminary prototype system designs. At the end of Phase One, one or two contractors will be selected to proceed to Phase Two to perform final design and fabrication of the two Discoverer II satellites.

Discoverer II is an R&D prototype demonstration program to identify and validate the technology growth path required to a launch a capability by 2008 [if full funding was approved, deployment of the additional 22 STARLITES was projected by DARPA for FY03-05]. Launches using GFE EELV or Delta II class launch vehicles are programmed for 4 th quarter FY 2003 and 1 st quarter FY 2004. The DISCOVERER II constellation consists of 24 low cost satellites, with a constellation constructed in 8 planes of 3 satellites evenly spaced per plane, in a Walker orbit with phase value 4 and inclination of 53 degrees, at 770 km altitude. By designing the orbitology this way, DISCOVERER II answers a commander's request for an imaging operation within fifteen minutes after receiving tasking, 90% of the time, averaged across 65 degrees north and south latitude.

Sensor characteristics include grazing angle of 12 degrees (6 degrees for ground moving target indication -GMTI), slope angle of 70 degrees, and squint angle of 45 degrees (no squint angle for

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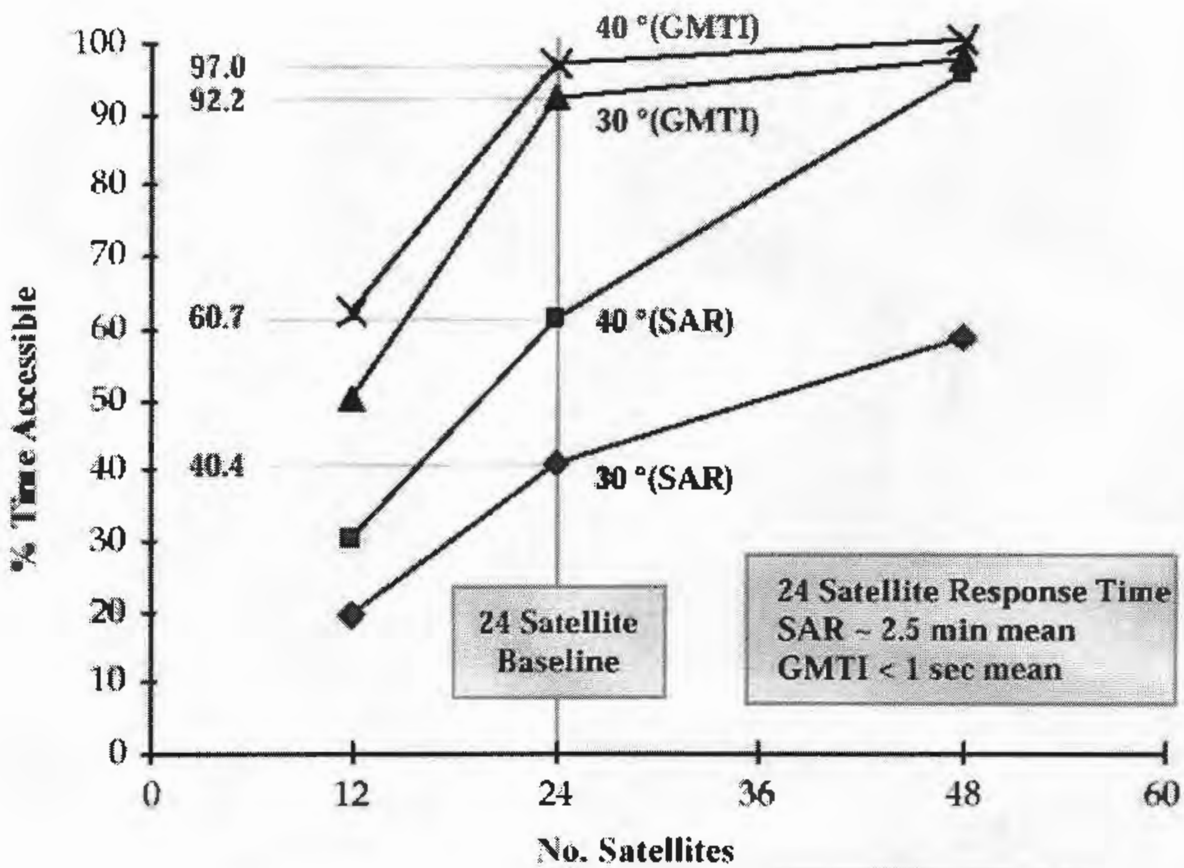
GMTI). SAR collection can only occur in one "wing" of the "butterfly" ground coverage area at a time, antenna slewing is required to image in the other "wing." Synthetic aperture radar was selected to provide day/night all weather collection capability.

- In strip map SAR mode, DISCOVERER II provides 3 meter impulse response (IPR) imagery at a collection rate of 700,000 km2 per hour. Such collection would typically be used for object detection, to cue collection in other modes or using other sensors for classification and/or identification.
- In scan SAR mode, DISCOVERER II provides 1 meter IPR imagery at a collection rate of up to 100,000 km2 per hour. Such collection would typically be used for object classification.
- In spot SAR mode, DISCOVERER II provides up to 160 images per hour at 0.3 meter IPR of 4 km x 4km target areas. Such collection would typically be used for object identification
- In GMTI mode, DISCOVERER II provides 3 meter target location error at a collection rate of 2,000,000 km2 per hour for object detectable velocities between 1.3 and 58 knots.



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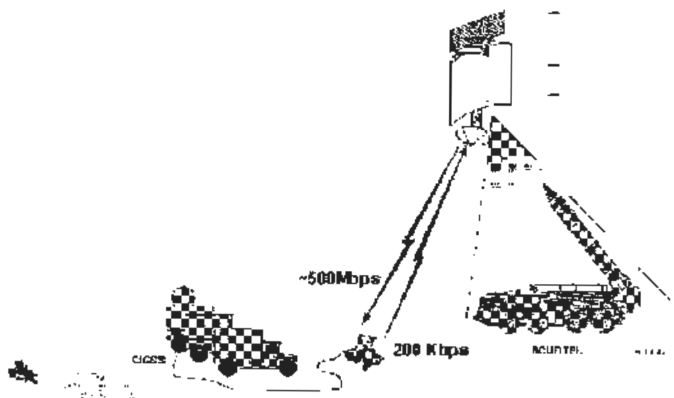
DARPA

SYSTEM PARAMETERS



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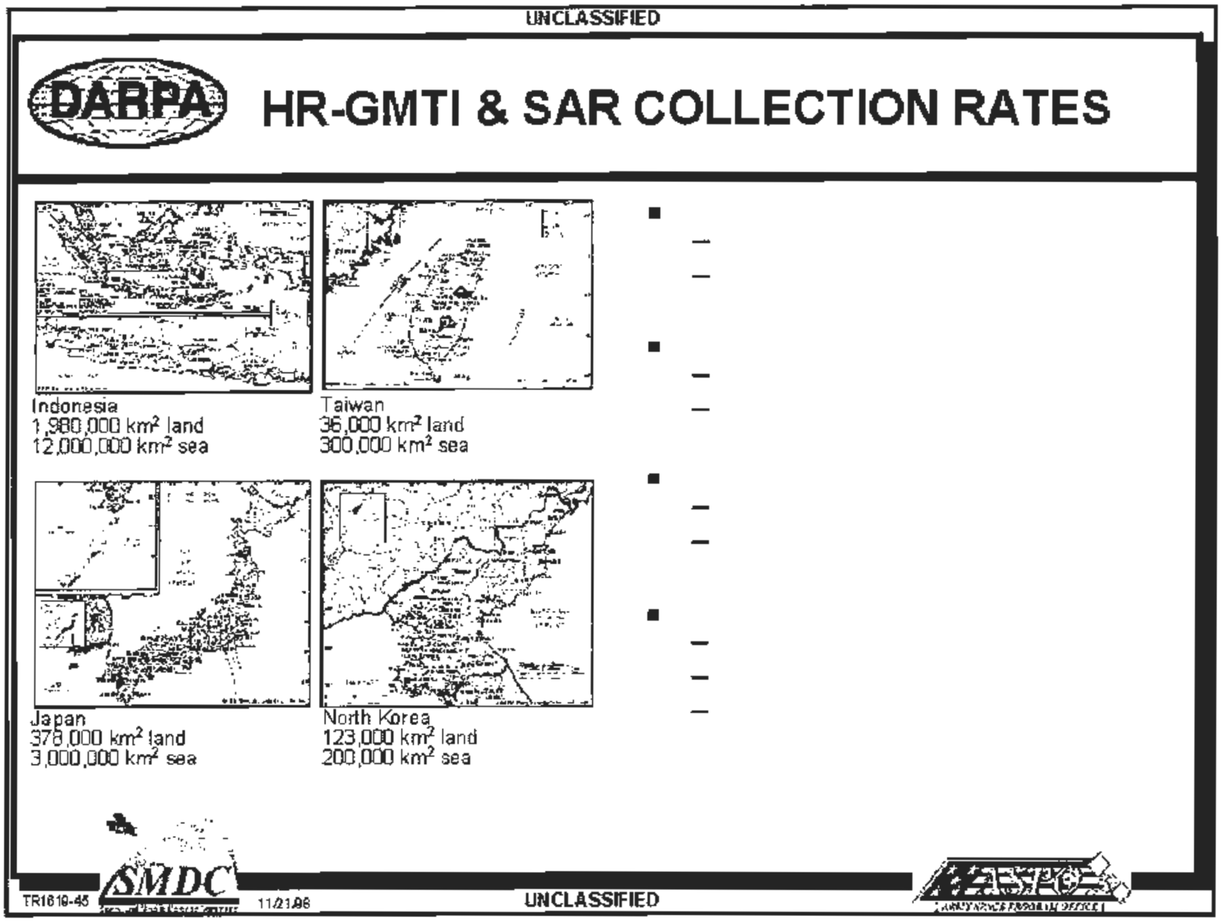

DISCOVERER II provides in-theater tasking capability to the services during training and exercises, and JTF and component commanders during crisis or hostilities using an Apportionment by Pass, Allocation by Operations methodology. Specifically, the JTF possesses the complete collection capability of the constellation for all those passes that will view the JTF Area of Operational Responsibility (AOR), once a contingency has been declared.

The Services have equipped or are in the process of developing Distributed Common Ground/Surface Systems (DCGSs), for receipt, processing, exploitation and dissemination of intelligence data from multiple sensors. These systems include the Navy Tactical Input Segment (TIS), Marine Corps Tactical Exploitation Group (TEG), Army Tactical Exploitation System (TES), and Air Force Contingency Airborne Reconnaissance System (CARS). Each of these possesses imagery subsystems, which the Defense Airborne Reconnaissance Office (DARO) has required to migrate toward commonality and interoperability under the Common Imagery Ground/Surface System (CIG/SS) initiative. Required elements for CIG/SS compliance include use of the CDL, the Common Imagery Processor (CIP), the Imagery Exploitation Support System (IESS), and the Imagery Product Library (IPL).

DCGSs supporting the JTF and/or air/ground/naval component commanders task and downlink satellites on each pass that views the AOR, with changes in tasking priority among the ground systems operating for the contingency potentially changing on each spacecraft pass.

For each 24-hour period of operations during a contingency, the JTF Commander apportions the collection capabilities according to the objectives for that day. For example, during the air campaign early in Desert Storm, the JTF may have apportioned 35 percent of passes (59) to the Air Component Commander, 35 percent (59) to the Naval Component Commander, 20 percent (34) to the Ground Component Commander, with 10 percent (16) reserved for JTF needs. In the days prior to movement of

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combined ground forces across the Iraq and Kuwait borders, the apportionment may have shifted to 20 percent (34) to Air, 20 percent (34) to Naval, 50 percent (84) to Ground and 10 percent (16) reserved for JTF. With a 24 satellite constellation, approximately 168 passes can view the Iraqi theater of operations during a typical day. Allocation by Operations provides for assignment of individual passes to specific ground systems directly supporting the JTF or a Component Commander based upon Component requests, considering their anticipated combat operations for a particular day. In the event that requests arrive from more than one component for a particular pass, the JTF J2 Collection Manager will adjudicate the priority between the two requests, based on the JTF Commander's mission priorities. Or the Collection Manager will require that the selected Component DCGS system that gets the pass provide primary imagery to the other Component's DCGS.

DCGSs that can also receive intelligence from multiple sources would use DISCOVERER II data complementary with those sources. This takes advantage of each sensor's unique strengths, maximizes efficiency and ensures truly synergistic operations. The result for JFCs is more responsive and timely battlespace information and greater employment efficiency for collection systems. DISCOVERER II radar data can be used to cue airborne sensors to provide dwell surveillance or airborne or national sensors for target identification and classification. National and airborne sensors can also cue DISCOVERER II collection of movement or stationary targets at high resolution. Cross-cueing can be highly valuable when other GMTI sensors have collection gaps in time and space, as in beyond line of sight or radar shadowed areas, or when adverse weather, diplomatic/political or airspace restrictions prevent other systems from flying.

DISCOVERER II SAR imagery taken over a period of several hours or days of a particular assembly area, when subjected to Coherent Change Detection processing, may show changes in levels of activity for forces based in that general locale. GMTI data will also indicate relevant military activity through indications of traffic flow and movement into and out of known or suspected areas of operation. This data would be used to cue unmanned aerial vehicles (UAVs) or other airborne and national sensors for vehicle/target identification and classification, for purposes of interpreting the opposing commander's intent. The DISCOVERER II high-revisit-rate feature, wide area coverage, and on demand assured access SAR capability could reduce the tasking on national and theater assets, to increase their effectiveness in collecting targets of a strategic nature.

Signals Intelligence (SIGINT) platforms may indicate a potential for vehicle movement into or out of a certain garrison location, or for the presence of high value assets. This information would be used to task DISCOVERER II GMTI coverage in the vicinity of the site to confirm or deny such movement, or to task DISCOVERER II SAR coverage to attempt to identify the characteristics of the hostile forces gathered at that location.

The Enhanced Tactical Radar Correlator (ETRAC) was planned by DARPA to support the demo as the ground processing segment, responsible for tasking, receiving the direct down link, processing, and exploiting the data. DARPA planned to cover the costs to include modifications to the ETRAC. The Government desires to leverage the migration path of the CIG/SS infrastructure, which employs the Common Imagery Processor (CIP) and Modular Interoperable Surface Terminal (MIST). The ground interface for the Phase II operational demonstrations will use CIG/SS compliant infrastructure resident in the Tactical Exploitation System (TES), and disseminated using existing infrastructure. It is anticipated the Phase II SI(s) will establish a relationship with the CIP prime contractor, Northrop-Grumman

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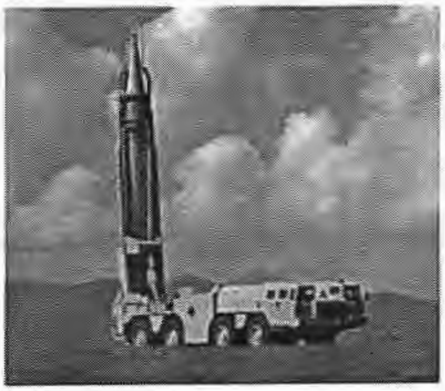
Surveillance Challenge Problem

SAR/ATR



40,000 sqnm/day @ 1 ft. Resolution

Algorithms	Clear Targets: Template Matching	CC&D Targets: Partial Feature Matching
Detection Throughput		
Bit Ops/Sec	10×10^{12}	400×10^{12}
CY1996 → CY2000 Chip Numbers	62 → 1	2500 → 42
Identification Throughput		
Integer Ops/Sec	7×10^{12}	288×10^{12}
CY1996 → CY2000 Chip Numbers	360 → 6	14,400 → 240

One of the key Defense problems involves the ability to locate and identify potential targets. This challenge has been quantified as the ability to search 40,000 square nautical miles per day with one meter resolution. This is equivalent to locating an object several meters in diameter in an area the size of a small country. For the purpose of this program we have artificially increased the resolution required for this application to provide a serious challenge for the Adaptive Computing researchers. The problem can be simplistically divided into two categories, detection and identification. The detection problem is considered to be a bit-level problem while the identification is a byte-level problem. This analysis is based on techniques known as template matching. This granularity provides an interesting application for the dynamic and temporal reuse aspects of Adaptive Computing. The computation levels for this problem when the targets are partially obscured reaches the hundreds-of-teraflop range. The slide is annotated with an estimate of the number of configurable devices that might be required to meet these requirements in 1996 and in 2000. These estimates present an overly optimistic view of the technology capabilities today because of the limited ability to deliver raw performance to an application. The 2000 goals in terms of component count remain a challenge for the community.

The government intends to support development of the tactical ground segment through risk reduction efforts in the areas of communication link studies, frequency management activities, 20/40 GHz space and ground communications technology development, ground processing and information infrastructure studies, and secondary dissemination interface specification.

Communication link studies focus on atmospheric and elevation dependent effects at the higher frequencies on area rates, revisit intervals, and system access. As ongoing studies are completed they will be added to the library. Frequency management activities have resulted in preliminary frequency band recommendations, to be followed by detailed compatibility studies, final frequency recommendations, and frequency assignment filings, made in concert with Phase I contractors' input, by the first quarter FY00. Efforts for 20/40 GHz space and ground communications technology development are not yet underway but are planned to study and develop space and ground transmitter

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technology, transmitter power management techniques, antenna feed technologies to support X, Ku and Ka in a single aperture, multi-rate modulator/demodulators, higher rate input/output technology in the TES/MIST interface, and other selected efforts to support the demonstration goals.

Ground processing and information infrastructure studies have covered the CIG/SS, TES, MIST, and secondary dissemination interface specifications. Suitability of the Common Imagery Processor (CIP) and Modular Interoperable Surface Terminal (MIST) for the STARLITE Study Concept have been evaluated. The ground system evaluated for this effort was the Enhanced Tactical Radar Airborne Correlator (ETRAC) which is currently being migrated into the TES as part of the on-going P3I program.

Northrop Grumman evaluated the Common Imagery Processor to determine the feasibility of the ground station architecture and the imagery processor viability to accept a higher density datastream from another source of unique operational characteristics, while retaining the capabilities inherent in the current configuration. In summary, it was determined the processor with appropriate system modifications, could be capable of handling the STARLITE satellite data processing and collection planning. Analysis of future server processing capabilities, applying Moore's Law, indicates the processing capability will likely exceed the DISCOVERER II objective constellation capabilities. Further evaluation is required to assess processing latencies, data formats, and other characteristics that will evolve from the space based radar design.

L3COM evaluated at the system level, those modifications to the ETRAC and MIST communication subsystem to support an increased downlink data rate of 548.352 Mbps also referred to as 2X from the STARLITE design. The MIST provides the antenna, RF electronics, modulator, demodulator and link controller that delivers the imagery data to the ground station. Several design options were identified for consideration to accommodate the increased data rate and further acknowledged the MIST is capable of accommodating a data rate up to 4X. Unknown is the cost impact to implement the 4X design and further analysis is needed to assess the maintainability and impact to operational capabilities. Additional work in the frequency allocation arena is needed and is being pursued within the Discoverer II Joint Program Office.

Estimated navigation and timing accuracy requirements, minimum SNR requirement, and tasking constraints for high resolution, single-pass IFSAR collection will be extrapolated from the performance and characteristics of airborne systems. Preliminary results will be obtained from trade studies on terrain mapping modes (stereo SAR and IFSAR), orbit configurations for a satellite pair to allow monostatic and/or bistatic single-pass IFSAR operation, and performance, including coverage rates, latency, and mode availability.

The Government will provide a requirements document describing algorithms and performance requirements (thresholds, goals and trades) for MTI/SAR/ECCM on-board/off-board processing. The specification includes HRR-GMTI Space Time Adaptive Processing (STAP), with subsequent target detection and multiple hypothesis tracking, including automatic target recognition. The package will present results of theoretical analysis showing the dependency of minimum detectable velocity, bandwidth, classification accuracy, and revisit on track purity. The Government will also provide analysis results and phase history data from subsequent enhanced collections, including communications, A/D, and processor quantization effects, frequency jump burst (FJB) and stepped chirp effects, influences of two step nulling for ECCM, range sidelobe effects and as available, classification accuracy as a function of bandwidth and polarization. In this Government will validate the processing algorithms using synthetic and actual targets, and man-made and natural clutter.

Trade studies to show the performance of stereo SAR and interferometric SAR modes in terrain

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mapping were completed in 1999. Orbit configuration trades studies will be completed and results will indicate system performance for alternative configurations, including coverage rate, latency, and mode availability. Initial version of error model will be completed for high-resolution terrain mapping with proposed allocation of errors to individual error sources. Errors will include navigation and timing errors, noise errors, and errors due to atmospheric and scene-based phenomena.

Sources and Resources

- DEFENSE SCIENCE BOARD TASK FORCE ON SATELLITE RECONNAISSANCE JAN 1998
- **DISCOVERER II - A DARPA SAR TACSAT** ASPO Briefing
- DISCOVERER II DEMONSTRATION - DRAFT SOLICITATION - 02 September 1998
  - INFORMATION TO OFFERORS (ITO)
  - STATEMENT OF OBJECTIVES
  - Standard Scenario Description System Capabilities Document
  - GOVERNMENT FURNISHED INFORMATION
- Discoverer II: Briefing to Industry Col Mark T. Hughes, Discoverer II Program Manager -- June 24, 1998
- Discoverer II: Global Precision Surveillance Industry Day Briefing June 24, 1998
- GOVERNMENT FURNISHED INFORMATION - Discoverer II (DII) program
- INFORMATION TO OFFERORS (ITO) - Discoverer II (DII) program
- INDUSTRY DAY BRIEFS - November 5, 1998
  - Space-Based GMTI/SAR Demonstration Program PD - Col Mark T. Hughes
  - Contracting to Meet Program Objectives Dir Cntr - Mr. Ron Poussard
  - Discoverer II Core Program - Part 1 Part 2 Part 3 Core,PM - Lt Col Allan Netzer
- Discoverer II: Space-Based GMTI/SAR Demonstration Program
  June 24, 1998 Presented by: Col Mark T. Hughes Discoverer II Joint Program Manager
- Discoverer II: Global Precision Surveillance Industry Day Briefing
  June 24, 1998 by: Dr. David Whelan Director, Tactical Technology Office
- Adaptive Computing Systems [ACS] Program Overview, June 1998 Dr. Jose Munoz
- Integrated Master Plan (IMP) and Integrated Master Schedule (IMS) Core,PM - Lt Col Allan Netzer (8/19/98)
- DISCOVERER II Commerce Business Daily: October 2, 1998
- System Engineering, Integration, and Test (SEIT) - Lt Col Allan Netzer, (12/11/98)

- Discoverer II Phase One Contract Awards February 19, 1999
- Affordable Space-Based Radar - COL Mark T. Hughes, *DARPATech 99*, June 1999. (1128 KB PDF)

- **Discoverer II (DII)** @ LAAFB
- STARLITE MAPLINES #12 (19 April 1997)

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DOC 1_34

Updated Monday, January 24, 2000 11:00:47 AM

Doc I-35 (IR)
Discoverer 2

Discoverer II touts improved surveillance

John Ryan
Public Affairs

The Discoverer II Joint Program is an Air Force, Defense Advanced Research Projects Agency and National Reconnaissance Office cooperating initiative designed to improve military surveillance capabilities through the use of a future constellation of Space Based Radar satellites.

The joint program office, located in Arlington, Va., was established in February 1998 and designated Discoverer II two months later.

The goal of the Discoverer II program is to develop, design, fabricate and launch two research and development satellites in 2005 that will demonstrate the capability to detect and track moving targets on the earth's surface, produce high-resolution imagery, and collect precision ground mapping data.

During the fiscal year 2000 appropriations process and fiscal year 2001 budget cycle, the program was under scrutiny from decision-makers who questioned the affordability of the demonstration.

Last November, an independent cost team from the NRO and Air Force concluded the demonstration program's cost was consistent with the funding commitment of the three partners.

"The Discoverer II program is alive and well," said Lt. Col. Allan Netzer, Discoverer II Program Manager. "During the past year or so, we have had some significant technological successes and demonstrated that Discoverer II is affordable."

The Discoverer II program is tied closely to an operational space based radar concept for a follow-on constellation envisioned for 2010.

Colonel James Puhek, the Discoverer II System Program director, has visited six of the warfighting commands this year describing the DII program.

"We are visiting the warfighters, briefing them on the utility that a follow-on operational system to the DII demonstration could have for them," said Puhek. "We've had very enthusiastic responses at the Deputy CINC level for the program."

In February 1999, contracts were awarded for the first phase of the program. This first phase involves concept exploration, preliminary design and risk reduction work.

The second phase, planned for early fiscal year 2001, will complete design, fabrication, integration, testing and operation of two demonstration satellites scheduled for launch in fiscal year 2005.

EELV critical to space access

Developing and acquiring future spacelift vehicles is what the 125 employees of the Evolved Expendable Launch Vehicle program office are tasked with every day.

Known as EELV, the program will modernize and improve the nation's access to space by making space launch more reliable and affordable.

An Air Force initiative, the program is designed to reduce the cost of launch by at least 25 percent over the current Delta, Atlas and Titan launch vehicles. This will save taxpayers more than $6 billion in launch costs between 2002 and 2020.

EELV will replace the existing fleet of launch systems with two families of launch vehicles using common components. Improvements over current systems will include a standard payload interface, standardized launch pads and off-pad processing.

The program is currently in the engineering, manufacturing and development phase, which runs through fiscal year 2002. During this phase, the contractors will complete engineering and manufacturing development of the launch vehicle system, launch pads, satellite interfaces and support equipment. Contractors will also demonstrate that the system meets all government requirements via two system launches. Two launch services contracts covering 28 missions are also in place through fiscal year 2006.

Launch vehicles to be used in this program are the Boeing Delta IV and Lockheed Martin's Atlas V. (*Information provided by SMC Public Affairs.*)

Doc. I-35

Friday, July 14, 2000

Doc I-36

Conferees Terminate Space-Based Radar Project

July 14, 2000 -- A House-Senate conference committee has agreed to terminate the Pentagon's Discoverer II program, congressional sources tell *InsideDefense.com.*

The DII effort is a space-based radar demonstration project aimed at improving the military's ground surveillance capabilities. The program, managed jointly by the Air Force, National Reconnaissance Office and Defense Advanced Research Projects Agency, enjoys strong support from military officials as well as some lawmakers. But the House Appropriations Committee was convinced that the costs of the DII project could not be controlled and pushed to terminate the effort. Accordingly, the House's fiscal year 2001 defense appropriations bill eliminated the $130 million request for the project. The Senate's FY-01 appropriations package, however, provided the requested funding, making the House action a conference issue.

House and Senate appropriations conferees last night completed their work on the FY-01 defense appropriations conference report. While complete details of the conference committee's deliberations have yet to be released, sources say the DII project was terminated as the House had recommended.

A statement issued this afternoon by the Senate Appropriations Committee noted that conferees approved the "defunding (of) the Air Force Discoverer II surveillance satellite program, with the exception of funding for sensor research."

Inside the Air Force reported this week that DII backers on Capitol Hill had made a last-ditch effort to preserve the project, which U.S. Space Command Chief Gen. Ed Eberhart considers his No. 1 technology program. "One of the lessons of last year's Kosovo air campaign was that our inability to track mobile targets in all weather conditions, both day and night, reduced the effectiveness of our precision weapons," a group of Republican senators said in a June 29 letter to Senate Appropriations Committee Chairman Ted Stevens (R-AK). "The Discoverer II program is designed to assess the affordability and feasibility of tracking moving ground targets from space, which would allow for all-weather, day-night, precision tracking anywhere in the world."

In an effort to mollify the House appropriators, Art Money, the assistant secretary of defense for command, control, communications and intelligence, told House Appropriations defense subcommittee Chairman Jerry Lewis (R-CA) last month that the success of the DII demonstration would determine whether DOD would actually field the space-based radar. "Discoverer II is a technology program, not a classical acquisition with a major production tail or an operation deployment," Money wrote. -- *Amy Butler and Amy Svitak*

RETURN
DefAlert menu

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Doc I-37

Installation

Installation Overview

For more information on this subject:
Schriever AFB Web Page
http://www.schriever.af.mil

Location: Schriever Air Force Base is located 10 miles east of Colorado Springs, south of Colorado Highway 94 on Enoch Rd.

Major Command: Air Force Space Command

Mission: Schriever AFB is home to the 50th Space Wing, and the wing's mission is to provide command and control for Department of Defense operational military satellites and operate and manage the worldwide Air Force Satellite Control Network. The wing operates satellite operations centers at Schriever AFB, remote tracking stations and other command and control facilities around the world. These facilities monitor satellites during launch, put the satellites in their proper orbits following launch, operate the satellites while they are in orbit, and fix satellite anomalies when they occur. The wing has 20 units at 24 locations worldwide. Two of Schriever's major tenant units are the Space Warfare Center and the Joint National Test Facility.

Population assigned-served:

Active Duty:	2,001
Army/Navy/Marines:	24
Family Members:	2,589
ANG/Reserve:	24
Appropriated Fund Civilians:	353
Non-Appropriated Fund Contract Civilians and Private Business:	1,396

Telephone Access: The Schriever AFB commercial prefix is 567, and the DSN prefix is 560. For Peterson numbers with a 556 commercial prefix, the DSN prefix is 834. For Peterson numbers with a 554 commercial prefix, the DSN prefix is 692. For Schriever AFB Operator Assistance, call DSN 560-1110 or (719) 567-1110. For Peterson AFB, Operator Assistance, call DSN 834-7011 or (719)556-7011. For the Colorado Springs area, the area code is 719.

History: Schriever AFB is the home of the 50th Space Wing. The decision to establish a new space control facility was approved by the Secretary of Defense in September, 1979. The site, formerly known as Falcon AFB, was chosen from 12 possible sites, and ground breaking took place in May 1983. The Air Force began operations on 1 October 1985, on schedule and $50 million under budget. Originally an Air Force station, Falcon became a base on 13 June 1988. On 5 June 1998, Falcon AFB was renamed Schriever AFB in honor of Gen Bernard A. Schriever. Schriever pioneered the development of the nation's intercontinental ballistic missile programs and is recognized as "the father of the U.S. Air Force's space and missile program."

Must Know Items

Many of the support facilities which you and your family will utilize are located on Peterson AFB. Therefore, information in this SITES database will include Schriever AFB, Peterson AFB and the Colorado Springs community.

MAJOR CONSTRUCTION AT THE INTERSECTION OF POWERS BLVD AND PLATTE AVENUE (HWY 24): This construction started June 2000 and isn't scheduled for completion until October 2001. Delays or detours are routine, but usually well-marked.

BASE ACCESS: The main entrance to Schriever AFB is west of the installation. It is located 10 miles east of Colorado Springs and Peterson AFB, south of Colorado Highway 94, and west of Enoch Road. Since Schriever does not have a Temporary Lodging Facility, you will probably go to Peterson AFB first.

Peterson AFB has three entrances. The North (or Main) Gate is located on Peterson Blvd at Highway 94. It is open 24 hours a day. The West Gate is located east of Powers Blvd, approximately one half mile south of Highway 24. It is open Monday thru Friday, 0600-1800. The East Gate is located off Marksheffel Road, approximately two miles south of Highway 94. It is open Monday thru Friday, 0600-0800; it is closed weekends and holidays.

DIRECTIONS FROM AIRPORT: The Colorado Springs airport is located south of Peterson AFB. Following the road exiting the airport, turn right on Powers Blvd. Stay on Powers approximately 6 miles. Turn right at the Airport Road intersection. Turn right at the next light. This is the access road to the Peterson AFB West Gate. If you wish to enter Peterson AFB through the Main Gate, stay on Powers Blvd until you reach Platte Avenue. Turn right; the exit for the Main Gate is approximately one mile east of Powers Blvd.

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Air Force Bases

➡ Military Discussion Forum (Click Here)

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MQ

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

Doc I-38

SPECIAL ORDER
GA-19

17 September 1998

1. HQ Air Force Development Test Center (AFDTC) is redesignated as HQ Air Armament Center (AAC), and remains assigned to the Air Force Materiel Command, effective 1 October 1998. Authority: DAF/XPM letter 016s-1, 17 September 1998, Redesignation of HQ Air Force Development Test Center, and AFI 38-101.

2. HQ 377th Air Base Wing (377 ABW), Kirtland AFB, New Mexico, is relieved from its present assignment to the Space and Missile Systems Center, and is assigned to the Air Armament Center, effective 1 October 1998. Authority: AFI 38-101.

3. Detachment 5, Aeronautical Systems Center, is inactivated at Eglin AFB, Florida, effective 1 October 1998. Authority: AFI 38-101.

FOR THE COMMANDER

RD Sullivan

RONNIE D. SULLIVAN, Colonel, USAF
Chief, Manpower and Organization
Directorate of Plans and Programs

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1 – ALHQDRU/CC
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1 – AFDTC/CC/HO/MQ/PA
1 – AFFTC/CC/HO/MQ/PA
1 – AFRL/CC/HR
1 – ASC/CC/HO/MQ/PA
1 – ESC/CC/HO/MQ/PA
1 – HSC/CC/HO/MQ/PA
1 – SMC/CC/HO/MQ/PA
1 – OC-ALC/CC/HO/PA/XPM
1 – OO-ALC/CC/HO/PA/XPM
1 – SA-ALC/CC/HO/MQ/PA
1 – SM-ALC/CC/HO/MQ/PA
1 – WR-ALC/CC/HO/PA/XPM
1 – 96 ABW/CC
1 – 377 ABW/CC/HO/MQ/PA

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Doc I-39 (MQ)

Air Force announces realignments

Leigh Anne Redovian
Air Force Materiel Command Public Affairs

WRIGHT-PATTERSON AIR FORCE BASE, Ohio (AFNS) — Command officials announced major realignments at several Air Force Materiel Command bases Sept. 14.

The Air Force Development Test Center at Eglin Air Force Base, Fla., and Aeronautical Systems Center at Wright-Patterson AFB, Ohio, will be realigned to support the command's strategic plan for guiding the Air Force into the 21st century.

The Air Force Development Test Center will soon become responsible for all Air Force armaments and will be renamed the Air Armament Center. The center will work under new management giving the Air Force a more efficient and cost-effective process for providing products and services to its operational commands.

With the realignment, the center will be responsible for the 377th Air Base Wing at Kirtland AFB, N.M., formerly under the Space and Missile Systems Center at Los Angeles AFB. It will also acquire certain elements of ASC, which are currently geographically located at Eglin AFB.

The new center will manage the development, test, procurement and support of all air-delivered weapons. It will transition from a test center to become a product center, managing the full range of the armament's life cycle.

In another realignment, ASC will now manage the Human Systems Center at Brooks AFB, Texas. The center at Brooks will be redesignated as the 311th Human Systems Wing with ASC serving as its higher headquarters.

The name redesignation will not change the mission at Brooks, which is serving as the Air Force advocate for integrating and maintaining the human in Air Force systems and operations.

There will be no movement of people from Wright-Patterson AFB or Kirtland AFB as a result of the realignments, nor will other command centers be impacted. Current workloads will remain in place and any other future adjustments to workload or manpower will be the result of business efficiencies and not the designation of Eglin as a product center.

As the commander, Maj. Gen. Michael Kostelnik will remain at Eglin and assume the additional duties of Air Armament Center.

Brig. Gen. John G. Jernigan, the current commander at Brooks AFB, will remain and maintain operational control of the organization and report to Lt. Gen. Robert Raggio, Aeronautical Systems Center commander.

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(Doc I-40)

Mulcahy Robert D Civ SMC/HO

From: Gildea James E MSgt 377 ABW/HO
Sent: Tuesday, December 11, 2001 2:39 PM
To: Mulcahy Robert D Civ SMC/HO
Subject: RE: Transfer of 377 ABW from SMC

Robert,
According to the 377th Air Base Wing FY 99 History; (U) Effective 1 October 1998 the Air Force redesignated Headquarters Air Force Development Test Center as Headquarters Air Armament Center (AAC) located at Eglin AFB, Florida. Assignment of the 377 ABW transferred from Space and Missile Systems Center to AAC under Air Force Material Command (AFMC). Along with the 377th, four other units came under AAC control. This consolidation created a single focal point for armament issues within the Air Force. At the stand up on 30 September 1998, General George T. Babbitt, AFMC/CC, commented, "We now are pulling every phase in the life cycle of air delivered weapons-from development through sustainment-together under one flag." The reassignment involved no change in personnel or mission at the 377th ABW.
I hope this answered your question, let me know if you need anything else.

Jim
JAMES E. GILDEA, MSgt, USAF
377 ABW/HO
2000 Wyoming Blvd., Suite D-2
Kirtland AFB, N.M. 87117-5606
Comm: (505) 846-0170
DSN: 246-0170

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

27 July 1998

SPECIAL ORDER
GA-12

Detachment 2, Space and Missile Systems Center (SMC), is inactivated at Onizuka AS, California, effective 31 July 1998. Authority: AFI 38-101.

FOR THE COMMANDER

DENNIS M. BOGGS
Acting Chief, Manpower and Organization
Directorate of Plans and Programs

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1 – HQ AFMC/HO/JA/PA/SCDP/XPMO/ XPMQ/XPMR
1 - AFMC QMIO
1 - HQ AFMC/DP/DPA/DPC/DPO
1 – SMC/CC/HO/MQ/PA

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MG M+O

SMC Det. 2 inactivated

Airman 1st Class Elaine Tarello
Onizuka Public Affairs Office

After five years at Onizuka Air Station, Detachment 2, Space and Missile Systems Center, inactivated during a formal ceremony July 30.

This inactivation, however, does not mean the end of Det. 2's mission.

Although the Det. 2 flag was furled and its commander relinquished command, the detachment's mission at Onizuka AS will remain the same but under a different name. The organization is now designated SMC Operating Location-AO.

"Although the detachment is inactivated, only its name has changed," said Lt. Col. Randy T. Odle, former Det. 2 commander. "The outstanding Air Force Satellite Control Network on-site engineering support provided continues as normal."

Odle will serve as deputy program director, Satellite and Launch Control Systems Program Office at Los Angeles Air Force Base, Calif.

Det. 2's mission at Onizuka AS is to provide engineering support for the AFSCN.

"We buy new systems and maintain the current ones," said Maj. Paul P. Pilipenko, SMC/OL-AO deputy chief. "It's basically hardware and software acquisition and maintenance."

Air Force Materiel Command designated and activated Det. 2 at Onizuka Air Force Base Aug. 27, 1993. From August 1993 to July 1995, the detachment's mission was space test and evaluation, providing support for the Department of Defense satellite programs under the Space Test and Evaluation Division.

Tattini cont. from Page 1

opportunity to do a job that I have always wanted and to be close to our family in the process," Tattini said. The men and women of SMC are brilliant, and it will be great working here.

Tattini earned his bachelor of science degree in industrial management at the University of Illinois and a master of business administration degree at Oklahoma City University.

His professional development as an Air Force officer is extensive. He is a graduate of Industrial College of the Armed Forces, Air War College, Cornell University's Executive Development Program and Harvard University's Executive Development Program for Senior Managers in Government.

During his career,, Tattini has earned the Legion of Merit with an oak leaf cluster, Meritorious Service Medal with three oak leaf clusters, Air Force Outstanding Unit Award and Air Force Organizational Excellence Award with three oak leaf clusters, among others.

Tattini was promoted to major general May 25, 1995.

Tattini is accompanied by his wife, Jene, and has two daughters, Susann and Michelle.

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[Doc I-43]

Onizuka Air Station, California

[Federal Register: March 1, 1995 (Volume 60, Number 40)]
[Notices]
[Page 11567]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]

[[Page 11567]]

Recommendation: Realign Onizuka AS. The 750th Space Group will inactivate and its functions will relocate to Falcon AFB, Colorado. Detachment 2, Space and **Missile** Systems Center (AFMC) will relocate to Falcon AFB, Colorado. Some tenants will remain in existing facilities. All activities and facilities associated with the 750th Space Group including family housing and the clinic will close.

Justification: The Air Force has one more satellite control installation than is needed to support projected future Air Force satellite control requirements consistent with the Department of Defense (DoD) Force Structure Plan. When all eight criteria are applied to the bases in the Satellite Control subcategory, Onizuka AS ranked lower than the other base in the subcategory. Among other factors, Falcon AFB has superior protection against current and future electronic encroachment, reduced risks associated with security and mission-disrupting contingencies, and significantly higher closure costs.

Return on Investment: The total estimated one-time cost to implement this recommendation is $124.2 million. The net of all costs and savings during the implementation period is a cost of $125.7 million. Annual recurring savings after implementation are $30.3 million with a return on investment expected in eight years. The net present value of the costs and savings over 20 years is a savings of $181.6 million.

Impacts: Assuming no economic recovery, this recommendation could result in a maximum potential reduction of 2,969 jobs (1,875 direct jobs and 1,094 indirect jobs) over the 1996-to-2001 period in the San Jose, California, Primary Metropolitan Statistical Area, which is 0.3 percent of the economic area's employment. The cumulative economic impact of all BRAC 95 recommendations and all prior-round BRAC actions in the economic area over the 1994-to-2001 period could result in a maximum potential decrease equal to 0.5 percent of employment in the economic area. Environmental impact from this action is minimal and ongoing restoration of Onizuka AS will continue.

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Federation of American Scientists

January 31, 2002

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Investment in Educational Technology Research and Development

A study conducted by FAS finds that while the US designated approximately $200 million to educatioual technology research and development in FY2000, less than $40 million was invested for nou-military applications and that research programs are scattered across many different agencies with little coordination.

The War Against Terrorism

The September 11 attacks on New York and Washington are redefining the national security landscape. Here are some resources for understanding the terrorist threat and the possible responses to it.

Fewer Nukes, but Looser

Amid the backdrop of rising concern over nuclear terrorism, the upcoming Bush-Putin summit, and the imminent release of the US Nuclear Posture Review, a panel of nuclear experts convened in Washington to discuss ways to reduce the dangers posed by nuclear weapons.

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(Doc I-44)

MILITARY BASE CLOSURES ANNOUNCED IN JULY 1995 - BRAC IV

[Return to Index]

ONIZUKA AIR STATION (Realignment)

Reuse Plan	na
Environmental Impact Statement	na
Record of Decision	na
Current new employment	0
Acres eligible for transfer	105
Acres retained by the federal government	105
Acres transferred by long-term lease	0
Acres transferred by deed	0
Acres remaining	0

Retained by the federal government: Three housing complexes (105 acres) have been requested by NASA

UPDATE 2000

The Air Force was directed to inactivate the 750th Space Group and realign its functions to Falcon AFB, Colorado. Some tenants operating at Onizuka Air Station were authorized to remain in existing facilities. All activities and facilities associated with the 750th Space Group, including Family Housing and the Clinic, were directed to close by 30 Sep. 2000.

As the Onizuka workforce downsized, current Onizuka Air Station employees will relocate from off base leased facilities to fill vacated on-base facilities. Onizuka Air Station on-base facilities are projected to be 100% utilized through 2004 and potentially through 2008.

KEY CONTACTS

Air Force Contact:
Col. Tim Roberts
750th Space Group
(408) 752-4026

Base PA Office: Howard Antelis
750 SG/PA

1080 Lockheed Way, Box 53
Sunnyvale, Ca 94089
(408) 752-4026

LRA:
Kevin Duggan
City of Mountain View
500 Castro Street

DOC I-44

Mountain View, CA 94041
(415) 903-6301

Location: Onizuka Air Station is located in Sunnyvale off US Highway 101 (Bayshore Freeway), approximately 2 miles south of Moffett Federal Airfield, 11 miles north of San Jose, and 37 miles south of San Francisco. Onizuka annex housing is partitioned into three sections located on, adjacent to, and within two miles of Moffett Federal Airfield.

Onizuka Air Station is situated in close proximity to major space related corporations supporting DOD space mission activities. Established communications networks at Onizuka Air Station enhance current DOD space mission reliability.

Projected Realignment: September 2001

Job Loss: 485 (m) 1,039 (c)

Area and Facilities: The main base covers 23 acres. This secure area is used for Department of Defense satellite command and control and will not be declared excess. The host Air Force unit, the 750th Space Group, will be inactivated by not later than September 30, 2000. Residual host responsibilities will be consolidated into an Air Force Space Command squadron supporting tenant satellite operation beyond July 13, 2001.

The Onizuka annex located within and adjacent to Moffett Federal Airfield includes three distinct housing parcels. The Officer's Housing includes 111 housing units. Orion Park is situated immediately adjacent to Moffett on 69 acres and includes 562 enlisted housing units. Shenandoah Park contains 126 family housing units on 15 acres located one mile from Moffett Federal Airfield and within the City of Mountain View.

While the Air Force at Onizuka manages the 18-hole golf course at Moffett, this facility is actually owned by NASA. NASA received ownership from the Navy when BRAC 1991 closed Moffett Field.

Background: BRAC 1991 transferred the Navy housing units at Moffett Field to the Air Force at Onizuka. However, BRAC 1995 realigned a significant portion of the Onizuka Air Station mission. Onizuka Annex housing today supports a multi-service active duty military contingent to include active duty Air National Guard and Naval Air Reserve members. Based on January 1996 demographics, the Air Force used approximately 47% of the 806 available units; the Navy used 30%, the Army 8%, the Marine Corps 3%, and the Coast Guard 2%, and the residual 10% was under renovation or in new occupant transition.

The Air Force is interested in retaining the 111 units of Officer Housing to service residual active duty Air Force assigned to Onizuka Air Station.

Since there are additional 1000 non-Air Force active duty military members in the South Bay Area, the DoD conducted an evaluation before a notice of availability was issued to other federal agencies. One alternative included appointing an executive agent to manage all the housing needs for the aggregate DoD presence. Excising military housing would mean that military members will have to seek housing in the private sector, and that would be very expensive.

Prior Planning Status: At this time, all real property on the 23-acre main Onizuka Air Station facility will continue to be used for satellite command and control. The Air Force is planning a 5-year realignment period from July 1997 to July 2001.

On May 23, 1996, DoD formally designated the City of Mountain View as the local reuse entity for

DOC 1.44

managing the reuse of off-base housing properties made available at Onizuka. Prior to this designation, the City of Mountain View and the City of Sunnyvale established a "Moffett Joint Powers Agreement" on January 30, 1996 to address redevelopment issues pertaining to Onizuka.

Previous Activity: On April 18, 1997, the Air Force gave notice of the availability of real property at Onizuka including Orion Park that contains 564 family housing units in 103 buildings on 60 acres. These units are contiguous to Moffett Federal Airfield. Also included in the notice, is Shenandoah Housing, with 126 family housing units in 23 buildings on 15 acres located in the City of Mountain View. NASA has requested this property.

The Silicon Valley Defense/Space Consortium, Inc. (DSC) is a nonprofit, industry-led organization of businesses, academic institutions, research laboratories, civic organizations and local government agencies promoting the vitality of the Silicon Valley's defense and space industries. The DSC's mission is to support the continued evolution of the defense/space industry in the region and to catalyze civil and commercial space commerce business cluster development, thereby helping to offset the continued decline in the region's defense/space infrastructure. This organization is exploring alternative Onizuka Air Station private sector use should it close as a result of a future BRAC cycle.

Environmental Contamination: There are some environmental clean-up problems detailed in the draft November 1998 Environmental Assessment.

Government Representatives:

U.S. Congress 14th District - Eshoo-D
State Senate 13th District - Vasconcellos -D
State Assembly 22nd District - White-Alquist-D

California Military Base Closures and Realignments: Current Status of Reuse Efforts -- February 1999

This report is prepared by:
California Trade and Commerce Agency
Office of Business Development
801 K Street
Sacramento, CA 95814
916-327-3116

State of California
Gray Davis, Governor

DOC 1-44

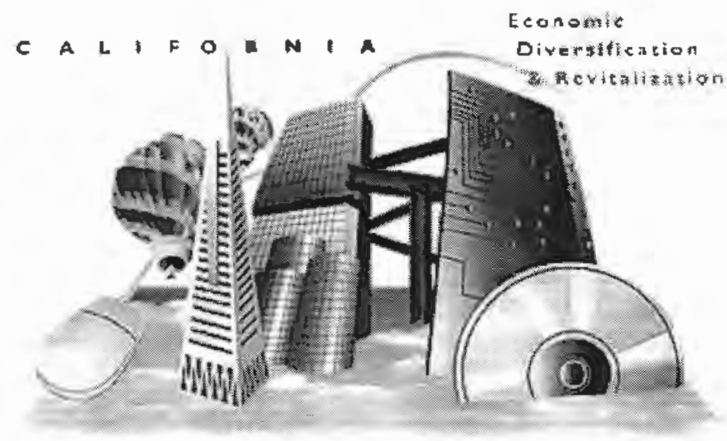
Military & Base Reuse

Doing Business in California

Jobs, Education & Training

Available Base Properties

What's New



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For technical or content questions please e-mail the CEDAR Team. We welcome any suggestions for new sites, format changes or expanded content which would make our pages better for our users.

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Doc I-45

Why Onizuka ?

Onizuka Air Station

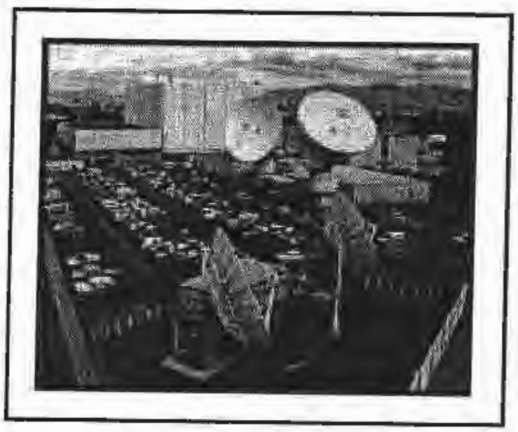
23 high-tech acres in the heart of Silicon Valley

A proud and distinguished history ...

1956 - initial operations begin in Palo Alto
1959 - operates Discover 1 Satellite / first CORONA
1960 - begins operations as Air Force Satellite Test Center
1964 - renamed "Air Force Satellite Control Facility"
1969 - Blue Cube construction
1971 - renamed "Sunnyvale Air Force Station"
1981 - supported first orbital flight of Space Shuttle
1986 - renamed "Onizuka Air Station"
1995 - BRAC directs realignment
1996 - CORONA program declassified
1999 - 750th Space Group decommissioned

AIR FORCE SPACE COMMAND

What exactly is Onizuka ?



Although Onizuka Air Station -- the Blue Cube -- is a Silicon Valley landmark, most people in the area are surprised to hear that it is an operational Air Force facility. Onizuka is usually thought to be part of the adjacent Lockheed Martin industrial complex or the nearby NASA Ames Research Center.

The facility is best known for the large operations building -- the Blue Cube -- and the two large satellite communication antennas.

Few people really understand the mission of Onizuka Air Station and there has always been an aura of mystery surrounding the facility.

DOC I.45

In many respects the Air Force activities at Onizuka were the foundation of this nations and California's defense space industry. It was not until August 1996, when the CORONA photoreconnaissance satellite program was declassified, that the Air Force proudly reported that the Air Force Satellite Test Center, the original Air Force designation for Onizuka, was built to operate the world's first "spy satellite system". CORONA related operations continued at the facility until 1972.

As the complexity of defense satellite programs evolved, the mission of Onizuka has also changed. Oniznka evolved to be the "command center" of the Air Force Satellite Control Network, a world-wide network of remote satellite tracking and control stations.

At about the same time the facility was renamed to honor Space Shuttle Challenger Astronaut Air Force Lt. Col. Ellison Onizuka, most new Air Force satellite missions were starting to be controlled from Falcon Air Force Base, now Schriever Air force Base, in Colorado Springs, Colorado.

The activities at Onizuka began to focus on the operation of the Air Force Satellite Control Network, R&D missions and the "fly-out" of older operational Air Force and DoD satellite missions.

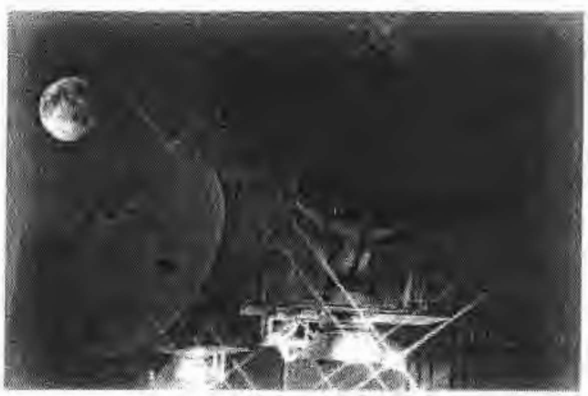
In 1995 the Base Realignment and Closure Commission, BRAC, directed the operations at Onizuka be realigned. The Onizuka BRAC process was essentially completed in June 1999 with the decommissioning of the 750th Space Group, a wing of the 50th Space Wing of the Air Force Space Command. As part of the realignment at Onizuka, the management of the Air Force Satellite Control Network has been to transferred to Schriever Air Force Base.

Although the majority of the missions at Onizuka are now directed by the Air Force Office of Special Projects the facility is still managed by the Air Force Space Command.

It is a common misperception that Onizuka has already, or is about to close. In fact, all infrastructure at Onizuka is in place and continues to operate.

Current Air Force plans are for operations at Onizuka to continue as is, with a combined military and contractor staff of between 1000-1500, through at the least 2005-2008 time period.

How does Onizuka fit into the plans of the Western Disaster Center ?



Over the past 40 years the DoD has invested in significant resources to support the Department of Defense and Air Force operations at Onizuka Air Station.

Using the resources of the Defense Information Systems Network (DISN), the "Information Superhighway" and "Global Communications Grid" have long been business as usual at Onizuka Air Station. The operations at Onizuka even predate the evolution of what today is Silicon Valley.

Even after realignment, Onizuka Air Station continues to be a key operational node in the DISN. In late 1997 a $6.6 Million upgrade to Onizuka's two 60-foot DSCS MILSATCOM antennas was completed. In July 1998, as part of the Onizuka realignment process, the operation of the MILSATCOM terminal at Onizuka was turned over to a support contractor.

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of the MILSATCOM terminal at Onizuka was turned over to a support contractor.

Organized as part of the Defense Information Systems Agency (DISA), the purpose of the DISN is rapid information access to conduct effective DoD operations; and, in particular, to allow the DoD to perform any mission, anytime, any place in the world. The DISN Architecture prescribes a global network integrating Defense Communications System assets, MILSATCOM, Commercial SATCOM initiatives, leased telecommunications services, dedicated DoD Service and Defense Agency networks, and mobile/deployable networks; i.e., the consolidated worldwide enterprise level telecommnnications infrastructure that provides the end-to-end information transfer component of the Defense Information Infrastructure (DII).

Following the "Cuban Missile Crisis" and the recognition that the US had deficiencies in civil emergency communications, the National Communication System (NCS) was established. The NCS was constituted and given the mission to link together, improve, and extend the communications facilities and components of all Federal agencies . . . to provide necessary commnnications for the Federal Government under all conditions ranging from a normal sitnation to national emergencies and international crises. The NCS is managed as part of DISA.

The DoD is an active participant in the development of the Global Disaster Information Network concept. The US National Disaster Information Network will likely be built upon the foundation of the existing National Communications System (NCS), part of the Defense Information Systems Agency (DISA) and Defense Information System Network (DISN) infrastructure.

The Defense and Intelligence communities already operate secnre "intranets" that provide access to classified information. At Onizuka the Western Disaster Center operations would have ready access to the DoD/IC Intelink-SCI and Intelink-S systems if required.

Lessons Learned ...

Pacific Disaster Center

The significant DoD investment in the establishment of the Pacific Disaster Center in Hawaii are directly related to this process. When the Pacific Disaster Center was first established at the Maui Research Technology Park, the concept was criticized because of its inability to readily link to the defense communications network. To address this deficiency, the Pacific Disaster Center now has two operating nodes, the Maui facility and a second communications node co-located with the Hawaii State Civil Defense Emergency Operating Center at Diamond Head on the island of Oahu. On Oahu, the Pacific Disaster Center has direct access to the "all-source" communication and information technology resources of the US Pacific Command.

Learning from the Pacific Disaster Center development process, the Western Disaster Center, from its inception, has been proposed to be located at Onizuka Air Station. As an operational component of the US National Disaster Information Network (NDIN), the Western Disaster Information Network

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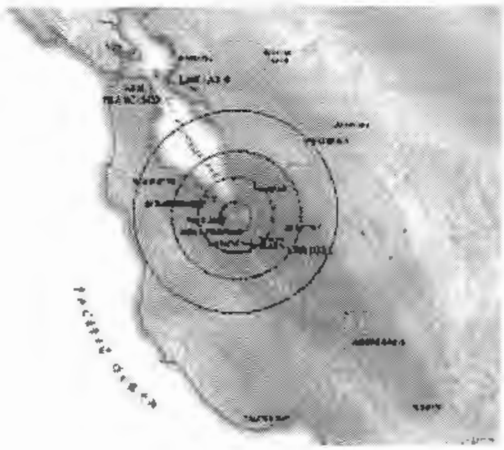
(Western DIN) will utilize, on a non-interference basis with the on-going Air Force missions at Onizuka, the existing "all-sonrce" communications resources accessible at the facility.

Location, Location, Location ...



There are also other significant advantages to locating the Western DIN at Onizuka Air Station. Onizuka is located in the "Heart of Silicon Valley", the high technology nexus of the world. The Western Disaster Center, Inc. believes that it is only through the creative power of the private sector that we will be able to build a truly integrated disaster information system. By being located in Silicon Valley, the Western DIN is able to attract support and investment from the world's commercial and defense technology industry leaders.

The greater Silicon Valley region is also the home of world class universities, numerous Federal research centers and Federal agency regional headquarters.

Directly adjacent to the Onizuka Air Station complex is the Moffett Federal Airfield, home of the NASA Ames Research Center, NASA's Center of Excellence in Information Technology.

Within a few minutes drive of Onizuka are located the US Geological Survey Menlo Park complex, Headquarters of the USGS Western Region, the Lawrence Livermore National Laboratory, the US Navy Fleet Numerical Meteorology and Oceanography Center, the Headquarters of the US Army Corps of Engineers South Pacific Division and the Headquarters of FEMA Region IX.

Silicon Valley's "connectivity" is also unparalleled. Supplementing the "all-source" connectivity provided by Onizuka Air Station is the MAE-WEST Federal civil sector Internet Network Access Point (NAP) at Moffett Federal Airfield operated by the NASA Ames Research Center and three commercial NAPs: the COMPAQ Computer Palo Alto Internet Exchange (PAIX), the Pacific Bell Network Access Point and the MCI WorldCom Metropolitan Area Ethernet Installation.

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don't hesitate to contact ns if you have any other questions
rhdavies@wdc.ndin.net

page content revision date: June 25, 2000

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Western Disaster Center

The Western Disaster Center is an innovative, nonprofit research center using technology to save lives and reduce the economic loss from natural, environmental, technological and man-made disasters ...

The Latest News ...	FEMA Disaster News Summary ...
	CBS News - Disaster Links ...
	WDC News & Events ...
	DOMESTIC TERRORISM ISSUES

WDC Affiliates Program

US Disaster Information Network

WDC BooKStore

1SRG 1st Special Response Group

Contact the WDC

WMD Joint Operations Center

NEW!

Research Initiative

Page content revision date: October 2, 2001

Feedback: feedback@WesternDisasterCenter.org

Doc I-46

BRAC 95 Quick Facts 13 July 2001

General: BRAC 95 directed that 750 SG must inactivate and its functions either relocate or close. Onizuka Air Force Station must realign but not close.

Directives: Congressionally enacted Public Law - directed that activities be complete by 13 Jul 01
HQ USAF Program Action Directive 96-01 - directed that activities be complete by 30 Sep 00
HQ AFSPC Program Plan 96-01 - outlined specific missions to be transferred by 30 Sep 00
50 SW Implementation Plan - set goal of 30 Sep 99 for 750 SG inactivation
(Completed 25 Jun 99)

50 SW Reorg: 750 SG inactivated on 25 Jun 99, restructured 21 SOPS as new host
3 SOPS picked up specified 5 SOPS missions transferring to SAFB
21, 22, and 23 SOPS realigned under 50 OG (7, 2, & 3 Jun 99 respectively)
5 SOPS inactivated on 13 Jun 00 and 21 SOPS assumed all missions

Missions:

Transfers:
- NATO IV/SKYNET 4: (7 vehicles; 6 current + 1 future) On-orbit transferred to 3 SOPS 28 Sep 00; last LEO (4F) transfer 14 Sep 01
- DSCS III: (1 vehicle + future launches) On-orbit transferred 23 Aug 99; LEO Prime transferred 31 Mar 98; hot Back-up transferred 30 Sep 99
- 21 SOPS Orbital Analysis Flight: Collision avoidance (COLA) transferred 1 Jan 00; RFI transferred 11 May 01; Frequency Management transfer 30 Aug 01
- Network Scheduling: transferred to 22 SOPS 1 Feb 98
- NRO Operations Squadron (NOPS): completed 30 Sep 00
- Hot B/U Ops (GPS & DSP): transferred 1 Oct 97

Fly-outs:
- DSCS II: (1 vehicle) Super-synced & transferred to SMC/TEO 21 Oct 98
- TAOS: was to be transferred to SMC/TEO 11 Sep 00; satellite failed 8 Sep 00
- IUS: last mission (IUS-10) fly-out in FY 03

Other:
- Expendable Launch Vehicle Support: (Non-BRAC realignment) TBD
- NASA: (Non-BRAC realignment) will terminate with IUS fly-out
- Cold Back-up for DSP, GPS and DSCS III: (Non-BRAC realignment) TBD
- NATO IIID: (Non-BRAC realignment) transferred to 3 SOPS 29 Mar 01

Impacted: 50 SW, NRO, NASA, Royal Air Force (United Kingdom)

BRAC 95 Milestones:

- **750 SG inactivation:** **Completed 25 Jun 99**
- **21 SOPS assumes OAFS responsibilities:** **Completed 25 Jun 99**
- **All Realignment Activities Completed:** **13 Jul 01 [BRAC Law]**

DOC I-46

Mulcahy Robert D Civ SMC/HO

From: Joseph Valerie T GS-11 21SOPS/PA [Valerie.Joseph@ONIZUKA.AF.MIL]
Sent: Monday, March 18, 2002 8:52 AM
To: Mulcahy Robert D Civ SMC/HO
Subject: RE: Onizuka BRAC

BRAC 95.doc

Here is the information you requested.

VJ

DOC 1_46

Doc I-46-1

Air Force News

Air Force Space Command stateside air stations redesignated

Released: 4 Feb 2000

PETERSON AIR FORCE BASE, Colo. (AFPN) -- Effective Feb. 4, all Air Force Space Command air stations located in the United States will be redesignated as "Air Force stations."

The AFSPC commander authorized the change in December 1999.

Changing the designation to Air Force stations will allow for clearer identity of the facilities as Air Force sites. For example, at a location like Cape Canaveral, Fla. -- where commercial, civil and military space programs exist side by side -- identifying the station as Cape Canaveral Air Force Station clearly delineates Air Force roles and missions.

Only stateside locations will be affected by this change. They include: Cape Canaveral; Cape Cod AFS, Mass.; Cavalier AFS, N.D.; Cheyenne Mountain AFS, Colo.; Clear AFS, Alaska; New Boston AFS, N.H.; Onizuka AFS, Calif.; El Dorado AFS, Texas; and Pillar Point AFS, Calif.

Overseas and non-U.S. located facilities will continue to be called air stations. They include: North Bay AS, Canada; Kapaun AS, Germany; and Woomera AS, Australia. (Courtesy of AFSPC News Service)

RELATED SITES

* Air Force Space Command
* Cape Canaveral Air Force Station, Fla.
* Onizuka Air Force Station, Calif.
* Peterson Air Force Base, Colo.

For more on this subject, try the Air Force Link Search Engine.

Doc I 46-1

11-022

Doc I-47

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

SPECIAL ORDER
GA-14

29 May 2001

Special Order GA-13, this headquarters, 11 May 2001, which reads: *The following SMC operating locations are realigned under Detachment 12: OL-00AC (Kirtland AFB, NM) and OL-AW00 (L.B. Johnson Space Center, Houston TX)*, is amended to read: *The following SMC operating location is realigned under Detachment 12: OL-AW00 (L.B. Johnson Space Center, Houston TX)*. Authority: AFI 38-101.

FOR THE COMMANDER

RONNIE D. SULLIVAN, Colonel, USAF
Chief, Manpower and Organization Division
Directorate of Plans and Programs

Distribution
1 - HQ USAF/SG, Wash DC 20330-5133
1 - HQ USAF/DPG, Wash DC 20330-1040
1 - HQ USAF/JAEC, Wash DC 20330-5120
2 - HQ USAF/XPMO, Wash DC 20330-1070
1 - HQ USAF/ILEB, Wash DC 20330-1480
1 - AFPCA/DOVR, Wash DC 20330-1600
1 - AUL/LDEA, Maxwell AFB AL 36112-5564
1 - AFHRA/RS, Maxwell AFB AL 36112-6424
1 - HQ AFMC/DR/HO/JA/PA/SCD/XPMO/XPMQ/XPMR/XPMS/XPX
1 - HQ AFMC/DP/DPC/DPM/DPO
1 - SMC/CC/HO/PA/XPM
1 - SMC/TB/TL/TM/AX
1 - 377 ABW/XP
1 - 377 MSS/CC

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Doc I-48

Det. 12 activates as SMC moves closer to realignment

Kirtland AFB assets merge into single local command

By Peggy Hodge
Public Affairs

"Today is an important day," said Space and Missile Systems Center commander Lt. Gen. Brian Arnold, as he officiated at an activation ceremony of Detachment 12 at Kirtland AFB, N.M. June 29. The detachment activated to align several of SMC's subordinate units under a local command to prepare for the Oct. 1 realignment of SMC under Air Force Space Command.

Activation of Det. 12 "reflects a lot of changes that are happening in the Air Force and particularly in the arena of space," Arnold said.

Originally established as the Space Test and Experimentation Program Office in 1992, Det. 12 was later renamed the SMC Test and Evaluation Directorate.

Col. James Neumeister is the first commander of Det. 12 and inherits the diverse accomplishments of three pioneering space and missile programs: the Rocket Systems Launch Program, the Department of Defense Space Test Program and the Research and Development Space and Missile Operations Program.

"This is a very special day in our unit's history," Neumeister said. "We are building on yesterday's heritage to ensure the success of tomorrow's horizons."

The RSLP, chartered in 1972 by the Secretary of Defense as the single DoD agency to provide booster management and launch support for developmental programs, has successfully launched more than 535 sounding rockets and ballistic missiles.

The DoD STP, chartered in 1965 by the Secretary of Defense, provides space flight for advanced DoD research and development experiments not able to fund their own flights. STP has since successfully flown more than 400 technologies.

The RDSMO provides operations support to boosters and on-orbit space vehicles. From its inception as part of the Air Force Satellite Control Facility, through its activities with the Consolidated Space Test Center, RDSMO has provided more than three decades of continuous support to space missions with more than 250 deployed operations worldwide.

Photo by Keith Wright

Detachment 12 commander Col. James Neumeister, left, presents a T-shirt bearing the logo of the newly activated detachment to SMC commander Lt. Gen. Brian Arnold.

Joining the umbrella of Det. 12 is the Kirtland AFB segment of the Space Based Laser Program. SBL builds on more than 20 years of research and investment by the nation in the development of directed energy weapon systems, technologies and related facilities.

"The past experience and current capabilities in the planning, building, launching and operating of unique space and missile systems make Det. 12 America's premier source for getting technology to space for the warfighter," Neumeister said.

Base water deemed safe

The water supplied to Los Angeles AFB and Fort be accessed on the Internet at the following locations:

'Town Hall' meeting set for Tuesday at Fort MacArthur Community Center

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Doc I-49

Detachment 12

Space and Missile Systems Center
Air Force Material Command
"The Dirty Dozen"

SMC DETACHMENT 12

History of Detachment 12

Detachment 12 was established 1 July 1992 as the Space Test and Experimentation Program Office. Later renamed the Space and Missile Test and Evaluation Directorate, Detachment 12 inherits the diverse accomplishments and distinguished legacy of three pioneering space and missile programs over the course of nearly four decades.

The Rocket Systems Launch Program (RSLP) was chartered in 1972 by the Secretary of Defense as the single DoD agency to provide booster management and launch support for developmental space programs. Since then, RSLP has launched over 535 sounding rockets and ballistic missiles in support of our nation's defense.

The DoD Space Test Program (STP) was chartered in 1965 by the Secretary of Defense to provide space flight for advanced DoD research and development experiments not able to fund their own flights. STP has since flown nearly 400 experiments, using one-of-a-kind spacecraft, the space shuttle, and various host satellites.

The Research, Development, Test and Evaluation Space and Missile Operations Program (RDSMO) provides operations support to R&D space vehicles. RDSMO has provided over three decades of 24/7 support to space missions, over 250 deployed operations, and recently added test execution support for reusable space vehicles.

Joining this rich heritage of diverse and pioneering successes in military space is the Kirtland Air Force Base Segment of the Space Based Laser (SBL) Program Office. SBL will be integrated within the national missile defense architecture in 2020 as the first line of defense against intercontinental ballistic missiles.

This wealth of combined past experience and current capabilites in the planning, building, launching, and operating of unique space and missile systems makes Detachment 12 America's premier source for getting technology to space for the warfighter.

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DETACHMENT 12

Space and Missile Systems Center

Air Force Space Command

"The Dirty Dozen"

MISSION

The mission of Detachment 12, Space and Missile Systems Center, is to serve as the primary provider of launch capability, spaceflight, and on-orbit operations for the entire DoD space research, development, test, and evaluation community.

VISION

Smart, dedicated, energetic team of aerospace and support professionals providing recognized world-class leadership in the design, acquisition, launch, and operation of one-of-a-kind space and missile missions for DoD.

Organization	History	Contacts	Commanders Briefing	Links	Det12 Intranet (Restricted Access)

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Doc I-51

Report of the

COMMISSION TO ASSESS UNITED STATES NATIONAL SECURITY SPACE MANAGEMENT AND ORGANIZATION

Pursuant to Public Law 106-65
January 11, 2001

Commission to Assess United States National Security Space Management and Organization

PO BOX 33633
WASHINGTON DC 20033-0633

Hon. Donald H. Rumsfeld *
Chairman

Hon. Duane P. Andrews
Mr. Robert V. Davis
Gen. Howell M. Estes, III, USAF (Ret.)
Gen. Ronald R. Fogleman, USAF (Ret.)
LTG Jay M. Garner, USA (Ret.)
Hon. William R. Graham

Gen. Charles A. Horner, USAF (Ret.)
ADM David E. Jeremiah, USN (Ret.)
Gen. Thomas S. Moorman, Jr., USAF (Ret.)
Mr. Douglas H. Necessary
GEN Glenn K. Otis, USA (Ret.)
Sen. Malcolm Wallop (ret.)

January 11, 2001

The Honorable Carl Levin
Chairman
Committee on Armed Services of the U.S. Senate
Washington, DC 20510-6050

Dear Mr. Chairman:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

Respectfully submitted,

Duane P. Andrews | Robert V. Davis | Howell M. Estes, III

Ronald R. Fogleman | Jay M. Garner | William R. Graham

Charles A. Horner | David E. Jeremiah | Thomas S. Moorman, Jr.

Douglas H. Necessary | Glenn K. Otis | Malcolm Wallop

* The Honorable Donald H. Rumsfeld served as a member and chairman of the Commission from its inception until December 28, 2000, when he was nominated for the position of Secretary of Defense by President-elect George W. Bush.

Members of the Commission to Assess United States National Security Space Management and Organization

were appointed
by the

Chairman of the Committee on Armed Services of the
United States House of Representatives

Chairman of the Committee on Armed Services of the
United States Senate

Ranking Minority Members of the
Committee on Armed Services of the United States House of Representatives
and the Committee on Armed Services of the United States Senate

Secretary of Defense, in consultation with the
Director of Central Intelligence

The Honorable Duane P. Andrews
Mr. Robert V. Davis
General Howell M. Estes, III, USAF (Ret.)
General Ronald R. Fogleman, USAF (Ret.)
Lieutenant General Jay M. Garner, U.S. Army (Ret.)
The Honorable William R. Graham
General Charles A. Horner, USAF (Ret.)
Admiral David E. Jeremiah, USN (Ret.)
General Thomas S. Moorman, Jr., USAF (Ret.)
Mr. Douglas H. Necessary
General Glenn K. Otis, U.S. Army (Ret.)
The Honorable Donald H. Rumsfeld*
Senator Malcolm Wallop (ret.)

* The Honorable Donald H. Rumsfeld served as a member and chairman of the Commission from its inception until December 28, 2000, when he was nominated for the position of Secretary of Defense by President-elect George W. Bush.

Table of Contents

Executive Summary

A. Conclusions of the Commission

The Commission was directed to assess the organization and management of space activities in support of U.S. national security. Members of the Commission were appointed by the chairmen and ranking minority members of the House and Senate Armed Services Committees and by the Secretary of Defense in consultation with the Director of Central Intelligence.

The Commission unanimously concluded that the security and well being of the United States, its allies and friends depend on the nation's ability to operate in space.

Therefore, it is in the U.S. national interest to:

- Promote the peaceful use of space.
- Use the nation's potential in space to support its domestic, economic, diplomatic and national security objectives.
- Develop and deploy the means to deter and defend against hostile acts directed at U.S. space assets and against the uses of space hostile to U.S. interests.

The pursuit of U.S. national interests in space requires leadership by the President and senior officials. The Commission recommends an early review and, as appropriate, revision of the national space policy. The policy should provide direction and guidance for the departments and agencies of the U.S. Government to:

- Employ space systems to help speed the transformation of the U.S. military into a modern force able to deter and defend against evolving threats directed at the U.S. homeland, its forward deployed forces, allies and interests abroad and in space.
- Develop revolutionary methods of collecting intelligence from space to provide the President the information necessary for him to direct the nation's affairs, manage crises and resolve conflicts in a complex and changing international environment.

- Shape the domestic and international legal and regulatory environment for space in ways that ensure U.S. national security interests and enhance the competitiveness of the commercial sector and the effectiveness of the civil space sector.

- Promote government and commercial investment in leading edge technologies to assure that the U.S. has the means to master operations in space and compete in international markets.

- Create and sustain within the government a trained cadre of military and civilian space professionals.

The U.S. Government is increasingly dependent on the commercial space sector to provide essential services for national security operations. Those services include satellite communications as well as images of the earth useful to government officials, intelligence analysts and military commanders. To assure the United States remains the world's leading space-faring nation, the government has to become a more reliable consumer of U.S. space products and services and should:

- Invest in technologies to permit the U.S. Government to field systems one generation ahead of what is available commercially to meet unique national security requirements.

- Encourage the U.S. commercial space industry to field systems one generation ahead of international competitors.

The relative dependence of the U.S. on space makes its space systems potentially attractive targets. Many foreign nations and non-state entities are pursuing space-related activities. Those hostile to the U.S. possess, or can acquire on the global market, the means to deny, disrupt or destroy U.S. space systems by attacking satellites in space, communications links to and from the ground or ground stations that command the satellites and process their data. Therefore, the U.S. must develop and maintain intelligence collection capabilities and an analysis approach that will enable it to better understand the intentions and motivations as well as the capabilities of potentially hostile states and entities.

An attack on elements of U.S. space systems during a crisis or conflict should not be considered an improbable act. If the U.S. is to avoid a "Space Pearl Harbor" it needs to take seriously the possibility of an attack on U.S.

space systems. The nation's leaders must assure that the vulnerability of the United States is reduced and that the consequences of a surprise attack on U.S. space assets are limited in their effects.

The Commission has unanimously concluded that organizational and management changes are needed for the following reasons.

> **First, the present extent of U.S. dependence on space, the rapid pace at which this dependence is increasing and the vulnerabilities it creates, all demand that U.S. national security space interests be recognized as a top national security priority. The only way they will receive this priority is through specific guidance and direction from the very highest government levels. Only the President has the authority, first, to set forth the national space policy, and then to provide the guidance and direction to senior officials, that together are needed to ensure that the United States remains the world's leading space-faring nation. Only Presidential leadership can ensure the cooperation needed from all space sectors—commercial, civil, defense and intelligence.**
>
> **Second, the U.S. Government—in particular, the Department of Defense and the Intelligence Community—is not yet arranged or focused to meet the national security space needs of the 21st century. Our growing dependence on space, our vulnerabilities in space and the burgeoning opportunities from space are simply not reflected in the present institutional arrangements. After examining a variety of organizational approaches, the Commission concluded that a number of disparate space activities should promptly be merged, chains of command adjusted, lines of communication opened and policies modified to achieve greater responsibility and accountability. Only then can the necessary trade-offs be made, the appropriate priorities be established and the opportunities for improving U.S. military and intelligence capabilities be realized. Only with senior-level leadership, when properly managed and with the right priorities will U.S. space programs both deserve and attract the funding that is required.**

Third, U.S. national security space programs are vital to peace and stability, and the two officials primarily responsible and accountable for those programs are the Secretary of Defense and the Director of Central Intelligence. Their relationship is critical to the development and deployment of the space capabilities needed to support the President in war, in crisis and also in peace. They must work closely and effectively together, in partnership, both to set and maintain the course for national security space programs and to resolve the differences that arise between their respective bureaucracies. Only if they do so will the armed forces, the Intelligence Community and the National Command Authorities have the information they need to pursue our deterrence and defense objectives successfully in this complex, changing and still dangerous world.

Fourth, we know from history that every medium—air, land and sea—has seen conflict. Reality indicates that space will be no different. Given this virtual certainty, the U.S. must develop the means both to deter and to defend against hostile acts in and from space. This will require superior space capabilities. Thus far, the broad outline of U.S. national space policy is sound, but the U.S. has not yet taken the steps necessary to develop the needed capabilities and to maintain and ensure continuing superiority.

Finally, investment in science and technology resources—not just facilities, but people—is essential if the U.S. is to remain the world's leading space-faring nation. The U.S. Government needs to play an active, deliberate role in expanding and deepening the pool of military and civilian talent in science, engineering and systems operations that the nation will need. The government also needs to snstain its investment in enabling and breakthrough technologies in order to maintain its leadership in space.

B. Space: Today and the Future

With the dramatic and still accelerating advances in science and technology, the use of space is increasing rapidly. Yet, the uses and benefits of space often go unrecognized. We live in an information age, driven by needs for precision, accuracy and timeliness in all of our endeavors—personal, business and governmental. As society becomes increasingly mobile and global, reliance on the worldwide availability of information will increase. Space-based systems, transmitting data, voice and video, will continue to play a critical part in collecting and distributing information. Space is also a medium in which highly valuable applications are being developed and around which highly lucrative economic endeavors are being built.

1. A New Era of Space

The first era of the space age was one of experimentation and discovery. Telstar, Mercury and Apollo, Voyager and Hubble, and the Space Shuttle taught Americans how to journey into space and allowed them to take the first tentative steps toward operating in space while enlarging their knowledge of the universe. We are now on the threshold of a new era of the space age, devoted to mastering operations in space.

The Role for Space
Space-based technology is revolutionizing major aspects of commercial and social activity and will continue to do so as the capacity and capabilities of satellites increase through emerging technologies. Space enters homes, businesses, schools, hospitals and government offices through its applications for transportation, health, the environment, telecommunications, education, commerce, agriculture and energy. Much like highways and airways, water lines and electric grids, services supplied from space are already an important part of the U.S. and global infrastructures.

Space-related capabilities help national leaders to implement American foreign policy and, when necessary, to use military power in ways never before possible. Because of space capabilities, the U.S. is better able to sustain and extend deterrence to its allies and friends in our highly complex international environment.

In the coming period, the U.S. will conduct operations to, from, in and through space in support of its national interests both on the earth and in space. As with national capabilities in the air, on land and at sea, the U.S. must have the capabilities to defend its space assets against hostile acts and to negate the hostile use of space against U.S. interests.

Intelligence collected from space remains essential to U.S. national security. It is essential to the formulation of foreign and defense policies, the capacity of the President to manage crises and conflicts, the conduct of military operations and the development of military capabilities to assure the attainment of U.S. objectives. The Department of Defense and the Intelligence Community are undertaking substantial and expensive programs to replace virtually their entire inventory of satellites over the next decade or so. These programs are estimated to cost more than $60 billion during this period.

Opportunities in space are not limited to the United States. Many countries either conduct or participate in space programs dedicated to a variety of tasks, including communications and remote sensing. The U.S. will be tested over time by competing programs or attempts to restrict U.S. space activities through international regulations.

> *The Department of Defense and the Intelligence Community are undertaking expensive programs to replace virtually their entire inventory of satellites...*

Toward the Future

Mastering near-earth space operations is still in its early stages. As mastery over operating in space is achieved, the value of activity in space will grow. Commercial space activity will become increasingly important to the global economy. Civil activity will involve more nations, international consortia and non-state actors. U.S. defense and intelligence activities in space will become increasingly important to the pursuit of U.S. national security interests.

The Commissioners appreciate the sensitivity that surrounds the notion of weapons in space for offensive or defensive purposes. They also believe, however, that to ignore the issue would be a disservice to the nation. The Commissioners believe the U.S. Government should vigorously pursue the capabilities called for in the National Space Policy to ensure that the President will have the option to deploy weapons in space to deter threats to and, if necessary, defend against attacks on U.S. interests.

2. Vulnerabilities and Threats

Space systems are vulnerable to a range of attacks that could disrupt or destroy the ground stations, launch systems or satellites on orbit. The political, economic and military value of space systems makes them attractive targets for state and non-state actors hostile to the United States and its interests. In order to extend its deterrence concepts and defense capabilities to space, the U.S. will require development of new military capabilities for operation to, from, in and through space. It will require, as well, engaging U.S. allies and friends, and the international community, in a sustained effort to fashion appropriate "rules of the road" for space.

Assessing the Threat Environment

The U.S. is more dependent on space than any other nation. Yet, the threat to the U.S. and its allies in and from space does not command the attention it merits from the departments and agencies of the U.S. Government charged with national security responsibilities. Consequently, evaluation of the threat to U.S. space capabilities currently lacks priority in the competition for collection and analytic resources. Failure to develop credible threat analyses could have serious consequences for the United States. It could leave the U.S. vulnerable to surprises in space and could result in deferred decisions on developing space-based capabilities due to the lack of a validated, well-understood threat.

> *The U.S. is more dependent on space than any other nation.*

The ability to restrict or deny freedom of access to and operations in space is no longer limited to global military powers. Knowledge of space systems and the means to counter them is increasingly available on the international market. The reality is that there are many extant capabilities to deny, disrupt or physically destroy space systems and the ground facilities that use and control them. Examples include denial and deception, interference with satellite systems, jamming satellites on orbit, use of microsatellites for hostile action and detonation of a nuclear weapon in space.

Reducing Vulnerability

As harmful as the loss of commercial satellites or damage to civil assets would be, an attack on intelligence and military satellites would be even more serious for the nation in time of crisis or conflict. As history has shown—whether at Pearl Harbor, the killing of 241 U.S. Marines in their barracks in Lebanon or the attack on the USS Cole in Yemen—if the U.S. offers an inviting target, it may well pay the price of attack. With the growing commercial and national security use of space, U.S. assets in space and on the ground offer just such targets. The U.S. is an attractive candidate for a "Space Pearl Harbor." The warning signs of U.S. vulnerability include:

- In 1998, the Galaxy IV satellite malfunctioned, shutting down 80 percent of U.S. pagers, as well as video feeds for cable and broadcast transmissions. It took weeks in some cases to fully restore satellite service.

- In early 2000, the U.S. lost all information from a number of its satellites for three hours when computers in ground stations malfunctioned.

- In July 2000, the Xinhua news agency reported that China's military is developing methods and strategies for defeating the U.S. military in a high-tech and space-based future war.

The signs of vulnerability are not always so clear as those described above and therefore are not always recognized. Hostile actions against space systems can reasonably be confused with natural phenomena. Space debris or solar activity can "explain" the loss of a space system and mask unfriendly actions or the potential thereof. Such ambiguity and uncertainty could be fatal to the successful management of a crisis or resolution of a conflict. They could lead to forbearance when action is needed or to hasty action when more or better information would have given rise to a broader and more effective set of response options.

The U.S. is an attractive candidate for a "Space Pearl Harbor."

There are a number of possible crises or conflicts in which the potential vulnerability of national security space systems would be worrisome. For example:

- Efforts to identify and strike terrorist strongholds and facilities in advance of or in retaliation for terrorist attacks on U.S. forces or citizens abroad, or on the U.S. homeland or that of its allies.

- Conflict in the Taiwan Straits, in which the U.S. attempts to deter escalation through the conduct of military operations while seeking to bring it to a favorable end through diplomatic measures.

- War in the Middle East, posing a threat to U.S. friends and allies in the region and calling for a rapid political and military response to threats by an aggressor to launch ballistic missiles armed with weapons of mass destruction.

That U.S. space systems might be threatened or attacked in such contingencies may seem improbable, even reckless. However, as political economist Thomas Schelling has pointed out, "There is a tendency in our planning to confuse the unfamiliar with the improbable. The contingency we have not considered looks strange; what looks strange is thought improbable; what is improbable need not be considered seriously." Surprise is most often not a lack of warning, but the result of a tendency to dismiss as reckless what we consider improbable.

History is replete with instances in which warning signs were ignored and change resisted until an external, "improbable" event forced resistant bureaucracies to take action. The question is whether the U.S. will be wise enough to act responsibly and soon enough to reduce U.S. space vulnerability. Or whether, as in the past, a disabling attack against the country and its people—a "Space Pearl Harbor"—will be the only event able to galvanize the nation and cause the U.S. Government to act.

We are on notice, but we have not noticed.

We are on notice, but we have not noticed.

C. U.S. Objectives for Space

How the U.S. develops the potential of space for civil, commercial, defense and intelligence purposes will affect the nation's security for decades to come.

How the U.S. develops the potential of space for civil, commercial, defense and intelligence purposes will affect the nation's security for decades to come.

America's interests in space are to:

- Promote the peaceful use of space.
- Use the nation's potential in space to support U.S. domestic, economic, diplomatic and national security objectives.
- Develop and deploy the means to deter and defend against hostile acts directed at U.S. space assets and against the uses of space hostile to U.S. interests.

The U.S. Government must work actively to make sure that the nation has the means necessary to advance its interests in space. This requires action in the following areas.

1. Transform U.S. Military Capabilities

A deterrence strategy in space... must be supported by a greater range of space capabilities.

The United States must develop, deploy and maintain the means to deter attack on and to defend vulnerable space capabilities. Explicit national security guidance and defense policy is needed to direct development of doctrine, concepts of operations and capabilities for space, including weapons systems that operate in space and that can defend assets in orbit and augment air, land and sea forces. This requires a deterrence strategy for space, which in turn must be supported by a broader range of space capabilities. Improvements are needed in the areas of:

- Assured access to space and on-orbit operations.
- Space situational awareness.
- Earth surveillance from space.
- Global command, control and communications in space.
- Defense in space.
- Homeland defense.
- Power projection in, from and through space.

The senior political and military leadership needs to test these capabilities in exercises on a regular basis. Exercises, including "live fire" events, are needed both to keep the armed forces proficient in the use of these capabilities and to bolster their deterrent effect on potential adversaries. While exercises may give adversaries information they can use to challenge American space capabilities, that risk must be balanced against the fact that capabilities that are untested, unknown or unproven cannot be expected to deter.

2. Strengthen Intelligence Capabilities

The U.S. needs to strengthen its ability to collect information about the activities, capabilities and intentions of potential adversaries and to overcome their efforts to deny the U.S. this information. Since the end of the Cold War, the number, complexity and scope of high-priority tasks assigned to the Intelligence Community have increased even as its human resources and technical advantage have eroded. This has reduced the Intelligence Community's ability to provide timely and accurate estimates of threats and has correspondingly increased the possibility of surprise.

To meet the challenges posed to space-based intelligence collection, the U.S. needs to review its approach to intelligence collection from space. Planned and programmed collection platforms may not be adaptable enough to meet the many and varied tasks assigned. To the extent that commercial products, particularly imagery from U.S. commercial remote sensing companies, can meet intelligence collection needs, these should be incorporated into an overall collection architecture. The U.S. must also invest in space-based collection technologies that will provide revolutionary methods for collecting intelligence.

3. Shape the International Legal and Regulatory Environment

The U.S. must participate actively in shaping the space legal and regulatory environment.

U.S. activity in space, both governmental and commercial, is governed by treaties and by international and domestic law and regulations, which have contributed to the orderly use of space by all nations. As interest in and use of space increases, both within the United States and around the world, the U.S. must participate actively in shaping the space legal and regulatory environment. To protect the country's interests, the U.S. must promote the peaceful use of space, monitor activities of regulatory bodies, and protect the rights of nations to defend their interests in and from space. The U.S. and most other nations interpret "peaceful" to mean "non-aggressive"; this comports with customary international law allowing for routine military activities in outer space, as it does on the high seas and in international airspace. There is no blanket prohibition in international law on placing or using weapons in space, applying force from space to earth or conducting military operations in and through space. The U.S. must be cautious of agreements intended for one purpose that, when added to a larger web of treaties or regulations, may have the unintended consequences of restricting future activities in space.

4. Advance U.S. Technological Leadership

To achieve national security objectives and compete successfully internationally, the U.S. must maintain technological leadership in space. This requires a healthy industrial base, improved science and technology resources, an attitude of risk-taking and innovation, and government policies that support international competitiveness. In particular, the government needs to significantly increase its investment in breakthrough technologies to fuel innovative, revolutionary capabilities. Mastery of space also requires new approaches that reduce significantly the cost of building and launching space systems. The U.S. will not remain the world's leading space-faring nation by relying on yesterday's technology to meet today's requirements at tomorrow's prices.

The U.S. will not remain the world's leading space-faring nation by relying on yesterday's technology to meet today's requirements at tomorrow's prices.

5. Create and Sustain a Cadre of Space Professionals

Since its inception, a hallmark of the U.S. space program has been world-class scientists, engineers and operators from academic institutions, industry, government agencies and the military Services. Sustained excellence in the scientific and engineering disciplines is essential to the future of the nation's national security space program. It cannot be taken for granted.

Military space professionals will have to master highly complex technology; develop new doctrine and concepts of operations for space launch, offensive and defensive space operations, power projection in, from and through space and other military uses of space; and operate some of the most complex systems ever built and deployed. To ensure the needed talent and experience, the Department of Defense, the Intelligence Community and the nation as a whole must place a high priority on intensifying investments in career development, education and training to develop and sustain a cadre of highly competent and motivated military and civilian space professionals.

D. Organizations that Affect National Security Space

The principal organizations involved in national security space include the Executive Office of the President, the Department of Defense, the Intelligence Community and the Congress (Figure 1).

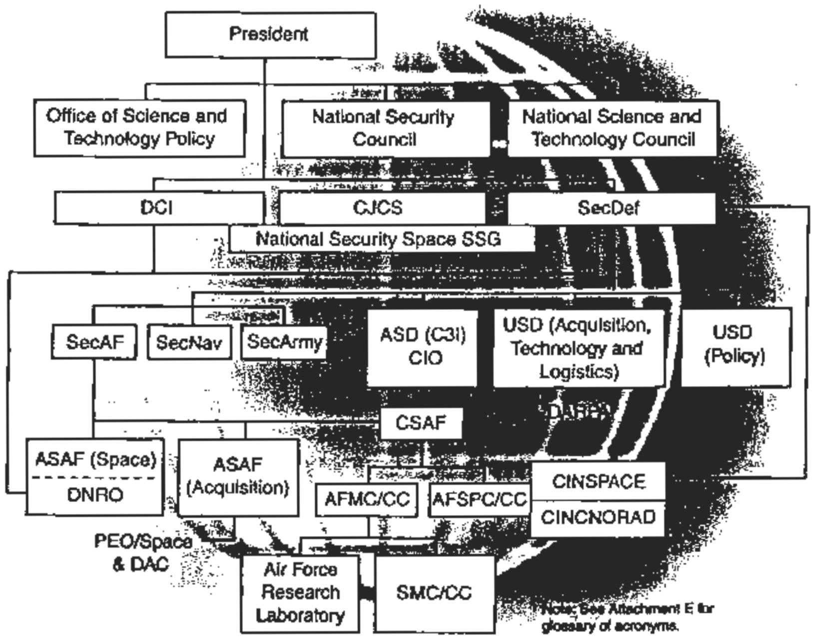


Figure 1: Current Organization for Managing US National Security Space Activity

1. Executive Office of the President

There is no single individual other than the President who can provide the sustained and deliberate leadership, direction and oversight of national security space policy that is needed. Currently, responsibility and accountability for space are broadly diffused throughout the government.

The 1996 National Space Policy designates the National Science and Technology Council (NSTC), a Cabinet-level organization chaired by the President, as "the principal forum for resolving issues related to national space policy." The policy directs that, "as appropriate, the NSTC and NSC [National Security Council] will co-chair policy processes." In the National Security Council, national security space issues are currently assigned to the Senior Director for Defense Policy and Arms Control.

This arrangement has not, does not and cannot provide the focused attention to space matters that is needed. The interdependence of the space sectors requires a more concentrated focus on space at the Cabinet level. The distribution of responsibility for space activity among many departments and agencies is less than ideal. Moreover, the portfolio of the Senior Director with responsibility for space affairs on the NSC is broad. That combined with a lack of staff support means that space issues are selectively addressed, most frequently only when they have become crises.

2. Department of Defense

Secretary of Defense
Title 10 of the U.S. Code, which provides the statutory basis for the Armed Services, assigns the Secretary of Defense as the principal assistant to the President in all matters relating to the Department of Defense. The Secretary has "authority, direction, and control" over the Department. With respect to those elements of the Intelligence Community within the Department, Title 50 U.S.C. provides the statutory basis for the Intelligence Community and directs that the Secretary, in consultation with the Director of Central Intelligence (DCI), "shall…ensure that [their] budgets are adequate…[and] ensure appropriate implementation of the policies and resource decisions of the Director of Central Intelligence by [those] elements…" This dual tasking establishes the obligation for the Secretary of Defense to ensure that the missions of the Department of Defense and of the Intelligence Community are successfully completed.

The relationship between the Secretary of Defense and the Director of Central Intelligence has evolved over time in such a manner that national security space issues do not receive the sustained focus appropriate to their importance to national security.

Office of the Secretary of Defense
Except for responding to urgent programmatic decisions, defense secretaries have generally delegated management of national security space activities. Today, this responsibility is delegated to the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD (C3I)), who serves as the "principal staff assistant and advisor to the Secretary and Deputy Secretary of Defense and the focal point within the Department for space and space-related activities." The ASD (C3I) in turn relies on deputy assistant secretaries to guide policy and acquisition and provide oversight of the Department's intelligence, surveillance, reconnaissance, information, command, control, communications and space programs.

The current ASD (C3I) organization suffers from three difficulties:

- The span of control is so broad that only the most pressing issues are attended to and space matters are left, on a day-to-day basis, in the hands of middle-level officials without sufficient influence within the Department and the interagency arena.

- Its influence on the planning, programming and budgeting process for space is too far removed or too late to have substantial effect on either the Services' or the Intelligence Community's processes.

- Within this structure it is not possible for senior officials outside DoD to identify a single, high-level individual who has the authority to represent the Department on space-related matters.

Commander in Chief of U.S. Space Command and North American Aerospace Defense Command and Commander, Air Force Space Command
The Commander in Chief, U.S. Space Command (CINCSPACE) serves as the Commander in Chief, North American Aerospace Defense Command (CINCNORAD) and as the Commander, Air Force Space Command. As CINCSPACE, he serves as the advocate for the space requirements for all the CINCs and, on an annual basis, submits to the Chairman of the Joint Chiefs of Staff an Integrated Priority List that reflects these requirements. CINCSPACE has a broad set of responsibilities that are quite different in character. He is responsible for protecting and defending the space environment. His responsibilities also include support of strategic ballistic missile defense and the Department's computer network attack and computer network defense missions.

With the growing dependence on space and the vulnerability of space-related assets, more attention needs to be given to deploying and employing space-based capabilities for deterrence and defense. As space missions continue to expand, space will continue to mature as an "area of responsibility." All of this will require CINCSPACE to pay more attention to the space tasks assigned by the National Command Authorities, leaving less time for other assigned duties as CINCNORAD and Commander, Air Force Space Command.

Military Services

Each military Service is directed by the Secretary of Defense to execute specific space programs, comply with DoD space policy and integrate space capabilities into its strategy, doctrine, education, training, exercises and operations. Each Service is free to develop those space capabilities needed to perform its mission. However, no single service has been assigned statutory responsibility to "organize, train and equip" for space operations. Eighty-five percent of space-related budget activity within the Department of Defense, approximately $7 billion per year, resides in the Air Force.

Within the Air Force, space-related activity is centered primarily in four elements. Space systems operations and requirements are organized under Air Force Space Command (AFSPC). Design, development and acquisition of space launch, command and control, and satellite systems are conducted by personnel assigned to the Space and Missile Systems Center (SMC) under the Air Force Materiel Command. The Program Executive Officer (PEO) and the SMC Commander, who also serves as the Designated Acquisition Commander (DAC), report to the Assistant Secretary of the Air Force for Acquisition on the cost, schedule and performance for the programs in their portfolios. The Air Force Research Laboratory, also part of Air Force Materiel Command, conducts advanced technology research.

> *As with air operations, the Air Force must take steps to create a culture within the Service dedicated to developing new space system concepts, doctrine and operational capabilities.*

The Commission heard testimony that there is a lack of confidence that the Air Force will fully address the requirement to provide space capabilities for the other Services. Many believe the Air Force treats space solely as a supporting capability that enhances the primary mission of the Air Force to conduct offensive and defensive air operations. Despite official doctrine that calls for the integration of space and air capabilities, the Air Force does not treat the two equally. As with air operations, the Air Force must take steps to create a culture within the Service dedicated to developing new space system concepts, doctrine and operational capabilities.

National Reconnaissance Office

The National Reconnaissance Office (NRO) is the single national organization tasked to meet the U.S. Government's intelligence needs for space-borne reconnaissance. The NRO is responsible for unique and innovative technology; large-scale systems engineering; development, acquisition and operation of space reconnaissance systems; and related intelligence activities needed to support national security missions. While the NRO is an agency of the Department of Defense, its budget, the National Reconnaissance Program (NRP), is one part of the National Foreign Intelligence Program (NFIP). The Director of Central Intelligence provides guidance for and approves the NRP and all other elements of the NFIP. The Secretary of Defense ensures implementation of the DCI's resource decisions by DoD elements within the NFIP. As a result, the NRO is a joint venture between these organizations.

The NRO today is a different organization, simultaneously struggling to manage a large number of legacy programs while working to renew a focus on leading edge research.

The NRO had a reputation as one of the U.S. Government's best system acquisition agencies and worked to maintain exceptional systems engineering capabilities. In its early years, the NRO was a small, agile organization, a leader in developing advanced technologies, often first-of-a-kind systems, for solving some of the nation's most difficult intelligence collection challenges. The NRO today is a different organization, simultaneously struggling to manage a large number of legacy programs while working to renew a focus on leading edge research. The NRO's capacity to convert leading edge research and technology into innovative operational systems is inhibited by the requirement to maintain its legacy programs.

3. Intelligence Community

The Director of Central Intelligence is the principal advisor to the President for intelligence matters related to national security and serves as the head of the Intelligence Community. The DCI is responsible for providing national intelligence to the President, to the heads of departments and agencies of the executive branch, to the Chairman of the Joint Chiefs of Staff and senior military commanders and, when appropriate, to the Congress. "National intelligence" refers to "intelligence which pertains to the interests of more than one department or agency of the government."

The DCI develops and presents to the President an annual budget for the National Foreign Intelligence Program, which is distributed throughout the budgets of the various departments and agencies that comprise the Intelligence Community.

The Community Management Staff, managed by the Deputy Director of Central Intelligence for Community Management, assists the DCI in coordinating and managing the Intelligence Community, including responsibility for managing resources and collection requirements and assessing space programs and policies. It is also responsible for coordinating policy and budgets with the Office of the Secretary of Defense. The Community Management Staff has made substantial progress in coordinating the planning and budgeting of the components of the Intelligence Community. However, it does not have authority to reprogram in-year money within components, an authority that would enhance its direction of Intelligence Community affairs. Nor is it well structured to coordinate with OSD on broad intelligence policy, long-term space strategy and other issues requiring intelligence support.

4. Congress

Congressional oversight of the authorization and appropriation of national security space funding routinely involves no fewer than six committees. Generally, each committee mirrors the priorities of the executive branch interests it oversees. Executive branch officials must expend considerable time and energy interacting with a large number of committees and subcommittees that, on some matters, have overlapping jurisdiction. To the extent that this process can be streamlined, it would likely benefit the nation, Congress and the executive branch. It would also help if there were an environment in which national security space matters could be addressed as an integrated program—one that includes consideration for commercial and civil capabilities that are often overlooked today.

This report offers suggestions for organizational changes in the executive branch that are intended to bring a more focused, well-directed approach to the conduct of national security space activities, based on a clear national space policy directed by the President. These organizational changes in the executive branch suggest changes in the Congressional committee and subcommittee structure to align the jurisdictions of these committees as much as possible with the executive branch, leading to a more streamlined process. Congress might usefully consider encouraging greater "crossover" membership among all of the space-related committees to increase legislative coordination between defense and intelligence space programs.

E. Management of National Security Space Activities

A number of issues transcend organizational approaches and are important to the ability of the U.S. to achieve its objectives in space. These are issues that the national leadership, the Department of Defense and the Intelligence Community should address in the near term irrespective of particular organizational arrangements that may be pursued.

1. Interagency Coordination

The present interagency process is inadequate for the volume and complexity of today's space issues. For the most part, the existing interagency process addresses space issues on an as needed basis. As issues in the space arena inevitably become more complex, this approach will become increasingly unsatisfactory. What may be needed is a standing interagency group to identify key national security space issues, to guide, as necessary, the revision of existing national space policy and to oversee implementation of that policy throughout the departments and agencies of the U.S. Government. The need for a standing interagency coordination process is made more urgent by the fact that there are a number of pending issues on space affairs in Congress, in domestic regulatory bodies and in international trade and arms control negotiating fora. To avoid unintended and deleterious effects on the space sectors, these issues must be addressed in a comprehensive fashion.

2. SecDef/DCI Relationship

No relationship within the executive branch touching on national security space is as important as the one between the Secretary of Defense and the Director of Central Intelligence. Together, the Secretary and the DCI control national security space capabilities. Neither can accomplish the tasks assigned without the support of the other. The Secretary and the DCI have not given the national security space program their sustained, joint attention for nearly a decade. Nor have the urgent issues related to space control, information operations and the assessment of the threats the nation faces from space received the attention they deserve. The Secretary and the DCI need to align their respective staff offices so that coordination on intelligence issues broadly, and space matters specifically, is easier and more direct between the two.

No relationship touching on national security space is as important as the one between the Secretary of Defense and the Director of Central Intelligence.

3. Acquiring and Operating Space Systems

The Department of Defense and the Intelligence Community acquire and operate most of the satellites used to support defense and intelligence missions. Within DoD, the Air Force is the Service that acquires most of the Department's satellites; the NRO is the acquisition agent for the Intelligence Community's space systems. The acquisition processes used by DoD and the NRO have become similar in recent years. The NRO relies on authorities delegated by both the Secretary of Defense and the Director of the Central Intelligence Agency. By virtue of these authorities, the NRO is able, for some purposes unique to its mission, to award and administer contracts without a number of the encumbrances that affect DoD. Because the use of NRO and Air Force satellites is sufficiently different, the approach to operations in the two organizations is also different in character.

The NRO's approach to acquisition and operations, referred to as "cradle-to-grave," creates a different relationship between the acquirers and operators than that of the Air Force, in which the acquisition and operations elements are in separate commands. With the NRO model, the same individuals are involved in the acquisition and operations processes. Therefore, the experiences and understanding derived from operations can more directly influence satellite design. This is not the case in the Air Force, where the operators have less direct influence. When the operators are on the technical design team, their capacity to resolve on-orbit anomalies is also greater. These differences amount, in essence, to different organizational cultures within NRO and Air Force space activities, an understanding of which is essential to determining whether and how the activities might be integrated over time.

4. Pursuing "Leap Ahead" Technologies

Technological superiority has aided the U.S. military in maintaining its worldwide commitments even as the size of its force has been reduced. As the spread of high technology weaponry on the world market continues, it will become increasingly difficult to stay ahead, particularly in space-related technologies. The Department of Defense needs to provide both resources and direction to ensure that advances in space technology continue. In addition to establishing possible areas for investment, the Department, in cooperation with the space community, needs to ensure that an environment exists within which experimentation and innovation will flourish. The Department also needs to actively coordinate science and technology investments across the space technology community so as to better integrate and prioritize these efforts, many of which have application across all space sectors. And, finally, it needs to encourage demonstration projects, such as Discoverer II was planned to be, if the U.S. is to develop and deploy effective, affordable systems dedicated to military missions in space.

5. Leveraging the Commercial and Civil Sectors

Despite the importance of the U.S. commercial and civil space sectors to the successful completion of the national security mission, the U.S. Government has no comprehensive approach to incorporating these capabilities and services into its national security space architecture. The U.S. Government, as a consumer, a regulator or an investor, is currently not a good partner to the national security space industry. To ensure support for the commercial and civil sectors, the U.S. Government must:

The U.S. Government, as a consumer, a regulator or an investor, is currently not a good partner to the national security space industry.

- Use more expeditious licensing processes while safeguarding U.S. national security interests.

- Develop a strategy for integrating and funding commercial services to meet, as practical, part of current and future national security space requirements.

- Develop a strategy for relying more on commercial launch facilities, toward the goal of largely privatizing the national launch infrastructure.

- Foster multinational alliances to help maintain the U.S. position as a leader in the global space market.

6. Budgeting for Space

Currently, there is no DoD appropriation that identifies and aggregates funding for space programs. Space funding is a part of many appropriations spread across the DoD and Intelligence Community budgets. Most of the funding for national security space is in the Air Force and National Reconnaissance Office budgets. The Army and Navy each fund space programs that are primarily in support of Service-unique requirements. In the Navy's case, funding supports satellite communication and satellite surveillance systems.

These multiple appropriations lead to several problems. When satellite programs are funded in one budget and terminals in another, the decentralized arrangement can result in program disconnects and duplication. It can result in lack of synchronization in the acquisition of satellites and their associated terminals. It can also be difficult for user requirements to be incorporated into the satellite system if the organization funding the system does not agree with and support those user requirements. The current methods of budgeting for national security space programs lack the visibility and accountability essential to developing a coherent program.

Looking to the future, the Department of Defense will undertake new responsibilities in space, including deterrence and defense of space-based assets as well as other defense and power projection missions in and from space. These new missions will require development of new systems and capabilities. Space capabilities are not funded at a level commensurate with their relative importance. Nor is there a plan in place to build up to the investments needed to modernize existing systems and procure new capabilities. Appropriate investments in space-based capabilities would enable the Department to pursue:

- Improved space situational awareness and attack warning capabilities.
- Enhanced protection/defensive measures, prevention and negation systems and rapid long-range power projection capabilities.
- Modernized launch capabilities.
- A more robust science and technology program for developing and deploying space-based radar, space-based laser, hyper-spectral sensors and reusable launch vehicle technology.

Providing the Department of Defense and the Intelligence Community with additional resources to accomplish these new missions should be considered as part of U.S. national space policy.

7. Exercises, Experiments and Wargames

The military uses a variety of tools to simulate warfighting environments in support of exercises, experiments and wargames. However, these tools have not been modernized to take into account the missions and tasks that space systems can perform. As a result, simulation tools cannot be used effectively to understand the utility of space-based capabilities on warfare. Further, the lack of modeling and simulation tools has prevented military commanders from learning how to cope with the loss or temporary interruption of key space capabilities, such as the Global Positioning System (GPS), satellite communications, remote sensing or missile warning information. To support exercises, experiments and wargames, the Department must develop and employ modeling and simulation tools based on measures of merit and effectiveness that will quantify the effects of space-based capabilities.

F. Recommendations: Organizing and Managing for the Future

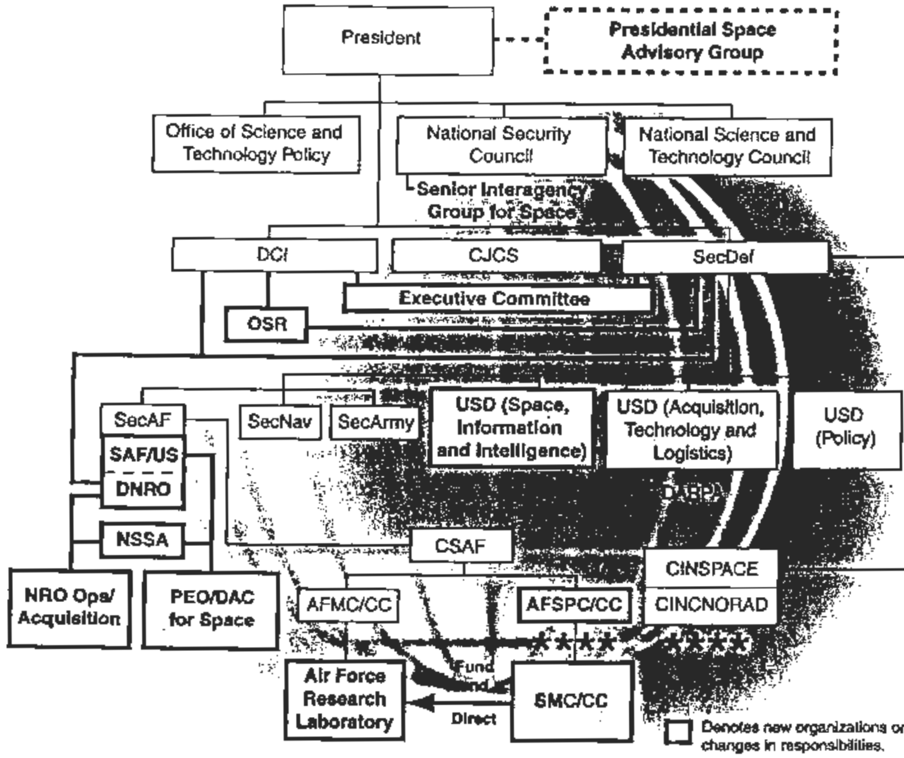
National security space organization and management today fail to reflect the growing importance of space to U.S. interests. There is a need for greater emphasis on space-related matters, starting at the highest levels of government.

National security space organization and management today fail to reflect the growing importance of space to U.S. interests.

In light of the vital place space has in the spectrum of national security interests, a successful approach to organization and management for the future must:

- Provide for national-level guidance that establishes space activity as a fundamental national interest of the United States.
- Create a process to ensure that the national-level policy guidance is carried out among and within the relevant agencies and departments.
- Ensure the government's ability to participate effectively in shaping the domestic and international rules and policies that will govern space.
- Create conditions that encourage the Department of Defense to develop and deploy systems in space to deter attack on and, if deterrence should fail, to defend U.S. interests on earth and in space.
- Create conditions that encourage the Intelligence Community to develop revolutionary methods for collecting intelligence from space.
- Provide methods for resolving the inevitable issues between the defense and intelligence sectors on the priority, funding and control of space programs.
- Account for the increasingly important role played by the commercial and civil space sectors in the nation's domestic and global economic and national security affairs.
- Develop a military and civilian cadre of space professionals within DoD, the Intelligence Community and throughout government more generally.
- Provide an organizational and management structure that permits officials to be agile in addressing the opportunities, risks and threats that inevitably will arise.
- Ensure that DoD and the Intelligence Community are full participants in preparing government positions for international negotiations that may affect U.S. space activities.

The Commission believes that a new and more comprehensive approach is needed to further the nation's security interests in space (Figure 2).



Source: Commission

Figure 2: A New Organizational Approach for Space

Following are the Commission's unanimous recommendations.

1. Presidential Leadership

The United States has a vital national interest in space. National security space should be high among the nation's priorities. It deserves the attention of the national leadership, from the President down.

> ***The President should consider establishing space as a national security priority.***

2. Presidential Space Advisory Group

The President might find it useful to have access to high-level advice in developing a long-term strategy for sustaining the nation's role as the leading space-faring nation.

> ***The President should consider the appointment of a Presidential Space Advisory Group to provide independent advice on developing and employing new space capabilities.***

3. Senior Interagency Group for Space

The current interagency process is inadequate to address the number, range and complexity of today's space issues, which are expected to increase over time. A standing interagency coordination process is needed to focus on policy formulation and coordination of space activities pertinent to national security and to assure that representation in domestic and international fora effectively reflects U.S. national security and other space interests.

> ***The President should direct that a Senior Interagency Group for Space be established and staffed within the National Security Council structure.***

4. SecDef/DCI Relationship

The issues relating to space between the Department of Defense and the Intelligence Community are sufficiently numerous and complex that their successful resolution and implementation require a close, continuing and effective relationship between the Secretary of Defense and the Director of Central Intelligence.

> ***The Secretary of Defense and the Director of Central Intelligence should meet regularly to address national security space policy, objectives and issues.***

5. Under Secretary of Defense for Space, Intelligence and Information

Until space organizations have more fully evolved, the Office of the Secretary of Defense would benefit from having a senior-level official with sufficient standing to serve as the advocate for space within the Department. The Secretary of Defense would assign this official responsibility to oversee the Department's research and development, *acquisition, launch and operation of its space, intelligence and information assets; coordinate the military intelligence activities within the Department; and work with the Intelligence Community on long-range intelligence requirements for national security.*

An Under Secretary of Defense for Space, Intelligence and Information should be established.

6. Commander in Chief of U.S. Space Command and NORAD and Commander, Air Force Space Command

The Commander in Chief, U.S. Space Command should continue to concentrate on space as it relates to warfare in the mediums of air, land and sea, as well as space. His primary role is to conduct space operations and provide space-related services, to include computer network defense/ attack missions in support of the operations of the other CINCs, and national missile defense. This broad and varied set of responsibilities as CINCSPACE will leave less time for his other assigned duties.

The Secretary of the Air Force should assign responsibility for the command of Air Force Space Command to a four-star officer other than CINCSPACE/CINCNORAD.

The Secretary of Defense should end the practice of assigning only Air Force flight-rated officers to the position of CINCSPACE and CINCNORAD to ensure that an officer from any Service with an understanding of combat and space could be assigned to this position.

7. Military Services

The Department of Defense requires space systems that can be employed in independent operations or in support of air, land and sea forces to deter and defend against hostile actions directed at the interests of the United States. In the mid term a Space Corps within the Air Force may be appropriate to meet this requirement; in the longer term it may be met by a military department for space. In the nearer term, a realigned, rechartered Air Force is best suited to organize, train and equip space forces.

The Air Force should realign headquarters and field commands to more effectively organize, train and equip for prompt and sustained space operations. Assign Air Force Space Command (AFSPC) responsibility for providing the resources to execute space research, development, acquisition and operations, under the command of a four-star general. The Army and Navy would still establish requirements and develop and deploy space systems unique to each Service.

Amend Title 10 U.S.C. to assign the Air Force responsibility to organize, train and equip for prompt and sustained offensive and defensive air <u>and</u> space operations. In addition, the Secretary of Defense should designate the Air Force as Executive Agent for Space within the Department of Defense.

8. Aligning Air Force and NRO Space Programs

The Department of Defense and the Intelligence Community would benefit from the appointment of a single official within the Air Force with authority for the acquisition of space systems for the Air Force and the NRO based on the "best practices" of each organization.

Assign the Under Secretary of the Air Force as the Director of the National Reconnaissance Office. Designate the Under Secretary as the Air Force Acquisition Executive for Space.

9. Innovative Research and Development

The Intelligence Community has a need for revolutionary methods, including but not limited to space systems, for collecting intelligence.

The Secretary of Defense and the Director of Central Intelligence should direct the creation of a research, development and demonstration organization to focus on this requirement.

Competitive centers of innovation that actively pursue space-related research, development and demonstration programs are desirable.

> ***The Secretary of Defense should direct the Defense Advanced Research Projects Agency and the Services' laboratories to undertake development and demonstration of innovative space technologies and systems for dedicated military missions.***

10. Budgeting for Space

Better visibility into the level and distribution of fiscal and personnel resources would improve management and oversight of space programs.

> ***The Secretary of Defense should establish a Major Force Program for Space.***

The Commission believes that its recommendations, taken as a whole, will enable the U.S. to sustain its position as the world's leading space-faring nation. Presidential leadership and guidance, coupled with a more effective interagency process and especially with improved coordination between the Department of Defense and the Intelligence Community, are essential if the nation is to promote and protect its interests in space.

I. The Commission's Charter

A. Statutory Charter of the Commission

The Commission to Assess United States National Security Space Management and Organization was established pursuant to Public Law 106-65, the National Defense Authorization Act for Fiscal Year 2000, Section 1622.

The mandate is as follows:

"The Commission shall, concerning changes to be implemented over the near-term, medium-term and long-term that would strengthen United States national security, assess the following:

(1) The manner in which military space assets may be exploited to provide support for United States military operations.

(2) The current interagency coordination process regarding the operation of national security space assets, including identification of interoperability and communications issues.

(3) The relationship between the intelligence and nonintelligence aspects of national security space…and the potential costs and benefits of a partial or complete merger of the programs, projects, or activities that are differentiated by those two aspects.

(4) The manner in which military space issues are addressed by professional military education institutions.

(5) The potential costs and benefits of establishing:

(A) An independent military department and service dedicated to the national security space mission.

(B) A corps within the Air Force dedicated to the national security space mission.

(C) A position of Assistant Secretary of Defense for Space within the Office of the Secretary of Defense.

(D) A new major force program, or other budget mechanism, for managing national security space funding within the Department of Defense.

(E) Any other change in the existing organizational structure of the Department of Defense for national security space management and organization."

The National Defense Authorization Act for Fiscal Year 2001 amended the Commission mandate, adding the following task:

(6) "The advisability of

(A) various actions to eliminate the requirement for specified officers in the United States Space Command to be flight rated that results from the dual assignment of such officers to that command and to one or more other commands for which the officers are expressly required to be flight rated;

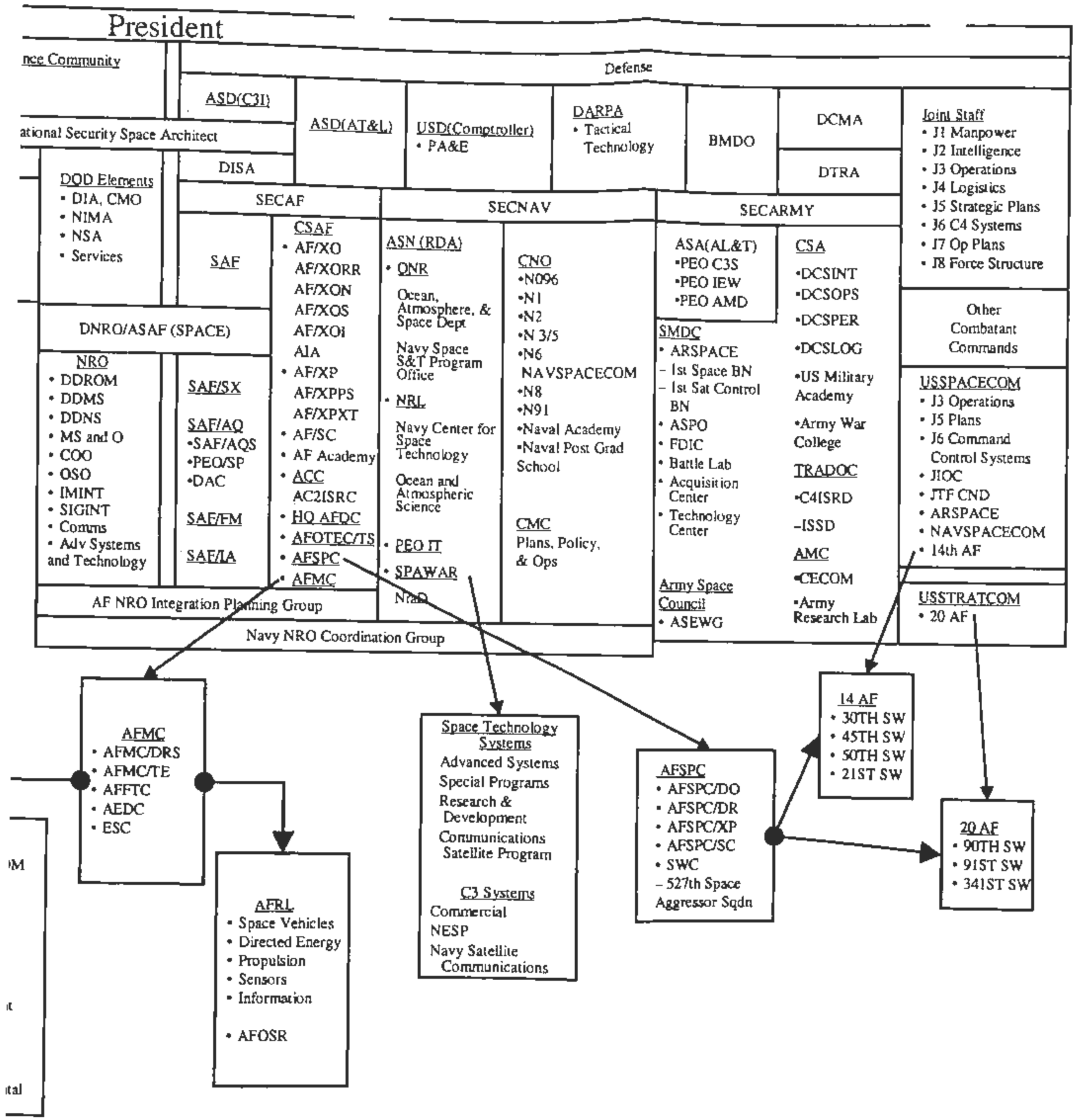
(B) the establishment of a requirement that all new general or flag officers of the United States Space Command have experience in space, missile, or information operations that is either acquisition experience or operational experience; and

(C) rotating the command of the United States Space Command among the Armed Forces."

B. Scope of the Commission's Assessment

The U.S. has an urgent interest in promoting and protecting the peaceful use of space.

The Commission's charter was to assess the organization and management of space activities that support U.S. national security interests. (Figure 3 represents the U.S. Government organizations currently involved in space activities.) The Commission took into account the range of space missions and functions identified in the 1996 National Space Policy, but focused its assessment on national security space activity. As a result, attention was given primarily to the Department of Defense (DoD)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• J2 Intelligence
• J3 Operations
• J4 Logistics
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• J7 Op Plans
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• Information
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Special Programs
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and Intelligence Community space activities. However, the assessment included consideration of civil and commercial activities to assess their relationship to and effect on national security space.

The Commission examined the role of organization and management in developing and implementing national-level guidance and in establishing requirements, acquiring and operating systems, and planning, programming and budgeting for national security space capabilities. The review concentrated on intelligence and military space operations as they relate to the needs of the national leadership as well as the needs of the military in conducting air, land and sea operations and independent space operations.

The Commission's unanimous findings and conclusions reflect its conviction that the U.S. has an urgent interest in promoting and protecting the peaceful use of space and in developing the technologies and operational capabilities that its objectives in space will require. This will require a focus on the long-term goals of national security space activities in the context of a dynamic and evolving security environment. Precisely because organizations need to adapt to changing events, the Commission focused its recommendations on near- and mid-term actions. The Commission believes these actions will better position U.S. space organizations and provide the direction and flexibility the U.S. needs to realize its longer-term interests in space. However, while organization and management are important, the critical need is national leadership to elevate space on the national security agenda.

While organization and management are important, the critical need is national leadership to elevate space on the national security agenda.

The Commission reviewed a large number of studies completed over the last decade on the state of the nation's launch capabilities and facilities. The Commission is in broad agreement with these studies on the nation's clear needs in this area, particularly modernization of the launch infrastructure and vehicles.

Although the Commission was not asked to evaluate specific space programs, it did consider the Future Imagery Architecture (FIA), Space-Based Infrared System-Low (SBIRS-Low) and Discoverer-II programs as examples of the ways in which organizational and management interests can affect decisions on national security space programs.

In evaluating alternative approaches to organizing and managing national security space activities, the Commission did not conduct a cost assessment of each approach. Instead, the advantages and disadvantages of organizational change were considered more broadly in terms of the opportunity costs of the status quo versus the advantages of making changes to better attain U.S. interests in space.

The Commission met with senior officials in the Department of Defense, including the Secretary of Defense, the Deputy Secretary of Defense and the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C3I)). It met with senior military leaders, including the Vice Chairman, Joint Chiefs of Staff, the Chief of Staff of the Air Force and, in a three-day session in Colorado Springs, Colorado, the military Commanders in Chief (CINCs) or their designated representatives. The Commission met with the Director of Central Intelligence, the Deputy Director of Central Intelligence for Community Management and the Directors of the National Security Agency (NSA), National Reconnaissance Office (NRO), and National Imagery and Mapping Agency (NIMA). The Commission met as well with the Administrator of the National Aeronautics and Space Administration (NASA).

The Commission had access to information from experts associated with the commercial, civil, defense and intelligence space sectors. To gain perspective for its analysis, the Commission met with former senior government officials. It met as well with the Chairmen of the National Commission for the Review of the National Reconnaissance Office and the Chairman of the Commission to Review the National Imagery and Mapping Agency. The Department of Defense and National Reconnaissance Office provided the Commissioners access to a number of classified space programs.

C. Organization of the Report

The report provides the Commission's views on:

- The role for space in future national security affairs and the challenges the U.S. is likely to confront to its commercial, civil, defense and intelligence interests in space.

- Objectives for advancing U.S. interests in space by enabling and encouraging development of policies, personnel, technologies and operations essential to maintaining U.S. leadership.

- U.S. agencies involved in national security space as a basis for understanding current practices and identifying alternative approaches to organization and management.

- Current management of space activity at the national level, within the Department of Defense and within the Intelligence Community.

- Recommendations for organization and management, including specific proposals to address discrete issues and problems identified in the course of the Commission's deliberations.

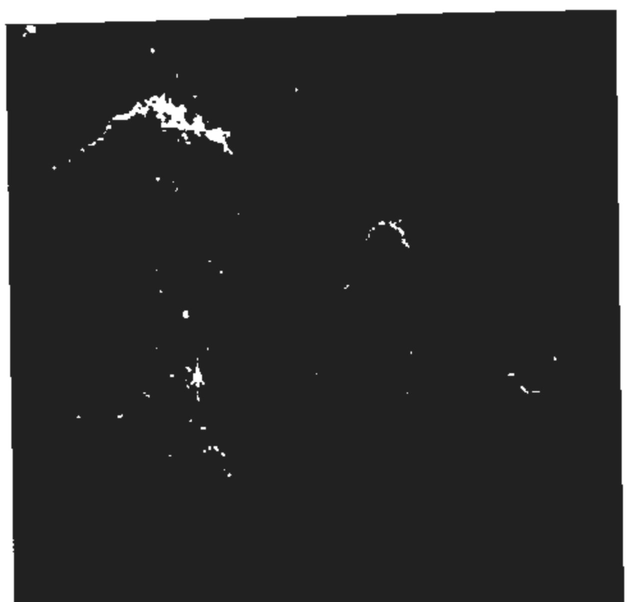
II. Space: Today and the Future

The security and economic well being of the United States and its allies and friends depend on the nation's ability to operate successfully in space. To be able to contribute to peace and stability in a distinctly different but still dangerous and complex global environment, the U.S. needs to remain at the forefront in space, technologically and operationally, as we have in the air, on land and at sea. Specifically, the U.S. must have the capability to use space as an integral part of its ability to manage crises, deter conflicts and, if deterrence fails, to prevail in conflict.

With the dramatic and still accelerating advances in science and technology, the use of space is increasing rapidly. Yet, the uses and benefits of space often go unrecognized. We live in an information age, driven by needs for precision, accuracy and timeliness in all of our endeavors—personal, business and governmental. As society becomes increasingly mobile and global, reliance on the worldwide availability of information will increase. Space-based systems, transmitting data, voice and video, will continue to play a critical part in collecting and distributing information. Space is also a medium in which highly valuable applications are being developed and around which highly lucrative economic endeavors are being built.

A. A New Era of Space

The first era of the space age was one of experimentation and discovery. Telstar, Mercury and Apollo, Voyager and Hubble, and the Space Shuttle taught Americans how to journey into space and allowed them to take the first tentative steps toward operating in space while enlarging their knowledge of the universe (Figure 4). While these programs were underway, the U.S. defense and intelligence communities were building and using satellites to conduct reconnaissance, warn of missile launches, chart the weather and allow commanders to



Source: Jeff Hester and Paul Scowen (Arizona State University) and NASA
Figure 4: Hubble space telescope image of the Eagle Nebula, 7,000 light years from the Earth

We are now on the threshold of a new era of the space age, devoted to mastering operations in space.

communicate with their forces and to precisely locate objects in time and space. These programs were driven by the urgent need for information about threats to vital interests of the United States. During this era, the commercial space industry matured gradually as it learned to develop reliable communications satellites to carry voice, data and video over continents and oceans.

We are now on the threshold of a new era of the space age, devoted to mastering operations in space.

1. The Role for Space

There are four sectors of space activity: civil, commercial, defense and intelligence.

Civil Space Sector

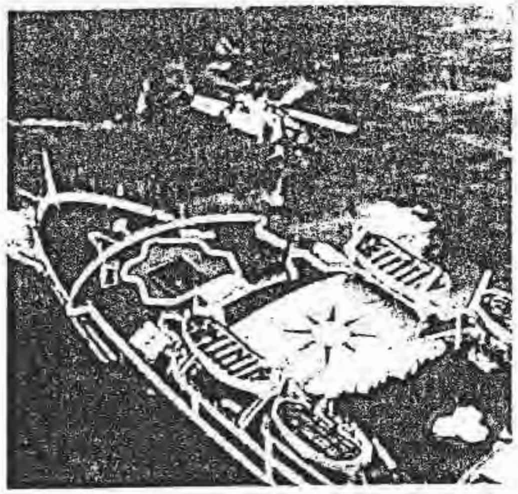
The civil space sector is approaching a long-standing goal of a permanent manned presence in space with the deployment of astronauts to the International Space Station. The U.S. has shouldered the largest share of development and funding for this effort. Because it is an international program, however, its benefits for scientific research, experimentation and commercial processes will be widely shared. The number of countries able to participate in manned space flight has grown substantially. In addition to the U.S. and the USSR (now the Russian Federation), 21 other countries have sent astronauts into orbit in U.S. and Russian spacecraft. The People's Republic of China has announced its intention to become the third nation to place human beings in orbit and return them safely to earth.

Other research and experiments in the civil sector have many applications to human activity. For example, civil space missions to understand the effects of the sun on the earth, other planets and the space between them, such as those conducted by the Solar Terrestrial Probe missions, will help in the development of more advanced means to predict weather on earth.

The growth of the space industry today, and its hallmark in the future, will be space-based services.

Commercial Space Sector

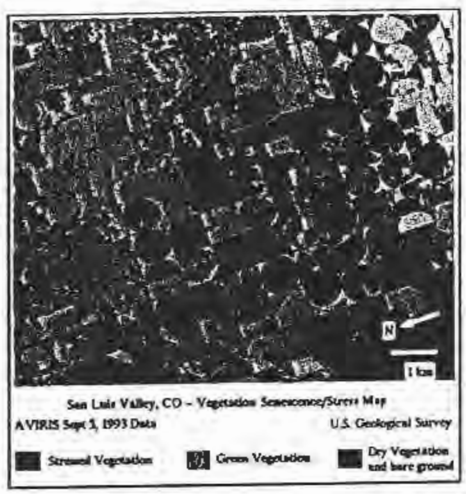
Unlike the earlier space era, in which governments drove activity in space, in this new era certain space applications, such as communications, are being driven by the commercial sector (Figure 5). An international space industry has developed, with revenues exceeding $80 billion in 2000. Industry forecasts project revenues will more than triple in the next decade. Whereas satellite system manufacturing once defined the market, the growth of the space industry today, and its hallmark in the future, will be space-based services.



Source: United States Coast Guard
Figure 5: Coast Guard rescue of the crew aboard the cruise ship Sea Breeze I relied on space-based communications and navigation

The space industry is marked by stiff competition among commercial firms to secure orbital locations for satellites and to secure the use of radio frequencies to exploit a global market for goods and services provided by those satellites. International consortia are pursuing many space enterprises, so ascertaining the national identity of a firm is increasingly complex. The calculations of financial investors in the industry and consumer buying habits are dominated by time to market, cost and price, quantity and quality. It is a volatile market. Nevertheless, as a result of the competition in goods and services, new applications for space-based systems continue to be developed, the use of those products is increasing and their market value is growing.

Space-based technology is revolutionizing major aspects of commercial and social activity and will continue to do so as the capacity and capabilities of satellites increase through emerging technologies. Space enters homes, businesses, schools, hospitals and government offices through its applications for transportation, health, the environment, telecommunications, education, commerce, agriculture and energy (Figure 6). Space-based technologies and services permit people to communicate, companies to do business, civic groups to serve the public and



Source: USGS Spectroscopy Laboratory
Figure 6: Revolutionary satellite imaging products, simulated by this false color image, will enable new farming methods

The commercial revolution in space has eliminated the exclusive control of space once enjoyed by national defense, intelligence and government agencies.

scientists to conduct research. Much like highways and airways, water lines and electric grids, services supplied from space are already an important part of the U.S. and global infrastructures.

The most telling feature of the new space age is that the commercial revolution in space has eliminated the exclusive control of space once enjoyed by national defense, intelligence and government agencies. For only a few thousand dollars, a customer today can purchase a photograph of an area on earth equal in quality to those formerly available only to the superpowers during the Cold War. Commercial providers can complement the photographic images with data that identify the location and type of foliage in an area and provide evidence of recent activity there. They can produce radar-generated maps with terrain elevations, transmit this information around the globe and combine all of it into formats most useful to the customer (Figure 7). This service is of increasing value to farmers and ranchers, fisherman and miners, city planners and scientists.

Source: Jet Propulsion Laboratory Planetary Photo Journal
Figure 7: Radar satellite imagery can detail natural phenomena in three dimensions, such as the eruption of this Japanese volcano on the populated island of Miyake-Jima.

Defense Space Sector

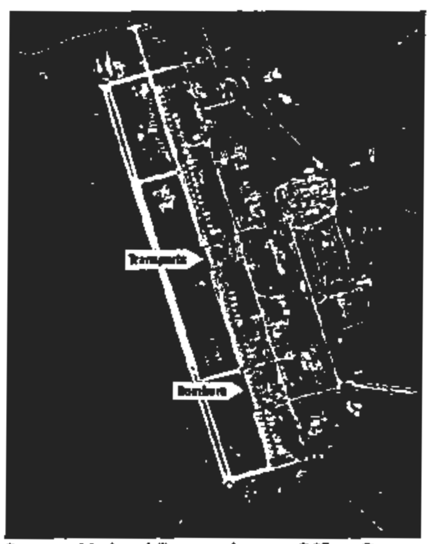
Space-related capabilities help national leaders to implement American foreign policy and, when necessary, to use military power in ways never before possible. Today, information gathered from and transmitted through space is an integral component of American military strategy and

Intelligence Space Sector

Intelligence collected from space remains essential to the mission of the Intelligence Community, as it has been since the early 1960s. Then the need to gain access to a hostile, denied area, the USSR, drove the development of space-based intelligence collection. The need for access to denied areas persists. In addition, the U.S. Intelligence Community is required to collect information on a wide variety of subjects in support of U.S. global security policy.

> *Today, the U.S. Intelligence Community is required to collect information about many nations, organizations and even individuals.*

The Intelligence Community and the Department of Defense deploy satellites to provide global communications capabilities; verify treaties through "national technical means"; conduct photoreconnaissance; collect mapping, charting, geodetic, scientific and environmental data; and gather information on natural or man-made disasters (Figure 9). The U.S. also collects signals intelligence and measurement and signature intelligence from space. This intelligence is essential to the formulation of foreign and defense policies, the capacity of the President to manage crises and conflicts, the conduct of military operations and the development of military capabilities to assure the attainment of U.S. objectives.



Source: National Reconnaissance Office, Corona Image of Dolon Airfield
Figure 9: Space-based image of a military airfield in the Former USSR

Modernizing the National Security Space Sector

The defense and intelligence space activities together comprise the national security space sector. The Department of Defense and the Intelligence Community are undertaking substantial and expensive programs to replace virtually their entire inventory of satellites and launch vehicles over the next decade or so. These programs are estimated to cost more than $60 billion during this period (Figure 10). Following are examples of space programs undergoing modernization:

- Intelligence collection systems designed in the late 1970s and early 1980s are scheduled for replacement in the near future. There are plans to improve the process for moving intelligence collected from these satellites to the users, both political and military.

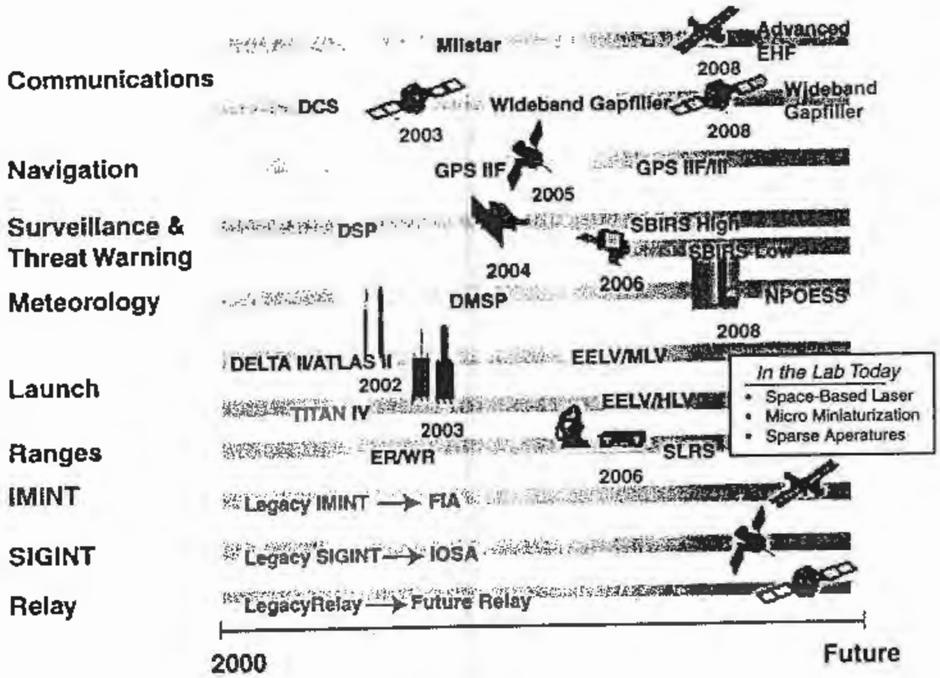
- The military will deploy the next generation Global Positioning System (GPS), which will provide both military and civilian users with position, location and navigation with greater precision and reliability while improving the value of the system for military operations.

- Weather satellites operated by DoD are to be merged in a program jointly conducted with the National Oceanic and Atmospheric Administration (NOAA) and NASA, which will improve weather and environmental monitoring.

- To meet the military's growing reliance on information, all military communication satellites are planned to be replaced with more capable systems.

- Deployment of the Space-Based Infrared System (SBIRS) will improve the ability to detect ballistic missile launches. SBIRS will also provide significant contributions to missile defense and intelligence missions.

- The Space Based Laser program plans to demonstrate the technology to destroy a ballistic missile from space.



Source: Headquarters Air Force and National Reconnaissance Office

Figure 10: An extensive modernization program is underway for national security space systems

International Dimension

Opportunities in space are not limited to the United States. Many countries either conduct or participate in space programs dedicated to a variety of tasks, including communications and remote sensing. Although no country has a comprehensive space program to rival that of the United States, a growing number of nations have more limited programs or take part in international collaborative efforts in order to improve their own national security, commercial and civil space capabilities. Collaborative efforts are making space knowledge, technology, capabilities and applications increasingly available worldwide.

The U.S. will be tested over time by competing programs or attempts to restrict U.S. space activities through international regulations. In some countries such as Russia, China and India, "commercial" space programs are operated and controlled by the government, not private industry. In others, Israel, France and Japan, for example, the government has a strong influence over space companies, but these countries have a commercial space industry as well. Public and private entities in these and other countries are becoming competitive in the international market.

2. Toward the Future

Mastering near-earth space operations is still in its early stages. As mastery over operating in space is achieved, the value of activity in space will grow. Commercial space activity will become increasingly important to the global economy. Civil activity will involve more nations, international consortia and non-state actors. U.S. defense and intelligence activities in space will become increasingly important to the pursuit of U.S. national security interests.

The Commissioners appreciate the sensitivity that surrounds the notion of weapons in space for offensive or defensive purposes. They also believe, however, that to ignore the issue would be a disservice to the nation. The Commissioners believe the U.S. Government should vigorously pursue the capabilities called for in the National Space Policy to ensure that the President will have the option to deploy weapons in space to deter threats to and, if necessary, defend against attacks on U.S. interests.

B. Vulnerabilities and Threats

Space systems can be vulnerable to a range of attacks. These include disruption activities that temporarily deny access to space-derived products; activities that completely destroy a satellite system—the ground stations, launch systems or satellites on orbit; and those with the potential to render space useless for human purposes over an extended period of time. Launch systems are fragile. A launch failure can stop the U.S. from employing entire classes of boosters for extended periods of time. For example, after successive Titan failures in 1985 and 1986 and the Challenger Space Shuttle disaster in 1986, the nation experienced a 21-month hiatus in its ability to launch heavy national security payloads.

The political, economic and military value of space systems makes them attractive targets for state and non-state actors hostile to the United States and its interests. In order to extend its deterrence concepts and defense capabilities to space, the U.S. will require development of new military

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capabilities for operation to, from, in and through space. It will require, as well, engaging U.S. allies and friends, and the international community, in a sustained effort to fashion appropriate "rules of the road" for space.

1. Assessing the Threat Environment

The U.S. is more dependent on space than any other nation. Yet, the threat to the U.S. and its allies in and from space does not command the attention it merits from the departments and agencies of the U.S. Government charged with national security responsibilities. Consequently, evaluation of the threat to U.S. space capabilities currently lacks priority in the competition for collection and analytic resources.

The U.S. is more dependent on space than any other nation

The Intelligence Community has begun to improve its collection strategy for threats in and from space. Its analytic efforts, however, need to give more attention to the technical and operational forms a threat might take. The Intelligence Community needs to account fully for the implications of technology proliferation and services available on the open market to those entities that could threaten U.S. space capabilities. Political and military leaders need to appreciate the nature of the threat and should seek and receive from the Intelligence Community the necessary information on the space-related threat.

Failure to develop credible threat analyses could have serious consequences for the United States. It could leave the U.S. vulnerable to surprises in space and could result in deferred decisions on developing space-based capabilities due to the lack of a validated, well-understood threat. Surprise, however, is not limited to the possibility of an attack on U.S. systems. The U.S. also could be surprised by the emergence of new technological capabilities in the hands of potential adversaries. Or, the U.S. could be surprised in the international arena by economic or arms control proposals it does not anticipate, or the importance of which it does not fully appreciate, because of insufficient knowledge about the technical or operational capabilities of current or future negotiating partners.

2. Existing and Emerging Threats

The ability to restrict or deny freedom of access to and operations in space is no longer limited to global military powers. Knowledge of space systems and the means to counter them is increasingly available on the international market. Nations hostile to the U.S. possess or can acquire the means to disrupt or destroy U.S. space systems by attacking the satellites in space, their communications nodes on the ground and in space, or ground nodes that command the satellites.

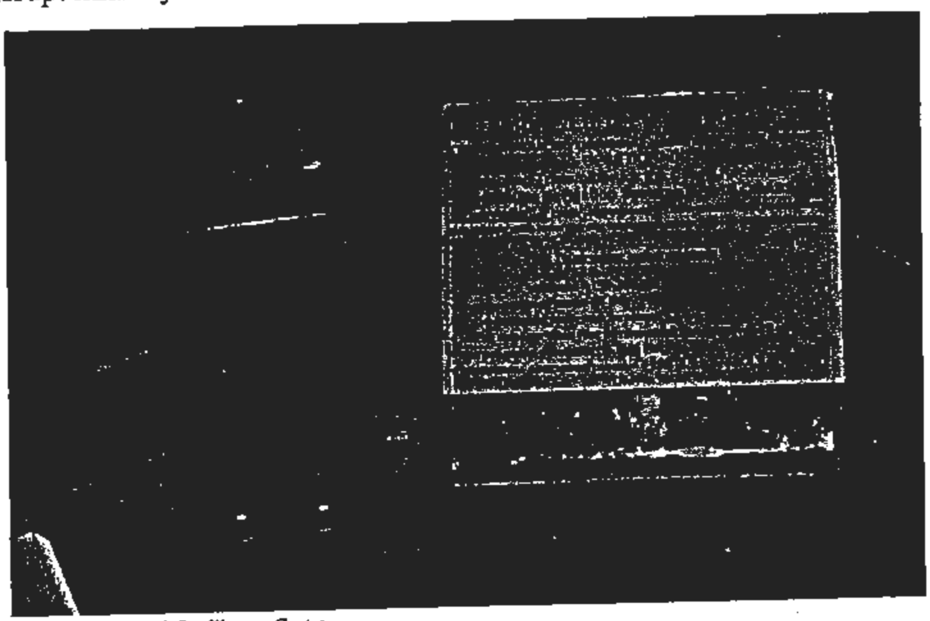
Small nations, groups or even individuals can acquire from commercial sources imagery of targets on earth and in space. They can acquire accurate timing and navigational data and critical weather information generated by government-owned satellites. Improved command and control capabilities are available through the use of commercial communications satellites. Even launch capabilities can be contracted for with legitimate companies, and a number of smaller nations are developing their own space launch vehicles. The reality is that there are many extant capabilities, such as those described below, to deny, disrupt or physically destroy space systems and the ground facilities that use and control them.

Attacking Ground Stations
One of the more accessible ways to disrupt space systems is by attacking the associated satellite ground stations. This can be accomplished by a variety of means, ranging from physical attack to computer network intrusion.

Denial and Deception
Countries can attempt to defeat the reconnaissance function of satellites by obtaining sufficient information about the satellites' orbital and sensor characteristics. This information can be used to either deny access to the reconnaissance targets at critical times or to carry out deception efforts to confuse and complicate their signatures. As more information is made available concerning reconnaissance satellite characteristics, denial and deception are made easier and information collection more difficult.

Jamming Satellites on Orbit
Commercial satellite ground communications equipment has electronic jamming capabilities that can easily be used to disrupt the functions of some satellites. Many countries also have military jamming capabilities, including Russia and China as well as Iran, Cuba, Iraq and North Korea. Most U.S. commercial and civil satellites lack built-in protection measures

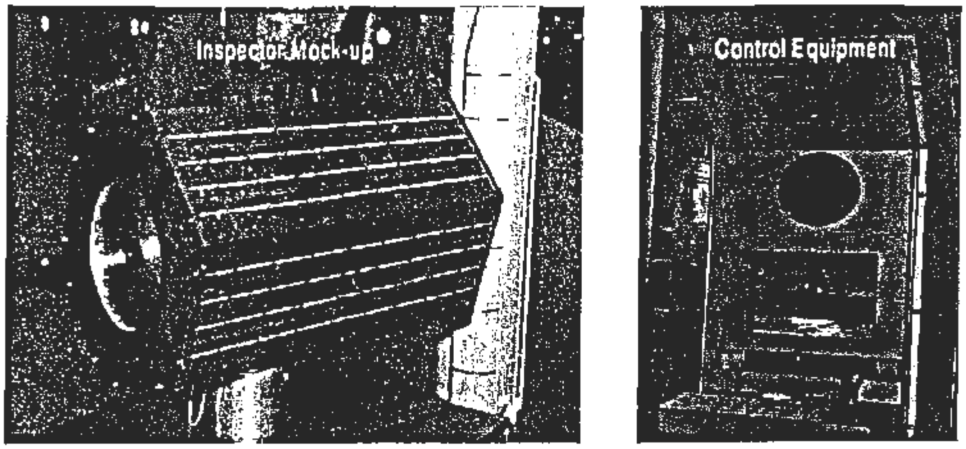
and are vulnerable to such attacks. Recent examples of satellite jamming include Indonesia jamming a transponder on a Chinese-owned satellite and Iran and Turkey jamming satellite TV broadcasts of dissidents. More sophisticated technologies for jamming satellite signals are becoming available. For example, Russia is marketing a handheld GPS jamming system (Figure 11). A one-watt version of that system, the size of a cigarette pack, is able to deny access to GPS out to 80 kilometers; a slightly larger version can deny access out to 192 kilometers. Both are compact and powerful enough to jam an aircraft's GPS receiver signal, which could disrupt military missions or create havoc at a civilian airport.



Source: National Air Intelligence Center
Figure 11: Russian handheld GPS jammers are available commercially worldwide

Microsatellites

Advances in miniaturization and the proliferation of space technologies create opportunities for many countries to enter space with small, lightweight, inexpensive and highly capable systems that can perform a variety of missions (Figure 12). Microsatellites and nanosatellites, weighing from 100 kilograms to 10 kilograms, respectively, are examples of the advances in miniaturized space system technologies. Microsatellites can perform satellite inspection, imaging and other functions and could be adapted as weapons. Placed on an interception course and programmed to home on a satellite, a microsatellite could fly alongside a target until commanded to disrupt, disable or destroy the target. Detection of and defense against such an attack could prove difficult.



Source: National Air Intelligence Center
Figure 12: Many countries use microsatellites today for missions such as on-orbit inspection and remote sensing

Technology transfer programs exist to train nations in the development and deployment of microsatellite systems. Commercial entities offer to teach customers how to design, develop, launch and operate small satellites, some as small as a portable compact disc player. Services have been provided to France, the United Kingdom and the United States, and technology transfer programs have been conducted with China, South Korea, Portugal, Pakistan, Chile, South Africa, Thailand, Singapore, Turkey and Malaysia. Companies in the United States and the United Kingdom, as well as other countries including Russia, Israel, Canada and Sweden, are involved in maturing microsatellite technology.

Nuclear Detonation

Perhaps the most devastating threat could come from a low-yield nuclear device, on the order of 50 kilotons, detonated a few hundred kilometers above the atmosphere. A nuclear detonation would increase ambient radiation to a level sufficient to severely damage nearby satellites and reduce the lifetime of satellites in low earth orbit from years to months or less. The lingering effects of radiation could make satellite operations futile for many

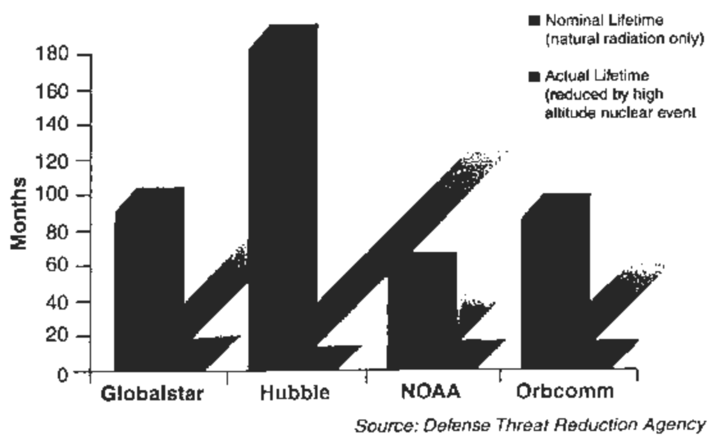


Figure 13: Impact of a nuclear detonation on the lifetime of satellitics

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months. Even nuclear detonations in the 10-kiloton range could have significant effects on satellites for many months (Figure 13). To execute this mission, all that is needed is a rocket and a simple nuclear device. Countries such as Iran, North Korea, Iraq and Pakistan possess missiles that could carry warheads to the necessary altitudes and either have, or are believed to be developing, nuclear weapons.

3. Reducing Vulnerability

As harmful as the loss of commercial satellites or damage to civil assets would be, an attack on intelligence and military satellites would be even more serious for the nation in time of crisis or conflict. The U.S. could be subjected to serious difficulties if the functions of U.S. satellites were significantly disrupted or degraded as the President was working to ease a crisis between nuclear-armed adversaries or to end a conflict before an adversary used weapons of mass destruction against the U.S. or its allies.

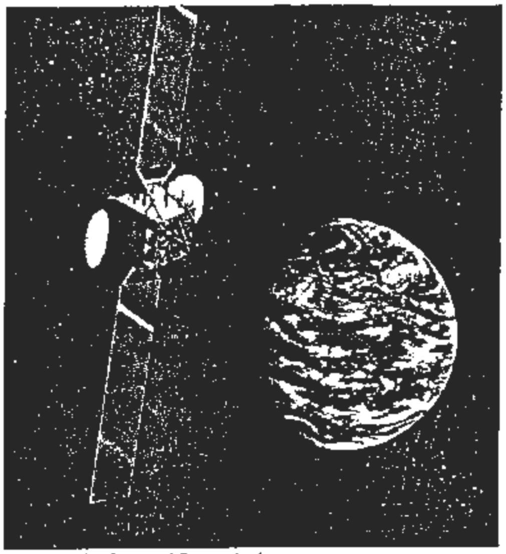
The U.S. is an attractive candidate for a "Space Pearl Harbor."

As history has shown—whether at Pearl Harbor, the killing of 241 U.S. Marines in their barracks in Lebanon or the attack on the USS Cole in Yemen—if the U.S. offers an inviting target, it may well pay the price of attack. With the growing commercial and national security use of space, U.S. assets in space and on the ground offer just such targets. The U.S. is an attractive candidate for a "Space Pearl Harbor." The warning signs of U.S. vulnerability include:

- In 1998, the Galaxy IV satellite malfunctioned, shutting down 80 percent of U.S. pagers, as well as video feeds for cable and broadcast transmission, credit card authorization networks and corporate communications systems (Figure 14). To restore satellite service, satellites had to be moved and thousands of ground antennas had to be manually repositioned, which took weeks in some cases.

- In early 2000, the U.S. lost all information from a number of its satellites for three hours when computers in ground stations malfunctioned.

- In July 2000, the Xinhau news agency reported that China's military is developing methods and strategies for defeating the U.S. military in a high-tech and space-based future war. It noted, "for countries that could never win a war by using the method of tanks and planes, attacking the U.S. space system may be an irresistible and most tempting choice. . ." These reports illustrate a troubling but little-noticed view of the future.



Source: Boeing Space and Communications
Figure 14: Malfunction of the Galaxy IV satellite shut down 80% of the nation's pagers

- Hackers are routinely probing DoD networks and computers. The U.S. Space Command's Joint Task Force for Computer Network Defense reported that detected probes and scans are increasing, access to hacking tools is becoming easier and hacking techniques are becoming more sophisticated. In 1999 the number of detected probes and scans against DoD systems was just over 22,000; in the first eleven months of 2000, the number had grown to 26,500.

- If the GPS system were to experience widespread failure or disruption, the impact could be serious. Loss of GPS timing could disable police, fire and ambulance communications around the world; disrupt the global banking and financial system, which depends on GPS timing to keep worldwide financial centers connected; and interrupt the operation of electric power distribution systems.

The signs of vulnerability are not always so clear as those described above and therefore are not always recognized. Hostile actions against space systems can reasonably be confused with natural phenomena. Space debris or solar activity can "explain" the loss of a space system and mask unfriendly actions or the potential thereof. They can be explained as computer hardware or software failure, even though either might be the result of malicious acts. Thus far, the indicators have been neither sufficiently persuasive nor gripping to energize the U.S. to take appropriate defensive steps. For this reason, the Commission believes that the U.S. is not as yet well prepared to handle the range of potential threats to its space systems.

Threats to U.S. space systems might arise under a variety of conditions:

- In peacetime, as a terrorist act.
- In time of crisis, as an act of coercion or escalation.
- In wartime, as an effort to degrade U.S. intelligence or military performance.

Threatening or attacking the space capabilities of the U.S. would have domestic, economic and political consequences and could provoke international disputes about the origin and intent of an attack. Such ambiguity and uncertainty could be fatal to the successful management of a crisis or resolution of a conflict. They could lead to forbearance when action is needed or to hasty action when more or better information would have given rise to a broader and more effective set of response options.

There are a number of possible crises or conflicts in which the potential vulnerability of national security space systems would be worrisome. For example:

- Efforts to identify and strike terrorist strongholds and facilities in advance of or in retaliation for terrorist attacks on U.S. forces or citizens abroad, or on the U.S. homeland or that of its allies.
- Conflict in the Taiwan Straits, in which the U.S. attempts to deter escalation through the conduct of military operations while seeking to bring it to a favorable end through diplomatic measures.
- War in the Middle East, posing a threat to U.S. friends and allies in the region and calling for a rapid political and military response to threats by an aggressor to launch ballistic missiles armed with weapons of mass destruction.
- The disabling of a remote sensing satellite being used by a regional power to monitor Southwest Asia, followed shortly thereafter by another state in the region launching a long range ballistic missile armed with a weapon of mass destruction.
- Cyber attacks on nuclear command and control systems that precipitate a crisis in South Asia involving India and Pakistan and their respective allies.

In each of these contingencies and others like them, the President, his senior advisors and military commanders would be dependent on U.S. satellite systems to help manage the crisis, conduct military operations or bring about a resolution to the conflict. If the performance of U.S. systems were affected, the diplomatic and military leverage of the U.S. could be reduced, that of an adversary improved, and the cost and risks associated with achieving U.S. objectives commensurately increased.

That U.S. space systems might be threatened or attacked in such contingencies may seem improbable, even reckless. However, as political economist Thomas Schelling has pointed out, "There is a tendency in our planning to confuse the unfamiliar with the improbable. The contingency we have not considered looks strange; what looks strange is thought improbable; what is improbable need not be considered seriously." Surprise is most often not a lack of warning, but the result of a tendency to dismiss as reckless what we consider improbable.

We are on notice, but we have not noticed.

History is replete with instances in which warning signs were ignored and change resisted until an external, "improbable" event forced resistant bureaucracies to take action. The question is whether the U.S. will be wise enough to act responsibly and soon enough to reduce U.S. space vulnerability. Or whether, as in the past, a disabling attack against the country and its people—a "Space Pearl Harbor"—will be the only event able to galvanize the nation and cause the U.S. Government to act.

We are on notice, but we have not noticed.

III. U.S. Objectives for Space

How the U.S. develops the potential of space for civil, commercial, defense and intelligence purposes will affect the nation's security for decades to come.

America's interests in space are to:

> *How the U.S. develops the potential of space for civil, commercial, defense and intelligence purposes will affect the nation's security for decades to come.*

- Promote the peaceful use of space.
- Use the nation's potential in space to support U.S. domestic, economic, diplomatic and national security objectives.
- Develop and deploy the means to deter and defend against hostile acts directed at U.S. space assets and against the uses of space hostile to U.S. interests.

The U.S. Government must work actively to make sure that the nation has the means necessary to advance its interests in space. To do so, it must direct its activities to:

- Transform U.S. military capabilities.
- Strengthen U.S. intelligence capabilities.
- Shape the international legal and regulatory environment that affects activities in space.
- Advance U.S. technological leadership related to space operations.
- Create and sustain a cadre of space professionals.

Concerted efforts in these areas are needed to enhance the nation's security by improving its capacity to deter aggression, to defend its interests and to pursue its civil space programs with modern and more capable systems. Deliberate, coherent policies in these areas also provide incentives to the commercial sector to pursue new activities in space and to develop new applications for goods and services derived from space systems. This essential combination of both government and private activity will be needed to keep the U.S. the world's leading space-faring nation.

A. Transform U.S. Military Capabilities

The United States must develop, deploy and maintain the means to deter attack on and to defend vulnerable space capabilities. Explicit national security guidance and defense policy is needed to direct development of doctrine, concepts of operations and capabilities for space, including weapons systems that operate in space and that can defend assets in orbit and augment air, land and sea forces. This requires a deterrence strategy for space, which in turn must be supported by a broader range of space capabilities.

A deterrence strategy for space must be supported by a greater range of space capabilities.

1. Deterrence and Defense Policy for Space

The 1996 National Space Policy states, "Purposeful interference with space systems shall be viewed as an infringement on sovereign rights." That policy directs that steps be taken to protect against attack through such measures as deploying sensors on satellites, hardening them to electromagnetic effects and radiation and improving the security of ground stations and communication links. It also directs that measures be taken to prevent attack on the communication links by encrypting messages, by tracking satellites and through warnings. Generally, commercial satellite operators have not seen a need to do this, as there are associated costs and customers have not demanded protection measures.

Current policy also calls for a capability to negate threats to the use of space by the United States. In 1999 then-Deputy Secretary of Defense John Hamre stated that the preferred U.S. approach was "tactical denial of capabilities" used by an adversary, not "permanent destruction." The U.S. "reserves the right to be able to retaliate and destroy" either ground sites or satellites, if necessary. The preferred approach to negation is the use of effects that are "temporary and reversible in their nature."

Such approaches rely on jamming signals or interfering with the function of hostile satellites rather than disabling or destroying them. Temporary and reversible approaches are technically elegant and valuable, but they may not serve equally well across the full spectrum of possible contingencies. This is especially true when it is important to know with high confidence that a satellite can no longer function.

The U.S. will require means of negating satellite threats, whether temporary and reversible or physically destructive. The senior political and military leadership needs to test these capabilities in exercises on a regular basis, both to keep the armed forces proficient in their use and to bolster their deterrent effect on potential adversaries. Besides computer-based simulations and other wargaming techniques, these exercises should include "live fire" events. These "live fire" events will require the development of testing ranges in space and procedures for their use that protect the on-orbit assets of the U.S. and other space-faring nations. While exercises may give adversaries information they can use to challenge U.S. space capabilities, that risk must be balanced against the fact that capabilities that are untested, unknown or unproven cannot be expected to deter.

A policy of deterrence would need to be extended to U.S. allies and friends, consistent with U.S. treaty obligations and U.S. interests. In the case of NATO, the U.S. might consider whether a planning group should be formed to develop a common appreciation of the threats, discuss potential responses and consult on the formulation of alliance policy and plans to deter and defend against threats from space. Only by extensive prior consultation, planning and appropriate exercises will the U.S. have the cooperation it would need in a crisis.

2. Assured Access to Space and On-Orbit Operations

United States deterrence and defense capabilities depend critically on assured and timely access to space. The U.S. should continue to pursue revolutionary reusable launch vehicle technologies and systems even as the U.S. moves to the next generation of expendable launch vehicles (Figure 15). In addition, the U.S. must invest in technologies that will enable satellites to be operational shortly after launch. One key objective of these technological advances must be to reduce substantially the cost of

Source: United States Space Command

Figure 15: Reusable launch vehicles offer new approaches for operating to, from and in space

placing objects and capabilities in orbit, while providing the means to launch operationally useful satellites, both on short notice and on routine schedules.

If the U.S. is to master space operations, its launch capabilities must respond both to national security needs and to commercial and civil sector requirements. This calls for a modern launch infrastructure and modern launch vehicles. Today's U.S. launch infrastructure, which includes launch complexes, processing facilities and tracking systems, needs modernization. The nation lacks an overall vision for launch that accommodates the evolving and essential partnership between the government and commercial industry.

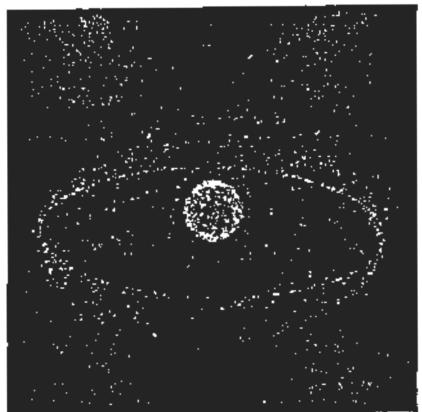
> *One key objective of these technological advances must be to substantially reduce the cost of placing objects and capabilities in orbit.*

The ranges and their associated launch complexes, at Cape Canaveral AFB and Kennedy Space Flight Center on the east coast and Vandenberg AFB on the west coast, have enough capacity to meet the projected needs of all users under normal conditions. However, more capacity is needed to provide for margin and flexibility to handle launch "surges," to accommodate launch delays and to allow launch areas to undergo scheduled maintenance and modernization. The U.S. should seek to streamline the processes associated with integrating spacecraft with launch vehicles. The U.S. also needs to implement plans to reduce range costs and improve flexibility by using more efficient technology, such as GPS and satellite-based communications, in the areas of range safety and tracking.

Along with assured access to space, the U.S. needs to develop better ways to conduct operations once in space. New approaches to on-orbit propulsion can improve spacecraft maneuverability and safety, and on-orbit servicing can extend the life of space systems and upgrade their capabilities after launch. Autonomous, reusable orbit transfer systems can provide greater maneuverability in and between different orbits. In addition, the Defense Advanced Research Projects Agency, the Air Force and NASA are studying robotic microsatellites that can provide spacecraft servicing. When coupled with spacecraft that allow for modular component replacement while on orbit, these systems could provide significant life cycle cost savings, and would enable spacecraft and interchangeable payloads to be upgraded.

3. Space Situational Awareness

To use space effectively and to protect against threats that may originate from it, the U.S. must be able to identify and track much smaller objects in space than it can track today (Figure 16). The current space surveillance network, the earth-based radars and cameras used to track objects in space, needs modernization and expansion. An improved space surveillance network is needed to reduce the chance of collision between satellites, the Space Shuttle or the International Space Station and the thousands of pieces of space debris orbiting the earth. It will also have to track objects deeper in space, such as asteroids or spacecraft. And to reduce the possibility of surprise by hostile actors, it will have to monitor space activity. The evolution of technology and the character of this problem argue for placing elements of the surveillance network in space, including both electro-optical and radar systems.



Source: National Aeronautics and Space Administration's Orbital Debris Program Office, Johnson Space Center

Figure 16: Space situational awareness requires tracking and identifying many thousands of objects in space, not only the satellites illustrated here

4. Earth Surveillance From Space

Space provides a unique vantage point for observing objects across vast reaches of air, land and sea. The U.S. needs to develop technologies for sensors, communication, power generation and space platforms that will enable it to observe the earth and objects in motion on a near real-time basis, 24 hours-a-day. If deployed, these could revolutionize military operations. For example, a space-based radar, such as the recently cancelled Discoverer II program, could provide military commanders, on a near-continuous and global basis, with timely, precise information on the location of adversary forces and their movement over time. Coupled to precision strike weapons delivered rapidly over long distances, even conventionally armed inter-continental ballistic missiles, space-based radar surveillance would enhance deterrence of hostile action. The same space-based technologies could revolutionize public and private transportation, traffic management and disaster relief operations by providing information on the location, routing and status of vehicles.

5. Global Command, Control and Communications in Space

Development of a Global Information Grid—a globally interconnected, end-to-end set of information capabilities and associated processes that will allow the warfighter, policy makers and support personnel to access information on demand—will rely on space assets to provide the command, control and communications (C3) required by enroute, mobile and deployed military forces.

6. Defense in Space

Assuring the security of space capabilities becomes more challenging as technology proliferates and access to it by potentially hostile entities becomes easier. The loss of space systems that support military operations or collect intelligence would dramatically affect the way U.S. forces could fight, likely raising the cost in lives and property and making the outcome less sure. U.S. space systems, including the ground, communication and space segments, need to be defended to ensure their survivability.

Providing active and passive protection to assets that could be at risk during peacetime, crisis or conflict is increasingly urgent. New technologies for microsatellites, hardened electronics, autonomous operations and reusable launch vehicles are needed to improve the survivability of satellites on orbit as well as the ability to rapidly replace systems that have malfunctioned, been disabled or been destroyed.

7. Homeland Defense

Some believe the ballistic missile defense mission is best performed when both sensors and interceptors are deployed in space. Effective sensors make countermeasures more difficult, and interceptors make it possible to destroy a missile shortly after launch, before either warhead or countermeasures are released.

8. Power Projection In, From and Through Space

Finally, space offers advantages for basing systems intended to affect air, land and sea operations. Many think of space only as a place for passive collection of images or signals or a switchboard that can quickly pass information back and forth over long distances. It is also possible to project power through and from space in response to events anywhere in the world. Unlike weapons from aircraft, land forces or ships, space missions initiated from earth or space could be carried out with little transit, information or weather delay. Having this capability would give the U.S. a much stronger deterrent and, in a conflict, an extraordinary military advantage.

> *It is also possible to project power through and from space in response to events anywhere in the world.*

B. Strengthen Intelligence Capabilities

The U.S. needs to strengthen its ability to collect information about the activities, capabilities and intentions of potential adversaries and to overcome their efforts to deny the U.S. this information. Since the end of the Cold War, the number, complexity and scope of high-priority tasks assigned to the Intelligence Community have increased even as its human resources and technical advantage have eroded. This has reduced the Intelligence Community's ability to provide timely and accurate estimates of threats and has correspondingly increased the possibility of surprise.

1. Tasks of the Intelligence Community

The growth in collection requirements is a result of the broader nature of U.S. security interests in the decade since the end of the Cold War. Once concerned primarily with the Soviet Union, the Intelligence Community is now tasked to monitor political, economic and even environmental developments in many places around the globe. Tasking related to national security has expanded as well. The Intelligence Community is tasked to collect scientific, technical and military information on countries potentially hostile to the U.S. or its allies. It is tasked to collect intelligence to support anti-drug efforts and anti-terrorism operations, such as the pursuit of the terrorist Osama bin Laden. Amidst these tasks, the Community has as its highest priority support for forward-deployed military forces engaged in a variety of missions to include peace enforcement operations.

2. Revolutionary Collection Methods

With the growth and use of fiber optic cable and the employment of active denial and deception measures by potential adversaries, intelligence collection from space is increasingly difficult. Information published on the Internet or elsewhere, available through unauthorized disclosure or through espionage is used by adversaries to avoid and disrupt U.S. intelligence collection efforts. This, in turn, increases the time, effort and money needed to collect information and can reduce the value of the resulting intelligence product. Nevertheless, collection from space will continue to be critical to meeting difficult intelligence collection challenges.

To meet the challenges posed to space-based intelligence collection, the U.S. needs to review its approach to intelligence collection from space. Current strategy seeks to capitalize on known technologies to improve collection capabilities in ways that will provide intelligence users, especially military forces in the field, with information in a timely fashion.

While the current collection strategy has been a boon to military forces and crisis managers, planned and programmed collection platforms may not be adaptable enough to meet the many and varied tasks assigned. The U.S. must invest in space-based collection technologies that will provide revolutionary methods for collecting intelligence, especially on difficult intelligence targets. This is essential if the U.S. is to conduct complex diplomatic initiatives successfully, provide strategic warning of significant political and military events, support research into countermeasures to the weapons of potential adversaries, and maintain its other activities not directly related to military operations.

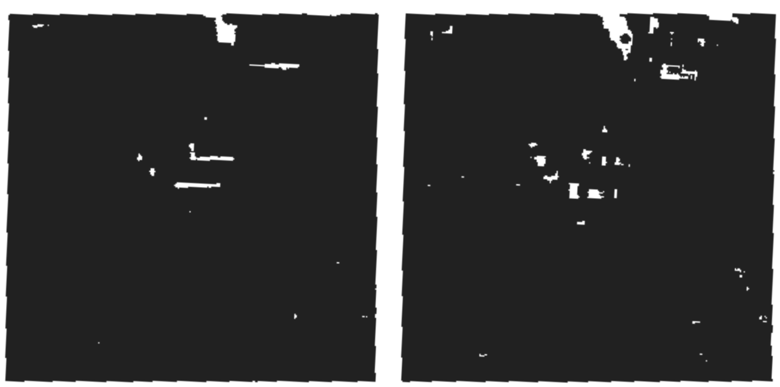
The United States must invest in revolutionary space-based collection technologies.

3. Leveraging Commercial Products

To the extent that commercial products, particularly imagery from U.S. commercial remote sensing companies, can meet intelligence collection needs, these should be incorporated into the overall collection architecture. Current policy endorses and encourages this use.

The reasons for the policy are clear and compelling. Commercial imagery providers are now licensed to provide half-meter imagery, a resolution that allows the human eye to see objects as small as an automobile or differentiate between classes of military vehicles (Figure 17). Informed estimates suggest that data of this resolution and quality would satisfy approximately half of NIMA's requirements for information on the location of objects on the earth.

In particular, commercial imagery systems could be used for wide-area surveillance, freeing government satellites for more challenging, point-target reconnaissance. More aggressive government use of commercial imagery would also help to solidify the position of American companies in a fiercely competitive international market. However, the government has neither established a systematic process for tasking, processing and disseminating commercial imagery, nor budgeted the resources to use commercial products to meet customer needs.



1.0 meter **0.5 meter**

Source: Intelligence Resource Program of the Federation of American Scientists, http://www.fas.org/irp
Figure 17: The U.S. Government has recently approved the sale of half-meter commercial imagery

Freed from providing so-called "commodity products," the Intelligence Community would be able to concentrate on more innovative technologies and take greater risk in designing future systems to overcome the growing challenges to collection. This approach should include demonstration efforts that could provide the foundation for new approaches to collection.

In designing and funding both current and revolutionary collection systems, the Intelligence Community needs to take new initiatives and dedicate more resources to planning and funding its tasking, processing, exploitation and distribution system for intelligence. If not delivered in a timely way to the user, even the best information is worse than useless.

C. Shape the International Legal and Regulatory Environment

U.S. activity in space, both governmental and commercial, is governed by treaties and by international and domestic law and regulations, which have contributed to the orderly use of space by all nations. As interest in and use of space increases, both within the United States and around the world, the U.S. must participate actively in shaping the space legal and regulatory environment. Because of its investment in space and its increasing dependence on space-based capabilities, the U.S. has a large stake in how this environment evolves. To protect the country's interests, the U.S. must promote the peaceful use of space, monitor activities of regulatory bodies, and protect the rights of nations to defend their interests in and from space.

> *The U.S. must participate actively in shaping the space legal and regulatory environment.*

1. Impact on the Military Use of Space

International Law

A number of existing principles of international law apply to space activity. Chief among these are the definition of "peaceful purposes," the right of self-defense and the effect of hostilities on treaties. The U.S. and most other nations interpret "peaceful" to mean "non-aggressive"; this comports with customary international law allowing for routine military activities in outer space, as it does on the high seas and in international airspace.

There is no blanket prohibition in international law on placing or using weapons in space, applying force from space to earth or conducting military operations in and through space. There are a number of specific prohibitions on activity to which the U.S. has agreed:

- The 1963 Limited Test Ban Treaty prohibits "any nuclear weapon test explosion, or any other nuclear explosion" in outer space.
- The 1967 Outer Space Treaty proscribes placing weapons of mass destruction in space or on the moon or other celestial bodies, and using the moon or other celestial bodies for any military purposes.
- The 1972 Anti-Ballistic Missile (ABM) Treaty prohibits the development, testing, or deployment of space-based components of an anti-ballistic missile system.
- A number of arms control treaties are intended to prohibit the U.S and Russia from interfering with the other's use of satellites for monitoring treaty compliance.
- The 1980 Environmental Modification Convention prohibits all hostile actions that might cause long-lasting, severe or widespread environmental effects in space.

It is important to note, however, that by specifically extending the principles of the U.N. Charter to space, the Outer Space Treaty (Article III) provides for the right of individual and collective self-defense, including "anticipatory self-defense." In addition, the non-interference principle established by space law treaties would be suspended among belligerents during a state of hostilities.

Emerging Challenges

To counter U.S. advantages in space, other states and international organizations have sought agreements that would restrict the use of space. For example, nearly every year, the U.N. General Assembly passes a resolution calling for prevention of "an arms race in outer space" by prohibiting all space weapons. Russia and China have proposed to prohibit the use of space for national missile defense. The U.S. should seek to preserve the space weapons regime established by the Outer Space Treaty, particularly the traditional interpretation of the Treaty's "peaceful purposes" language to mean that both self-defense and non-aggressive military use of space are allowed.

The U.S. should review existing arms control obligations in light of a growing need to extend deterrent capabilities to space. These agreements were not meant to restrict lawful space activity outside the scope of each treaty. For example, ABM Treaty prohibitions on space-based ABM systems should not apply to other types of space-based systems that do not meet its definitions. Similarly, while international treaty law holds that arms control and other treaties may be suspended between belligerents during a state of conflict, the changing character of conflict requires careful consideration of U.S. obligations when the status of belligerents may be unclear.

The changing character of conflict requires careful consideration of U.S. obligations when the status of belligerents may be unclear.

The U.S. must be cautious of agreements intended for one purpose that, when added to a larger web of treaties or regulations, may have the unintended consequence of restricting future activities in space. One recent example is the agreement signed between the U.S. and Russia on a Pre- and Post-Launch Notification System (PLNS), intended to minimize the consequences of a false missile attack warning. It requires at least 24-hour advance notice of every significant launch. The PLNS may establish a precedent for using international agreements to regulate space launch. Its specific provisions, which apply both to ballistic missiles and conventional space launch vehicles, could prove to be a significant burden if applied to systems now being designed to provide "better, faster, cheaper" access to space.

2. Satellite Regulation

U.S. satellite companies face many new legal and regulatory challenges. Traditional priorities and alliances are shifting, and international negotiations are becoming less predictable and more complex. Globalization is increasing. Foreign satellite services entering the U.S. market may bring competitive advantages to the United States and may also raise national security concerns. At the same time, more governments are expanding their use of satellite systems, raising critical near-term regulatory issues. For example:

- ***Radio Frequency Spectrum.*** Demands for radio frequency spectrum are escalating because of the pro-competitive market-opening effects of the 1997 World Trade Organization Agreement, as well as new and expanded uses of radio-frequency spectrum. As a result, the allocation, assignment and coordination of radio-frequency spectrum for government and non-government purposes is becoming more difficult and time-consuming. Nations and international organizations are addressing these issues, which have significant security and economic implications worldwide.

- *Export Controls.* Different arms of the U.S. Government have widely differing and sometimes contradictory perspectives toward exports. While export controls can prevent technology from falling into dangerous hands, a process that is too onerous and time-consuming can needlessly restrict U.S. companies in the international market, weaken the U.S. space industry in the global market and eventually erode U.S. technological leadership.

Looking toward the future, the U.S. challenge is to shape a domestic and international legal and regulatory framework that ensures U.S. national security and enhances the commercial and civil space sectors. This means strengthening and supporting the competitive position of U.S. interests in space commerce. An effective interagency process needs to be put in place to identify and address the multiple U.S. interests, sort out the implications of U.S. policies and positions and avoid uncoordinated decisions.

D. Advance U.S. Technological Leadership

To achieve national security objectives and compete successfully internationally, the U.S. must maintain technological leadership in space. This requires a healthy industrial base, inproved science and technology resources, an attitude of risk-taking and innovation, and government policies that support international competitiveness. In particular, the government needs to significantly increase its investment in breakthrough technologies to fuel innovative, revolutionary capabilities. Mastery of space also requires new approaches that reduce significantly the

> *The U.S. will not remain the world's leading spacefaring nation by relying on yesterday's technology to meet today's requirements at tomorrow's prices.*

cost of building and launching space systems. The U.S. will not remain the world's leading space-faring nation by relying on yesterday's technology to meet today's requirements at tomorrow's prices.

1. Investment in Research and Development

Research and development investment is a powerful engine to drive industrial growth. Aerospace research and development investments of the 1960s through the 1980s propelled the U.S. into world leadership in the space business. Since the 1980s, however, the aerospace sector's share of the total national research and development investment has decreased from nearly 20 percent to less than 8 percent, an amount insufficient to maintain the nation's leadership position in space in the coming decades.

The problem is compounded by how industry is investing its research and development resources. U.S. companies are investing most of the independent research and development funds available to help win modernization contracts rather than invest in "leap ahead" technologies.

2. Government/Industry Relationship

The U.S. Government needs to develop a new relationship with industry to ensure U.S. space technological leadership.

The recent *U.S. Space Industrial Base Study* that surveyed 21 major defense contractors found the space industry plagued by deteriorating financial health, a high debt burden, and a rate of return that is often less than the cost of raising funds. The government should be sensitive to this situation and ensure that its policies allow industry to realize a reasonable rate of return on its investment in the space business.

The U.S. Government needs to develop a new relationship with industry to ensure U.S. space technological leadership.

To advance technological leadership, the goal is to ensure conditions exist such that the U.S. commercial space industry can field systems one generation ahead of international competitors and the U.S. Government can field systems two generations ahead. These goals can be attained if the U.S. Government is a responsible investor, consumer and regulator in the space industry. The U.S. Government needs to:

- Increase its space research and development *investment* and focus on those critical technologies unique to national security.

- Become a more reliable *customer* of commercial space products and services.

- Establish *regulatory* policies that encourage rather than restrict the availability of space products worldwide, while maintaining the U.S. technological lead.

Continued investment in research and development will help discover revolutionary and innovative advances for national security. At the same time, earlier-generation technology can migrate to the domestic and international commercial sectors.

3. New Approaches to Space

The cost of transporting payloads to space has two separate aspects: the cost-per-unit of weight and the cost-per-unit of capability. In the near term, it will be easier to reduce the cost-per-unit of capability, through miniaturization and related technologies, than to reduce the cost-per-unit of weight. Beyond these technical advances, mastery of space requires new approaches that will lower the cost of building and launching space systems.

Two fundamental changes could revolutionize U.S. space capabilities and lead the way to reducing the cost of operating in space:

- Align payload value to risk by separating manned space operations from cargo launches, making both manned and unmanned space operations more economical. For example, manned space flights could be supported by smaller reusable launch vehicles that incorporate the range of safety measures required for manned flights. On the other hand, cargo could be launched on more economical vehicles, either unmanned reusable launch vehicles or expendable vehicles, without the expensive, time-consuming safety measures required for manned flight.

- Shift from hand-tooled, custom-built space hardware to an infrastructure based on standardized hardware and software.

E. Create and Sustain a Cadre of Space Professionals

Since its inception, a hallmark of the U.S. space program has been world-class scientists, engineers and operators from academic institutions, industry, government agencies and the military Services. Sustained excellence in the scientific and engineering disciplines is essential to the future of the nation's national security space program. It cannot be taken for granted.

Military space professionals will have to master highly complex technology; develop new doctrine and concepts of operations for space launch, offensive and defensive space operations, power projection in, from and through space and other military uses of space; and operate some of the most complex systems ever built and deployed. To ensure the needed talent and experience, the Department of Defense, the Intelligence Community and the nation as a whole must place a high priority on intensifying investments in career development, education and training to develop and sustain a cadre of highly competent and motivated military and civilian space professionals.

1. Developing a Military Space Culture

The Department of Defense is not yet on course to develop the space cadre the nation needs.

The Department of Defense is not yet on course to develop the space cadre the nation needs. The Department must create a stronger military space culture, through focused career development, education and training, within which the space leaders for the future can be developed. This has an impact on each of the Services but is most critical within the Air Force.

Leadership

Leadership is a vital element in gaining mastery in any military area of endeavor. U.S. air power is the product of pilots such as Billy Mitchell, Hap Arnold and Curtis LeMay. It was Hyman Rickover who blazed the trail that led to the nuclear Navy. These individuals succeeded because they drew upon the talents of thousands of flyers or nuclear naval officers leading at all levels of command and staff. In the Air Force pilot and Navy nuclear submarine career fields, military leaders have spent about 90 percent of their careers within their respective fields.

In contrast, military leaders with little or no previous experience or expertise in space technology or operations often lead space organizations. A review by the Commission of over 150 personnel currently serving in key operational space leadership positions showed that fewer than 20 percent of the flag officers in key space jobs come from space career backgrounds (Figure 18). The remaining officers, drawn from pilot, air defense artillery and Intercontinental Ballistic Missile (ICBM) career fields, on average had spent 8 percent, or 2.5 years, of their careers in space or space related positions. Officers commanding space wings, groups and squadrons fare only slightly better; about one-third of the officers have extensive space experience, while the remaining two-thirds averaged less than 4.5 years in space-related positions (Figure 19).

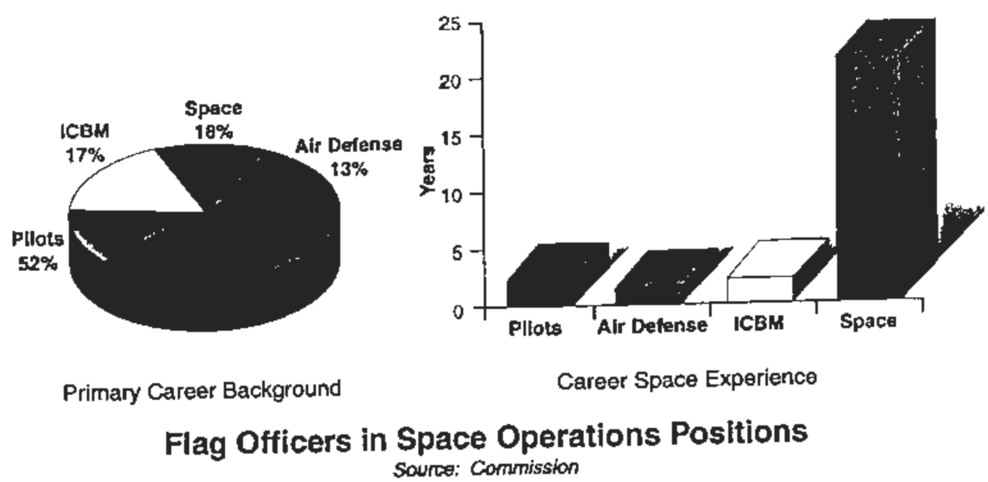


Figure 18: Career space experience of flag officers

This lack of experience in leadership positions is a result of several factors. The space force is young and small, but it has been around long enough for a few to reach four-star rank and the number of personnel is growing. There has been an infusion of personnel from the ICBM force into space organizations in an effort to broaden career opportunities for the missile launch officers. Over time, this will create a larger cadre of space professionals, but in the short term it has had an impact on the overall level of experience of space personnel. Military officers with space training are in high demand in the commercial world. As a result, there has been a

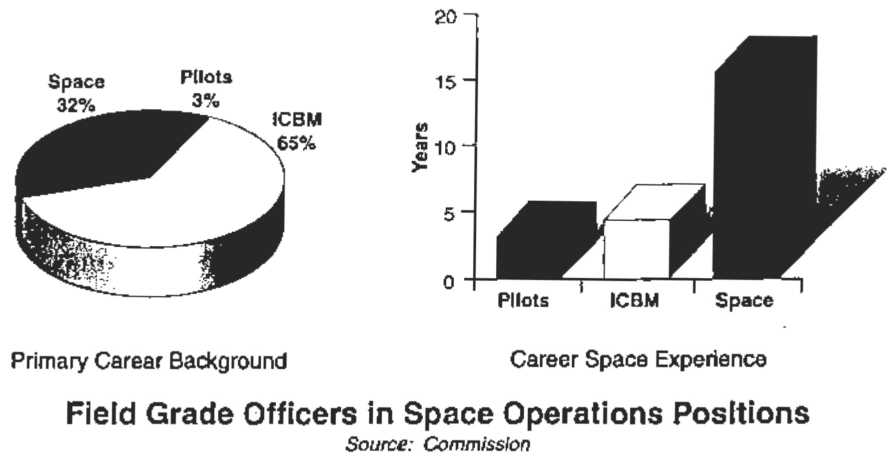


Figure 19: Career space experience of Air Force field grade officers

drain of space talent as evidenced by the low retention of first term space engineers and operators. Finally, there is a lack of focused career development in the space community.

Space leadership in the military will require highly trained and experienced personnel at the very senior positions and throughout all echelons of command. These leaders must provide the vision, the technological expertise and doctrine, concepts and tactics to generate and operate space forces in this new era of space and to generate the cadre of space professionals future military operations will require. New space personnel management policies and new career paths are needed to develop leaders with greater depth and breath of experience in the space career field.

New Career Paths

Depth. Space professionals need more depth of experience in their field and more extensive education and training. In the past, space forces have relied on accessions of highly educated officers who are trained in space once in the job. Instead, career tracks need to be developed that will provide commanders at all levels more expertise within their mission areas. To achieve this, specific criteria should be developed for the selection, training, qualification and assignment of space personnel who will design, develop, acquire and operate military space systems. Training programs need to be refined to provide the basis for qualifying space professionals to occupy specific positions in the space force.

Breadth. Tomorrow's space professionals need a broader understanding of operations across the range of space mission areas and the size of the space cadre will need to grow, as space becomes increasingly important to military operations. Perhaps more than other areas, space benefits from a unique and close relationship among research, development, acquisition and operations, as spacecraft are usually procured in far fewer numbers, sometimes as few as one or two, than are tanks, airplanes or missiles. Exchange of personnel across space communities, between the operational and acquisition commands and between the Air Force and the NRO, is clearly desirable but at present there are barriers that restrict the cross flow of personnel among these communities.

Personnel managers in the Air Force need to have a comprehensive view of all space career positions within the national security space community and the means to manage individual assignments among the acquisition, operations and intelligence communities. Improving the exchange of personnel among these organizations, would expand the space manpower base and could also help to reverse the retention problem among space acquisition officers by opening up new career paths and leadership opportunities within the Air Force.

Education

To ensure the highly skilled workforce needed, technical education programs will have to be enhanced. Space systems under development, such as the Space-Based Infrared System and the Global Positioning System III, and future systems envisioned, such as a space-based radar and a space-based laser, will be far more complex than today's systems. New concepts for space launch, offensive and defensive space control operations and projection of military power in, from and through space will give rise to increasing technology innovation.

Other career fields, such as the Navy's nuclear submarine program, place strong emphasis on career-long technical education. This approach produces officers with a depth of understanding of the functions and underlying technologies of their systems that enables them to use the systems more efficiently in combat. The military's space force should follow this model. In addition, career field entry criteria should emphasize the need for technically oriented personnel, whether they be new lieutenants or personnel from related career fields. In-depth space-related science, engineering, application, theory and doctrine curricula should be developed and its study required for all military and government civilian space personnel, as is done in the Naval Nuclear Propulsion Program.

Tour Length

Military officers typically remain in their assignments for only a year or two, especially as they rise in rank. Short assignments can make it difficult for officers in leadership positions to establish sufficient continuity to create and execute a vision for the job. If the officers have experience and training in their specialties, however, problems of this sort can be mitigated.

In general, leadership in the space field today suffers on all counts: limited experience in the field, little technical education and tour lengths that average less than a year and a half. This keeps space organizations from reaching their potential. Space leaders spend most of their assignments learning about space rather than leading. This can weaken their effectiveness as military leaders, as they of necessity come to depend on civilian subordinates, whether civil servants or contractor personnel. Until space leaders have more extensive experience and technical training in space activities, longer and more stable tour lengths would be desirable.

2. Professional Military Education

Space capabilities are already integral to all traditional air, land and sea military operations. They have contributed to U.S. successes in conflicts during the past decade, from DESERT STORM in 1991 to the air campaign against Serbia in 1999. Soldiers, sailors, marines and airmen need an understanding of how space systems are integrated into nearly all military operations, particularly as new systems and applications emerge.

Professional military education does not stress the technical, operational or strategic application of space systems to combat operations.

Programs in the four Services' professional military education institutions are key sources of space education programs. In all the military schools, space education is gaining in prominence. Within the Air Force, space education is now integrated into all phases of professional military education. New Air Force lieutenants who attend the Aerospace Basic Course are taught space fundamentals and how space systems are integrated into the tactical and operational levels of war. Other Service schools offer space electives as well as optional space focus areas. The Naval War College offers several elective courses allowing students at both its intermediate and senior service schools to focus on space. The Army Command and General Staff College offers a focused study program requiring 81 hours of space-related instruction. Students completing this program are awarded a special skill identifier qualifying them to serve in space-related positions in Army and Joint commands.

Despite the increased attention given to space within the military education system, the core curriculum does not stress, at the appropriate levels, the tactical, operational or strategic application of space systems to combat operations. Military commanders and their staffs continue to rely on "space support teams" assigned to them in time of crisis to advise on the use of space capabilities. Commanders would be better able to exploit the full range of combat capability at their disposal if they were educated from the beginning of their careers in the application of space systems.

3. Science and Engineering Workforce

To build a cadre of space professionals, the Department of Defense needs to draw on the nation's best scientists and engineers. However, both industry and the U.S. Government face substantial shortages in these fields and an aging workforce. Experienced personnel from the Apollo generation are nearing retirement and recruitment is difficult. The aerospace and defense industries overall have seen their appeal battered by declining stock prices, steady layoffs, program failures and cost and schedule overruns. Without a sufficient base of interesting, leading edge technology programs, it is increasingly difficult for both industry and government to attract and retain talent.

Senior leaders in the space industry are unanimous in identifying recruiting and retention of qualified people as their number one problem.

Senior leaders in the space industry are unanimous in identifying recruiting and retention of qualified people as their number one problem. Their talent pool is aging and many experienced engineers are leaving industry. Filling the pipeline is a growing challenge, with the space industry being one of many sectors competing for the limited number of trained scientists and engineers.

The National Science Board recently reported that the U.S. has fewer science and engineering graduates than many major industrialized and emerging nations. At the same time, the demand for scientists and engineers is expected to increase in the next ten years at a rate almost four times that of all other occupations. The growing need for scientists and engineers is a national concern.

IV. Organizations that Affect National Security Space

The previous chapters identified U.S. national security interests in space and measures needed to advance them. This chapter describes the principal organizations involved in national security space activities, concentrating on the Executive Office of the President, the Department of Defense, the Intelligence Community and the Congress. It provides an assessment of how well this structure now serves the nation's interests in space.

A. Executive Office of the President

There is no single individual other than the President who can provide sustained and deliberate leadership, direction and oversight of national security space policy that is needed. Currently, responsibility and accountability for space are broadly diffused throughout the government.

The 1996 National Space Policy designates the National Science and Technology Council (NSTC), a Cabinet-level organization chaired by the President, as "the principal forum for resolving issues related to national space policy." The Office of Science and Technology Policy (OSTP) coordinates Federal policies for science and technology. The Director of OSTP also serves as the Assistant to the President for Science and Technology. In this role, he co-chairs the President's Committee of Advisors on Science and Technology and supports the NSTC. The policy directs that, "as appropriate, the NSTC and NSC [National Security Council] will co-chair policy processes."

In the National Security Council, national security space issues are currently assigned to the Senior Director for Defense Policy and Arms Control. Within this office, one staff member is assigned responsibility for space issues. This staff position supports the Senior Director for Intelligence on the NSC staff and also supports the Office of Science and Technology Policy on national security space issues.

This arrangement has not, does not and cannot provide the focused attention to space matters that is needed (Figure 20). The interdependence of the space sectors requires a more concentrated focus on space at the Cabinet level. The distribution of responsibility for space activity among many departments and agencies is less than ideal.

This arrangement has not, does not and cannot provide the focused attention to space matters that is needed.

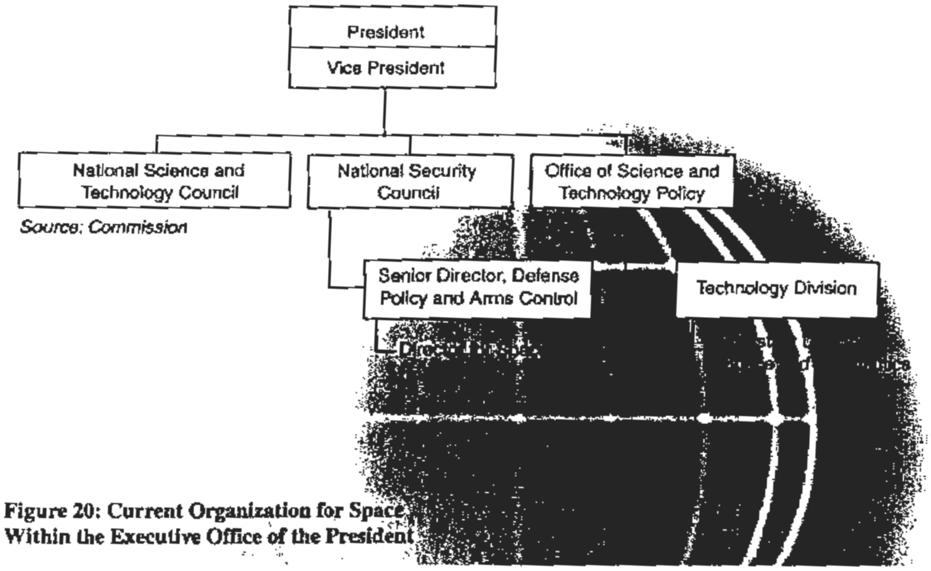


Figure 20: Current Organization for Space Within the Executive Office of the President

Moreover, the portfolio of the Senior Director with responsibility for space affairs on the NSC is broad. That combined with a lack of staff support means that space issues are selectively addressed, frequently only when they have become crises.

For the last two years, the NSC staff has worked to resolve a number of critical issues, such as licensing for earth remote sensing satellite services, modernizing the GPS constellation and integrating the nation's civil and military weather satellite systems. This case-by-case approach, however, has not allowed the development of a coherent, persistent and deliberate national process for implementing U.S. national security space policy.

B. Department of Defense

1. Secretary of Defense

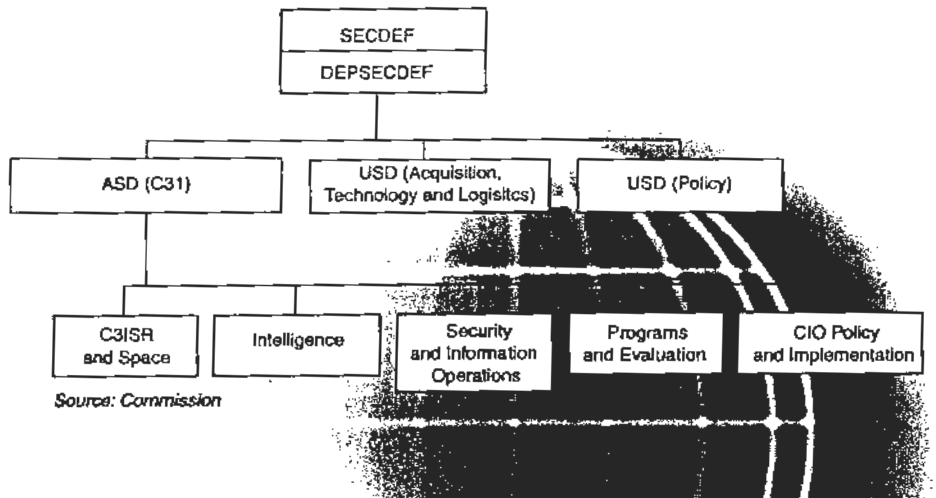
Title 10 of the U.S. Code, which provides the statutory basis for the Armed Services, assigns the Secretary of Defense as the principal assistant to the President in all matters relating to the Department of Defense. The Secretary has "authority, direction, and control" over the Department. With respect to those elements of the Intelligence Community within the Department, Title 50 U.S.C. provides the statutory basis for the Intelligence Community and directs that the Secretary, in consultation with the Director of Central Intelligence (DCI), "shall...ensure that [their] budgets are adequate...[and] ensure appropriate implementation of the policies and resource decisions of the Director of Central Intelligence by [those] elements..." This dual tasking establishes the obligation for the Secretary of Defense to ensure that the missions of the Department of Defense and of the Intelligence Community are successfully completed.

With respect to defense elements within the Intelligence Community, the DCI has the responsibility to "facilitate the development of an annual budget for intelligence and intelligence-related activities" and "establish the requirements and priorities to govern the collection of national intelligence by elements of the national intelligence community..." This includes those elements within the Department of Defense.

2. Office of the Secretary of Defense

The Deputy Secretary of Defense (DepSecDef) has generally been responsible for many aspects of the day-to-day management of the Department. On matters relating to space, the DepSecDef is usually involved in acquisition matters through the Under Secretary of Defense for Acquisition, Technology and Logistics, who serves as the Defense Acquisition Executive. As chairman of the Defense Resources Board, the DepSecDef is directly involved in budget decisions. With respect to intelligence, the DepSecDef and the DCI have historically conferred on policies, plans, programs and budgets for the Department of Defense and the Intelligence Community.

The relationship between the Secretary of Defense and the Director of Central Intelligence has evolved over time in such a manner that national security space issues do not receive the sustained focus appropriate to their importance to national security. Except for responding to urgent programmatic decisions, defense secretaries have generally delegated the management of national security space activities. Today, this responsibility is delegated to the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD (C3I)), who serves as the "principal staff assistant and advisor to the Secretary and Deputy Secretary of Defense and the focal point within the Department for space and space-related activities" (Figure 21). The ASD (C3I) in turn relies on deputy assistant secretaries to guide policy and acquisition and provide oversight of the Department's intelligence, surveillance, reconnaissance, information, command, control, communications and space programs.



Source: Commission

Figure 21: Current Organization for Space Within the Office of the Secretary of Defense

As established in the Department of Defense Space Policy, the ASD (C3I) coordinates space policy and acquisition with the appropriate Under Secretaries for Policy and for Acquisition, Technology and Logistics. In the role of principal staff assistant, the ASD (C3I) is charged with "authority, direction and control" of the Defense Intelligence Agency and Defense Security Service; "staff supervision" of the National Security Agency and the National Reconnaissance Office; and "overall supervision" of the National Imagery and Mapping Agency and the work of the National Security Space Architect (NSSA).

The ASD (C3I) also serves as the Chief Information Officer of the Department, and is the principal staff assistant in the Office of the Secretary of Defense (OSD) for developing, overseeing and integrating DoD policies and programs relating to the Department's information superiority strategy. In addition to space systems and space policy, ASD (C3I) functions include information policy and information management, command and control, communications, counterintelligence, security, information assurance, information operations, intelligence, surveillance and reconnaissance, and intelligence-related activities conducted by the Department.

The office of ASD (C3I) was first established in the early 1980s, restructured in the mid-1990s and restructured again in the late 1990s. Its development over time reflects an effort to provide a single point of responsibility for C3I within OSD. The evolving role for space in military operations, however, makes this difficult. Before the Gulf War, space capabilities were not well integrated into military operations. During and since the Gulf War, space has been seen as the place in which a combination of intelligence and surveillance sensors and command, control and communications systems could be based "to support the warfighter." The campaigns in Bosnia and Serbia extended the role for space. Information operations, which include the defense and attack of computer networks, were recognized as critical elements of military campaign planning. Many information operations are linked through satellites.

The scope of the ASD (C3I) portfolio reflects the difficult task of coordinating the many roles for space—national intelligence, support to the warfighter and information operations—across the many functions of DoD, which include policy, acquisition and interagency coordination. While concentrating responsibility in one office has advantages, the large number of issues to address and agencies to oversee and coordinate with results in a competition among them for the time and attention of the Assistant Secretary.

Within the organization, responsibility for space has devolved to a deputy assistant secretary. However, an official at this level does not have the rank to give space-related activities the visibility they need and to represent the Department in interagency fora.

In the office of the ASD (C3I), the Deputy Assistant Secretary of Defense for Programs and Evaluation is responsible for oversight of Service programming and budgeting for space-related C3I capabilities. It does not appear that this position has sufficient authority at the working level to influence policies that drive programming and budgeting decisions within the DoD.

The National Security Space Architect, who reports to both the ASD (C3I) and the head of the DCI's Community Management Staff, is charged with developing and coordinating space architectures that reflect the range of Intelligence Community and DoD space mission areas, with a view toward the mid- and long-term. However, the architect has no authority over the budgets or acquisition programs of the Services or the Intelligence Community.

The current ASD (C3I) organization suffers from three difficulties:

- The span of control is so broad that only the most pressing issues are attended to and space matters are left, on a day-to-day basis, in the hands of middle-level officials without sufficient influence within the Department and the interagency arena.
- Its influence on the planning, programming and budgeting process for space is too far removed or too late to have substantial effect on either the Services' or the Intelligence Community's processes.
- Within this structure, it is not possible for senior officials outside DoD to identify a single, high-level individual who has the authority to represent the Department on space-related matters.

3. Military Commanders in Chief (CINCs)

The nine CINCs are responsible for considering how space-based assets might be used to satisfy mission needs and how space capabilities and applications could be integrated into contingency and operational plans in their areas of responsibility. They also contribute to developing military requirements for space and space-related capabilities through the normal requirements process.

The CINCs are authorized to organize their forces as needed to carry out their assigned responsibilities. In recent military operations, the CINCs have organized functional commands for air, land and maritime operations. Future operations may well require a component commander for space due to the growing importance of space-based assets to combat operations.

4. Commander in Chief of U.S. Space Command and North American Aerospace Defense Command and Commander, Air Force Space Command

The Commander in Chief, U.S. Space Command (CINCSPACE) serves as the Commander in Chief, North American Aerospace Defense Command (CINCNORAD) and as the Commander, Air Force Space Command. As CINCSPACE, he serves as the advocate for the space requirements for all the CINCs and, on an annual basis, submits to the Chairman of the Joint Chiefs of Staff an Integrated Priority List that reflects these requirements. CINCSPACE has a broad set of responsibilities that are quite different in character. He is responsible for protecting and defending the space

environment. His responsibilities also include support of strategic ballistic missile defense and DoD's computer network attack and computer network defense missions.

With the growing dependence on space and the vulnerability of space-related assets, more attention needs to be given to deploying and employing space-based capabilities for deterrence and defense. As space missions continue to expand, space will continue to mature as an "area of responsibility." All of this will require CINCSPACE to pay more attention to the space tasks assigned by the National Command Authorities, leaving less time for other assigned duties as CINCNORAD and Commander, Air Force Space Command.

5. Military Services

Each military Service is directed by the Secretary of Defense to execute specific space programs, comply with DoD space policy and integrate space capabilities into its strategy, doctrine, education, training, exercises and operations. Each Service is free to develop those space capabilities needed to perform its mission. However, no single Service has been assigned statutory responsibility to "organize, train and equip" for space operations. Eighty-five percent of space-related budget activity within the Department of Defense, approximately $7 billion per year, resides in the Air Force.

U.S. Air Force

The Air Force provides the facilities and bases, and operates and maintains its assigned space systems, to support the operational requirements of the U.S. Combatant Commands. These activities include surveillance, missile warning, nuclear detection, position, navigation, timing, weather and communications. The U.S. Air Force launches satellites for DoD and other government agencies and is responsible for air and missile defense and space control operations. The Air Force does not develop, acquire or operate the space-based reconnaissance satellites on which it and the other Services rely for precision, targeting, location and battlespace awareness. Those systems are developed, acquired and operated by the National Reconnaissance Office.

No single service has been assigned statutory responsibility to "organize, train and equip" for space operations

Within the Air Force, space-related activity is centered primarily in four elements (Figure 22). Space systems operations and requirements are organized under Air Force Space Command (AFSPC). The 14th Air Force launches the NRO, DoD and selected civil satellites and provides support for commercial satellite launches. The 14th Air Force also provides space-based support to the CINCs, and supports NORAD by providing missile warning and space surveillance information. Air Force Space Command develops all Air Force space requirements and works with the other Services in developing their requirements.

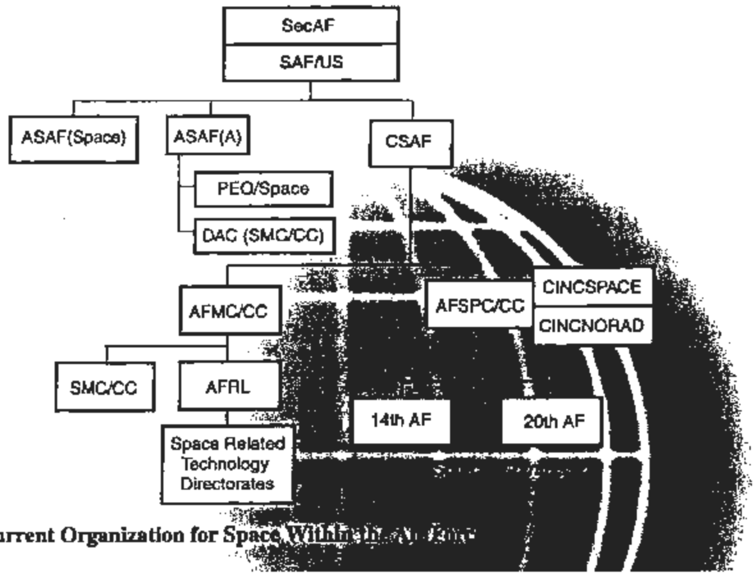


Figure 22: Current Organization for Space Within the Air Force

Design, development and acquisition of space launch, command and control, and satellite systems are conducted by personnel assigned to the Space and Missile Systems Center (SMC) under the Air Force Materiel Command. The Program Executive Officer (PEO) and the SMC Commander, who also serves as the Designated Acquisition Commander (DAC), report to the Assistant Secretary of the Air Force for Acquisition on the cost, schedule and performance for the programs in their portfolios. The Air Force Research Laboratory, also part of Air Force Materiel Command, conducts advanced technology research.

The Air Force role as the lead Service for space dates to the 1960s, with the creation of the Air Force Research and Development Command—the predecessor to Air Force Systems Command. The Air Force has since made a series of adjustments in the organization of its space activities. In many cases, these adjustments responded to a growth in responsibilities for space operations and space mission management. In 1982, for example, the Air Force Space Command was created because of growing dependence on space, the evolving threat from the Soviet Union, the growing space budget and a perceived need to "operationalize" space.

In the future, space will play an expanded role in transforming U.S. military forces; providing support to air, land and sea forces; conducting new missions of space surveillance; protecting space capabilities; and projecting power in, from, to and through space. These new missions will expand the Department's deterrence and defense capabilities into space.

Few witnesses before the Commission expressed confidence that the current Air Force organization is suited to the conduct of these missions. Nor was there confidence that the Air Force will fully address the requirement to provide space capabilities for the other Services. Many believe the Air Force treats space solely as a supporting capability that enhances the primary mission of the Air Force to conduct offensive and defensive air operations. Despite official doctrine that calls for the integration of space and air capabilities, the Air Force does not treat the two equally. As with air operations, the Air Force must take steps to create a culture within the Service dedicated to developing new space system concepts, doctrine and operational capabilities.

As with air operations, the Air Force must take steps to create a culture within the Service dedicated to developing new space system concepts, doctrine and operational capabilities.

U.S. Army

Space operations assigned to the Army are conducted by Army Space Command, an element of the Army's Space and Missile Defense Command (SMDC). Army Space Command is assigned as the Army component to U.S. Space Command. Army Space Command is assigned payload control responsibility for the Defense Satellite Communications System (DSCS) and operates Ground Mobile Forces terminals, providing DSCS communications to DoD forces forward deployed worldwide. The Army conducts space surveillance operations from Kwajalein Atoll in the Marshall Islands. Satellite terminal and receiver operations are spread throughout the Army, based in units responsible for a particular function. Joint Tactical Ground Stations are co-operated by the Army Space

Command and Naval Space Forces in Europe, Korea and the Middle East. Army intelligence units assigned worldwide operate a variety of terminals and receivers that collect and receive space, air and ground intelligence.

The Department of the Army Headquarters approves Army space requirements developed by SMDC's Force Development Integration Center. However, Army Space Command and the Army Training and Doctrine Command also influence the development of Army space requirements. Research, development and acquisition of space-related equipment are generally conducted within the Space and Missile Defense Command, the Intelligence and Security Command or the Communications Electronic Command. The Army Space Program Office has responsibility for the operation of systems acquired through the Army's Tactical Exploitation of National Capabilities (TENCAP) program.

U.S. Navy

Naval Space Command serves as the naval component of U.S. Space Command. Its responsibilities include operating assigned space systems for surveillance and warning; providing spacecraft telemetry and on orbit engineering; developing space plans, programs, concepts and doctrine; and advocating naval warfighting requirements in the joint arena. Space research and development in the Navy is conducted by the Naval Research Laboratory. Space requirements for the Navy and Marine Corps are developed by Naval Space Command; space systems are acquired by the Space and Naval Warfare Systems Command. The Navy also maintains a small TENCAP office to enhance warfighter use of national security space information.

Naval Space Command serves as the Alternate Space Command Center to U.S. Space Command's primary center located at Cheyenne Mountain, Colorado. It is also responsible for operating the Navy Radar Fence, which contributes to space surveillance. The Navy operates the UHF Follow-On constellation of communication satellites, is responsible for the development and acquisition of its replacement system, the Multi User Objective System, and acquires Navy ground terminals. The primary mission of Naval Space Command is to provide direct space support to Fleet and Fleet Marine Force operational units around the world, whether for routine deployments, exercises or crisis response.

6. National Reconnaissance Office

> *The NRO today is a different organization, simultaneously struggling to manage a large number of legacy programs while working to renew a focus on leading edge research.*

The National Reconnaissance Office (NRO) is the single national organization tasked to meet the U.S. Government's intelligence needs for space-borne reconnaissance. The NRO is responsible for unique and innovative technology; large-scale systems engineering; development, acquisition and operation of space reconnaissance systems; and related intelligence activities needed to support national security missions. While the NRO is an agency of the Department of Defense, its budget, the National Reconnaissance Program (NRP), is one part of the National Foreign Intelligence Program (NFIP). The Director of Central Intelligence provides guidance for and approves the NRP and all other elements of the NFIP. The Secretary of Defense ensures implementation of the DCI resource decisions by DoD elements within the NFIP. As a result, the NRO is a joint venture between these organizations.

The NRO had a reputation as one of the U.S. Government's best system acquisition agencies and worked to maintain exceptional systems engineering capabilities. In its early years, the NRO was a small, agile organization, a leader in developing advanced technologies, often first-of-a-kind systems, for solving some of the nation's most difficult intelligence collection challenges. The NRO today is a different organization, simultaneously struggling to manage a large number of legacy programs while working to renew a focus on leading edge research. The NRO's capacity to convert leading edge research and technology into innovative operational systems is inhibited by the requirement to maintain its legacy programs.

The NRO has been very successful in collecting intelligence globally and, as a result, customers have become increasingly dependent on the products from satellite reconnaissance. The NRO has spent an increasing amount of time operating and maintaining a large number of legacy satellite reconnaissance programs. To minimize the risk of disruption in service to its customers in this resource-constrained environment, the NRO's plans for new system acquisitions tend to stress operational utility and reliability, while reducing technical risk. This approach has the effect of favoring evolutionary improvements to current systems and less focus on developing new systems that incorporate revolutionary technical advances.

C. Intelligence Community

The Director of Central Intelligence is the principal advisor to the President for intelligence matters related to national security and serves as the head of the Intelligence Community. The DCI is responsible for providing national intelligence to the President, to the heads of departments and agencies of the executive branch, to the Chairman of the Joint Chiefs of Staff and senior military commanders and, when appropriate, to the Congress. "National intelligence" refers to "intelligence which pertains to the interests of more than one department or agency of the government."

The elements of the Intelligence Community include: the Office of the Director of Central Intelligence; the Central Intelligence Agency; the National Security Agency; the Defense Intelligence Agency; the National Imagery and Mapping Agency; the National Reconnaissance Office; other offices within DoD for the collection of specialized national intelligence through reconnaissance programs; the intelligence elements of the Army, Navy, Air Force, Marine Corps, Federal Bureau of Investigation, Department of the Treasury and Department of Energy; and the Department of State's Bureau of Intelligence and Research (Figure 23).

The DCI develops and presents to the President an annual budget for the National Foreign Intelligence Program, which is distributed throughout the budgets of the various departments and agencies that comprise the Intelligence Community.

The Community Management Staff, managed by the Deputy Director of Central Intelligence for Community Management, assists the DCI in coordinating and managing the Intelligence Community, including responsibility for managing resources and collection requirements and assessing space programs and policies. It is also responsible for coordinating policy and budgets with the Office of the Secretary of Defense. The Community Management Staff has made substantial progress in coordinating the planning and budgeting of the components of the Intelligence Community. However, it does not have authority to reprogram in-year money within components, an authority that would enhance its direction of Intelligence Community affairs. Nor is it well structured to coordinate with OSD on broad intelligence policy, long-term space strategy and other issues requiring intelligence support.

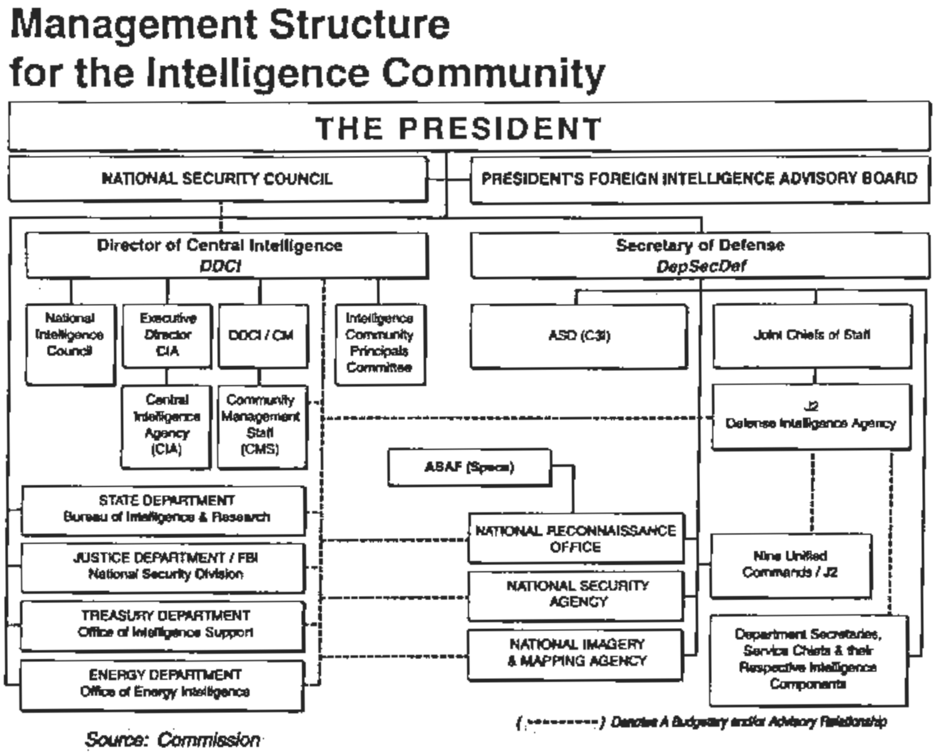


Figure 23: Current Intelligence Community Management Structure

D. Congress

Congressional oversight of the authorization and appropriation of national security space funding routinely involves no fewer than six committees. These include the House and Senate Armed Services Committees (HASC/SASC), the House and Senate Appropriations Committees (HAC/SAC), the Senate Select Committee on Intelligence (SSCI) and the House Permanent Select Committee on Intelligence (HPSCI), as well as the Budget Committees. Four or five committees review DoD space programs; six committees review intelligence space programs. For example, the HPSCI reviews the Joint Military Intelligence Program and the Tactical Intelligence and Related Activities program; the SSCI does not. While an exception, some civil space activities can be reviewed by as many as 13 committees.

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Generally, each committee mirrors the priorities of the executive branch interests it oversees. The intelligence committees focus on issues concerning "sources and methods" and on the ability of the Intelligence Community to provide intelligence to the National Command Authorities. The Armed Services committees contend with competing space requirements of the three Services, the military intelligence agencies and the CINCs, and tend to see national intelligence primarily as support for combat forces. The appropriations committees' subcommittees on defense oversee all defense and intelligence space programs and are one place where national security space programs are viewed together. However, they focus primarily on budgets.

Executive branch officials must expend considerable time and energy interacting with a large number of committees and subcommittees that, on some matters, have overlapping jurisdiction. To the extent that this process can be streamlined, it would likely benefit the nation, Congress and the executive branch. It would also help if there were an environment in which national security space matters could be addressed as an integrated program—one that includes consideration for commercial and civil capabilities that are often overlooked today.

V. Management of National Security Space Activities

A number of issues transcend organizational approaches and are important to the ability of the U.S. to achieve its objectives in space. These are issues that the national leadership, the Department of Defense and the Intelligence Community should address in the near term, irrespective of particular organizational arrangements that may be pursued. Resolution of them would both benefit and support organizational changes.

A. Interagency Coordination

1. Current Interagency Process

The current interagency process is inadequate for the volume and complexity of today's space issues. For the most part, the existing interagency process addresses space issues on an as needed basis. As issues in the space arena inevitably become more complex, this approach will become increasingly unsatisfactory. What may be needed is a standing interagency group to identify key national security space issues, to guide, as necessary, the revision of existing national space policy and to oversee implementation of that policy throughout the departments and agencies of the U.S. Government. The need for a standing interagency coordination process is made more urgent by the fact that there are a number of pending issues on space affairs in Congress, in domestic regulatory bodies and in international trade and arms control negotiating fora. To avoid unintended and deleterious effects on the space sectors, these issues must be addressed in a comprehensive fashion.

2. Pending Agenda

The domestic and international issues facing the U.S. demand a coherent policy approach and deliberate direction for their treatment. A sample of that agenda includes:

- Arms control issues that China, Russia, Greece and Pakistan have raised in the United Nations Committee on Peaceful Uses of Outer Space.

- World Trade Organization negotiations regarding market access for commercial satellite systems.

- Domestic allocation of spectrum for third generation wireless (scheduled to occur by July 1, 2001) and the potential authorization of commercial ultrawide band services (a pending Federal Communications Commission rulemaking proceeding), both of which may affect DoD use of spectrum for military operations, government use of commercial spectrum and commercial use of government spectrum.

- Claims of developing countries regarding equitable access to radio frequency spectrum and orbital locations.

- U.S. and international development of orbital debris and deorbiting policies.

- Domestic licensing issues involving commercial, civil and national security interests, such as remote sensing policies, export control and foreign ownership.

B. SecDef/DCI Relationship

No relationship within the executive branch touching on national security space is as important as the one between the Secretary of Defense and the Director of Central Intelligence.

> *No relationship touching on national security space is as important as the one between the Secretary of Defense and the Director of Central Intelligence.*

Together, the Secretary and the DCI control national security space capabilities. Neither can accomplish the tasks assigned without the support of the other. The Secretary's support is needed by the DCI to field and operate intelligence systems. The DCI provides much of the intelligence required by the Secretary to support the development of U.S. military capabilities and the conduct of military operations. The Secretary's interest in and support of intelligence is critical to the DCI. The higher the Secretary's level of interest, the closer the relationship with the DCI is likely to be as the two work to assure the development and fielding of systems and the conduct of operations essential to the nation's security.

Since the two positions were created in 1947, and especially since the NRO was created in 1960, the relationship between the two officials has varied. While the Secretary and the DCI have established processes through which to cooperate on routine national security issues, they have not given the national security space program their sustained, joint attention for nearly a decade. Nor have the urgent issues related to space control, information operations and the assessment of the threats the nation faces from space received the attention they deserve. Specifically, the U.S. must:

- Invest in advanced technologies.
- Exploit the commercial market to supply imagery to relieve the burden on national systems.
- Make revolutionary changes in the nation's intelligence collection systems.
- Develop space-based systems to meet pressing military requirements.

The Secretary and the DCI need to align their respective staff offices so that coordination on intelligence issues broadly, and space matters specifically, is easier and more direct between the two. There is no systemic organizational impediment to such alignment or to meeting the need for increased attention to critical issues. It is a matter of the priorities of the Secretary and the DCI and how they choose to delegate and oversee responsibilities for space-related concerns.

C. Acquiring and Operating Space Systems

The Department of Defense and the Intelligence Community acquire and operate most of the satellites used to support defense and intelligence missions. Within DoD, the Air Force is the Service that acquires most of the Department's satellites; the National Reconnaissance Office is the acquisition agent for the Intelligence Community's satellites. The two organizations have approached satellite acquisition and operations differently over time, although the processes have evolved in a similar fashion in recent years. Understanding the differences, however, is useful in evaluating alternatives to organizing and managing these functions in the future.

1. Budgeting

The DoD and NRO processes for assembling and approving budgets are similar. In DoD the Services identify the resources, including the funds, people and facilities, needed to support approved system requirements. The Services' space inputs are generated by their respective Space Commands, reviewed by Service Headquarters staffs, submitted by Service Secretaries, integrated and rationalized by the OSD staff through a structured process, and approved by the Secretary of Defense. In the NRO, the inputs are generated by its directorates; reviewed, integrated and rationalized by its staff; and submitted by the Director of the National Reconnaissance Office (DNRO) for DCI approval.

2. Satellite Acquisition

For acquisition, the DoD approval chain is from the program managers, to the Program Executive Officers, to the Component Acquisition Executive. In the NRO, the approval chain is from the program managers, to the directorate heads, to the Service Assistant Secretary for Acquisition and the DNRO. For major DoD programs, such as satellite systems, the Defense Acquisition Executive is the final decision authority. For all NRO programs, the DNRO is delegated the final decision authority, eliminating one layer of bureaucracy and the accompanying staff review.

Both the Air Force and the NRO acquire space systems under authorities from the Secretary of Defense (Figure 24). For some purposes unique to its mission, the NRO also operates under authorities derived from the Director of the Central Intelligence Agency, as provided for in the Central Intelligence Agency Act of 1949, as amended. The DoD acquisition process is described in Department of Defense Directive 5000.1 and applies to all major systems. In the early 1990s, the Deputy Secretary of Defense exempted the NRO from DoD Directive 5000.1 and directed the development of an equivalent process, known as Directive 7. Directive 7, in essence, tailored the basic principles in 5000.1 specifically for the acquisition of space systems, the NRO's only line of business, which resulted in a more streamlined process than that of the DoD. In the fall of 2000, however, DoD revised its 5000.1 directive to streamline the DoD acquisition process. It is now similar to the Directive 7 process.

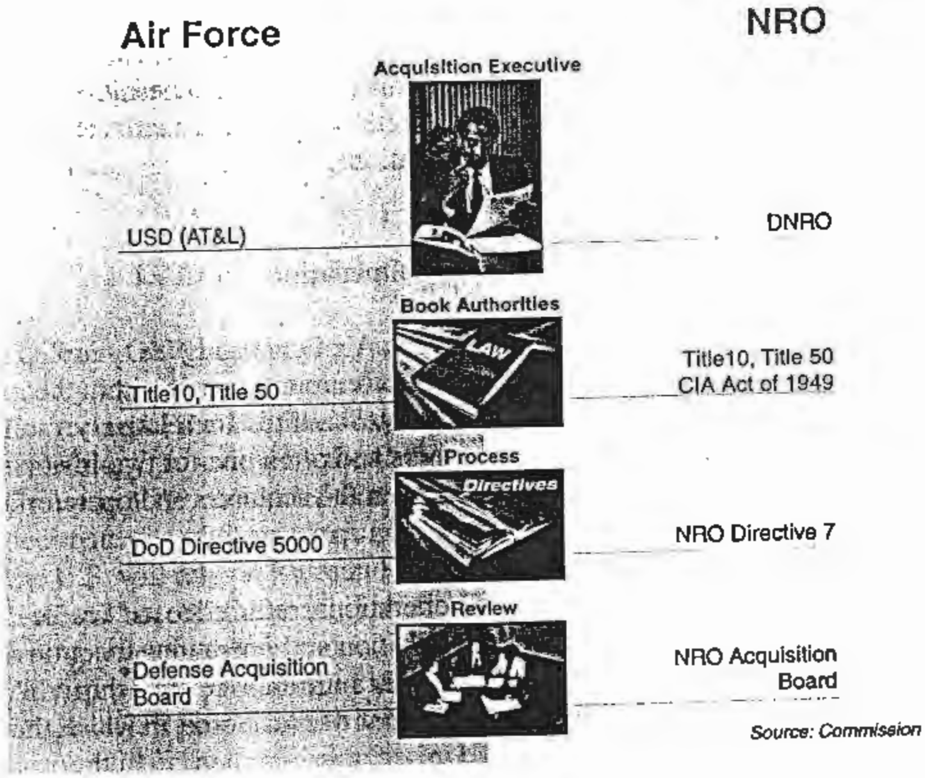

Figure: 24 Acquisition Oversight in the Air Force and the NRO

3. Satellite Operations

The use of NRO and Air Force satellites is sufficiently different that the approach to operations in the two organizations is also different in character. With the exception of station keeping and repositioning, operations of DoD satellites are characterized for the most part by constancy of operations. Operators monitor but do not interact with the satellites unless there is an anomaly. In contrast, NRO satellite operations are tasked frequently in response to constantly changing collection requirements. Operators intervene in real-time on a routine basis, often with each orbit of the satellite, to change the satellite configuration. These characteristics demand continuity of highly experienced, on-site technical experts who are extremely knowledgeable about the satellite design features. To support these requirements, NRO satellite operations rely on crews comprised of a government lead and a crew of contractor technical experts. However, DoD satellite operations rely less on contractor technical support at the ground stations.

Future DoD systems like the Space Based Infrared System will operate more like NRO systems. Therefore, the operational philosophies of the two organizations are likely to become more similar. Air Force acquisition and operations will have to be more closely linked to ensure the continuity and technical expertise needed in the ground stations.

4. Integrated Acquisition and Operations

While there are growing similarities between Air Force and NRO satellite acquisition and operations, how these functions are integrated within the two organizations is still quite different today. Satellites are relatively unique systems, purchased in small numbers and often one- or two-of-a-kind. As a result, a close relationship between the acquirers and operators can be beneficial throughout the life cycle of a space system.

The NRO's approach to acquisition and operations, referred to as "cradle-to-grave," more closely integrates the acquisition and operations functions within the organization. This approach creates a different relationship between the acquirers and operators than that of the Air Force, in which the acquisition and operations elements are in separate commands. In the NRO model, the individuals involved in acquiring the satellites are the same individuals who fly the satellites. Therefore, the experiences and understanding derived from operations can more directly influence satellite design; the reverse is also true. When the operators are on the technical design team, their capacity to resolve on-orbit anomalies during satellite operation is greater. This is not the case in the Air Force, where the operators have less direct influence in design. These differences amount, in essence, to different organizational cultures within NRO and Air Force space activities, an understanding of which is essential to determining whether and how the activities might be integrated over time.

D. Pursuing "Leap Ahead" Technologies

Technology has been a major driver of U.S. economic growth over the past five decades. Scientific discovery and technological innovation have been important elements of U.S. economic and military leadership, and have improved the quality of life in the United States. Technological superiority has aided the U.S. military in maintaining its worldwide commitments even as the size of its force has been reduced. As the spread of high technology weaponry on the world market continues, it will become increasingly difficult to stay ahead, particularly in space-related technologies. The Department of Defense needs to provide both resources and direction to ensure that advances in space technology continue.

1. Managing Science and Technology Programs

Declining budgets and programmatic instability have had a major impact on key technologies required by the defense and intelligence space sectors. For example, the U.S. has lost its preeminence in rocket propulsion technology. A review by the Defense Science and Technology Advisory Group in 1999 concluded that funding perturbations could potentially decimate one of the nation's priority propulsion initiatives. For example, the U.S. will rely on Russian RD-180 technology to power some of its core Evolved Extended Launch Vehicle (EELV) booster fleet. In addition to losing preeminence in space booster technology, the Air Force Scientific Advisory board declared in 1995 that "other countries have taken the lead in spacecraft propulsion, where U.S. technology is behind what has been accomplished in the former Soviet Union."

Certain core technologies rely on a narrow industrial base. The U.S. Government may need to sustain critical providers through innovative programs such as "centers of excellence." Radiation-hardened parts and atomic clocks are two examples of the larger problem of an eroding industrial base. In each of these cases, the business base is inadequate to sustain the companies that supply the components. In the case of radiation-hardened parts, market forecasts project a decline in the business base of 50 to 60 percent. The sole U.S. company that produces the atomic clock critical to the U.S. GPS system announced in 2000 that it plans to stop production because of insufficient market demand.

The Department needs to actively coordinate science and technology investments across the space technology community so as to better integrate and prioritize these efforts, many of which have application across all space sectors. The defense and intelligence sectors need to partner more closely with the civil sector. Some NASA research and development programs have national security applications. Investments in launch infrastructure and launch vehicles have clear applications across all sectors.

Many attempts have been made, but with limited success, to coordinate space technology planning, development and projects among the various space technology communities. In 1997, the Space Technology Alliance, an informal organization with membership that includes executive-level technical directors from NASA, DoD, the Intelligence Community and others, was established to coordinate the development of space technologies. This has done much to improve the level of interagency coordination, but even so, a number of priority national issues need attention at a higher level. Modernization of U.S. launch ranges and the development of a reusable launch vehicle, both of which are key drivers to reducing the cost of access to space for government and commercial purposes, are critical examples.

2. Space Technology Goals

The Department of Defense should focus its space technology investment strategy on:

- Reducing the cost of launch and space systems by emphasizing miniaturization and new ways of doing business (Figures 25).
- Developing new sensors that can detect and track smaller, moving and concealed targets under all environmental conditions.
- Promoting on-orbit data processing and artificial intelligence to reduce human operator costs and the burden of high data volume on the communications infrastructure.
- Developing advanced launcher and propulsion technology to reduce the cost of getting to and maneuvering on orbit.
- Developing on-orbit servicing equipment that can extend space system life expectancy and makes it possible to upgrade system capabilities on orbit.
- Developing advanced surveillance and defensive and offensive technologies needed for space control and information operations (Figures 26).
- Developing advanced command and control, guidance and pointing, power generation, materials and optics technologies needed for power projection from space.

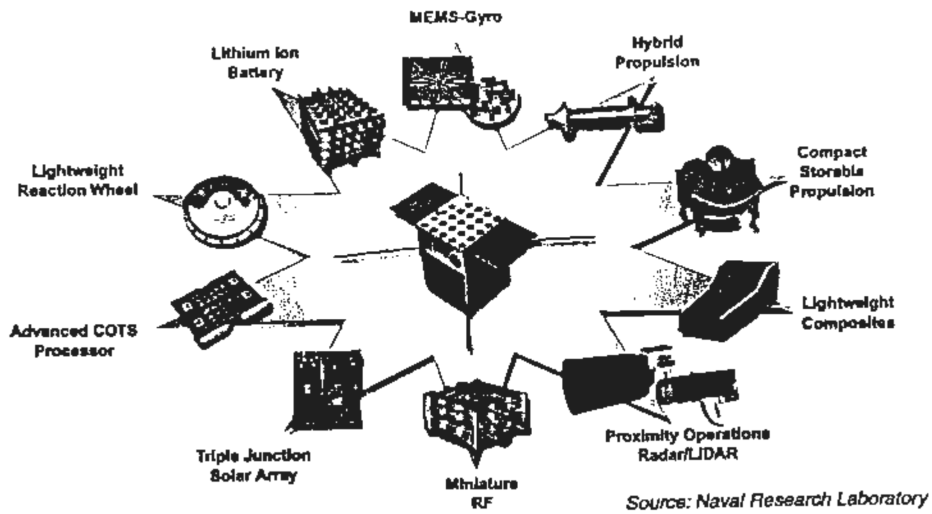

Figure 25: Examples of advanced space system technologies

Source: Air Force Space Command
Figure 26: Artist rendering of the space based laser demonstration project, now in research and development.

In addition to establishing possible areas for investment, the Department, in cooperation with the space community, needs to ensure that an environment exists within which experimentation and innovation will flourish. Most successful science and technology programs are conducted in organizations well apart from the bureaucratic mainstream. It would serve the space community well to establish temporary joint interagency program offices to foster flexible, innovative and adaptable space technology research and development.

E. Leveraging the Commercial and Civil Sectors

The commercial and civil space sectors provide satellite services and scientific and engineering resources useful for national security space. In the United States, investments from commercial space activities now exceed

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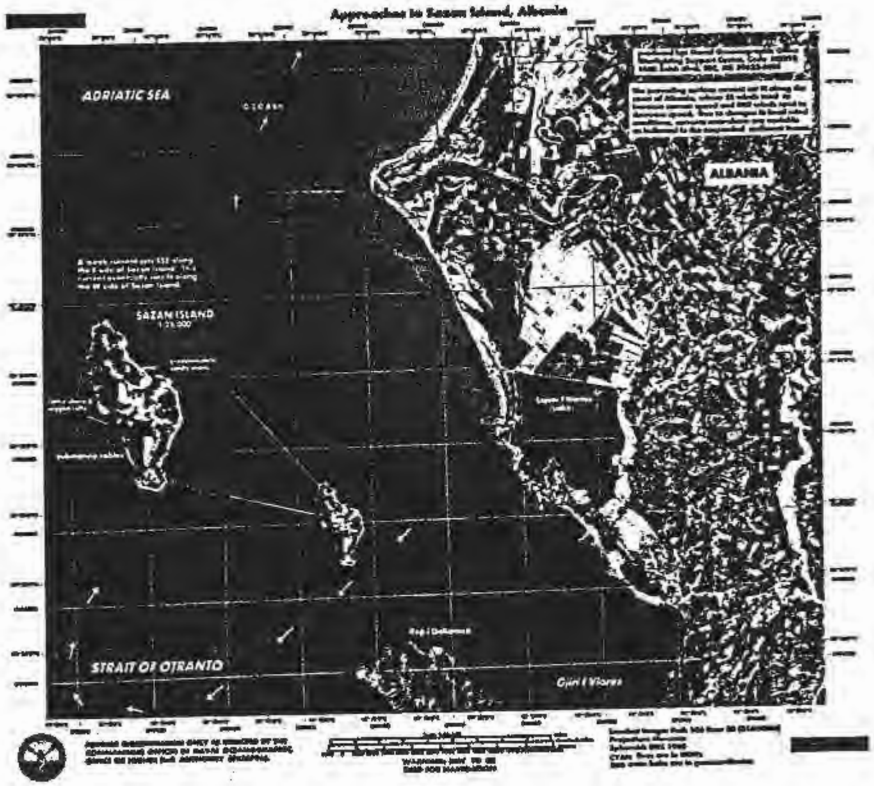
those of the U.S. Government by a factor of two. For decades, in conflict and in peacetime, the Department of Defense and the Intelligence Community have turned to the commercial industry to develop new technologies, design new systems and build hardware. They rely as well on industry to provide services, such as satellite communication and imagery services, when U.S. Government capabilities cannot meet requirements (Figure 27).



Source: Naval Oceanographic Office Warfighter Support Center, Stennis Space Center, Mississippi (Approved for Public Release)
Figure 27: U.S. military forces use commercial imagery for "intelligence preparation of the battlefield"

Despite the importance of the U.S. commercial and civil space sectors to the successful completion of the national security mission, the U.S. Government has no comprehensive approach to incorporating those capabilities and services into its national security space architecture. Nor does it have well-defined policies to enhance the competitiveness of the commercial and civil industries. The U.S. Government, as a consumer, a regulator or an investor, is currently not a good partner to the national security space industry.

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1. Launch Facilities

Air Force launch facilities continue to support both government and commercial launches, even as the number of commercial launches from these facilities approaches half of the total. Privatizing the maintenance and operations of the launch infrastructure is a valid consideration as long as the U.S. Government retains control of certain core governmental functions, such as making critical safety decisions on destroying a rocket that has strayed off course. The commercial sector is gaining experience in space operations. Three states, New Mexico, Virginia and Alaska, are developing spaceports to handle commercial and government customers. In October 1996, NASA began the transfer of responsibility for day-to-day operations and management of the U.S. Space Shuttle fleet to United Space Alliance, a commercial space operations company, while retaining oversight of the Space Shuttle program. The Department of Transportation is responsible for issuing licenses to private companies to provide commercial space payload processing and launch services at the two government launch sites.

2. Export Control Policy

Except where exclusions are needed for national security purposes, U.S. Government policies should encourage the U.S. commercial space sector to earn as much of the international commercial space market as possible. U.S. industry, therefore, deserves timely responses from the U.S. Government in approval or denial of licenses. Unfortunately, the current process produces long delays in licensing approval. The Canadian government, for example, originally intended to award a contract to build Radarsat 2 to a U.S. company, but awarded it instead to an Italian company because of U.S. export control procedures and regulations. Industry reports many instances in which it took months to get permission to hold a meeting with a close U.S. ally, and in one case took weeks to get permission to make a phone call to a foreign entity. This sort of delay is damaging to U.S. industry in today's fast-paced, international markets. The U.S Government must develop and evolve new export control and licensing processes that will promote the commercial space industry, while being mindful of national security considerations.

3. Satellite Services

The U.S. Government and its allies have turned to the commercial sector for many satellite services and products and will continue to do so (Figure 28). Among the many examples of commercial products used by the U.S. Government are these:

- In 1991, the U.S. military procured commercial remote sensing imagery from a non-U.S. company during Desert Storm. Commercial satellite communications services were critical to U.S. Army missions.

Source: Air Force Space Warfare Center

Figure 28: The U.S. military uses commercial satellite communications to support its missions

- In 1995, the U.S. Navy bought more than two million minutes of service on an intergovernmental satellite system constellation, and many Navy ships communicate through the system today.

- The U.S. Government has leveraged commercially-developed direct broadcast satellite technology for its Global Broadcast Service.

The Department of Defense and the Intelligence Community are not likely to own and operate enough on-orbit assets to meet their requirements. According to RAND Corporation, "in the near term, there are not enough military systems to satisfy projected communications demand and commercial systems will have to be used." The Department of Defense uses commercial services on a daily basis. However, it often procures these services on an ad hoc basis rather than integrating them into its space architecture planning process because of a concern over potential unavailability in a crisis situation. Furthermore, the Department builds capabilities that could perhaps be more economically provided by the commercial sector.

Besides satisfying DoD needs, greater use of commercial satellite systems also could facilitate more effective operations with U.S. allies by providing greater interoperability between some U.S. and non-U.S. military satellite systems. The U.S. Government should become a more reliable customer for commercial products and should plan to augment internal capabilities with commercial products and services in developing future space architectures. The Department of Defense should buy commercial services and products unless a unique requirement can be justified.

4. Multinational Space Alliances

Multinational alliances can increase U.S. space capabilities and reduce costs, as well as give the U.S. access to foreign investment, technology and expertise. Fostering these alliances can help maintain the U.S. position as a leader in the global space market. Civil multinational alliances provide opportunities for the United States to promote international cooperation and build support among other countries, especially emerging space-faring nations and developing countries, for U.S. positions on international policy or regulatory concerns.

F. Budgeting for Space

Currently, there is no DoD appropriation that identifies and aggregates funding for space programs. Space funding is a part of many appropriations spread across DoD and Intelligence Community budgets. Most of the funding for national security space is in the Air Force and National Reconnaissance Office budgets. The Army and Navy each fund space programs that are primarily in support of Service-unique requirements. The Army funds common user and Army-unique ground terminals, and the Navy funds the UHF Follow-On program, the Multi-User Objective System and Navy terminals. These multiple appropriations lead to several problems:

- When satellite programs are funded in one budget and terminals in another, the decentralized arrangement can result in program disconnects and duplication. It can result in lack of synchronization in the acquisition of satellites and their associated terminals.

- It can also be difficult for user requirements to be incorporated into the satellite system if the organization funding the system does not agree with and support those user requirements.

- Since the Air Force builds most DoD space systems, the Army and the Navy fund little research and development for space.

Of some concern is that, although the Army and the Navy represent DoD's largest users of space products and capabilities, their budget activities consistently fail to reflect the importance of space. Their rationale is that space technology programs should be funded by the Air Force. This dichotomy between the importance of space to the Army and the Navy versus the funding commitment these Services make needs to be addressed.

The current method of budgeting for national security space programs lacks the visibility and accountability essential to developing a coherent program. Alternative budget mechanisms, such as a major force program or space appropriation, would be useful in raising the visibility of the national security space program in the Department of Defense's budgeting process.

1. Major Force Program

A Major Force Program (MFP) is a tool to track program resources independent of Congressional appropriations. Currently, 11 such MFPs cover functional areas such as strategic programs, general-purpose forces, guard and reserve, and airlift. Each MFP is further broken into program elements that track dollars and people across the various appropriations assigned to a particular program, such as the F-22 aircraft, the DDG-51 destroyer and the UH-60 helicopter. While there are program elements dedicated to particular space programs, such as SBIRS or the EELV, there is no MFP for space and related programs, nor is there any comprehensive effort in DoD to identify all space and related ground elements.

All MFPs, except MFP 11, are managed decentrally. In the case of MFP 11 for special operations forces, the Congress directed that management control of those resources be exercised by the Commander in Chief, U.S. Special Operations Command.

2. Space Appropriation

An alternative approach is to consolidate space programs in specific Congressional appropriations. For example, there are such appropriations for Air Force aircraft, for Army military personnel and for Navy shipbuilding. No similar appropriation exists for space programs, even in the Air Force. While an appropriation effectively "fences" programs by Service or defense agency, it does not necessarily provide insight into the dynamics of the individual programs.

G. Exercises, Experiments and Wargames

The military uses a variety of tools to simulate warfighting environments in support of exercises, experiments and wargames. However, these tools have not been modernized to take into account the missions and tasks that space systems can perform. As a result, simulation tools cannot be used as effectively to understand the utility of space-based capabilities on warfare.

1. Exercises

Military exercises generally involve training with current capabilities. To the extent feasible, Service and joint exercises train forces for missions they may be called upon to perform during conflict. Incorporating actual space capabilities into exercises is difficult. Intelligence satellites can provide some products in real time, but because training objectives are usually scripted, synthetic intelligence products are often used. Because doing so would shorten their operational lives, satellites are rarely moved to accommodate the requirements of an exercise. Because of potential loss of control of the satellite, ground stations are not disabled. Nor are satellites such as GPS jammed, because to do so would interrupt their real world missions.

Space capabilities should be embedded in military exercises.

As a result, military commanders have had relatively little experience in learning to cope with the loss or temporary interruption of key space capabilities, such as GPS, satellite communications, remote sensing or missile warning information. Space capabilities should be embedded in military exercises. The 527th Space Aggressor Squadron, created in October 2000 by the Air Force, is the kind of capability that could be incorporated into exercises to demonstrate the impact of warfighting operations on hostile actions directed against space-based capabilities.

2. Experiments

Experiments are conducted primarily to evaluate prototypes or upgraded capabilities. Service battle labs and research organizations have conducted experiments involving space applications for years. These experiments have made possible new capabilities such as near real-time imagery transmitted to the cockpit, space-based tracking of friendly forces and dissemination of missile warning data. Most space experiments tend to be conducted by a single Service, despite the fact that space systems support joint missions. Experiments need to focus more on joint applications. A Space Applications Experimentation Cell at Joint Forces Command could provide the leadership needed to encourage more innovative experiments for this purpose.

3. Wargames

Wargames, unlike exercises and experiments, are devised to examine future concepts. These are particularly applicable to concepts relating to space, in which satellite constellations costing tens of billions of dollars can be simulated with a few keystrokes. The Services, OSD and NRO conduct wargames that address vital emerging national security space concepts and issues. These activities should be expanded to include greater participation of senior-level officials from the national security community. Standardizing the force structures and timeframes examined within the different wargames would be useful to enable comparisons of the lessons learned in various games. More should be done to ensure that NRO wargaming capabilities are included in Service, joint and combined wargames to foster greater collaboration on future space system concepts.

4. Models and Simulation

The Department of Defense uses models and simulation to help develop system requirements, test new system concepts, plan acquisition and conduct useful but less expensive training. Historically, DoD has measured the potential combat effectiveness of new systems by simulating their employment in mock combat. Because the value of communications, intelligence and space systems can be difficult to quantify, their contributions to warfighting are not accurately captured in current models and simulations. To support exercises, experiments and wargames, the Department must develop and employ modeling and simulation tools based on measures of merit and effectiveness that will quantify the effects of space-based capabilities.

VI. Organizing and Managing for the Future

National security space organization and management today fail to reflect the growing importance of space to U.S. interests. The Defense Science Board Task Force on Space Superiority observed that "the use of space has become such a dominant factor in the outcome of future military conflict and in the protection of vital national security interests that it should take on the priority…similar to that which existed for Strategic Forces in the 1960s through 1980s." There is a need for greater emphasis on space-related matters, starting at the highest levels of government.

National security space management and organization today fail to reflect the growing importance of space to U.S. interests.

A. Criteria

In light of the vital place space has in the spectrum of national security interests, a successful approach to organization and management for the future must:

- Provide for national-level guidance that establishes space activity as a fundamental national interest of the United States.
- Create a process to ensure that national-level policy guidance is carried out among and within the relevant agencies and departments.
- Ensure the government's ability to participate effectively in shaping the domestic and international rules and policies that will govern space.
- Create conditions that encourage the Department of Defense to develop and deploy systems in space to deter attack on and, if deterrence should fail, to defend U.S. interests on earth and in space.
- Create conditions that encourage the Intelligence Community to develop revolutionary methods for collecting intelligence from space.
- Provide methods for resolving the inevitable issues between the defense and intelligence sectors on the priority, funding and control of space programs.

- Account for the increasingly important role played by the commercial and civil space sectors in the nation's domestic and global economic and national security affairs.

- Develop a military and civilian cadre of space professionals within DoD, the Intelligence Community and throughout government more generally.

- Provide an organizational and management structure that permits officials to be agile in addressing the opportunities, risks and threats that inevitably will arise.

- Ensure that DoD and the Intelligence Community are full participants in preparing government positions for international negotiations that may affect U.S. space activities.

B. Assessment of Congressionally Directed Approaches

The Commission was specifically directed by Congress to assess four organizational approaches the Department of Defense might implement for organizing and managing national security space activities. Each is discussed below.

1. A New Military Department for Space

A department is the traditional approach to creating a military organization with responsibility to organize, train and equip forces for operations in a defined medium of activity. Hence, the U.S. today has military departments with the primary missions of providing forces for conducting operations in the air, on land and at sea. The use of space in defense of U.S. interests may require the creation of a military department for space at some future date. A Space Department would provide strong advocacy for space and a single organization with the primary mission of providing forces for conducting both military and intelligence space operations. However, the Commission believes that the disadvantages of creating a department today outweigh the advantages for a number of reasons, including that there is not yet a critical mass of qualified personnel, budget, requirements or missions sufficient to establish a new department. Meanwhile, near- and mid-term organizational adjustments should be fashioned so as to not preclude eventual evolution toward a Space Department if that proves desirable.

2. Space Corps

A Space Corps within the Department of the Air Force may be an appropriate model in its own right or a useful way station in the evolution toward a Space Department. One model is the Army Air Force's relationship to the Army during World War II. Existing Air Force space forces, facilities, units and personnel, and military space missions could be transferred to a Corps. A Space Corps could have authority for acquisition and operation of space systems, perhaps to include both DoD and Intelligence Community systems, while leveraging existing Air Force logistics and support functions. Alternative approaches might be modeled after the relationship of the Marine Corps to the Department of the Navy. A Space Corps would have many of the same advantages and disadvantages of a Space Department. However, unlike a Space Department, a Corps within the Air Force would not eliminate the competition for resources between air and space platforms that exists within the Air Force today. Nor would it by itself alleviate the concerns of other Services and agencies over Air Force space resource allocations.

3. Assistant Secretary of Defense for Space

An Assistant Secretary of Defense for Space reporting to the Secretary of Defense could be created with primary responsibility for space policy. The Commission believes that this position likely would not have sufficient influence over the evolution of U.S. national security space capabilities. Oversight of space policy needs to be coordinated with acquisition and technology development and with command and control, intelligence, and information operations in support of military operations. These activities are now highly integrated. The Commission believes that singling out policy for special treatment by an Assistant Secretary is not likely to result in greater or more effective focus on space within DoD.

An alternative is to position an Assistant Secretary of Defense for Space within the office of the Under Secretary of Defense for Policy and to broaden the scope of responsibilities to include intelligence and information operations. Under this arrangement, the Assistant Secretary for Space would focus on establishing policy guidance for the Department on space, intelligence and information operations, coordinating that policy with the Intelligence Community and acting as DoD's representative for space-related matters in interagency and international fora. This approach would be effective only if a companion office with responsibility for oversight of acquisition programs for space, intelligence, information and command, control and communication is assigned to the Under Secretary of Defense for Acquisition, Technology and Logistics. This approach may be better associated with the creation of a Space Department or Space Corps, either of which would presuppose greater focus within DoD on space capabilities. The Commission recommends an alternative arrangement, an Under Secretary of Defense for Space, Intelligence and Information, as described later in this chapter.

4. Major Force Program

A Major Force Program is a Department of Defense mechanism to aggregate related budget items into a single program in order to track program resources independent of the appropriation process. As a management tool, this could be useful in helping make the various elements of the Department's space program more visible and in providing accountability for space funding decisions.

C. Recommendations: A New Approach to Space Organization and Management

The Congress also directed the Commission to consider any other changes to national security space organization and management. The Commission believes that a new and more comprehensive approach is needed to further the nation's security interests in space.

Following are the Commission's unanimous recommendations:

1. Presidential Leadership

The United States has a vital national interest in space. National security space should be high among the nation's priorities. It deserves the attention of the national leadership, from the President down.

> ***The President should consider establishing space as a national security priority.***

Only the President can impress upon the members of the Cabinet, particularly the Secretary of Defense and the Director of Central Intelligence, the priority to be placed on the success of the national space program. To establish a priority on space, the President could direct a review of national space policy. That policy should give the departments and agencies guidance to reflect the national space priorities in building their budgets and programs. The National Security Council can assist the President with measures to monitor the progress of the national space program toward defined goals. This information is useful to the President and Cabinet officials in holding their departments and agencies accountable for achieving the national goals.

2. Presidential Space Advisory Group

The President might find it useful to have access to high-level advice in developing a long-term strategy for sustaining the nation's role as the leading space-faring nation.

> ***The President should consider the appointment of a Presidential Space Advisory Group to provide independent advice on developing and employing new space capabilities.***

A top-level Presidential space advisory group could provide independent advice on new concepts for employing space capabilities for intelligence collection and operations, military operations or commercial advantage (Figure 29). It should be unconstrained in scope and provide

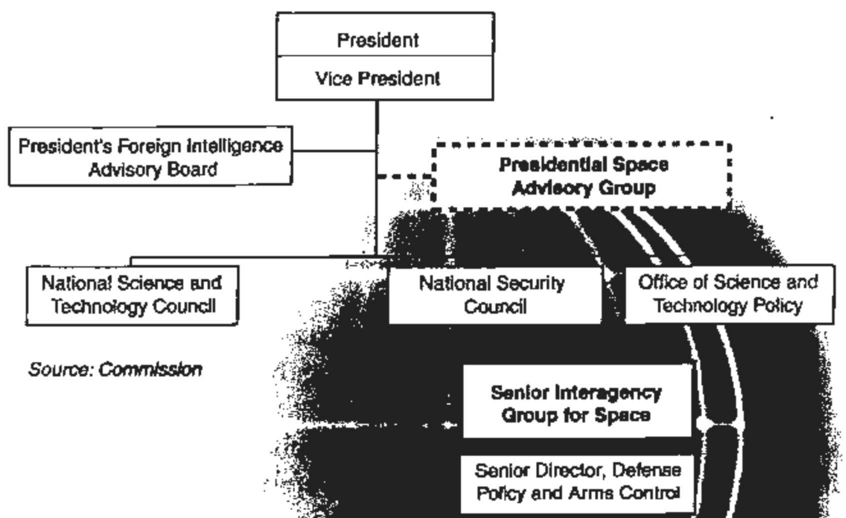


Figure 29: A New Organizational Approach for Space in the Executive Office of the President

recommendations that enable the nation to capitalize on its investment in people, technology, infrastructure and capabilities in all space sectors, to assure that the U.S. sustains its leadership role. The group should seek to identify new technical opportunities that could advance U.S. interests in space. The group should be chartered with a mandate to expire after three years.

3. Senior Interagency Group for Space

The current interagency process is inadequate to address the number, range and complexity of today's space issues, which are expected to increase over time. A standing interagency coordination process is needed to focus on policy formulation and coordination of space activities pertinent to national security and to assure that representation in domestic and international fora effectively reflects U.S. national security and other space interests.

The President should direct that a Senior Interagency Group for Space be established and staffed within the National Security Council structure.

The core membership for a Senior Interagency Group (SIG) for Space should ensure that senior-level attention is directed to specific national security space issues. However, the membership could be expanded to include officials from other relevant departments and agencies as issues warrant.

The central objectives of the interagency process for space should be to:

- Leverage the collective investments in the commercial, civil, defense and intelligence sectors to advance U.S. capabilities in each.

- Advance initiatives in domestic and international fora that preserve and enhance U.S. use of and access to space.

- Reduce existing impediments to the use of space for national security purposes.

The SIG would oversee implementation of national space policy, coordinate national security space matters government-wide and frame key issues for resolution by the President. The SIG should focus on the most critical national security space issues, including those that span the civil and commercial space sectors. Its agenda might include:

- Space control.
- Military missions in space.
- Space transportation.
- Space utilities, including GPS, weather, rescue, space surveillance, spectrum and communications.
- Earth remote sensing.
- Domestic, allied and international agreement, treaty and regulatory regimes.

The agenda should be shaped to produce a deliberate, coherent approach to the implementation of space policy. To develop the group's agenda and to coordinate national security space matters at the working level, the Senior Interagency Group would need dedicated staff support, provided through the National Security Council staff, with experience across the four space sectors.

4. SecDef/DCI Relationship

The issues relating to space between the Department of Defense and the Intelligence Community are sufficiently numerous and complex that their successful resolution and implementation require a close, continuing and effective relationship between the Secretary of Defense and the Director of Central Intelligence.

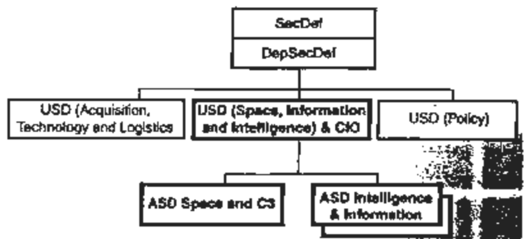
> ***The Secretary of Defense and the Director of Central Intelligence should meet regularly to address national security space policy, objectives and issues.***

5. Under Secretary of Defense for Space, Intelligence and Information

Until space organizations have more fully evolved, the Office of the Secretary of Defense would benefit from having a senior-level official with sufficient standing to serve as the advocate for space within the Department. The Secretary of Defense would assign this official *responsibility to oversee the Department's research and development, acquisition, launch and operation of its space, intelligence and information assets; coordinate the military intelligence activities within the Department; and work with the Intelligence Community on long-range intelligence requirements for national security.*

An Under Secretary of Defense for Space, Intelligence and Information should be established.

An Under Secretary of Defense for Space, Intelligence and Information (USD (SII)) would provide policy, guidance and oversight for space in a single organization within the Office of the Secretary of Defense (Figure 30). The USD (SII) would help ensure that space-related issues are addressed in the Department at an appropriately influential level. This is particularly important in the near term to help advance the development of new space missions and associated forces.



Source: Commission

Figure 30: A New Organizational Approach for Space in the Office of the Secretary of Defense

The Under Secretary would absorb the responsibilities of the current ASD (C3I) and would serve as the senior OSD advocate for space. This might require a change in the legislation establishing the office of the ASD (C3I). The USD (SII) would provide policy recommendations to the Secretary of Defense for the future course and direction for space activity within the Department of Defense. An Under Secretary would have the rank to work effectively with the military Services and with the CINCs and Joint Staff. This organization would also provide more senior-level attention to intelligence and information operations, particularly as they relate to establishing longer-term space-related policies. This can be done by assigning space and C3 acquisition-related issues to one Assistant Secretary of Defense. A second Assistant Secretary could be assigned responsibility for intelligence and information. The Under Secretary would represent the Department within the interagency process on all but matters of high national policy, up to the level of the Deputies' committees.

The Under Secretary, on behalf of the Secretary of Defense, would be assigned responsibility to:

- Establish space policy in coordination with the Under Secretary of Defense for Policy and oversee space system acquisition in coordination with the Under Secretary of Defense for Acquisition, Technology and Logistics.

- Implement policy to enable deployment and employment of space assets to conduct new military missions in the areas of space protection and projecting force in and from space.

- Oversee research and development, acquisition, launch and operation of space, intelligence and information assets and ensure that they are considered in an end-to-end fashion.

- On behalf of the Secretary of Defense, coordinate military intelligence activities within the Department and work with the Intelligence Community on long-range intelligence requirements for national security.

- Coordinate DoD space activities with the commercial and civil sectors at home and abroad.

- Develop the still nascent field of information assurance and information operations by defining the mission area, coordinating efforts within the Department and coordinating departmental plans with those in the broader government community.

- Fulfill the role of Chief Information Officer as provided in Title 44 U.S.C.

- Oversee the Department's information architecture.

6. Commander in Chief of U.S. Space Command and NORAD and Commander, Air Force Space Command

The Commander in Chief, U.S. Space Command should continue to concentrate on space as it relates to warfare in the mediums of air, land and sea, as well as space. His primary role is to conduct space operations and provide space-related services, to include computer network defense/

attack missions in support of the operations of the other CINCs, and national missile defense. This broad and varied set of responsibilities as CINCSPACE will leave less time for his other assigned duties.

> ***The Secretary of the Air Force should assign responsibility for the command of Air Force Space Command to a four-star officer other than CINCSPACE/CINCNORAD.***
>
> ***The Secretary of Defense should end the practice of assigning only Air Force flight-rated officers to the position of CINCSPACE and CINCNORAD to ensure that an officer from any Service with an understanding of combat and space could be assigned to this position.***

In today's arrangement, CINCSPACE also serves as CINCNORAD and Commander of Air Force Space Command. Current practice assigns a rated pilot as CINCNORAD, though the actual requirement is that the NORAD Director of Operations, a J-3 position, be flight rated. As a result, only flight-rated U.S. Air Force officers serve as CINCSPACE and CINCNORAD.

To let the best-qualified officer from any Service fill the position of CINCSPACE, the Department should end the practice of assigning only flight-rated officers as CINCNORAD and end the practice of assigning CINCSPACE to serve also as Commander, Air Force Space Command. This would help ensure that an officer from any Service with an understanding of combat and space could be assigned as CINCSPACE, and one with the required in-depth knowledge of space acquisition and operations could be made Commander, Air Force Space Command. The Commission believes that the position of CINCSPACE should remain nominative and need not be rotated among the military Services.

Freed of the role as Commander, Air Force Space Command and the associated responsibilities devoted to the needs of a single Service, CINCSPACE would be better positioned to play a significant role in developing long-term requirements for space systems for the Department as a whole, which are increasingly "joint."

There is no need to establish a specific set of experience requirements for CINCSPACE. As space education, career development and training in the Department of Defense are enriched, a cadre of space professionals will develop. A larger pool of senior officers will emerge with knowledge of space and experience in combat operations, providing a rich pool of leadership and operational experience from which to draw the country's most senior space commanders, among them CINCSPACE.

The Commission is also concerned about the short tenure among individuals serving as CINCSPACE and in other senior space positions, particularly as many of these individuals do not, today, come to the jobs with extensive space experience. While national security space missions evolve and mature, it would be useful for an individual to remain in this position for a period beyond the typical two-year commitment. With a longer time horizon, CINCSPACE could establish appropriate goals and objectives for maturing space missions and remain long enough to shape their development.

7. Military Services

The Department of Defense requires space systems that can be employed in independent operations or in suppart of air, land and sea forces to deter and defend against hostile actions directed at the interests of the United States. In the mid term, a Space Corps within the Air Force may be appropriate to meet this requirement; in the longer term, it may be met by a military department for space. In the nearer term, a realigned, rechartered Air Force is best suited to organize, train and equip space forces.

> ***The Air Force should realign headquarters and field commands to more effectively organize, train and equip for prompt and sustained space operations. Air Force Space Command (AFSPC) should be assigned responsibility for providing the resources to execute space research, development, acquisition and operations, under the command of a four-star general. The Army and Navy would still establish requirements and develop and deploy space systems unique to each Service.***
>
> ***Amend Title 10 U.S.C. to assign the Air Force responsibility to organize, train and equip for prompt and sustained offensive and defensive air and space operations. In addition, the Secretary of Defense should designate the Air Force as Executive Agent for Space within the Department of Defense.***

To carry out this realignment, Space and Missile Systems Center, now under the Air Force Materiel Command, would be reassigned to Air Force Space Command. The Commander, AFSPC would have authority to program funds and direct research and development programs within the Air Force laboratory system (Figure 31).

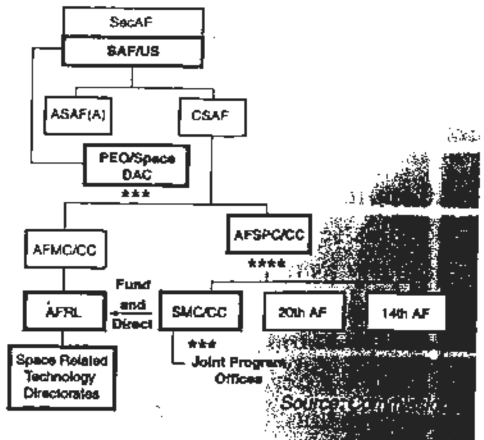


Figure 31: A New Organizational Approach for Space in the Air Force

Consolidating space functions into a single organization would create a strong center of advocacy for space and an environment in which to develop a cadre of space professionals. This cadre should be charged with developing doctrine, concepts of operations and new systems to achieve national space goals and objectives. The arrangement would increase the role of the uniformed military in research, development and acquisition of space systems to better meet operational requirements.

Air Force Space Command would become the center for developing a space cadre and advocating education and training programs for space professionals. The commander should have responsibility for managing all aspects of the space career field, to include developing new space career paths and defining and implementing selection and assignment criteria.

8. Aligning Air Force and NRO Space Programs

The Department of Defense and the Intelligence Community would benefit from the appointment of a single official within the Air Force with authority for the acquisition of space systems for the Air Force and the NRO based on the "best practices" of each organization.

> ***Assign the Under Secretary of the Air Force as the Director of the National Reconnaissance Office. Designate the Under Secretary as the Air Force Acquisition Executive for Space.***

This appointment would require a decision by the Secretary of Defense with the concurrence of the Director of Central Intelligence. It would serve several purposes. It would create a senior-level advocate for space within the Air Force. It would give a single person authority to acquire space systems for the Air Force and the NRO. Space would be strongly represented in the planning, programming and budgeting process and in the defense acquisition process. The Under Secretary would oversee space matters related to acquisition, financial management, manpower and infrastructure.

This would better align Service and NRO space acquisition organizations and would provide an opportunity to align space acquisition policies with the "best practices" of each. It would also help the Under Secretary in his current role in the Air Force resource process to ensure balance between air and space programs within the Air Force.

Designating the Air Force Under Secretary/DNRO as the acquisition executive for space would require a change in DoD directives, and there might be a need for Congressional action to amend Title 10 U.S.C. Currently, both the directives and the law imply that a Service may have only a single acquisition executive.

Additional organizational changes would be required in the Air Force as well. The position of the Assistant Secretary of the Air Force for Space would be eliminated. The staff functions performed by the Deputy Assistant Secretary of the Air Force for Space Plans and Policy would be transferred to the Under Secretary of the Air Force. To support the realignment of Air Force space acquisition responsibilities, the Program Executive Officer for Space, the Designated Acquisition Commander and the Director of Space and Nuclear Deterrence would also be re-assigned directly to the Under Secretary of the Air Force to provide program oversight and staff support for Air Force space acquisition programs.

In this new position, the Under Secretary/DNRO, in consultation with the Secretary of Defense and DCI, would select and oversee the National Security Space Architect. The Architect would be responsible for end-to-end architectures for all national security space systems, including user terminals, which would continue to be acquired within the individual Services. This places the architecture function within the resource processes of both the Air Force and the NRO, which should make it more effective. The National Security Space Architect would also be responsible for ensuring that NRO and Air Force program funding for space is consistent with policy, planning guidance and architectural decisions.

A flag officer of any Service or a senior civilian could fill the position of architect. The office would remain jointly staffed by the Intelligence Community and the military Services. Currently the NSSA has five joint billets—one Navy, two Army and two Air Force. The Commission recommends that each NSSA military position be designated as a "joint position" to encourage further participation by all the Services in this activity.

Meeting Army and Navy Requirements

The changes described, to realign Air Force space activities and align Air Force/NRO space activities, would elevate space within DoD and better position the Air Force to provide for the Department's needs for space doctrine and programs. An important Air Force responsibility is to ensure that the requirements and equities of the other military Services for space systems and capabilities are met as well. This would be accomplished in a number of ways. The Army and Navy would provide appropriately qualified officers to joint commands and agencies, including the NRO, to ensure that these agencies and commands have staff qualified to understand and meet joint requirements for space systems and products. These would include U.S. Space Command and the office of the National Security Space Architect.

The practice of acquiring most space systems through joint program offices would be continued and encouraged. The Army and Navy would need to develop, deploy, fund and, where appropriate, operate space systems to meet unique requirements. This would require the Army and Navy to maintain a cadre of space-qualified officers to represent their interests in space requirements, acquisition and operations.

Implementation

There are several possible ways to provide formal authorities to the Air Force for this new organization. One is to give the Air Force statutory responsibility under Title 10 U.S.C. to "organize, train and equip" for space, which the Commission recommends. Currently, the Air Force "shall be organized, trained, and equipped primarily for prompt and sustained offensive and defensive air operations." This could be changed to "air and space operations." It would establish a Congressionally mandated obligation for the Air Force to plan, program and budget for space missions. This approach should motivate the Air Force to give space activities higher priority.

The Commission recommends the Secretary of Defense designate the Air Force formally as the Executive Agent for Space, with department-wide responsibility for planning, programming and acquisition of space systems.

In this role, the Air Force would be responsible for developing, defending and submitting a joint "Space Program Plan" to the Office of the Secretary of Defense. The Army and Navy would continue to develop and fund space programs that meet their unique requirements and would submit them to the Executive Agent for inclusion in the joint space program. The Services would continue to acquire Service-specific programs but, for these, would report through the Air Force Space Acquisition Executive. The Services would continue to develop requirements through the Joint Requirements Oversight Council process, but under this arrangement the Executive Agent would harmonize the requirements with plans, programs and budgets before submission. The Services would retain responsibility for doctrine, strategy, education, training and operations, but in coordination with the Executive Agent.

The recommended realignment of space activities within the Air Force would create a single chain of authority from the Under Secretary of the Air Force through both the Air Force space organizations and the NRO. It would give the Air Force a clear opportunity to create a space-oriented culture comprised of military professionals who could directly influence the development of systems and doctrine for use in space operations.

The nation's vital interests depend increasingly on the capability of its military professionals to develop, acquire and operate systems capable of sustained space combat operations. The proliferation of technology and the ease with which hostile entities can gain access to space increase the need for a concentrated effort to deter and defend against such attacks.

Such efforts are not being pursued with the vision and attention needed. U.S. interests in space may well ultimately call for the creation of a Space Corps or a Space Department to organize, train and equip forces for sustained operations in space. For that reason, assignment of Title 10 responsibility to the Air Force by the Congress and its designation as Executive Agent for Space within the Department of Defense is recommended to lay the foundation for such future steps.

Future Steps

> *The Commission believes that once the realignment in the Air Force is complete, a logical step toward a Space Department could be to transition from the new Air Force Space Command to a Space Corps within the Air Force.*

A Strategic Reconnaissance Office would focus on the unique, one- or two-of-a-kind systems needed to address an urgent national requirement. It would retain control over the systems through acquisition and operational deployment. It should be operated as a joint venture between the Secretary of Defense and the Director of Central Intelligence. It should be relatively small in size and staffed by highly motivated people with the means to move a project rapidly from concept to deployed system. The budget would be contained within the NFIP, but outside the NRP. In developing systems, the office would not be limited to space solutions, but rather it could consider tradeoffs among air, space, surface and subsurface alternatives.

Competitive centers of innovation that actively pursue space-related research, development and demonstration programs are desirable.

The Secretary of Defense should direct the Defense Advanced Research Projects Agency and the Services' laboratories to undertake development and demonstration of innovative space technologies and systems for dedicated military missions.

DARPA should fund exploratory research and development and demonstration projects that exploit existing technology or apply new technology to existing or emerging requirements. These could be conducted on a classified or unclassified basis, depending on the sensitivity of the technology, mission or operational concept.

The Departments of the Army and Navy should increase and fortify their investments in and execution of research and development programs with emphasis on the uses of space to carry out their respective missions. This would not only ensure multiple sources of innovation, but also would help the Army and Navy retain a space-qualified cadre of engineers and scientists who could represent the individual Services' interests in space requirements, acquisition and operations.

10. Budgeting for Space

Better visibility into the level and distribution of fiscal and personnel resources would improve management and oversight of space programs.

The Secretary of Defense should establish a Major Force Program for Space.

A Major Force Program for Space should be managed in a decentralized fashion similar to Major Force Programs 1 through 10. The MFP would contain the same program elements as the previously recommended Space Program Plan, which is under the direction of the Air Force as Executive Agent for Space.

If properly highlighted, the current DoD program, budget and accounting information system is adequate to identify and track programs of management interest. A Major Force Program for Space would provide insight into the management of space programs without unnecessarily restricting the flexibility of the Secretary of Defense, the Director of Central Intelligence or the military departments.

Resources for Space Capabilities

Looking to the future, the Department of Defense will undertake new responsibilities in space, including deterrence and defense of space-based assets as well as other defense and power projection missions in and from space. These new missions will require development of new systems and capabilities.

Space capabilities are not funded at a level commensurate with their relative importance. Nor is there a plan in place to build up to the investments needed to modernize existing systems and procure new capabilities. Notionally, investments devoted to the buildup of strategic forces in the 1960s averaged some ten percent of the Department's budget annually. Appropriate investments in space-based capabilities would enable the Department to pursue:

- Improved space situational awareness and attack warning capabilities.
- Enhanced protection/defensive measures, prevention and negation systems and rapid long-range power projection capabilities.
- Modernized launch capabilities.
- A more robust science and technology program for developing and deploying space-based radar, space-based laser, hyper-spectral sensors and reusable launch vehicle technology.

Providing the Department of Defense and the Intelligence Community with additional resources to accomplish these new missions should be considered as part of U.S. national space policy.

11. Congress

Congress is concerned about the organization and management of national security space activities. It will play a key role in reviewing and coordinating many of the recommendations in this report and in helping promote a greater public understanding of the importance of national security space.

This report offers suggestions for organizational changes in the executive branch that are intended to bring a more focused, well-directed approach to the conduct of national security space activities, based on a clear national space policy directed by the President. These organizational changes in the executive branch suggest changes in the Congressional committee and subcommittee structure to align the jurisdictions of these committees as much as possible with the executive branch, leading to a more streamlined process. Congress might usefully consider encouraging greater "crossover" membership among all of the space-related committees to increase legislative coordination among defense and intelligence space programs.

The Commission believes that its recommendations, taken as a whole, will enable the U.S. to sustain its position as the world's leading space-faring nation. Presidential leadership and guidance, coupled with a more effective interagency process and especially with improved coordination between the Department of Defense and the Intelligence Community, are essential if the nation is to promote and protect its interests in space.

VII. Conclusions of the Commission

The members of this Commission have, together, identified five matters of key importance that we believe need attention quickly from the top levels of the U.S. Government. We have drawn these conclusions from six months of assessing U.S. national security space activities, including 32 days of meetings with 77 present and former senior officials and knowledgeable private sector representatives. These five matters—our unanimous conclusions—are:

> **First, the present extent of U.S. dependence on space, the rapid pace at which this dependence is increasing and the vulnerabilities it creates, all demand that U.S. national security space interests be recognized as a top national security priority. The only way they will receive this priority is through specific guidance and direction from the very highest government levels. Only the President has the authority, first, to set forth the national space policy, and then to provide the guidance and direction to senior officials, that together are needed to ensure that the United States remains the world's leading space-faring nation. Only Presidential leadership can ensure the cooperation needed from all space sectors—commercial, civil, defense and intelligence.**
>
> **Second, the U.S. Government—in particular, the Department of Defense and the Intelligence Community—is not yet arranged or focnsed to meet the national security space needs of the 21st century. Our growing dependence on space, our vulnerabilities in space and the burgeoning opportunities from space are simply not reflected in the present institutional arrangements. After examining a variety of organizational approaches, the Commission concluded that a number of disparate space activities should promptly be merged, chains of command adjusted, lines of communication opened and policies modified to achieve greater responsibility and accountability. Only then can the necessary trade-offs be made, the appropriate priorities be established and the opportunities for improving U.S. military and intelligence capabilities be realized. Only with senior-level leadership, when properly managed and with the right priorities, will U.S. space programs both deserve and attract the funding that is required.**

Third, U.S. national security space programs are vital to peace and stability, and the two officials primarily responsible and accountable for those programs are the Secretary of Defense and the Director of Central Intelligence. Their relationship is critical to the development and deployment of the space capabilities needed to support the President in war, in crisis and also in peace. They must work closely and effectively together, in partnership, both to set and maintain the course for national security space programs and to resolve the differences that arise between their respective bureaucracies. Only if they do so will the armed forces, the Intelligence Community and the National Command Authorities have the information they need to pursue our deterrence and defense objectives successfully in this complex, changing and still dangerous world.

Fourth, we know from history that every medium—air, land and sea—has seen conflict. Reality indicates that space will be no different. Given this virtual certainty, the U.S. must develop the means both to deter and to defend against hostile acts in and from space. This will require superior space capabilities. Thus far, the broad outline of U.S. national space policy is sound, but the U.S. has not yet taken the steps necessary to develop the needed capabilities and to maintain and ensure continuing superiority.

Finally, investment in science and technology resources—not just facilities, but people—is essential if the U.S. is to remain the world's leading space-faring nation. The U.S. Government needs to play an active, deliberate role in expanding and deepening the pool of military and civilian talent in science, engineering and systems operations that the nation will need. The government also needs to sustain its investment in enabling and breakthrough technologies in order to maintain its leadership in space.

Attachment A

Résumés of Commission Members

The Honorable Duane P. Andrews

Mr. Andrews is Corporate Executive Vice President and Director, Science Applications International Corporation (SAIC) (1993 to present). He previously was an officer in the United States Air Force (1967-77), a professional staff member with the House Permanent Select Committee on Intelligence (1977-89), and the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (1989-93). Mr. Andrews was awarded the Department of Defense Medal for Distinguished Public Service and the National Intelligence Distinguished Service Medal.

Mr. Robert V. Davis

Mr. Davis is President of R.V. Davis & Associates (1997 to present). He previously was a professional staff member of the House Appropriations Committee (1977-95) and Deputy Under Secretary of Defense for Space (1995-97). Mr. Davis was awarded the Secretary of Defense Medal for Outstanding Public Service (1997).

General Howell M. Estes, III, United States Air Force (Retired)

General Estes is President of Howell Estes & Associates, Inc. (1998 to present) and serves as Vice Chairman of the Board of Trustees, The Aerospace Corporation. He entered the United States Air Force in 1965 and served for 33 years. At the time of his retirement in 1998, General Estes was Commander in Chief, North American Aerospace Defense Command, Commander in Chief, United States Space Command, and Commander, Air Force Space Command. He previously served as a consultant to the Defense Science Board Task Force on Space Superiority (1999).

General Ronald R. Fogleman, United States Air Force (Retired)

General Fogleman is president and chief operating officer of the B Bar J Cattle and Consulting Company, Durango Aerospace Incorporated, and a partner in Laird and Company, LLC (1998 to present). He entered the United States Air Force in 1963 and served for 34 years. At the time of his retirement in 1997, General Fogleman was Chief of Staff of the U.S. Air Force. He previously served as the Commander in Chief of the U.S. Transportation Command (1992-94). He serves on the Boards of Directors for International Airline Service Group, DERCO Aerospace, EAST Inc., Mesa Air Group, MITRE Corporation, North American Airlines, Rolls-Royce North America, and World Airways. General Fogleman is a member of the Council on Foreign Relations.

Lieutenant General Jay M. Garner, United States Army (Retired)

General Garner is President of SY Technology (1997 to present). He entered the United States Army in 1962 and served for 35 years. Prior to leaving military service in 1997, he served as Assistant Vice Chief of Staff of the Army (1996-97). Previously he was the Commander of the U.S. Army Space and Strategic Defense Command (1994-96).

The Honorable William R. Graham

Dr. Graham is the Chairman of the Board and President of National Security Research, Inc. (1997 to present). He previously served as the Deputy Administrator of the National Aeronautics and Space Administration (1985-86), Science Advisor to President Reagan and Director of the White House Office of Science & Technology Policy (1986-89), and Member of the Commission to Assess the Ballistic Missile Threat to the United States (1998). He has a Ph.D. in electrical engineering.

General Charles A. Horner, United States Air Force (Retired)

General Horner is a business consultant, author and national defense advisor (1994 to present). He entered the United States Air Force in 1958 and served for 36 years. He served as Commander in Chief, North American Aerospace Defense Command, Commander in Chief, United States Space Command, Commander, Air Force Space Command, and he commanded Allied Air Forces during the 1991 Gulf War.

Admiral David E. Jeremiah, United States Navy (Retired)

Admiral Jeremiah is President of Technology Strategies & Alliances Corporation (1994 to present). Prior to leaving military service in 1994, he served as Vice Chairman, Joint Chiefs of Staff (1990-94) for Generals Powell and Shalikashvili. He serves on the Boards of Directors for several firms, including Litton Industries, Alliant Techsystems Inc., Getronics Government Systems, LLC and Geobiotics, Inc. Admiral Jeremiah serves on various national security and intelligence panels, boards and commissions, including the Defense Policy Board, and a National Reconnaissance Office Advisory Panel.

General Thomas S. Moorman, Jr., United States Air Force (Retired)

General Moorman is a Partner in Booz-Allen Hamilton (1998 to present). He also serves as a member of the Board of Trustees for The Aerospace Corporation, is an Outside Director on the Board of Smiths Industries and is a member of the Defense Policy Board Advisory Committee. He entered the United States Air Force in 1962 and served for 35 years. General Moorman served as Commander of Air Force Space Command (1990-92). At the time of his retirement in 1997, General Moorman was Vice Chief of Staff, United States Air Force. He is a member of the Council on Foreign Relations.

Mr. Douglas H. Necessary

Mr. Necessary is an independent management consultant. He has recently served on several government boards. He served on active duty in the U.S. Army from 1964-1984 and as a professional staff member of the Committee on Armed Services, U.S. House of Representatives (1984-2000).

General Glenn K. Otis, United States Army (Retired)

General Otis serves as a consultant for many defense firms and serves on the Defense Science Board and Ballistic Missile Defense Advisory Committee. Previously he was Senior Vice President of Coleman Research Corporation (1988-96) and Chairman of the Board on Army Science and Technology at the National Academy of Sciences. He entered the United States Army in 1946 and served for 42 years. Prior to leaving military service in 1988, he served as Commander in Chief, U.S. Army Europe and 7th Army, and Commander, NATO's Central Army Group (1983-88). Previously he commanded the U.S. Army's Training and Doctrine Command (1981-83).

The Honorable Donald H. Rumsfeld*

Mr. Rumsfeld is currently in private business. He serves as Chairman of the Board of Directors of Gilead Sciences, Inc., and on the Boards of Directors of a number of corporations and non-profit organizations. Previously he served as CEO of G.D. Searle & Co. and of General Instruments Corporation, and in a variety of U.S. government posts, including: Naval Aviator, Member of U.S. Congress, U.S. Ambassador to NATO, White House Chief of Staff, Secretary of Defense, Presidential Envoy to the Middle East and Chairman of the Commission to Assess the Ballistic Missile Threat to the United States. He received the Presidential Medal of Freedom, the nation's highest civilian award, in 1977.

Senator Malcolm Wallop (Retired)

Senator Wallop is currently a Senior Fellow with the Heritage Foundation and chairs Frontiers of Freedom, a non-profit public policy organization he established in January 1995. Previously he served as a U.S. Senator from Wyoming (1977-95). In 1977 he was the first elected official to propose a space-based missile defense system. Prior to serving in the U.S. Senate, he was a rancher, a businessman, and a member of the Wyoming Legislature (1969-76).

* The Honorable Donald H. Rumsfeld served as a member and chairman of the Commission from its inception until December 28, 2000, when he was nominated for the position of Secretary of Defense by President-elect George W. Bush.

Attachment B

Résumés of Core Staff of the Commission

Dr. Stephen A. Cambone, Staff Director. Research Director, Institute for National Strategic Studies, National Defense University (1998 to present). Staff Director, Commission to Assess the Ballistic Missile Threat to the United States (1998); Senior Fellow, Center for Strategic and International Studies (1993-98); Director, Strategic Defense Policy, Office of the Secretary of Defense (1990-93); Deputy Director of Strategic Analysis, SRS Technologies (1986-90); Staff Analyst, Los Alamos National Laboratory (1982-86). Ph.D. in political science.

D. Craig Baker, Staff Member. Special Assistant to the Chief Scientist, U.S. Army Space and Missile Defense Command (1999-2000); Concepts and Initiatives Division Chief, Army Space and Missile Defense Battle Lab (1997-98); Plans Director, Army Space Command (1996-97); Space Integration Division Chief, Army Space Command (1990-96); Army Research Fellow, RAND Arroyo Center (1986-88). M.S. in national security strategy. M.S. in systems management.

Barbara Bicksler, Staff Member. Senior Policy Analyst, Strategic Analysis, Inc. (1996 to present). Research Staff Member, Institute for Defense Analyses (1986-95); Analyst, Office of the Assistant Secretary of Defense for Program Analysis and Evaluation (1981-84). Master in Public Policy.

Linda L. Haller, Staff Member. Assistant Bureau Chief (1999 to present) and Senior Legal Advisor (1997-99), International Bureau, Federal Communications Commission (FCC); Senior Counsel, Office of General Counsel, FCC (1994-97); Attorney Advisor, FCC (1991-92); Associate, Morgan Lewis & Bockius (1988-90); Associate, Pierson, Ball & Dowd (1986-88). Juris Doctor.

Delonnie Henry, Staff Member. Committee Clerk, U.S. House Select Committee on U.S. Technology Transfers to the People's Republic of China (1998-99); Commission to Assess the Ballistic Missile Threat to the United States (Rumsfeld Commission) (1998); National Defense University (1993-98). M.Ed.

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John Luddy, Staff Member. Senior Policy Advisor, U.S. Senator Jon Kyl (1999-2000); Senior Legislative Assistant, U. S. Senator Bob Smith (1997-99); Military Legislative Assistant, U.S. Senator James Inhofe (1995-97); Defense Policy Analyst, The Heritage Foundation (1992-95); U.S. Marine Corps (1986-89). M.S. in international relations.

Lieutenant Colonel J. Kevin McLaughlin, United States Air Force, Staff Member. Commander, 2d Space Operations Squadron (1998-2000); Chief, Space/Missile Branch, Legislative Liaison (1996-98); Chief, Space Policy, Assistant Secretary of the Air Force (Space) (1995-96); Titan Launch Controller/Deputy for Standards/Evaluation, 45th Space Wing (1991-94). M.A. in space systems management.

William E. Savage, Staff Member. Director of Strategic Development for Space Programs, Litton TASC (1994 to present). National Reconnaissance Office (1986-94); U.S. Air Force Space Program (1967-86). M.S. in astro-geophysics.

G. Randall Seftas, Staff Member. Project Manager/Lead Engineer, National Aeronautics and Space Administration (1994-Present); Senior Research Engineer, Lockheed Missiles and Space Company (1989-94); Spacecraft Systems Engineer, Booz-Allen & Hamilton (1988-89); Operational Space Systems Engineer, GE Space Systems Division (1984-88). B.S. in aerospace engineering.

Thomas L. Wilson, Jr., Staff Member. Deputy Head, Program Coordination and Liaison Office, Naval Center for Space Technology (1997 to present). Program Manager, Naval Research Laboratory (1992-2000). Professional Staff, Office of the Deputy Under Secretary of Defense for Space (1996-98). B.S. in aerospace engineering.

Department of Defense Liaison

Major General H. J. "Mitch" Mitchell, United States Air Force. Department of Defense Liaison to the Commission to Assess United States National Security Space Management and Organization and Special Assistant to the Assistant Secretary of Defense for Command, Control, Communications and Intelligence. Former National Security Space Architect.

Attachment C

Commission Meetings

July 11, 2000

The Honorable Arthur L. Money	Assistant Secretary of Defense for Command, Control, Communications and Intelligence and DoD Chief Information Officer

July 26, 2000

The Honorable Porter J. Goss	Co-Chairman, National Commission for the Review of the National Reconnaissance Office and Chairman, Permanent Select Committee on Intelligence, U.S. House of Representatives
The Honorable J. Robert Kerrey	Co-Chairman, National Commission for the Review of the National Reconnaissance Office and former Vice Chairman, Select Committee on Intelligence, U.S. Senate
Mr. Ken Colucci	Chief of Staff, National Commission for the Review of the National Reconnaissance Office
Mr. Art Grant	Executive Staff Director, National Commission for the Review of the National Reconnaissance Office

July 27, 2000

The Honorable Edward C. "Pete" Aldridge	Chief Executive Officer, The Aerospace Corporation and former Secretary of the Air Force and Director of the National Reconnaissance Office

August 7, 2000

Mr. Lawrence K. Gershwin	National Intelligence Officer for Science and Technology, National Intelligence Council
Mr. Marc Berkowitz	Director of Space Policy, Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence

August 8, 2000

LTG John Costello, U.S. Army	Commanding General, U.S. Army Space & Missile Defense Command
VADM Richard Mayo, USN	Deputy Director, U.S. Navy Space Information Warfare Command & Control

August 23, 2000

LtGen Emil R. Bedard, USMC	Deputy Chief of Staff for Plans, Policies and Operations, Headquarters, U.S. Marine Corps
Maj Gen H. Marshall Ward, USAF	Director, Special Programs, Office of the Under Secretary of Defense for Acquisition, Technology and Logistics
The Honorable Keith Hall	Assistant Secretary of the Air Force for Space and Director of the National Reconnaissance Office
Mr. David A. Kier	Deputy Director, National Reconnaissance Office

August 24, 2000

Mr. Richard L. Shiffrin	Deputy General Counsel (Intelligence), Department of Defense
Mr. W. Harvey Dalton	Associate Deputy General Counsel (International Affairs and Intelligence), Department of Defense
Mr. Richard K. Sylvester	Assistant Deputy Undersecretary of Defense (Systems Acquisition)
The Honorable John Hamre	President and Chief Executive Officer, Center for Strategic and International Studies and former Deputy Secretary of Defense
Mr. James M. Simon, Jr.	Assistant Director of Central Intelligence for Administration
Mr. Larry Kindsvater	Executive Director, Intelligence Community Affairs, Office of the Director of Central Intelligence
Mr. Charles Allen	Assistant Deputy Director of Central Intelligence for Collection, Office of the Director of Central Intelligence
Mr. John Gannon	Assistant Deputy Director of Central Intelligence for Production and Analysis, Office of the Director of Central Intelligence

September 19, 2000

Lt Gen Robert H. Foglesong, USAF	Deputy Chief of Staff for Air and Space Operations
Brig Gen Daniel P. Leaf, USAF	Director of Operational Requirements
Gen Michael E. Ryan, USAF	Chief of Staff, United States Air Force
Maj Gen Brian A. Arnold, USAF	Director of Space and Nuclear Deterrence, Office of the Secretary of the Air Force for Acquisition

The Honorable Arthur L. Money	Assistant Secretary of Defense for Command, Control, Communications and Intelligence and DoD Chief Information Officer
Mr. Kenneth F. Colucci	Chief of Staff, National Commission for the Review of the National Reconnaissance Office
Mr. Arthur V. Grant	Executive Staff Director, National Commission for the Review of the National Reconnaissance Office

September 20, 2000

Mr. Kevin M. O'Connell	Executive Secretary, National Imagery and Mapping Agency Commission
Lt Gen Michael V. Hayden, USAF	Director, National Security Agency
Mr. Robert R. Soule	Director, Program Analysis & Evaluation, Office of the Secretary of Defense
LTG Edward G. Anderson, III, U.S. Army	Director for Strategic Plans & Policy (J-5), the Joint Staff
LTG James C. King, U.S. Army	Director, National Imagery and Mapping Agency

September 27, 2000

Mr. Larry Kindsvater	Executive Director, Intelligence Community Affairs, Office of the Director of Central Intelligence
Mr. James M. Simon, Jr.	Assistant Director of Central Intelligence for Administration
Gen Larry D. Welch, USAF (Ret.)	President, Institute for Defense Analysis and former Chief of Staff of the Air Force
Mr. Lawrence K. Gershwin	National Intelligence Officer for Science and Technology, National Intelligence Council

September 28, 2000

Ms. Cheryl Roby	Deputy Assistant Secretary of Defense for Programs and Evaluation, Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence
The Honorable William S. Cohen	Secretary of Defense
The Honorable Rudy de Leon	Deputy Secretary of Defense
Gen Richard B. Myers, USAF	Vice Chairman, Joint Chiefs of Staff
The Honorable Joan A. Dempsey	Deputy Director of Central Intelligence for Community Management

October 11, 2000

Mr. Albert E. Smith	Executive Vice President, Lockheed Martin Space Systems Company
Mr. James W. Evatt	Executive Vice President, Boeing Space and Communications Group and President, Government Systems
Mr. Tig H. Krekel	President and Chief Executive Officer, Hughes Space and Communications Company
Mr. Timothy W. Hannemann	Executive Vice President and General Manager, TRW Space and Electronics Group

October 12, 2000

The Honorable R. James Woolsey	Partner, Shea & Gardner and former Director of Central Intelligence
RADM J. J. Quinn, USN	Commander, Naval Space Command
The Honorable James R. Schlesinger	Senior Advisor, Lehman Brothers and former Secretary of Defense, former Secretary of Energy, former Director of Central Intelligence

October 17, 2000 *Buckley Air Force Base, Denver, Colorado*

Lt Gen Roger G. DeKok, USAF	Vice Commander, Air Force Space Command

October 18, 2000 *Peterson Air Force Base, Colorado Springs, Colorado*

Lt Gen Roger G. DeKok, USAF	Vice Commander, Air Force Space Command
Lt Gen Eugene L. Tattini, USAF	Commander, Space and Missile Systems Center
Maj Gen Richard W. Davis, USAF	Director, National Security Space Architect, Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence
Gen C. W. Fulford, Jr., USMC	Deputy Commander in Chief, U.S. European Command
COL (P) Richard V. Geraci, U.S. Army	Deputy Commanding General, Army Space, U.S. Army Space and Missile Defense Command
Maj Gen Thomas C. Waskow, USAF	Director of Air and Space Operations, Headquarters Pacific Air Forces
Lt Gen Maxwell C. Bailey, USAF	Commander, Air Force Special Operations Command
LTG Daniel G. Brown, U.S. Army	Deputy Commander in Chief, U.S. Transportation Command

RADM Martin J. Mayer, USN	Director for Strategy, Requirements and Integration (J-8), U.S. Joint Forces Command
RADM Paul Sullivan, USN	Director for Plans (J-5), U.S Strategic Command
MG Gary D. Speer, U.S. Army	Deputy Commander in Chief, U.S. Southern Command

October 19, 2000 *Peterson Air Force Base, Colorado Springs, Colorado*

Maj Gen William R. Looney, III, USAF	Component Commander, U.S. Air Force Space Operations, U.S. Space Command
COL (P) Richard V. Geraci, U.S. Army	Deputy Commanding General, Army Space, U.S. Army Space and Missile Defense Command
CAPT Victor Cerne, USN	Joint Information Operations Center, U.S. Space Command
Col John T. Hill, USMC	Deputy, Naval Space Command
LTG Edward G. Anderson, III, U.S. Army	Deputy Commander in Chief and Chief of Staff, U.S. Space Command
Lt Gen George E.C. Macdonald, Canadian Forces	Deputy Commander in Chief, North American Aerospace Defense Command
Gen Ralph E. Eberhart, USAF	Commander in Chief, U.S. Space Command, Commander in Chief, North American Aerospace Defense Command and Commander, Air Force Space Command

October 25, 2000

Dr. David Whelan	Director, Tactical Technology Office, Defense Advanced Research Projects Agency
Lt Gen George K. Muellner, USAF (Ret.)	Vice President and General Manager-Phantom Works, The Boeing Company and former Principal Assistant to the Secretary of the Air Force for Acquisition
Mr. David A. Kier	Deputy Director, National Reconnaissance Office
Mr. Peter A. Marino	Chairman, National Imagery and Mapping Agency Commission

October 26, 2000

The Honorable Robert M. Gates	Interim Dean, George Bush School of Government and Public Service, Texas A&M University and former Director of Central Intelligence

October 31, 2000

Mr. Robert S. Zitz	Director, Initiatives Group, National Imagery and Mapping Agency
Mr. Fred Faithful	Director of Analysis and Plans, National Imagery and Mapping Agency
Mr. James M. Simon, Jr.	Assistant Director of Central Intelligence for Administration
Lt Gen Bruce Carlson, USAF	Director for Force Structure, Resources, and Assessment (J-8), the Joint Staff
Mr. David A. Kier	Deputy Director, National Reconnaissance Office
Dr. Lawrence J. Delaney	Assistant Secretary of the Air Force for Acquisition
Lt Gen Ronald T. Kadish, USAF	Director, Ballistic Missile Defense Organization

November 1, 2000

Mr. Andrew W. Marshall	Director, Net Assessment, Office of the Secretary of Defense
Dr. Taylor Lawrence	Vice President, Products and Technology, Northrop Grumman Corporation and former Staff Director, U.S. Senate Select Committee on Intelligence
Mr. David Thompson	President and Chief Executive Officer, Spectrum Astro
Gen Richard B. Myers, USAF	Vice Chairman, Joint Chiefs of Staff
Mr. John Copple	Chief Executive Officer, Space Imaging

November 14, 2000

VADM Lyle G. Bien, USN (Ret.)	Vice President, Government Programs, Teledesic LLC

November 15, 2000

Brig Gen Douglas J. Richardson, USAF	Commander, Space Warfare Center, Air Force Space Command, Schriever Air Force Base, Colorado

November 28, 2000

Commission Business

November 29, 2000

The Honorable Daniel S. Goldin	Administrator, National Aeronautics and Space Administration

November 30, 2000

Commission Business

December 5, 2000

The Honorable George J. Tenet — Director of Central Intelligence

December 12, 2000

Commission Business

December 18, 2000

Commission Business

December 19, 2000

Commission Business

January 3, 2001

Commission Business

January 4, 2001

Commission Business

January 10, 2001

Commission Business

January 11, 2001

Deliver Report

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Attachment D

Acknowledgements

The Commissioners wish to express their appreciation to the men and women of the U.S. Government national security space community who took time to discuss national security space organization and management with the Commissioners and the Commission Staff.

In particular, the Commissioners express their thanks to the Honorable Arthur L. Money, Assistant Secretary of Defense for Command, Control, Communications and Intelligence in the Office of the Secretary of Defense and the Honorable Keith Hall, Director of the National Reconnaissance Office.

Special thanks are extended to Major General H. J. "Mitch" Mitchell, USAF, the Department of Defense Liaison to the Commission. His knowledge of the current organization and management of national security space and his persistence in obtaining information for the Commission made its task much easier than it might have been.

The Commissioners would also like to thank the organizations that detailed personnel to staff the Commission: National Defense University, United States Air Force, U.S. Army Space and Missile Defense Command, Naval Research Laboratory, Federal Communications Commission, Goddard Space Flight Center and Central Intelligence Agency.

The National Reconnaissance Office and the Department of Defense's Washington Headquarters Services provided excellent administrative and logistical support under difficult time constraints. Thanks also are extended to the Central Intelligence Agency's Printing and Photography Group, which assisted in the design and publication of this report.

Attachment E

Glossary for Organization Charts

AF	Air Force
AFMC/CC	Commander, Air Force Materiel Command
AFRL	Air Force Research Laboratory
AFSPC/CC	Commander, Air Force Space Command
ASAF	Assistant Secretary of the Air Force
ASAF(A)	Assistant Secretary of the Air Force (Acquisition)
ASD (C3I)	Assistant Secretary of Defense (Command, Control, Communications, Intelligence)
C3	Command, Control, Communications
C3ISR	Command, Control, Communications, Intelligence Surveillance and Reconnaissance
CIA	Central Intelligence Agency
CINCNORAD	Commander in Chief, North American Aerospace Defense Command
CINCSPACE	Commander in Chief, United States Space Command
CIO	Chief Information Officer
CJCS	Chairman, Joint Chiefs of Staff
CMS	Community Management Staff
CSAF	Chief of Staff of the Air Force
DAC	Designated Acquisition Commander
DARPA	Defense Advanced Research Projects Agency
DCI	Director of Central Intelligence
DDCI/CM	Deputy Director of Central Intelligence/Community Management
DepSecDef	Deputy Secretary of Defense
DNRO	Director, National Reconnaissance Office
FBI	Federal Bureau of Investigation
J2	Directorate for Intelligence
NRO	National Reconnaissance Office
NSSA	National Security Space Architect
OSR	Office of Strategic Reconnaissance
PEO	Program Executive Officer
SAF/US	Under Secretary of the Air Force
SecAF	Secretary of the Army
SecArmy	Secretary of the Army
SecDef	Secretary of Defense
SecNav	Secretary of Navy
SMC/CC	Commander, Space and Missile Systems Center
USD	Under Secretary of Defense

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Air Force Response Plan
to the Space Commission Report

Public Affairs Plan

Headquarters United States Air Force
Washington, D.C.

11 January 2001

[redacted]

DOC 1.52

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Air Force Response Plan
To The Space Commission Report

PURPOSE: The overall goal of The Air Force Response Plan to the Space Commission Report is to promote a common understanding among internal and external audiences and stakeholders on the Air Force's position on space management and organization. Furthermore this communication plan should reassure public officials and the American public that the Air Force is an excellent steward of America's space programs and has a well thought out plan for the use of space assets in the future. This plan outlines the public information program, processes and procedures for the Air Force's Response Plan to the Space Commission Report. It also includes messages, strategies and tactics for Air Force Public Affairs officers and spokespersons to use in order to communicate the Air Force position on its leadership of national security space.

CLASSIFICATION: Unclassified

BACKGROUND:

The report from the Space Commission to assess the National Security Space Management and Organization will be released on 11 January 2001. The report will influence key audiences on proposed changes to the national security space management and organization. The Air Force needs to respond to the report both officially and via the media. Our official response to the report's specific recommendations will become part of the DoD's official response. The Air Force should take the opportunity to present its side of the story on space management and organization to both internal and external audiences that could influence or take part in decisions on national security space.

The overall objective of an Air Force Response Plan to the Space Commission Report is to promote common understanding among internal and external stakeholders of the Air Force's position on its space missions. This communication plan will identify supporting objectives, key stakeholders, and the Air Force position. It will provide key messages that can be used in a variety of ways by Air Force spokespersons.

Key stakeholders should have a good understanding of both the Space Commission's recommendations and the Air Force's key messages. The key messages will enable them to better evaluate and articulate all the available alternatives for national security space; benefiting both the nation and the Air Force.

ASSUMPTIONS:

- Military and Trade press interest is moderate
- National, regional & local news (Colorado/Florida/California) interest is low to medium

- There will be significant interest in Industry, Congress, DoD, NASA, and other space related organizations
- Assure key legislators that they can remain confident in the Air Force's stewardship of the nation's security space program

TARGET AUDIENCES:

- OSD, Congress, JCS, Army, Navy, Marines
- HQ Air Force, MAJCOMs, FOAs, DRUs
- Military and Trade press
  - Space News, Defense Daily, Aerospace Daily, Space.com, Aviation Week, Inside the Air Force, Space Business News; Air Force Magazine, Air Force Times
- National, regional newspapers, television and radio stations
  - LA Times, NY Times, Washington Post, Denver Post, Rocky Mountain News, USA Today, Florida Times-Union, St Petersburg Times, Sun Sentinel (Fort Lauderdale, Florida), Orlando Sentinel, Sarasota Herald-Tribune, Press Journal (Vero Beach Florida), Colorado Springs-Gazette Telegraph, Florida Today
  - CNN, ABC, NBC, CBS, FOX, etc
  - News service wires
- Internal Air Force publications
  - Defense Link, AFPN, AF TV News, Air Force web page
- Local television, radio and newspapers in Colorado, Florida, and California
- Think tanks (key stakeholders affecting opinion inside the beltway)
  - Rand, Brookings, Heritage Foundation, Lexington Institute, Center for Strategic and International Studies, Center for Strategic and Budgetary Assessments, Institute for Defense Analyses, MITRE Corp, The Aerospace Corp, The Century Foundation
- Professional Journals: Joint Forces Quarterly, Armed Forces Journal
- **OPR/ POCs will be identified in advance to produce articles for the media and external and internal audiences**

MATRIX OF KEY AUDIENCES AND PUBLICATIONS & EVENTS

Key:

No mark = the event or media has no probable impact on the audience.

✓ = the event or media has limited probable impact on the audience.

✓✓ = the event or media has moderate probable impact on the audience.

✓✓✓ = the event or media has high probable impact on the audience.

	Congress (incl staff)	OSD	JCS	Army, Navy, Marines	HQ USAF	MAJCOMs, FOAs, DRUs	"National Security Space Community"
AF press releases					✓✓	✓✓	✓
Space News			✓	✓	✓	✓	✓✓✓
Defense Daily		✓	✓	✓	✓		✓
Aerospace Daily				✓	✓	✓	✓
Space.com					✓	✓	✓✓
Aviation Week			✓	✓	✓	✓	✓✓
Inside the Air Force			✓		✓		
Space Business News							✓✓
Air Force Magazine					✓	✓	✓
Air Force Times						✓	
LA Times, NY Times, Washington Post, Denver Post, Rocky Mountain News, USA Today	✓✓	✓✓	✓	✓	✓		✓
CNN, ABC, NBC, CBS, FOX, News service wires	✓✓	✓	✓	✓	✓		✓
Local television, radio & newspapers in CO, FL, CA							✓✓
Think tanks (see list in text)		✓✓	✓✓	✓✓	✓✓	✓	✓
Professional journals (see list in text)			✓✓	✓✓	✓✓	✓	✓
11 Jan 2001: Space Commission Press Conference							
12 Jan 2001: AF/QR media round table event							✓✓
Jan/Feb 2001: Editorial from (ret) AF General Officer	✓	✓	✓		✓	✓	✓
25 Jan 2001: Aerospace Power Breakfast (tentative)	✓						✓

	Congress (incl staff)	OSD	JCS	Army, Navy, Marines	HQ USAF	MAJCOMs, FOAs, DRUs	"National Security Space Community"
7-8 Feb 2001: Unified Aerospace Power Symposium		✓	✓	✓	✓		✓
Jan-Feb Space Launch Events	✓	✓✓	✓✓	✓	✓✓	✓	✓✓
13-15 Feb 2001: CORONA South							
15-16 Feb 2001: Air Force Symposium, Global Vigilance, Reach and Power		✓				✓	✓
21-22 Feb 2001: CAF XP/DO conference						✓	✓
senior spokesperson media interviews							✓✓
senior spokesperson appearances before local think tanks							✓✓
senior spokesperson engagements with the Hill	✓✓						

NEWS MEDIA COVERAGE/OPPORTUNITIES:

- Throughout the Space Commission process, SAF/PA in coordination with AFSPC/PA **will respond to questions** about Space Commission Report and Air Force position on space.

- Following release of the Space Commission Report SAF/PA in conjunction with designated AF spokespersons will conduct a media event (press conference or roundtable) to update the media. After a cursory review of the report, SAF/PA will consider releasing an editorial to highlight the positive items in the report and discuss the Air Force's overall goals in space. Also, consider using a neutral spokesperson for this duty. (projected for January 2001)

- SAF/PA **will field follow-on questions** concerning the Space Commission Report

- Plan will be placed into action January 2001. The following are media activities over the next two months that may present opportunities to promulgate our message both externally and internally:

    - 11 Jan 2001: Space Commission Press Conference

- 12 Jan 2001: AF/QR media round table event (Space Commission Report will be one of the Quadrennial Defense Review issues addressed at this event)
- Week of 22 Jan: Air Force media roundtable with Mgen Arnold (tentative)
- 25 Jan 2001: Aerospace Power Breakfast (tentative)
- Jan-Feb 2001: Launch events at Vandenberg and Cape Canaveral
- Jan/Feb 2001: Possible Editorial from (ret) AF General Officer
- 7-8 Feb 2001: Unified Aerospace Power Symposium
- 13-15 Feb 2001: CORONA South
- 15-16 Feb 2001: Air Force Association Symposium, Global Vigilance, Reach and Power
- 21-22 Feb 2001: CAF XP/DO conference

COMMUNITY OUTREACH PROGRAM:

SAF/PA and the space task force will build a proactive campaign to schedule our senior spokespersons for appearances before local think tanks, media interviews, and engagements with the Hill (scheduling targeted CODELS and STAFFDELS), etc. Rather than employing a defensive strategy (i.e., be prepared to answer media inquiries as highlighted above) we want to offensively go out and shape the information environment by engaging essential stakeholders on our terms.

SUPPORTING TEAM MEMBERS:

SAF/AQS
SAF/AQR
AF/XPX
AF/XOS
SAF/OSX
AF/CCX
SAF/PA
AFPAZ
AF/QR
SAF/SX
SAF/LL
AFSPC
AFMC/SMC
AFMC/AFRL
Air Force NRO Integration Planning Group (ANIPG)
Office of the Assistant Secretary of Defense for Public Affairs
Space Commission Task Force

PUBLIC AFFAIRS APPROACH:

Active – Primary news pegs will be messages after the report is released and after OSD sends its final response to the Space Commission. Media events (press conferences/roundtables and follow-on interviews) need to fully explain the Air Force position. Follow-on efforts will be required to demonstrate how the Air Force will implement recommendations from the Space Commission and/or OSD. Internal news stories will also be developed to keep AF members informed.

This public affairs plan provides a framework for public affairs activities concerning the release of information concerning the Air Force Response to the Space Commission Report. Its intent is to ensure a coordinated, focused public information program by the public affairs team consisting of the SAF/PA, AFSPC, and AFMC.

OBJECTIVES:

- Establish effective avenues to deliver accurate and timely information about the Air Force position on space stewardship to the media and internal and external stakeholders.
- Inform the public through the news media.
    - Secure public trust and confidence in Air Force stewardship of space.
    - Ensure the users, both internal and external, understand the recommended actions
    - Respond quickly and accurately to media questions.
    - Establish open and active communication channels between SAF/PA, AFSPC, and AFMC/SMC to the news media.
    - Ensure accurate, consistent, and coherent information released to the public.
    - Build a positive attitude among key audiences about the Air Force's plans for space.
    - Ensure successful implementation of Air Force plans for space.

KEY MESSAGES AND SUPPORTING MESSAGES:

- **The United States needs an integrated, national-level vision for space**
    - The national space vision should encompass the military, intelligence, civil, and commercial sectors, and account for a growing international space sector.
    - The growing capabilities of space systems are resulting in systems built for one sector having the ability to serve the needs of other sectors.
    - An integrated, national-level vision for space will promote efficiency and effectiveness in all sectors. The potential for each sector to leverage the capabilities of another could result in significant service improvements and savings.
- **The United States needs a greater funding commitment for national security space**
    - Space systems are ideally suited to assist the nation in dealing with the widening variety of future threats. National security space systems also support a spectrum of military, civil, and commercial users, increasing overall demand for space support.

  - Space systems are playing an increasingly central role in information superiority. National leaders, intelligence officials, and defense commanders are increasingly relying on space systems. Space systems are transforming battlespace operations for national decisionmakers and joint warfighters.
  - Increasing reliance on space systems requires that the nation make a greater investment in national security space.
  - Greater funding for national security space would help ensure the nation's security and prosperity in a world of widening and technologically advancing threats.
- **The United States must develop more robust space defenses**
  - Space systems are assuming a larger role in combat operations and the trend will continue. Space assets are forward deployed for global presence "first on the scene."
  - The United States is becoming more dependent on space systems for military, intelligence, and commercial purposes. This dependency could become a vulnerability that must be addressed before it is exploited by our adversaries. We cannot afford a "space Pearl Harbor."
  - Space-based capabilities have become a military center of gravity, and are on the path to becoming an economic center of gravity for the United States.
  - Many countries are developing and sharing technologies to disrupt and neutralize space systems.
  - Threats to space systems may soon include direct action against U.S. space systems, ground infrastructure and uplinks and downlinks (jamming, physical attack, and attack by directed energy). Countering these threats will require that the United States develop a broad array of defensive aerospace capabilities.
  - Such defensive aerospace capabilities should include improving our ability to detect and suppress jamming, augmenting our current anti-jam capabilities, improving our space surveillance system, protecting military, intelligence, and commercial space systems, and preventing their unauthorized use by hostile powers.
- **Offensive space capabilities will eventually be required**
  - In the future, space superiority cannot be completely assured in times of crisis by defensive means alone.
  - Many systems for offensive counterspace are militarily useful and technologically feasible now.
  - The Air Force is preparing for specific missions such as space control and space force application. These missions include theater and national missile defense. (See Appendix A for a fuller explanation.) But future space control and space force application capabilities need not be space-based; the Air Force focus is on effects.
  - We will continue to develop the ability to control space when need be. (Air Force vision *Global Vigilance, Reach, and Power*, page 7)

- The Air Force will continue to develop its air and space capabilities in the context of aerospace power. Space power for its own sake is a flawed strategy.
- In order to ensure proper preparedness should our civilian leadership later decide that the application of force from space is in our national interest, the Air Force will continue to invest in technology development as permitted by national policy. (*The Aerospace Force*, page 21)
- The United States must engage in a national debate on the merits of space power. This debate must address the unintended consequences of fielding or not fielding space control and space force application systems. Fielding space control and space force application systems requires a national commitment. Fielding them also requires that key thresholds be overcome: funding, political sensitivities, social ambivalence and foreign policy implications.

- **The Air Force is the right organization to which future space power missions should be assigned**
  - The Air Force is the nation's space warfare expert. The Air Force has the preponderance of DoD space capabilities and expertise.
  - The Air Force defines space power as our ability to exploit all manners of space systems to achieve national security objectives. Space power is not limited to lethal on-orbit systems. (See Appendix A for a fuller explanation.) The Air Force employs the full range of space power today.
  - The Air Force has the right leadership to apply aerospace power for the joint team and the nation.
  - The Air Force has the right vision to apply aerospace power for the joint team and the nation.
  - The Air Force is developing concepts and doctrine to employ space power.
  - The Air Force is on the leading edge in advancing space technology. The Air Force is continuing to research and develop future space systems and will be prepared when our national leadership decides the time is right to use them.
- **The Air Force is committed to aerospace modernization and integration**
  - Despite the cost burden and the lack of formal Title 10 authority, the Air Force has stepped up to the task of building space capabilities.
  - The Air Force is not the only U.S. operator in space, but we account for more than 85% of the DoD personnel, budget, assets, and infrastructure dedicated to space-related activities. On a daily basis, all U.S. military forces depend on the full set of space assets acquired and operated by the Air Force.
  - The Air Force is modernizing all space systems this decade. The Air Force is also increasing science and technology (S&T) funding toward space technology development.
  - The Air Force is advancing air and space capabilities by evolving into a full spectrum

aerospace force. "Aerospace integration" is the name the Air Force has given to its strategy of evolving into a full spectrum aerospace force. Experience proves air and space people and systems attain better results when integrated than they achieve when operating independently.

- By successfully integrating air and space operations, the Air Force will be able to control and exploit space to the same degree it can control and exploit the air today.
- The aerospace continuum is a seamless <u>operational</u> medium. This operational medium reaches from the Earth's surface to the orbit of the highest satellite.
- The Air Force employs aerospace power: forces that produce the desired effects, regardless of where platforms reside, fly, or orbit. The Air Force will use the synergistic mix of air and space systems to defeat future threats and accomplish its many missions

- **The Air Force is developing aerospace leaders**
  - The art of commanding aerospace power lies in integrating systems to produce the exact effects the nation needs. Our airmen will think in terms of controlling and exploiting the full aerospace continuum on a regional and global scale to achieve effect both on earth and in flight regimes beyond the horizon.
  - The Air Force has a program to develop aerospace leaders. This program will identify the skills required to lead the future aerospace force. It will develop the career paths necessary to produce a pool of candidates who are equally skilled in commanding air and space forces.
  - The Air Force's future aerospace leaders will have experience and cross-competence in the increasingly complex range of military disciplines.
  - The Air Force has modified its command organizations to take full advantage of air, space, and information expertise.
- **The Air Force is the nation's premiere space service**
  - The Air Force has a proud legacy of meeting the nation's military needs in space.
  - The Air Force is doing an excellent job today meeting the demands of diverse military, government, and civilian users of its space systems.
  - The Air Force will achieve its vision and, in doing so, help to assure the nation's security and prosperity.

<u>QUOTES</u>

SECAF Peters: "What comes from space is valuable because of the way you integrate it with everything else you do. A separate entity with responsibility for space would hamper integration with layers of bureaucracy." (December 2000, Air Force Magazine)

SECAF Peters: "We have an infinite and exquisite number of layers of oversight and review above us. None, you know, none of which has budget responsibility. And in DOD itself, we have C3I and AT&L, both of which claimed responsibility. We have national security space architect, we have JROC's, PRB's, EDRB's and endless number of organizations to report to and that's what we do, and yet no one has the responsibility for actually finding the money and doing the programs except the Air Force. Our proposal is that we try to look again at something like the National Space Council at the highest levels, and then create a Defense Space Council that really tries to coordinate what we want to do on DOD wide space." (28 October 2000, Defense Writers Group)

SECAF Peters: "There are still people talking about a separate force. I mean my own view is that, that misses the point on space over the next twenty to twenty-five years, and that is basically what comes from space is valuable because of the way you integrate it with everything else you do, as we did in Kosovo. If you can integrate space products with unmanned air products and manned air products and come together with a fused picture, you can do what joint vision 20/20 calls precision dominance. As a commander, I don't think I care where the electrons come from. You know, so long as the electrons come down and are fused in some meaningful way and can get back to the platform or people who have to pull the trigger or deliver humanitarian goods or whatever we're doing that day." (28 October 2000, Defense Writers Group)

CSAF Ryan: "There is no Title 10 authority that says the United States Air Force is in charge of space programs, but we have stepped up to it because we think it's the important thing to do". "There is some funding of those kinds of systems that we need to look at in the future because of the cost of them". "When we're providing a utility...those who use it should pay." (December 2000, Air Force Magazine)

CSAF Ryan: "We in the US Air Force, in this decade of drawdown, have been great stewards of the space force. We have throughout the drawdown maintained at a fairly constant level our funding for our space programs. Of all of our programs, our most recapitalized force is our space force, because it must be. We cannot let it fail because it not only supports the United States Air Force, but all the rest of our forces, indeed the national command authority." (The AFA National Symposium -- Los Angeles, 17 Nov 00)

CSAF Ryan: "I don't think we need a space corps or a space force. I think our strength is in our capability to meld all the vertical dimension together to produce the effects we need in the defense of this country. What we need is a national commitment in funding to make the vision a reality. Our vision for the future is one of an aerospace force that controls the vertical dimension."(The AFA National Symposium -- Los Angeles, 17 Nov 00)

CINCSPACE Gen Eberhart: "As space becomes more integral -- and critical -- to military land, sea and air operations, the U.S. must devote more attention to the sensitive issues of space control and superiority. Since the Persian Gulf war, the Pentagon and intelligence agencies have concentrated on getting space-derived information to troops in the field. To that end, the last few U.S. Space Command (USSC) commanders-in-chief (CinCspace) have devoted considerable time and effort to "operationalizing" space -- getting expertise and information from satellites to front-line commanders and helping the latter leverage the nation's high-flying assets. The result has been rapid integration into the day-to-day activities of warfighters." (Aviation Week and Space Technology, 13 Nov 00)

CINCSPACE Gen Eberhart: "The importance of space control and space superiority will continue to grow as our economy becomes more reliant on space." That reliance now is fairly transparent to most citizens who expect their pagers to always work, their credit card transactions to be completed smoothly and their stock market trades to be consummated at light-speed. All these now-routine activities are linked to orbiting spacecraft. And as private, civil and military communities become ever more dependent on space assets, those spacecraft also become vital elements of the nation's infrastructure -- and more tempting targets for potential enemies, be they national states, terrorists or sophisticated nonaligned entities such as drug cartels." (Aviation Week and Space Technology, 13 Nov 00)

AFMC/CC Gen Lyles: "The Air Force will be putting more emphasis on space activities. We will be putting more resources in the future of the space program. I see that area growing tremendously. However, that does not take away from the air mission. We need both capabilities. We are truly an aerospace organization, and we cannot do our missions anywhere near as efficiently without having a blend of all of our capabilities." (Leading Edge Magazine, May 2000)

Maj Gen Brian Arnold, Director of Space and Nuclear Deterrence: "The Service is beginning to migrate tasks to space-based assets that are presently performed by air-breathing assets". "We are the ones that are likely to make those future trades". "As our JSTARS begins to wear out, we will be the ones to begin to think about space-based radar to replace that". (Oct 30, 2000, Aviation Week and Space Technology)

Maj Gen Brian Arnold, Director of Space and Nuclear Deterrence: "The Air Force and the National Reconnaissance Office are together recapitalizing all of the communication, navigation, surveillance and threat warning, meteorology and launch vehicle systems in this decade. "For industry, this is a pretty good news story, because we have to buy them from somebody." "The important thing is that we are replacing virtually every one of these systems with a newer system that is giving us five to 10 times greater capability". " MILSTAR is being replaced with an advanced EHF satellite by 2008". "The Global Positioning System (GPS) is being upgraded, with Lockheed Martin modifying about 12 of the GPS IIR satellites and Boeing building new GPS IIFs". "A new GPS Block 3 will emerge in about 2010." (Oct 16, 2000, Aerospace Daily)

Maj Gen Brian Arnold, Director of Space and Nuclear Deterrence: "In the immediate future, the Space-Based Infrared System (SBIRS) layered approach of high and low early warning satellites remains U.S. Space Command's number one priority, and is designed to replace the aging Defense Support Program (DSP) satellite constellation to provide missile warning, technical intelligence and refined battlespace characterization". "SBIRS high and low are now full-up programs, with Lockheed Martin the prime on SBIRS-high". "Currently, the program is in Increment I, having just satisfied the Increment I software requirement". "SBIRS-low competition continues between TRW and Spectrum Astro, which are currently in the program definition and risk reduction (PDRR) stage as the AF refines its requirements". "A down-select is expected next year". " But it is the research and development dollars of today that will field the high-end, next generation technology of tomorrow." (Oct 16, 2000, Aerospace Daily)

AIR FORCE SPACE STEWARDSHIP INITIATIVES

- Stand-up of Directorate of Space Operations
- Space Warfare Center's Space Tactics School
- Space Aggressor Squadron: "Red Team" to assess our space vulnerabilities
- Space Battlelab: developing/testing new ops concepts
- Aerospace Operations Centers: integrates space, air and Intel assets
- Joint Expeditionary Force Experiments (JEFX)
- Aerospace Basic Course
- USAF Weapon School Space Division
- Aerospace Integration Center in Nellis AFB, NV
- Flex targeting technology, i.e. Multi-Source Tactical System (MSTS) and TRACK II
- By 2010, modernization of entire Air Force space
- Better harnessing of commercially provided space imagery through the Eagle Vision program
- Partnering with industry on the development of the Evolved Expendable Launch Vehicle

STRATEGIES

- Promote understanding within and outside the Air Force through a proactive briefing and media program by senior USAF leaders, SAF/PA, AFSPC, USSPACECOM and AFMC. Be prepared to respond to media queries when requested

- Create and distribute information products i.e. briefings and point papers explaining Air Force stewardship and leadership in the nations space programs.

- Inform Air Force personnel through an ongoing information campaign via internal public affairs channels and external media

PRIMARY SPOKESPERSONS

SAF/OS
SAF/US
AF/CC
AF/CV
SAF/AQS
SAF/AQR
AF/XPX
AF/XOS
AF/QR

DP-DAL
SAF/SN
AFSPC
AFMC/SMC
AFMC/AFRL
ACC

PUBLIC AFFAIRS GUIDANCE

- Public Affairs posture will be active. Commanders and public affairs staffs at all levels should take every opportunity to educate and inform internal and external audiences about the Air Force position on space. Disseminate information via base newspapers, unit websites, commanders' call; commanders' access channels, and in discussions with local community leaders.

- Use the key messages, quotes and references in this guidance as a basis for discussions on the Air Force's leadership of the nations space programs. Briefing materials, brochures, news articles and additional information will be made available for inclusion on Air Force websites:

- SAF/PAM point of contact for this PAG is Captain Joe Della Vedova, DSN 227-3462 or commercial (703) 697-3462.

APPENDIX A
FACT SHEETS

BULLET BACKGROUND PAPER

ON

COMMISSION TO ASSESS UNITED STATES NATIONAL SECURITY SPACE MANAGEMENT AND ORGANIZATION

Purpose

- Provide update on Space Commission and Air Force interaction with the Commission

Commission Legislation

- National Defense Authorization Act for FY 2000 (NDAA) established the Commission to Assess United States National Security Space Management and Organization (the "Space Commission")
  - NDAA for FY 2001 includes an amendment to the 2000 NDAA adding three new issues to the Space Commission charter
- Commission Scope - Extract from the establishing legislation:
  - The Commission shall, concerning changes to be implemented over the near-term, medium-term, and long-term that would strengthen United States national security, assess the following:
    - The manner in which military space assets may be exploited to provide support for United States military operations.
    - The current interagency coordination process regarding the operation of national security space assets, including identification of interoperability and communications issues.
    - The relationship between the intelligence and nonintelligence aspects of national security space (so-called "white space" and "black space"), and the potential costs and benefits of a partial or complete merger of the programs, projects, or activities that are differentiated by those two aspects.
    - The manner in which military space issues are addressed by professional military education institutions.

- The potential costs and benefits of establishing any of the following:
  - An independent military department and service dedicated to the national security space mission.
  - A corps within the Air Force dedicated to the national security space mission.
  - A position of Assistant Secretary of Defense for Space within the Office of the Secretary of Defense.
  - A new major force program, or other budget mechanism, for managing national security space funding within the Department of Defense.
  - Any other change to the existing organizational structure of the Department of Defense for national security space management and organization.
- Amendment in NDAA for FY 2001 - The advisability of...
  - Various actions to eliminate the de facto requirement that specified officers in the United States Space Command be flight rated that results from the dual assignment of officers to that command and to one or more other commands in positions in which such officers are expressly required to be flight rated;
  - The establishment of a requirement that, as a condition of the assignment of a general or flag officer to the United States Space Command, the officer have experience in space, missile, or information operations that was gained through either acquisition or operational experience; and
  - Rotating the command of the United States Space Command among the Armed Forces.

- Commission Membership
  - Chairman, Donald Rumsfeld --resigned December 2001 retired ADM David E. Jerimiah acting Chair
  - Members
- Duane P. Andrews, Robert V. Davis, Howell M. Estes III, Ronald R. Fogleman, Jay M. Garner, William R. Graham, Charles A. Horner, Thomas A. Moorman, Douglas H. Necessary, Glenn K. Otis, and Malcolm S. Wallop
- Timeline
  - Final appointments made in late May 3000 and official standup on 1 June 2000
  - First meeting on 11 July 2000
  - Final report submitted to Congress on 11 January 2001
  - SecDef and DCI response submitted to Congress on 12 April 2001

Senate Report

- The following extracts are from the Senate Armed Services Committee Report on the NDAA (Report 106-50) and relay the SASC's reasons for proposing an independent commission:
  - "The committee believes that the United States confronts a largely unexploited opportunity to enhance significantly U.S. national security through more complete utilization of space for military purposes."
  - "The committee is concerned that the Department of Defense (DOD) may not be ideally oriented--intellectually or organizationally--to fully exploit space for national

security purposes. Notwithstanding a significant annual budget for space programs and operations, for the most part DOD tends to treat space as an information medium to support existing air, land, and sea forces, rather than the strategic high ground from which to project power."

- "The committee believes that the United States must begin to take steps to exploit more fully space as a natural power center. This calls for greater utilization of space to support the full range of power applications, from missile defense and space control, to force application."
- "The committee notes that the Air Force and the Defense Department currently prefer to pursue "air and space integration" rather than the development of more dedicated "spacepower" concepts. Although the committee does not necessarily oppose such an approach in the near term, it does support efforts to ensure that we not unnecessarily constrain our thinking and planning for utilizing space in support of U.S. national security."
- "The Defense Department's current approach may adequately serve U.S. national security today, but the Department may not be ideally suited for objectively looking beyond existing programs, policies and organizational structures."

House Report

- The following is an extract from the House Armed Services Committee Report on the NDAA (Report 106-162) on the subject of the Space Commission. The HASC originally called for a report on space issues drafted by the DoD, but later agreed to the SASC proposal of an independent commission.
  - "The committee believes that the future security environment will be marked by profound technological change that will transform the conduct of war. This transformation will necessitate a fuller integration of land, air, sea, and space operations."
  - "The committee believes that the Department of Defense must be appropriately organized to exploit fully the opportunities offered by this transformation, and directs the Secretary to address in this report current and projected U.S. efforts to fully exploit space in preparation for possible conflicts in 2010 and beyond."

Other Related Initiatives

- National Commission for the Review of the National Reconnaissance Office (the "NRO Commission")
  - Established in the Intelligence Authorization Act for FY 2000
  - Report released on 15 November 2000, available at http://www.nrocommission.com/toc.htm
- NIMA Organizational Review
  - Established in the classified section of the House Defense Appropriations Bill 2000
  - Originally scheduled for May 2000 release, revised to August 2000 release
  - Joint SecDef & DCI report
- U.S. Commission on National Security/21st Century (Hart-Rudman Commission)

- Established to re-evaluate National Security Act and national strategy
- Not focusing on space-related issues
- Phase 1 and 2 reports available at http://www.nssg.gov/

Air Force Game Plan

- Headquarters Air Force has established the Space Commission General Officer Steering Group (GOSG) and the Space Commission Task Force to develop and coordinate Air Force positions on key issues related to the Space Commission's assessment
  - GOSG chaired by Maj Gen Brian A. Arnold, SAF/AQS
  - Space Commission Task Force led by LtC Dustin Tyson, AF/XPXT
  - The GOSG and Task Force have developed a coordinated a number of positions and information products at the Space Commission's request
- Air Force Position
  - The Air Force has developed a comprehensive set of recommendations to the Space Commission for changes to the management and organization of national security space at the national, DoD, and Air Force levels.

Summary

- Space Commission will assess a number of issues important to the Air Force, and may set the stage for dramatic changes in Air Force and DoD management of space
- The Air Force continues to support the Space Commission and is preparing to develop its response during the January-March 2001 time frame.

AIR FORCE POSITION ON RECOMMENDATIONS TO THE SPACE COMMISSION

- This paper represents the Air Force position on recommended changes to space-related organizations at the national, Defense, and Air Force levels.
- Benefit to the nation: these changes will strengthen national security by better focusing national efforts on space capabilities and integrating key space elements in support of U.S. security interests. These changes will have a positive but limited effect until space resources are increased commensurate with space's importance to the nation.

National Level

- Recommend an integrated, national-level vision for civil, commercial, intelligence, and military future space activities created by a National Space Council
- Recommend greater national funding commitment over the current level of DoD TOA
  - -- Must increase space funding in response to evolving threats, modernization needs, and growing demands of national users and joint warfighters
  - -- AF & NRO must recapitalize all space assets this decade... additional resources are required

Congress

- Assign Title 10 legislation lead Service authority to the Air Force for space missions to ensure better coordination of space activities for the nation; this does not preclude other Services and Agencies from initiatives that are primarily focused on their functional responsibilities
- Recommend Congress establish the Air Force authority for a second Under Secretary of the Air Force for Space, dual hatted as DNRO
  - -- Allows improved vetting of black/white space issues; improves interagency coordination; would sit on OSD Defense Space Council; provides program direction and oversight of "black and white" space programs
  - -- Recommend moving NSSA under the Air Force Under Secretary for Space to become the "National Security Aerospace Architect" to better tie to aerospace operational capabilities and resources

- Recommend creation of Aerospace Power Subcommittees in the Congress
  - -- Would provide consolidated oversight over aerospace and national security space programs. Can then align subcommittee responsibilities by Service function
  - -- Allows Land and Seapower Subcommittees to focus on ground and maritime issues
- Recommend creation of a "Space Caucus" in the Congress which would address additional military, intelligence, and civil, and commercial space programs

Administration

- Recommend reestablishing a National Space Council, chaired by the Vice President
  - -- Focus on space issues at the national level to consolidate oversight of interagency space matters
- Recommend creation of a Special Assistant for Space on the National Security Council staff
  - -- Focus on policy for military and intelligence space matters to ensure exercise of the normal interagency coordination process
  - -- OSTP would continue to focus on civil, commercial, and international issues
- Recommend combining NRO acquisition and operations with equivalent Air Force functions, under the policy control of the Air Force Under Secretary for Space, with execution to be in SAF/AQ and AFSPC, respectively; phased in over time
  - -- AFSPC would operate NRO legacy systems initially
  - -- Propose a time-phased transition plan for all NRO systems with military applications
  - -- The requirements process for intelligence and military systems should remain separate to ensure meeting national security intelligence requirements; work overlapping military and national intelligence requirements through the "Expanded JROC" process

DoD/JCS Level

- Recommend creation of a "Defense Space Council," vice an ASD (Space)
  - -- Would be co-chaired by DepSecDef and VCJCS to provide broad direction and guidance for DoD space programs, and be an interface with the National Space Council and Intelligence Community (membership would include Service Undersecretaries and Vice Chiefs)
  - -- Provides OSD and joint focus for space: space role in joint operations, black/white integration activities, etc.
- Recommend establishing an "Expanded JROC" to work with "Expanded DRB" by including representatives from intelligence community on JROC for dual-use systems
- Recommend DoD rewrite DoDD 5100.1 to give Air Force lead Service responsibility for space
  - -- DoD Directive 5100.1 *(Functions of the Department of Defense and Its Major Components*, 1987) responsibilities are ambiguous except for land-based space launch which is an Air Force responsibility
- Recommend DoD funding for joint use space systems be provided from Services and Agencies proportional to their requirements and use of the systems
- Do not recommend creation of an ASD (Space)
  - -- Office would be redundant with Services' responsibilities and would lack ability to

trade space capabilities with air, ground, and maritime capabilities (Note: this is the JCS position.)
  - -- Oversight, policy, and resource allocation functions are already performed by USD(AT&L), ASD(C3I), & ASAF/Space
  - -- Establishment of ASD (Space) is contrary to the current alignment of the ASD portfolios within OSD. Space is a physical medium, not a functional area. All existing ASDs are responsible for specific functions (acquisition, communications, policy, etc.).
    - --- The establishment of a medium-based ASD should logically lead to similar positions to oversee air, land, and sea
- Do not recommend creation of a major force program for space ("MFP 12")
  - -- Would "box in" Services' ability to make appropriate trades (Note: this is the JCS position.)
  - -- Would risk refocusing CINCSPACE on acquisition & R&D at the expense of operations

Air Force Level

- Establish AF Space Command Commander as a General Officer (0-10) billet separate and distinct from USCINCSPACE (critical if USCINCSPACE is not an AF General Officer)
- Air Force has created the Directorate of Space Operations and Integration (AF/XOS) that will develop operational policy and guidance and provide HQ USAF space operational expertise
- Air Force has created a "Developing Aerospace Leaders" office (AF/DP-DAL) to develop a focused aerospace career and leadership development program; effort includes processes that integrate air, space, and info operations, acquisition, and national community expertise into deliberate career paths
- Recommend the Air Force study the space acquisition system to look for efficiencies and improvements in the process and relationships between AFSPC, SMC, and various AF Research Lab efforts. Further, the Air Force should examine the current acquisition process to include a potential combination of the NRO "cradle to grave" acquisition process and processes required by Goldwater-Nichols.

Bullet Background Paper
On
Air Force Space Power (AFDD 2-2)

Purpose:

- To describe "Space Power" as applied by the United States Air Force

Discussion:

- Space Power is the capability to exploit civil, commercial, intelligence, and national security space systems and associated infrastructure to support national security strategy and national objectives from peacetime through combat operations. It requires having assured access to the use of space and the ability, if necessary, to deny such use to potential adversaries. Space systems and capabilities enhance the precision, lethality, survivability, and agility of all operations - air, land, sea and special operations.
- While the Air Force believes that space and air are a seamless continuum, the space environment has different characteristics from the air environment. The characteristics of space are sufficiently different from air that complete understanding of both is required to leverage their contributions.
- Space-based systems in appropriate orbital deployments provide worldwide coverage and frequent access to specific Earth locations, including those denied to terrestrial-based forces, on a recurring basis. The Air Force categorizes its use of space power into 4 mission areas:
  - Force Enhancement operations consist of those operations conducted from space with the objective of enabling or supporting terrestrial-based forces. Navigation, communications, reconnaissance, surveillance, ballistic missile warning, and environmental sensing help reduce uncertainty and friction at all three levels of war-strategic, operational, and tactical.
  - Space Support is carried out by terrestrial-based elements of military space forces to sustain, surge, and reconstitute elements of a military space system or capability. These activities deploy, sustain, or augment on-orbit spacecraft, direct missions, and support other government or civil organizations. Space support involves spacelift and satellite operations.

- Space Control is the means by which space superiority is gained and maintained to assure friendly forces can use the space environment while denying its use to the enemy. To accomplish this, space forces must survey space, protect the ability to use space, prevent adversaries from exploiting US or allied space services, and negate the ability for adversaries to exploit their space forces.
  - Counterspace is the mission carried out to achieve space control objectives by gaining and maintaining control of activities conducted in or through the space environment. It involves activities by land, sea, air, space, information and/or special operations forces, and includes offensive and defensive operations.
- The application of force would consist of attacks against terrestrial-based targets carried out by military weapon systems operations in space. Currently, there are no force application assets operating in space, but technology and national policy could change so that these missions could be performed from platforms in space.

- The Air Force is in the forefront of space operations to support DoD and the civil sector.

Theater and National Missile Defense

Messages

<u>KEY MESSAGES AND SUPPORTING MESSAGES:</u>

- **The Air Force is a key contributor to theater missile defense (TMD).**
  - The Air Force's primary contribution to TMD is the airborne laser (ABL).
    - The ABL's role is to destroy missiles in their boost phase, shortly after launch.
    - The ABL is in development now, with its first flight expected in January 2002; the first shoot-down test in 2003; and to be operational in 2007.
- **The Air Force is a key contributor to national missile defense (NMD).**
  - An Air Force contribution to NMD is the space-based laser (SBL).
    - The SBL's role is to destroy missiles in their boost phase, shortly after launch.
    - SBL technology is under development now through the Space and Missile Systems Center and the Air Force Research Lab, with a ground test of the laser and beam control system in 2004, and the launch of a SBL demonstrator in 2012. (Note: SMC is managing SBL project funds; AFRL is investing in technologies to support SBL)
  - The Air Force is contributing to NMD through the development of the Space Based Infrared System (SBIRS).
    - SBIRS consists of two satellite constellations, SBIRS High and SBIRS Low, that will detect missiles and warn commanders of the threat. Both systems will play a role in both TMD and NMD.

        - SBIRS High will provide global and theater infrared data on launch, flight, and impact of strategic and theater missiles. SBIRS High will be able to track enemy missiles until their delivery rockets burn out.
        - SBIRS Low will provide early warning and tracking of ballistic missiles in their mid-course of flight after a warhead separates from its booster. SBIRS Low would pick up missile tracking where the SBIRS High system leaves off.

- **Missile defense is a key element of the Air Force's Strategic Plan.**
    - Missile defense is one of 14 critical future capabilities in the Air Force Strategic Plan (AFSP).
        - The capability statement is "Consistent with international agreements render an adversary's cruise, land attack cruise, and ballistic missile assets ineffective before launch or soon after through timely and effective interaction with national and theater missile defense assets."
- **The Air Force anticipates that TMD and NMD missions will become part of its broad range of ongoing missions.**
    - The Air Force will operate the TMD and NMD systems it is currently developing and will conduct operational missions with them.

APPENDIX B
PRESS ADVISORY

Air Force Initial/Final Press Release on Space Commission Report

The Air Force welcomes the report from the Commission to Assess National Security Space Management and Organization. We have long recognized the importance and potential of space capability to the nation. The Air Force provides close to 90% of the DoD resources targeted toward space, as well as the vast majority of people. As the primary provider of space capability within the Department of Defense, we are encouraged by the attention national security space is receiving. This is a great step in opening dialogue and we look forward to responding to this report and continuing this dialogue throughout the QDR.

APPENDIX C
QUESTIONS AND ANSWERS

Q1. What exactly does the Space Commission Report entail?

A1. The Space Commission Report will provide an assessment of a number of issues important to the Air Force, and may set the stage for dramatic changes in Air Force and DoD management of space. OSD will issue a final assessment of the report in the spring of 2001.

Q2. Who directed the creation of a Space Commission to do this report and why?

A2. The National Defense Authorization Act for FY 2000 (NDAA) established the Commission to Assess United States National Security Space Management and Organization (the "Space Commission"). Their mission is to assess the manner in which military space assets may be exploited for U.S. military operations; the current interagency process to operate national security space assets; the relationships between non-intelligence and intelligence aspects of national security space, the manner space issues are addressed by professional military education institutions; and the cost benefits for organizational restructuring.

Q3. Is the Air Force concerned that the Space Commission report may reduce the Air Force's role in the nations space missions?

A3. The Air Force welcomes the report from the Commission to Assess National Security Space Management and Organization. We have long recognized the importance and potential of space capability to the nation. The Air Force provided 84% of the DoD resources targeted toward space in FY00 (spending is projected to reach 90% by FY05), as well as the vast majority of people. As the primary provider of space capability within the Department of Defense, we are encouraged by the attention national security space is receiving. This is a great step in opening dialogue and we look forward to responding to this report and continuing this dialogue throughout the QDR.

Q4. If the Air Force is a good steward of the nation's space mission, why did Congress establish a commission to investigate the Air Force's role in space?

A4. The nation's interest in space is much bigger than the Air Force. Congress (SASC) believes that the United States confronts a largely unexploited opportunity to enhance significantly U.S. national security through more complete utilization of space for military purposes. Congress believes that the future security environment will be marked by profound technological change that will transform the conduct of war. This transformation will necessitate a fuller integration of land, air, sea, and space operations. Congress also believes that the Department of Defense must be appropriately organized to exploit fully the opportunities offered by this transformation, and directs the Secretary to address in this report current and projected U.S. efforts to fully exploit space in preparation for possible conflicts in 2010 and beyond. The Air Force is heartened to see high level interest in this vitally important subject. The Air Force anticipates the Space Commission will recognize the Air Force's excellent stewardship of military space.

Q5 Why does the Air Force maintain that it has been a good steward of America's space programs when most of the programs are not controlled by the Air Force?

A5. The Air Force has been and will continue to be an excellent steward of national security space missions. The Air Force deserves credit for bringing military space to its advanced state. The Air Force has produced critical capabilities for the Joint Team despite budget cutbacks and demands to improve personnel programs, readiness, infrastructure, etc. The Air Force understands space missions, like all other military mission areas, needs more resources to meet future military demands. While some programs are not directly controlled by the Air Force, the Air Force manages a few key programs on which the other Services, civil agencies, and the public depends. These programs include the Global Positioning System, the NPOESS, MILSTAR, launch-related programs and others.

Q6. What is the Air Force's vision for space?

A6. The Air Force will continue to control and exploit space, integrate it with air and information operations and produce exact effects the nation needs.

- Near-term (2000-2005): Improve battlespace situational awareness, integrate aerospace forces, evolve space and info superiority.
- Mid-term (2006-2015): Improve battlespace management, evolve global conventional strike, gain space and info superiority
- Far-term (2016-2020): Complete efforts to provide global, real-time situational awareness, provide prompt, global conventional strike and maintain space and info superiority We will develop our ability to control and exploit space for the Joint Team and the nation

Q7. What are the Air Forces top priority space programs?

A7. Our top near-term space funding priority is Space-Based Infrared Program (SBIRS), which addresses critical warfighting needs in missile defense. SBIRS is an integrated architecture:

- SBIRS High replaces DSP satellites providing national strategic warning
- SBIRS Low supports NMD and other mission areas and has the ability to track RV's after booster burn out

Our top long-term space funding priority is the Space-Based Radar. Additional funding for all these programs is a risk reduction issue. However, equally important is the necessity to plan, develop and field the EELV and modernize the launch ranges.

Q8. How much of the Air Force budget is devoted to space missions?

A8. The percentage of the Air Force budget for space has increased from 6.5% to 9.0% in the last decade (constant year 01 dollars), in spite of shrinking budget for all Air Force programs. Moreover, the Air Force S&T budget for space has been increasing from 13% of the total in FY99PB to 36% in FY01PB. Roughly, 18% of Air Force modernization budget goes toward space.

Q9. Is this current budget adequate to fund your top priority space programs?

A9. The kind of air and space recapitalization that we need...to keep the current force structure and an average age that allows it to be viable is somewhere between $10-11 billion per year more than our current AF funding. This does not include what the Air Force needs to do with our physical plant, reinvestment in our people and some of our near-term readiness requirements. (CSAF testimony at the Readiness Hearings in Sept 2000). Overall the Air Force needs $20-30 billion more a year in order to recapitalize the entire force (SECAF Peters, Air Force Magazine, Dec 2000).

The current AF budget covers all programs to a minimum amount. However, across-the-board funding increases are necessary for all national security space programs, not just Air Force programs. The US needs a national level commitment to space. Future requirements for space capabilities far exceed our available resources. The entire Joint Team benefits from space--new funds are needed to support the Joint Team's demand for additional capability. Air Force is primarily a provider of space capabilities, other Services are primarily consumers, so the Air Force is faced with recapitalizing almost every space system during this decade while at the same time recapitalizing its air assets.

Q10. How come your number one space program is not funded/supported as number one?

A10. The perception is that the Air Force is not serious about SBIRS, as if the SBIRS Low transfer to BMDO shows a lack of commitment. The reality is that the Air Force recommended transfer after Congress designated SBIRS Low as a missile defense program. Transferring SBIRS to BMDO offers the potential for better system integration.

This is not a final decision; it is under evaluation by the DepSecDef. The Air Force is using a similar approach to Navy and Army NMD efforts. SBIRs is a "must have" system that ensures our nation's security against a ballistic missile threat. Since the early 1960s, the Air Force has invested over $25 billion to provide ballistic missile warning (DSP). The Air Force is continuing to make investments to develop new capabilities, like SBIRs, that will meet the nation's requirements for a robust threat warning capability.

Q11. If the Air Force's goal is for an aerospace force, how come most of your modernization budget is devoted to fixed/rotary wing aircraft?

A11. Overall, the percentage of the Air Force budget for space has increased from 6.5% to 9.0% in last decade (constant year 01 dollars), in spite of a shrinking modernization budget for all AF programs. Specific decisions to restructure air and space programs are only made after careful consideration of technological development and mission risk. Decisions on specific programs should not be viewed in isolation. The Air Force is currently sustaining and modernizing all of our space programs simultaneously.
Funds freed after SBIRS restructuring resulted in increases in many space programs in the FY00 PB, such as EELV, GPS, SBL, and space launch range infrastructure.

Q12. How is the Air Force going to balance its investments in airborne assets versus space assets?

A12. The Air Force Corporate Process is designed to make tradeoffs between all Air Force programs, so yes we do make essential tradeoffs. All air and space programs have experienced significant program adjustments. Examples are F-22, C-17, and AMRAAM, MILSATCOM, SBIRS, and spacelift. But an analysis of Air Force major programs and topline budget (FY93-FY00) indicates no significant migration of dollars from space to air programs .

Q13. How should the Air Force be properly structured or organized to better manage the nations space programs

A13. The Air Force is well structured to continue improving military space for the joint team and the nation. The nation's national security space programs would enjoy better health with a greater national commitment to funding them.

Q14. Should a DoD-level funding mechanism be set up for space to guarantee that the United States maintains superiority in space?

A14. No. The AF is the right place for space funding because it can make the trades required to balance the military programs to meet the nation's space needs.

Q15 Isn't the shift in science and technology (S&T) money toward space just a paper change, and not a real shift toward space?

A15. No. Although defining technical area categories for the dollars can be difficult, the Space S&T financial categorization is very conservative.
The "pure" space S&T budget rises from 13% of the total in the FY99 PB to 36% in FY01PB This real change in the space S&T investment depicts the Air Force's commitment to space and a corresponding shift in the overall S&T investment focus.
The Air Force maintained an overall FY00 PB S&T investment at FY99 PB's level. Air Force commitment to space in its S&T budget is reflected in the fact that S&T investment in non-space efforts was reduced by $94.6M, as well as the reclassification of SBL as an S&T program.
To address SBL reclassification:
The recategorization of SBL (and the now-terminated Discoverer II) was necessary because it is not at a sufficient stage of development where operational requirements could be defined, or where an operational prototype could be developed.
The Scientific Advisory Board reported that SBL required advanced, yet to be fully developed technologies, particularly in the field of optics.
Given the nature of this program, the Air Force made the decision to move it into S&T funding line and remains committed to developing the key technologies to make it an operational reality.

Q16. Is the Air Force a good steward of space and why?

A16. Absolutely. The Air Force deserves credit for bringing military space to its advanced state. The Air Force has produced critical capabilities for the Joint Team despite budget cutbacks and demands to improve personnel programs, readiness, infrastructure, etc. The Air Force understands that space missions (like all other military mission areas) need more resources across the board to meet future demands. An indicator of stewardship is the readiness of assigned units. Space/missile combined readiness is at 87% (for C1/C2) in Jan 2001. Readiness for other units is at 80% during the same time period

Q17. Does the Air Force believe that their sister Services have supported or funded space at the level commensurate with their use of space assets?

A17. The Air Force does not endorse a plan to charge the other Services for their requirements for space services today. However, in the future, we recommend that DoD funding for joint use space systems be provided from Services and Agencies proportional to their requirements and use of the systems. According to CSAF Ryan, "There is some funding of those kinds of systems that we need to look at in the future because of the cost of them." "When we're providing a utility…those who use it should pay." (December 2000, Air Force Magazine). The solution to everyone's resource constraint is a national level commitment to space. An increase in resources is required. Additionally, a review of the requirements process could possibly reduce growth in demand for space capabilities.

Q18. Are the Air Force's top space programs adequately funded?

A18. The AF has funded its space programs to the maximum extent possible, given its many diverse commitments in air and space. All of the AF's programs require more money to improve readiness, to modernize properly, and to compensate the people who operate and support them.

Q19. Is the Air Force adequately resourced to execute its space missions?

A19. The AF has funded its space programs to the maximum extent possible, given its many diverse commitments in air and space. All of the AF's programs require additional funding to improve readiness, to modernize properly, and to compensate the people who operate and support them. Future requirements for space capabilities far exceed our available resources, so funding of future missions requires a national level commitment to space. The entire Joint Team benefits from space, so new funds are needed to support the Joint Team's demand for additional capability. The Air Force is primarily a provider of space capabilities, and the other Services are primarily consumers. The Air Force is faced with recapitalizing almost every space system during this decade while at the same time recapitalizing its air assets

Q20. Do you believe the other services should pay more for space?

A20. The Air Force does not endorse a plan to charge the other Services and Agencies for their requirements for space services today. However, in the future, we recommend that DoD funding for joint use space systems be provided from Services and Agencies proportional to their requirements and use of the systems. According to CSAF Ryan, "There is some funding of those kinds of systems that we need to look at in the future because of the cost of them." "When we're providing a utility...those who use it should pay." (December 2000, Air Force Magazine). The solution to everyone's resource constraint is a national level commitment to space. An increase in resources is required. Additionally, a review of the requirements process could possibly reduce growth in demand for space capabilities.

Q21. Why is the Air Force neglecting SBIRs but fighting for the F-22 and JSF?

A21. Year to year comparisons of funding for specific programs are misleading. Short-term changes in program funding are sometimes necessary as each Service seeks to balance competing demands between competing priorities of people, readiness, modernization, and infrastructure. The true measure of the Air Force's commitment to a particular program is its long-term investment in providing a <u>capability</u> to the nation. Since the early 1960s, the Air Force has invested over $25B to provide ballistic missile warning (DSP) for <u>all</u> Services and the nation. The Air Force is continuing to make significant investments to develop new capabilities, such as SBIRS, that will meet the nation's requirement for a robust threat warning capability. <u>Both</u> the F-22 <u>and</u> SBIRS are vital for our future national security and the Air Force is fully committed to supporting them both, now and in the future.

Q22. Isn't the Air Force just giving lip service when it states it wants to become an aerospace force?

A22. The Air Force has taken many meaningful steps toward becoming a full spectrum aerospace force, starting with its new vision, *Global Vigilance, Reach, and Power.* The Air Force is taking advantage of the synergies between air and space. Artificial barriers between air and space are diminishing. (See examples in the section titled "Space Stewardship Initiatives.")

Q23. Is the Air Force divesting its space systems? (Examples through the 1990s: NPOESS moving to joint DoD/DoC control; SBIRS Low procurement is moving to BMDO; FLTSAT and UHF F/O satellite control transferred to Navy; DISA responsible for procuring commercial space communications; commercialization of space launch and EELV)

A23. The Air Force seeks to maximize its space capabilities while minimizing total cost and operational risk. The space systems cited above fit this principle. The Air Force strength is to leverage these capabilities to meet warfighter objectives ownership is secondary. This strategy allows the Air Force to focus on space warfighting capabilities.

Q24. Why do pilots command space units, not space operators?

A24 The Air Force has assigned leaders with joint operational experience in air combat to senior positions in all operations, including space. Their leadership has been instrumental in improving the application of space power to the joint warfighter.
Air Force policy for developing its senior leadership is to strive to develop more diverse leaders with well-rounded perspectives by assigning general officers both to positions where they have considerable experience, as well as positions where they can benefit from exposure to missions and areas of expertise that are new to them. This policy has resulted in a cross-flow of general officers into all combat career fields, regardless of their specialized expertise. For instance, the current ACC/CV has strong space background. The Air Force is developing a new generation of aerospace leaders who are skilled in both air and space operations.

Q25. Why can't space personnel command air units?

A25 The Air Force will probably always have pilots. But what is important is how the Air Force develops its future leaders. The Air Force will change how future leaders are developed by requiring specific education, training, and operational experience in <u>both air and space</u> to be assigned to key leadership positions.

Q26. What are the benefits of having Air Force officers and enlisted personnel in space operations?

A26. Having military personnel of all grades provides focus on military utility of space systems. Air Force people with warfighting experience then guide system development to benefit national security. Air Force personnel are required to operate space assets in peace, crisis, and war. This continuous support maintains Air Force expertise in space systems and develops Air Force leadership through experience in space operations. Air Force personnel are responsible for planning, programming and requirements development where systems expertise is critical. Their presence is also ensured by rigorous standards and training; a "checklist discipline" minimizes errors where high availability is vital.

Q27. Can a space officer be CSAF or CINCSPACE?

A27. Yes. There is no legal or administrative barriers that prevent a space officer from becoming CSAF or CINCSPACE. The Air Force chooses the most qualified officer for every general officer position.

Q28. What would the Air Force lose if the space forces were separated into another organization?

A28. Air Force is America's aerospace force. Without space, its ability to pursue revolutionary concepts of operation (CONOPS) will be limited. For example: Long range precision strike without space (hours) or with space (minutes). The Air Force leadership role in defining future aerospace missions would end. This risks air-space dis-integration. The Air Force could lose the great progress it has made. There would be less understanding of how space can be employed by other warfighters, it would retard migration of missions to and from space. Inter-Service mission migration is difficult, so a separation would lead to redundancy and inefficiencies.

Q29. What would the Air Force gain if it managed all of national security space?

A29. Air Force would present a seamless face to the warfighter. This move would address perceived fragmentation in the space community. It would gain explicit responsibility for managing space. The Air Force would achieve more efficient space programs, through unified national security space planning with budgeting. It would allow a clearer definition of roles, authorities, and responsibilities with fewer players in space. it would further build on synergies between Air Force and NRO (synergies in culture, operations, and R&D).

Q30. Why should the Air Force keep space?

A30. The Air Force has a 50-year legacy of space success, from concept development, to launch, to operations, to integration for the joint warfighting team. Its physical and intellectual infrastructure are in place. Air Force personnel have an aerospace mindset. Our personnel are best prepared to continue controlling and exploiting air and space.
Air and space capabilities are synergistic. Current and future revolutionary aerospace capabilities depend on <u>both</u> air <u>and</u> space. Separation of air and space operations would limit the nation's military potential. Air and space operations and acquisition <u>tradeoffs</u> are best accomplished within the Air Force.

Q31. Wouldn't a separate space force be better for the nation?

A31. Infrastructure costs of a separate space force would detract from the investments needed for space now. A new Service would focus on institutional survival, not space power development. Creating additional seams between air and space would inhibit development of space power. Current space warfare doctrine, CONOPS, and technology is relatively immature. Air-space tradeoffs are not likely if a Space Force is created. It would be more difficult to optimize the force mix for maximum capability.

Q32. Shouldn't the space mission get separate funding like USSOCOM?

A32. Separate funding would not mean better space capabilities. Some of that funding would be used to support the bookkeeping that would result. Improving national security space capabilities requires an overall increase in funding by the nation.

Q33. Does the Air Force want to merge its space missions with NRO?

A33. Current AF-NRO partnership is founded on mutual support, not identical organizations. Our 40-year partnership has yielded benefits for the nation. An AF-NRO merger is conceivable in the far term, but it must be a merger of equals. The Air Force must show it could satisfy both DCI and military requirements before the DCI would be willing to merge. Any merger must insure Intelligence Community equities are maintained.

Q34. Why is space a national issue?

A34. Space is growing as a US military and economic center of gravity. It is relied upon for military operations: space enables deep look-deep attack, reachback, and support to the NCA. Our investment in space capabilities is growing, in areas from imagery to communications to navigation. Foreign nations are investing in space, increasing competition, both economically and militarily. They see our reliance on space and may attempt to exploit it as a vulnerability. This situation therefore demands strong steps toward space control capabilities be taken now.

Q35. Would the nation be better served by re-establishing the National Space Council?

A35. Re-establishing the National Space Council provides a White House focus for space policy development. This move should be accompanied by the creation of a Special Assistant for Space on the National Security Council. This would facilitate coordination with civil and commercial space policymakers, and facilitate military/intelligence space cooperation. It compliments an initiative to create Aerospace Power Subcommittees in Congress.

Q36. Isn't aerospace integration a cover for preventing the formation of a separate space force?

A36. Aerospace integration is about building more powerful capabilities for joint warfare. The Air Force will always have a mix of air and space systems that best meet joint needs. Air and space systems have an inherent synergy to control and exploit air and space. A space force would hinder the Air Force from creating capabilities that capitalize on the inherent synergy between air and space systems

Q37. Why isn't the Air Force migrating all its air capabilities to space?

A37. Migration of capabilities from air to space (or from space to air) is not the issue. It does not make good operational sense to develop independent air or space capabilities. The Air Force is developing capabilities comprised of the best mix of systems regardless of the environment they operate. The best way to serve the needs of the nation is through aerospace integration combining Air Force people and systems to attain better results than could be achieved with air and space elements operating independently.

Q38. Why is the AFSPC Strategic Master Plan not the Air Force strategy for space?

A38. The AFSPC SMP is a MAJCOM document and is used to meet AFSPC's needs as a MAJCOM. It is not suitable by itself to address Air Force-level needs. HQ USAF uses the SMP to guide the formulation of the AF Strategic Plan. The Air Force Strategic Plan describes the AF strategy for both air and space. Individual air and space capabilities are incorporated into aerospace capabilities.

Q39. What role do space forces play in the Expeditionary Aerospace Force concept?

A39. Space and missile forces are considered "AEF Prime." They provide continuous support for all 10 EAFs before and during their deployment. Space systems are always "forward deployed." AEF Prime provides weather, communications for reachback, battlespace awareness, missile warning, navigation and timing, and command & control. AEF Prime forces are absolutely essential to the US' ability to rapidly project aerospace power around the world.

Q40. What is preventing the United States from weaponizing space?

A40. Weaponizing space is a national-level policy decision. The military must be prepared should a decision be made to weaponize space. Preparation includes technology development and a viable concept of operations. However, the US must thoroughly review the unintended consequences of such a move.

Q41. Why does the United States need to militarize space?

A41. US must maintain its competitive space advantage in order to maintain its global military advantage. Military space is the front line of nuclear defense. Military space fills a role that the intelligence, commercial, and civil space sectors will not fill, regardless of their budget. Potential adversaries will have much greater access to a wide range of space capabilities. Some space missions can only be performed by military people, such as missile defense, space control, and force application from space.

Q42. Where is the threat to the United States that justifies greater investments in space?

A42. Space threats are growing. Many countries have missile or directed energy programs. Space threats are being realized in imaging, navigation, and communications. The US must prepare to defeat space threats when they arise.
Space is increasingly important to the US economy, and is critical for US military operations. The solution is a fully integrated framework for space control, based on partnerships with other DOD and civil agencies, with industry, and with our foreign partners.

APPENDIX D

NEWS MEDIA INVITATION LIST

USA TODAY - Dave Moniz

Defense Daily - Frank Wolfe

Aviation Week and Space Technology - Robert Wall

Aerospace Daily - Jessica Drake

Space News - Jeremy Singer

Bloomberg News - Tony Cappacio

Inside the Air Force - Amy Butler

Air Force Magazine - John Tirpack

Air Force Times - Jennifer Palmer

Launchspace - Greg Beaudoin [gbeaudoin@launchspace.com]

Janes Defense Weekly - Brian Bender

The Gazette (Colorado Springs) - Mary Boyle

Defense Week - John Donnelly

Armed Forces Journal - Jason Sherman

Space Business News - Nick Mitisis

[redacted] Space Commission M+C 01

Waldron Harry N Civ SMC/HO

From:	Potter Robert A LtCol SMC/PA
Sent:	Thursday, January 11, 2001 9:49 AM
To:	Tattini Eugene L LtGen SMC/CC; Wilson William M Jr BrigGen SMC/CV; Maikisch William SES SMC/CD; Taverney Thomas D BrigGen SMC/CCR
Cc:	Smith Patrick T LtCol SMC/CCE; Kays Joseph D Capt SMC/XPP; Vogel Michael A Capt SMC/CVE; Graham Irene Civ SMC/CCS; Wells Jan L Civ SMC/CDS; Gargus Brenda Civ SMC/CVS; Cleveland Don C CMSgt SMC/CCC; Alexander Edward T Col SMC/AD; Fitzgerald Thomas A Col SMC/AX; Odle Randy T Col SMC/CI; Weeks Lawrence Civ SMC/CI; Dunn Mike Col SMC/CL; Baird Henry D Col SMC/CL; Morgan Barry G Col SMC/CW; Mantz Michael Col 821SG/CC; Loverro Douglas L Col SMC/CZ; Notestine Andrew Col SMC/FM; Waldron Harry N Civ SMC/HO; Hollett Joseph L LtCol SMC/IN; Bagley S Scott Col SMC/JA; Steadman Anthony L LtCol SMC/JAQ; Anderson Christine SES SMC/MC; Herbert Mike CAPT SMC/MC; Booen Michael W Col SMC/MT; Cornell Charles O Col SMC/MT; Saxer Robert K Col SMC/MV; Mashiko Susan K LtCol SMC/MV; McAlpine Patricia K SES SMC/PK; Murphy David Jr Col SMC/PK; McCasland William Col SMC/TL; Possel William H LtCol SMC/MT; Thumser Joseph F Col SMC/XP; Salem Edward M Civ SMC/XP; Gardner William G Col SMC/XR; Jaggers Terry J Civ SMC/XR; Parker Phil Col 61 ABG/CC; Regan Terrence F LtCol 61 ABG/CD; Wells Annette 2Lt SMC/PA; Jackson April L Capt SMC/PA; Oaks Brock C Capt SMC/PA; Buie Bryan P SSgt SMC/PA; Drysdale Cleota J Civ SMC/PA; Parker Cleveland Civ SMC/PA; Lehne Colleen M Capt SMC/PA; Helmer Frederick B Maj SMC/PA; Ryan John J Civ SMC/PA; MacLeod Mary E Maj SMC/PA; Hodge Peggy E Civ SMC/PA; Dougherty Timothy P Civ SMC/PA; Helton Timothy J MSgt SMC/PA; Racasner Tonya A Civ SMC/PA
Subject:	Space Commission

AirForceSpaceCommunicationsPla...

General Tattini/General Wilson/Mr. Maikisch/Senior Staff: Attached is the PA guidance (draft) provided to the command section on Wednesday (10 Jan). Below are the websites where the Space Commission Report will be located later today. The Commission members are scheduled to do a press availability at 1430(EST) (1130 PST)at the Rayburn House Bldg. If the event is run on C-Span we will attempt to capture on tape -- currently C-SPAN is covering the SECDEF Designate Rumsfeld hearings.

We've been advised that the following sites are where the Space Commission will be located sometime shortly after 1130L. We will provide the media results as they become available, but we understand CNN will begin running a piece on the Headline News shortly after the Commission media event.

http://www.defenselink.mil/pubs/space20010111.pdf

Additional Website where the report will be:

http://www.space.gov

VR. Bob

Robert A. Potter, Lt Col, USAF
Director of Public Affairs
Space & Missile Systems Center
"Forging the Shape of Military Space for the 21st Century"

[redacted]

DOC 1_52

Doc I-53

Discuss w/ staff (MdO)

space Commission

Waldron Harry N Civ SMC/HO

From: Gardner William G Col SMC/XR
Sent: Wednesday, May 24, 2000 7:40 PM
To: SMC Deputies; SMC Directors; SMC XOs
Cc: Adair Gerald G Col SMC/XRD; Hendricks Angela Civ SMC/XRD; Gardner William G Col SMC/XR
Subject: Need your help!!!!!

Fellow Directors,

I need your help on a couple of actions

1. Back about 3 CMRs ago, Col Hal Hagemeier (NSSA) presented "NSSA Space.XXX (attached below). Space.XXX is envisioned to be for you a browser-based tool that provides a common picture of space-related planning information. In particular.....
a. Query, browse, and retrieve information form multiple organizations
b. Identify points of contact for information you are interested in
c. Enter new information and for you to edit existing information
d. View information in various formats
e. Perform integrated planning and conduct what-if analyses

available via GWAN, SIPRNET, Intelink, and NIPRNET

Each of you Directors will only pass info that you are willing/would like to provide. The goal is to make a zero resource impact on you and/or your folks in supplying data as it exists within your SPOs. If you don't want to supply any, that's OK too! You are the data provider and you have the freedom to only provide what you are willing to provide. XR and AX are working with Aerospace to be the data base builder and maintainer without coming to any of you asking for your Aerospace or $ contributions. The vision (a few years from now) is to have a tool that could provide insight/observation on impacts to US space programs given a potential decision on a single program or programs.

If SMC does not step up to be the data base guru, then another stakeholder will.

Dir/NSSA will be asking SMC/CC whether or not we/SMC are on board with this.

I need from each of you whether you'll support to some extent (YES) or don't want anything to do with this (NO). I'll take any rationale for either answer. Please let me know by 30 May.

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2. Congress has chartered a Space Commission to look at the following:

a) Assessment of United States National Security Space Management and Organization.--The Commission shall, concerning changes to be implemented over the near-term, medium-term, and long-term that would strengthen United States national security, assess the following:

(1) The manner in which military space assets may be exploited to provide support for United States military operations.
(2) The current interagency coordination process regarding the operation of national security space assets, including identification of interoperability and communications issues.
(3) The relationship between the intelligence and nonintelligence aspects of national security space (so-called ``white space" and ``black space"), and the potential costs and benefits of a partial or complete merger of the programs, projects, or activities that are differentiated by those two aspects.
(4) The manner in which military space issues are addressed by professional military education institutions.
(5) The potential costs and benefits of establishing any of the following:
(A) An independent military department and service dedicated to the national security space

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mission.
(B) A corps within the Air Force dedicated to the national security space mission.
(C) A position of Assistant Secretary of Defense for Space within the Office of the Secretary of Defense.
(D) A new major force program, or other budget mechanism, for managing national security space funding within the Department of Defense.
(E) Any other change to the existing organizational structure of the Department of Defense for national security space management and organization.

If you read Senator Bob Smith's recent speech (attached), he berates the Air Force for shortchanging power projection. Other Commisioners will also have issues with programs that AF "should" have funded.

I've been tasked by BGen Wilson to ask the 2 ltrs the following:
- What programs/initiatives have not been funded because of a lack of resources, or failure to invest in technology?

- If you were King what areas would you spend $ if it were available?

Before you launch off and answer these 2 ?s, please read the attached below first.

If I can get 1 or 2 nuggets from each 2 ltr to each ? above, that would be great! Not looking for deep thought/extensive research.....rather your best judgement based on experience. Need by 30 May also.

05152000.htm

Thanks
bill

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Space and Missile Systems Center
Los Angeles Air Force Base, California
SMC/HO Oral History Program

Interview With

COLONEL WILLIAM G. GARDNER

THE SPACE COMMISSION

(Oral History No. 1)

The 1 October 2001 ceremony that transferred SMC from Air Force Material Command to Air Force Space Command. Gen. Lyles (AFMC) passes the SMC flag to Lt. Gen. DeKok (AFSPC). The transfer was a direct result of the Space Commission recommendations. (Photo by Joe Juarez 61 CS/SCSV)

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BIOGRAPHY

UNITED STATES AIR FORCE

COLONEL WILLIAM G GARDNER

Retired effective Nov. 1, 2002

Colonel William G. Gardner is the Director, Developmental Planning Directorate, Air Force Space Command, Space and Missile Systems Center, Los Angeles Air Force Base, CA.

Colonel Gardner was born in Lyons, NY. He received his Air Force commission in 1976, after graduating from Norwich University's Air Force Reserve Officer Training Corps in 1976 in VT. The colonel has served in a variety of acquisition, operations, and senior staff positions within the Air Force and National Reconnaissance Office (NRO). After attending the Air Force Institute of Technology in 1978, at Wright Patterson Air Force Base, Ohio, he was assigned as chief, integration and launch operations in the Defense Satellite Communications Systems SPO and later with the NRO where he was responsible for managing spacecraft-to-launch vehicle integration and operations for Titan IIIs and IVs, transtages, inertial upper stages and the space shuttle. He also served as chief, space programming branch for the Assistant Secretary of the Air Force for Space, where, representing the Department of Defense, he helped formulate the first United States and China commercial launch trade agreement. Colonel Gardner served as an NRO satellite operations squadron commander. He also served as a deputy operations group commander in AFSPC responsible for operations and maintenance of the worldwide satellite control network and deputy commander of Onizuka Air Station, Calif.

EDUCATION:

1976 Bachelor of Science, electrical engineering, Norwich University, Northfield, VT

1985 Squadron Officer School, correspondence

1986 Master of Science, electrical engineering, Northrop University, Inglewood, CA

1991 Air Command and Staff College, Maxwell Air Force Base, AL

1994 Air War College, correspondence

1995 Program Management Course, Defense Systems Management College, Fort Belvoir, VA

1996 Master of Science, national security strategy, National War College, Fort Lesley J. McNair, Washington DC

ASSIGNMENTS:

1. August 1976 – May 1978, student, Air Force Institute of Technology, Wright Patterson Air Force Base, Ohio

2. May 1978 – June 1982, Chief, Integration and Launch Operations, Defense Satellite Communications Systems Program Office, Los Angeles Air Force Base, Calif.

3. June 1982 – July 1986, Chief, Launch Segment Integration Division, Office of Special Projects, Los Angeles Air Force Base, Calif.

4. July 1986 – August 1990, Chief, Research and Development, Office of Space Systems, Pentagon, Washington D.C.

5. August 1990 – July 1991, student, Air Command and Staff College, Maxwell Air Force Base, Ala.

6. July 1991 – August 1993, Chief, Space Systems Engineering Division, Office of Special Projects, Los Angeles Air Force Base, Calif.

7. August 1993 – January 1995, Chief, Space Programming Branch, Assistant Secretary of the Air Force for Space, Pentagon, Washington, D.C.

8. January 1995 – August 1995, Program Management Course, Defense Systems Management College, Fort Belvoir, VA

9. August 1995 – June 1996, student, National War College, Fort McNair, Washington, D.C.

10. June 1996 – December 1997, Commander, Satellite Operations Squadron, Operating Division 4, Onizuka Air Station, Calif.

11. December 1997 – November 1998, Deputy Commander, 750th Space Group, 50th Space Wing, Air Force Space Command, Onizuka Air Station, Calif.

12. November 1998 – May 2000, Chief, Systems Engineering and Integration, Developmental Planning Directorate, Los Angeles AFB, Calif

13. May 2000 – October 2002, Director, Developmental Planning, Los Angeles AFB, Calif

BADGES:

Master Space Operations Badge
Basic Jump Wings

MAJOR AWARDS AND DECORATIONS:

Legion of Merit
Defense Meritorious Service Medal with one oak leaf cluster
Meritorious Service Medal with two oak leaf clusters
Joint Service Commendation Medal
Air Force Commendation Medal
Joint Service Achievement Medal
Air Force Achievement Medal
National Defense Service Medal with small bronze star

EFFECTIVE DATES OF PROMOTION:

Second Lieutenant Aug 23, 1976
First Lieutenant Aug 23, 1978
Captain Aug 23, 1980
Major Oct 1, 1987
Lieutenant Colonel Nov 1, 1992
Colonel Dec 1, 1998

(Current as of October 2002)

FOREWORD

One of the oldest and often-used sources for reconstructing the past is the personal recollections of the individuals who were involved. While of great value, memoirs and oral interviews are primary source documents rather than finished history. The following pages are the personal remembrances of the interviewee and not the official opinion of the United States Air Force History Program or of the Department of the Air Force. The Air Force has not verified the statements contained herein and does not assume any responsibility for their accuracy.

These pages are a transcript of an oral interview recorded on magnetic tape. Editorial notes and additions made by United States Air Force historians have been enclosed in brackets. When feasible, first names, ranks, or titles have been provided. For the sake of clarity, the transcript was edited before it was returned to the interviewee for final editing and approval. Readers must therefore remember that this is a transcript of the spoken, rather than the written, word.

The information within this oral history interview is unclassified.

KNOW ALL MEN BY THESE PRESENTS:

That I, William G. Gardner

have on (date), 16 January 2002 participated in an audio/video-taped interview with Robert Mulcahy (SMC/HO)

covering my best recollections of events and experiences, which may be of historical significance to the United States Air Force.

I understand that the tape(s) and the transcribed manuscript resulting therefrom will be accessioned into the United States Air Force Historical Research Agency to be used as the security classification permits. It is further understood and agreed that any copy or copies of this oral history interview given to me by the United States Air Force and in my possession or that of my executors, administrators, heirs, and assigns, may be used in any manner and for any purpose hy me or them, subject to security classification restrictions.

Subject to the license to use reserved above, I do hereby voluntarily give, transfer, convey, and assign all right, title, and interest in the memoirs and remembrances contained in the aforementioned magnetic tapes and manuscript to the Office of Air Force History, acting on behalf of the United States of America, to have and to hold the same forever, hereby relinquishing for myself, my executors, administrators, heirs, and assigns all ownership, right, title, and interest therein to the donee.

Unrestricted Access for all military personnel and civilians except for information that is classified or deemed subject to Privacy Act restrictions by appropriate authority.

DONOR William G. Gardner

DATED 14 OCT 02

Accepted on behalf of the
United States Air Force
History Office

BY Robert Mulcahy

DATED 26 August 2002

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SPACE AND MISSILE SYSTEMS CENTER (SMC)
LOS ANGELES AIR FORCE BASE, CALIFORNIA
SMC HISTORY OFFICE (SMC/HO) ORAL HISTORY PROGRAM

Space Commission Oral History (No. 1)

INTERVIEWEE: Colonel **William G. Gardner** (SMC/XR)

INTERVIEWER: **Robert Mulcahy** (SMC/HO Historian)

SUBJECT: Space Commission

SUBJECT TIME FRAME: 2000-2001

DATES OF INTERVIEWS: 16 January 2002 and 1 February 2002

INTRODUCTION

This is Robert Mulcahy of the History Office at the Space and Missile Systems Center (AFSPC) at Los Angeles Air Force Base (AFB), California. Today's date is 16 January 2002. I am going to interview Colonel William G. Gardner about the Space Commission. Colonel Gardner is the Director of the Developmental Planning Directorate at SMC (SMC/XR). We are conducting the interview in Colonel Gardner's office in Building 125 at Los Angeles AFB.

Colonel William G. Gardner in 2001
Colonel Gardner was the SMC point of contact for the Space Commission.

INTERVIEW

Mulcahy: Colonel Gardner, what was your role in regards to the Space Commission?

Gardner: My role was to assist [Lieutenant] General [Eugene] Tattini (SMC commander at the time) get prepared for his testimony to the Space Commission. The Commissioners had not been formed up or identified yet. We knew that congressional guidance would be coming to conduct the Space Commission. At the same time, there was an NRO [National Reconnaissance Office] commission getting under way, as well as another commission to look at NIMA [National Imagery and Mapping Agency]. We felt that the Space Commission was going to hopefully be a good, major opportunity for Space and Missile Systems Center [SMC]. My job was to begin to frame the debates and the discussion for the center, and I ended up being the point man for all of that.

Mulcahy: Did you have a title for your position in this capacity?

Gardner: No. I was simply the SMC commander's point of contact, or action officer, on all Space Commission matters.

Mulcahy: Please describe what you did in your day-to-day activities regarding the Space Commission.

Gardner: A couple of things occurred in parallel at the very beginning. First was to begin to think about what intellectual support I could gain access to immediately that may have connections into the inner decision-making reigns of the Pentagon, the White House and Congress. I began to gather G-2 [intelligence], if you will, as to who the commissioners might be. What were their terms of reference going to be? What's their scope? What kind of issues? What kinds of decisions were they going to try to make out of these issues? Typically, as a commission is forming, there's a support staff. I was trying to figure who that support staff was going to be, and luckily it was a staff that I already knew from prior assignments, so relationships and trust were already established. I got a little contract support to help pull together that G-2 for me, but no major contract activity was required.

At the same time, the second thing in parallel, was monitoring the Air Staff. How were they going to form up a core, central body? How were they going to organize? How would we (SMC) be a part of that activity? I knew that this was going to be much bigger than a single individual [myself] to take on here at the center. So in trying to get this early G-2, we were trying to also understand what kind of resource support, primarily as bodies [personnel] and expertise, we were going to need from the center to be involved in all aspects of what the Commission was going to be discussing and debating.

Mulcahy: What did you do once the Space Commission had been formed?

Gardner: Continued to monitor, as best as we could, information going in and out of the Commission. It was held pretty tight. We were able to get a little bit of G-2, but not a whole lot. We did see the terms of reference that the Commission was going to be looking at. As you may recall, now Secretary [of Defense Donald] Rumsfeld was the chair of the Commission. Also, composing of the Commission itself, were a lot of respected individuals with distinguished defense-related careers, many retired four-stars [generals]. This didn't look like just "another" commission.

Historically, the results of a commission can either be of no value added and no impact, or at the other end of the scale, a commission can have a major rippling affect and things are going to happen. The later is what occurred with the Space Commission. It was somewhat predicable early on just based on the composition of the Commission. As the Space Commission got formed up, realize - that the chair of that Commission may occupy a key position with the incoming [George W.] Bush administration. So, we were keeping an eye on that as well. The day-to day activity was an "additional" duty (laughs) as it started off. It gradually migrated towards a full time job, for over a year, for me.

The Air Staff had now begun to form up IPTs [Integrated Product Teams]. One IPT was focused on Executive Agent roles and responsibilities; another was taking a look at the best practices between the National Reconnaissance Office and the Air Force; a third IPT focused on space professional development; and another IPT focused on Acquisition Executive or Title 10 (for Air Force) and Title 50 (for NRO) kinds of things. In other words, the IPTs focused on the central theme of the Space Commission's terms of reference, which was the organization and management of space. The vision for space was consciously left out.

When these IPTs formed up, the Air Staff went out and asked for field reps [representatives] to be on these IPTs. That's when I formed up a list of suggested senior leadership here at the center. I coordinated that with the vice [commander] at that time, [Brigadier] General [William M.] Wilson, thus, General Wilson made recommendations to General Tattini. Then we designated SMC colonels to be points of contact for SMC on these headquarters Air Force IPTs. That gradually rolled from a part-time to a very intensive full-time effort for most of the colonels.

The Air Force clearly was taking advantage of the Commission opportunity to "Y-step" out and take the DoD [Department of Defense] lead for space.

Mulcahy: Did you make trips to Washington or elsewhere while you were gathering information about the Space Commission?

Gardner: No. I did not TDY [temporary duty] to DC to gather information. The contractor I hired had access/contacts to gather what the SMC commander needed. All the various IPTs that HAF [Headquarters Air Force] created conducted weekly VTCs [video teleconferences] stretching across the USA. SMC used these VTCs to keep TDYs to a minimum, so that we could continue to run the day-to-day SMC mission.

Mulcahy: Why did Congress establish the Space Commission? Why was it considered necessary?

Gardner: Space is broken, and it has been for a very long time. There are many "stovepipes" [different programs not coordinating with each other which leads to independent programs and inefficiency], many fiefdoms. Basically, the space business was run by many, many people and it was very fragmented. In Congress, it was not something that occurred overnight. Space has been that way for a long, long time. Congress had asked the Department of Defense to take a look at the management structure and organization of the space business within the Department of Defense. The Commission was asked to take a look at this structure under various sets of guidance by way of the Authorization Bill. The Commission was to come back with the recommendations. It was not intended to set a national agenda for the "vision" with respect to where the services ought to be going with respect to space. The focus of the Commission was purely on the management of space and on how we're organized. Defining a vision was deliberately excluded from the Commission's work.

Mulcahy: How did it affect the Space Commission after Donald Rumsfeld was nominated as the Secretary of Defense?

Gardner: As I recall, he had either a chief of staff or a deputy that essentially stepped in [to replace Rumsfeld] as the acting chair. The essential core discussions, the debates, and the recommendations among the commissioners themselves were pretty much over with by then. Rumsfeld had to resign the chairmanship of the Commission in order to be considered for the nomination. Although we weren't really sure at that particular point whether the recommendations, which we were beginning to get some clue on, would actually be implemented if Secretary Rumsfeld became the Secretary of Defense. One would think that the chairman of a commission, regardless of what "hat" [responsibility] he or she might wear in the administration, would probably want to try to execute as many of the recommendations as possible. So, as it came out, Secretary Rumsfeld did in fact implement and recommend to the Congress to implement all of the Commission recommendations.

The Air Force came out on top as being the Executive Agent, to be "The Lead," for space within the Department of Defense. The Air Force got what it asked for. Now we're under the gun to make sure that (in a very short period of time) the Air Force continues to act and execute the Commission recommendations in an extremely aggressive manner. This is perhaps defined to be within two years of the Commission implementation that was sparked by Secretary Rumsfeld's memo that basically set an implementation schedule of 120 days or less. The Air Force did not take a power-play approach and grab everything, but led the intellectual discussion of the management and the organizational structure, which was broken, and led the discussion on how it should be. So, now the Air Force is on the hook. We got what we asked for, so now we must execute.

Mulcahy: What was the general opinion towards the 12 members of the Space Commission? How qualified were they to make the proposals about space?

Gardner: There perhaps couldn't have been any finer group of folks pulled together to take a look at this business. They have each brought to the Commission unique backgrounds with respect to space. Many had already been observed as extremely influential within the space business, both when they were on active duty or in influential civil service positions. Most currently occupy key consultant roles today and continue to be very heavily involved with space. Essentially, the best possible set of minds and intellectual capacity had been assembled.

Mulcahy: Did any of Space Commission members come to SMC while they were conducting their assessment?

Gardner: No commissioners came to SMC while the Commission was active. General Tattini TDY'd to Colorado Springs (Headquarters Air Force Space Command) to testify in front of the Commissioners. The word on the street was that the Commissioners wanted to keep their travel outside the beltway [Washington, D.C.] to an absolute minimum.

Mulcahy: Did you see more optimism or apprehension about the Space Commission while they were conducting their analysis?

Gardner: The other services were extremely nervous that their space portfolios would be taken away and managed by the Air Force. The Air Force was very sensitive to that, with respect to, "That's probably not in our best interests." The Air Force has always had 90% of the people within the DoD space business, and about 90% of the money was from the Air Force TOA [total obligation authority].

As it rolled out, the services are still responsible for their unique space needs, such as "POM'ing" [using a Program Objective Memorandum] for acquisition and operations. We cast the net across the Department of Defense to take a look at all the program elements that support space in any way, whether it's ground terminals, an antenna connected to a mobile vehicle, launch vehicles, spacecraft, command and control nodes, and so forth. As a result of casting that net, we've been able to pretty much identify all the PEs [Program Elements] that support the funding for all of this business; those unique equipments that the services build, set the requirement for, and fund for, such as ground terminals and unique user equipment for each of the services. The Army and Navy will continue to be responsible for that. They've always had that role and they will continue to have it.

Within the Air Staff (underneath the Under Secretary of the Air Force) for space, are still in the process of further refining a "purple staff" (or a joint staff composed of the other services). This is to insure that as space decisions within the services are made, from an integration prospective at least, the Under Secretary of the Air Force is informed of those decisions, and in some cases may even make some of those decisions. The Under Secretary of the Air Force has the Executive Agent for Space role in the Department of Defense. There will be a unique staff, most likely, that will be composed of multi-service members to support the USecAF [Under Secretary of the Air Force].

Mulcahy: Would you say the Air Force felt optimistic about the Space Commission's proposals as they were being made?

Gardner: Very optimistic! We felt that there was an unprecedented, if not a historic, opportunity here for SMC as well as for Air Force Space Command. As a result, what we got is essentially a "cradle to grave," or end-to-end, responsibility for Air Force space in Space Command, of which we are now a part. We aren't there (cradle to grave responsibility) yet. We essentially clashed two cultures together: The acquisition culture predominately bedded down here at SMC; and the operational culture at Headquarters Air Force Space Command primarily coming from the missile side of the house, which is a very different career path, training path and education path, than the acquisition corps' training and education path. Those two cultures have now come together. It's not perfect. It may never be perfect, but one major job jar we got sitting ahead of us in the Air Force Space Command is to implement "cradle to grave," or end-to-end thinking. Implementing the professional development, to carry out this responsibility will be essential.

The National Reconnaissance Office has "cradle to grave" responsibilities. The NRO was formed up with that responsibility from the beginning, in the [19]60s. They continue with that responsibility today. Certainly, the NRO has matured over the years, been doing that for years, and have got it down. As I mentioned earlier, the "Best Practices IPT" was formed up by the Air Staff to take a look at how one does acquisition in several different areas, from launch operations, to requirements generation, to professional development in the military as well as civil service. We looked at all of these in the NRO as well as in the Air Force. We gathered up the best practices of each and implementing, primarily within the Air Force.

Right now the Air Force has to get the "cradle to grave" responsibility way of thinking. We need to get these operational and acquisition cultures merged together. We did a [uniform] patch change on 1 October [20]01. We transferred the SMC from Air Force Material Command to Air Force Space Command. That was easy by comparison to what lies ahead in getting these cultures merged together within Air Force Space Command.

Mulcahy: What is the biggest challenge to merging the space acquisition and operations cultures?

Gardner: In my judgment, the biggest challenge is simply getting developers and operators together on complementary professional development paths, including placing developers in operational jobs and vice-versa. Our traditional thinking in acquisition has been, "Give me the requirements and I'll go build it for you. Then I'll hand it back to you once it's on orbit." We [SMC] know how to acquire spacecraft. We know how to acquire launch vehicles. We're the best in the [space] business and we're proud of that. We've got a long successful history of that here at SMC.

Air Force Space Command was formed in 1982. It's now one of the oldest MAJCOMs [Major Command] in the Air Force. As it formed up, it essentially absorbed the Strategic

Air Command, which had no space (spacecraft and launch vehicle) acquisition and operations. The difficulty that originally set in was with the working levels at Headquarters Air Force Space Command who thought, "Well, it's about time! You folks at SMC now work for us, and you will do what we tell you!" That was the "going in" mindset at the lowest levels, very, very dangerous, because it affected the morale here at SMC.

Some [at SMC] were thinking of bailing. "I don't want to deal with that mindset! I don't need to deal with that!" There was no mass exodus from SMC, but there was a lot of discussion and questions in the minds of the CGOs [company grade officers]. The CGOs saw the minds of some of the colonels who didn't like what they were seeing either. So, there's some change going on. I think we'll get there. Headquarters Space Command needs to appreciate where we're coming from, and what our backgrounds are. Likewise, we need to help them to appreciate the acquisition arena. They need to help us appreciate the operational arena more in which they've grown up in. So, if we understand each other's camp, respect each other for our talents, we'll get there.
The top down leadership has been absolutely fantastic! General [Lester] Lyles portrayed superb leadership throughout, framing the discussions within Material Command, as well as dialog with General [Ralph E. "Ed"] Eberhart, Air Force Space Command commander.

The description of "the planets being aligned" [getting organized], if you will, was General [Roger] DeKok, the vice at Space Command and former SMC commander [from 19 August 1996 - 12 August 1998]. He's been in the Air Staff, he's been around, and he understands. General DeKok was a tremendous asset to have at the highest levels within Headquarters Air Force Space Command.

Likewise, [Major] General [Howard] Mitchell, the DO [Director of Operations] at headquarters, he's been around. He's been in the acquisition business here. General Mitchell used to be the director of [space launch] in the NRO, [he was also the first to direct] the NSSA [National Security Space Architect]. In fact, there was a period there in which he was selected to be the liaison, if you will, between the United States Air Force and the [Space] Commissioners. There was no better individual to help frame that discussion, keep the Headquarters Air Force informed and up to speed, as best as he could, in which he was licensed to talk about. At the same time, SMC had General Tattini who had obviously been around and understands the business.

[Lieutenant] General [Brian] Arnold is in place [commander of SMC]. In fact, he was very, very involved. He led the Air Force with his "Master IPT," if you will. His general officer steering group informed and framed the discussions. He then was picked up and moved out here to SMC to essentially implement the Commission recommendations.

[Brigadier] General [Michael] Hamel used to be the vice here at SMC [21 August 1998 - 18 August 1999]. He was the DR [Director of Requirements] at Air Force Space Command, and is now assigned as [director of] XOS (Space Operations) in Headquarters Air Force. He now has the responsibility to operationalize the recommendations.

Additionally, General Hamel, in concert with Brigadier General Craig Weston in the NRO, co-lead this responsibility. So, again we got the right individuals, who are smart, they've been around, they understand this business, and clearly they're on board with this to implement.

At the time the Commission was beginning to roll out its recommendations, we had all the right general officers, in the right places, at the right time. Looking back on it, it was kind of phenomenal. Timing's everything. It's rolling out to what the Air Force asked for, what Headquarters Air Force Space Command asked for, what SMC asked for - we got it (the Executive Agent for Space) and now we need to execute it. When I mentioned, "the planets are aliened to implement the Commission recommendations," we need people in key positions that have been around, understand this business, and to execute.

Mulcahy: Was SMC hoping to gain anything from the Space Commission's proposals?

Gardner: Absolutely! As for SMC, we were hoping to do two things. One, the system program directors had to be protected from anymore demands of bureaucracy, on top of the bureaucracy they're already dealing with. They were constantly being called to Washington. Many spent more time in Washington than they did here at the center [SMC] and with their families. We took a hard look at that and framed the debate to transfer the PEO [Program Executive Officer] responsibility from the Pentagon to SMC, and duel-hat the commander of SMC to also be the PEO for Space. Obviously, we got that. As of today, that transfer has not occurred yet. So [Brigadier] General [Craig] Cooning, essentially, is duel-hatted right now as a vice commander here at SMC, as well as the PEO for Space.

Having the PEO co-located with the SPDs [system program directors] is the way you ought to be doing business. It was that way many, many years ago, but then practically all of the decision-making of the space business migrated to the Pentagon - read "inside the beltway." Inefficiencies and bureaucracy just escalated from there. So, co-locating the SPDs with the PEO is the way to do business and that's what we've got.

Another item SMC wanted was to streamline the acquisition management chain. We got that too. By law, that had to be intact from the SPD to the Space Acquisition Executive. There are only two layers of management chain, reporting chain. We have the SPD reporting to the PEO here on the campus [SMC], and the PEO reporting to the Under Secretary of the Air Force with the Service Acquisition Executive hat on.

The Under Secretary of the Air Force [Peter Teets] has multiple hats. The responsibility for Mr. Teets is, one - the SAE (Service Acquisition Executive). General Arnold with his acquisition hat (PEO/SPACE) reports directly to Mr. Teets. The second hat Mr. Teets has is the director of the NRO. The third hat is the Executive Agent for Space across the Department of Defense. With those roles I suspect there'll be staffs supporting him in each of those hats.

What's going to be interesting to watch is the DNRO [director of the NRO] and Executive Agent for Space (responsibility across DoD). Those are major, major responsibilities. So, his third hat, being the Service Acquisition Executive for Space, how much influence and delegation is that going to put on our commander here as the PEO for Space?

The PEO may play a very major role in that Service Acquisition Executive hat. The Air Force Space Command four-star is the last major key position to be filled as a result of the Commission recommendations. I suspect that, the person for that position will be identified within the next couple of weeks [General Lance Lord was announced for the position on 14 February 2002]. It is absolutely essential that we get that four-star position filled as soon as we can. That will help free up General Eberhart's tri-hat responsibility as Air Force Space Command commander, NORAD [North American Air Defense Command] commander as well as the CINC [commander in chief]. So, it's those later two hats that have occupied a tremendous amount of his time.

The vice commander has spent a lot time trying to fulfill that "organize, train and equip" hat - read the Air Force Space Command commander's hat. Now having two four-stars out there, the Air Force Space Command commander can be fulltime on getting these cultures together.

As a comparison, the commander of ACC [Air Combat Command] is very influential in setting the course and making the decisions for air. Often when that four-star makes a decision, you see the product centers, ASC [Air Systems Command], ESC [Electronic Security Command] and recently the Air Command and Control ISR [Intelligence, Surveillance, and Reconnaissance] Center all line up behind that decision and press. We need that on the space side as well.

Mulcahy: What concerns did the Air Force have about possible recommendations from the Space Commission?

Gardner: One of the concerns is we don't have a long time to pat ourselves on the back because we got what we asked for. We have to execute, and we've got to do it quickly. Many have judged two years to be the horizon [deadline] as to implementing these recommendations.

One of the major areas that is still open, which strongly affects this cultural merger is the concept of the "space professional." We grappled a long time with trying to understand just what that is. What is the career path or career paths that one might follow to produce, years later, the best possible space leadership, general officers? There are models that exist (three-dimensional pyramids) that describe the paths that the military, as well as civilians, can take to groom the senior leadership of the future, to further the space business within the Department of Defense.

Mulcahy: Before the Commission released its proposals, were there some proposals that you thought might be implemented that the Air Force would have preferred to avoid?

Gardner: There might have been, but nothing pops to mind of a strategic nature, or even at the operational level that we would want to avoid. There's a lot of discussion about this MFP (Major Force Program). Should a separate MFP be developed for space and have all the money put in there? Lots of discussion about the pros and cons of that, there was lot of discussion about a virtual MFP. "Well, what's that really mean?"

A fourth hat that I neglected to mention earlier with the Under Secretary, is the Milestone Decision Authority [MDA] that has been the responsibility of OSD [Office of the Secretary of Defense]. This hat is equally as important, if not more so, than the other hats. The discussion early on was that responsibility would potentially migrate to the Air Force. OSD working-level staffs fought that and still fight it. They don't like that at all. Essentially, the OSD staffs have a significantly reduced "review after review" through multiple layers of IPTs. Secretary [Edward "Pete"] Aldridge (currently DoD's Acquisition, Technology and Logistics Secretary) has delegated MDA to the Air Force Secretary, in turn, who delegated it to the Under Secretary of the Air Force.

There were also two other organizations I mentioned, the White House and the Congress. Within the White House's National Security Council, a few years back, there was a small office that focused on national space policy matters. Over the years, that had kind of atrophied. That has reestablished itself as a result of the Space Commission.

Secondly, within Congress, multiple committees are involved with the space business, helping to perhaps feed fragmentation resulting from multiple views that had equal influence resulting in multiple directions within the space business.

One of the things that actually came out of the Air Force discussions, and was suggested to the Commission, was that perhaps there ought to be more centralized space decision-making within the Congress. Perhaps one committee would be responsible for that. The Congress is not there yet as I understand it. Will it ever go there? I have no idea, but both the services as well as the NRO still have multiple oversight committees that we must deal with. The NRO and the Air Force with the same committees as well as different committees.

Mulcahy: Did a proposal to create an independent military space service seem very likely?

Gardner: There was a lot of discussion about that. The Air Force corporate leadership didn't necessarily support that. We felt that it was too soon to separate out as a different service. That had major implications, bodies, money. Where would the money come from? Potentially, it would be a reduction in TOAs across the services. Again, with 90% of the space business being Air Force people, and 90% of the money going into DoD space being Air Force money, separating into a separate service had major implications for the Air Force.

Number two, we're trying to do better integration. We have a long way to go, but we have got to do better in integrating space and air. In my judgment, with a separate space service, that integration would probably be very difficult, perhaps nearly nonexistent.

The Commissioners did apparently get very, very close (on a unanimous level) of being very frustrated with the execution of space within the Air Force, to just go ahead and take it away from the Air Force and create a separate service. They were very seriously discussing a separate space service, and looking at it as a viable recommendation at this point and time. It didn't come out that way, but it may end up happening someday.

One of the quotes in the Space Commission report is, "The next Pearl Harbor is going to be in space." We need to be prepared for that. So, let's get our management act together. Let's get ourselves organized. Let's get the fragmented space business under one boss. Let's get all this together organizationally and managerially. Perhaps five, eight, 10 years from now, we may want to just go ahead and snip off the space cadre (with the "cradle to grave" responsibility), as a separate service. There's been some discussion about that. The focus is, we need to be prepared for the next Pearl Harbor.

Mulcahy: Do you know why the Commission decided not to recommend a separate space force?

Gardner: Perhaps this was discussed in the closed-door testimonies that the Commission conducted in Washington, Colorado Springs, the White House as well as with Congress. All I could judge, is it was discussed and perhaps it was just too radical of a change and not the right time. Let's take the first step, get ourselves organized, and get the management structure within the Department of Defense right. Then we can worry about and debate again, the need for a separate space service.

Mulcahy: How would appointing the president as the final authority in national space policy improve the leadership situation for DoD space programs?

[Editor: The Space Commission assessment stated in the Executive Summary on page xix, "There is no single individual other than the president who can provide the sustained and deliberate leadership, direction and oversight of national security space policy that is needed. Currently, responsibility and accountability for space are broadly diffused throughout the government."]

Space is a major economic "center of gravity" for this country. It's a huge business. It's growing. On a small scale, we see GPS [Global Positioning System] providing the global utility for precision navigation and timing. There's all sorts of capabilities that come along with the space business, whether it's communications (the internet in the sky, cell phone support, pager support), weather, early warning of attack upon the US etc… Space overall is, and will be, a major revenue source with major economic implications for the United States. It's a very important area, and that requires national leadership. It certainly needs to be in front of the president as he makes his decisions on what he does with the commercial space, civil space, and where we go with space within the Department of Defense.

It's essentially a portfolio that has global implications such as economic competition. There are space-fairing nations that would love to be on the level that the United States is on, whether they're launch vehicle-fairing nations or whether they're nations building spacecraft. There's a whole bunch of "want-to-be" nations out there that would very much like to influence the space business. Again, being a major economic, as well as a political capability, space has major national security implications for this country and for our allies. There are major economic considerations that space brings to the table. It's very, very important and requires the highest leadership in our government to be involved and knowledgeable, including key staffs to the president and the Congress.

Mulcahy: Today's date is 1 February 2002, and I'm finishing the interview with Colonel Gardner. We discussed some of the politics of space, Colonel Gardner, please compare the priority of space between the Bush administration and the Clinton administration from what you've seen.

Gardner: Maybe we can back it up 10 years to the [George] Bush [Senior] administration [1989-1993] prior to Clinton. That President Bush had a global focus at the top of his agenda. He was pro-military. Obviously, he wanted a stronger defense, and he wanted to increase military spending. We found ourselves in a war in the Middle East. The cabinet, at that time, did an absolutely outstanding job in making sure we met the objectives of that fight. I think President Bush lost the [1992] election because he didn't have the emphasis for economics here at home within his platform. I would loosely say the "isolationists," (those who don't want to worry about things beyond their borders to the extent that President Bush did) is what Bush perhaps underestimated. Clinton got the votes - his platform was to work the economy here at home. [His emphasis was], "We need to worry about the neighborhoods, jobs. Let's bring this home." Clinton successfully worked all that for eight years.

During those eight years, because of working internal domestic issues, I would say that space was not at the top of the agenda or perhaps in the top five percent of the key areas that Clinton wanted to put money into. Nor did Clinton want to put money into the military. During those eight years, budgets went down significantly. Force structure went down significantly, and I believe the progress with respect to space slowed. Maybe it was reduced, but it definitely slowed down tremendously.

Now with the current [George W.] Bush administration [2001-], he basically gathered up the cabinet that existed 10 years ago under his father. Cleary, in my opinion, even before we were attacked [on 11 September 2001], the Bush platform was for a strong defense. "We've got to rebuild the military back up again." We've lost, perhaps, some influence in various areas of the world. Regardless of the thriving economy, 9-11 launched overwhelming support to the military.

The US lost the competitive "edge" [advantage] with respect to launch to orbit. We (the U.S.) lost the launch market globally. We were the ones that spacecraft providers, would come to, to place their spacecraft on orbit. Over time, countries like China, Japan, France and Russia were offering excellent [launch] prices. In some cases, those governments subsidized their commercial space markets to successfully compete in the global launch market. We lost the edge. Now we're trying to gain that back again, militarily, commercially, as well as civil space.

Towards the end of the Clinton administration [1993-2001], the Congress saw that space would be a significant, economic revenue provider for this country. It's an expansive economic and political growth area and offers significant capabilities for several sectors, the commercial sector (whether it's launch or commercial satellites for instance), or for the military.

The concern was the next Pearl Harbor being in space, and the heavy reliance that we have on space. Example, when a satellite went out in the 1999 timeframe, ATM machines stopped working, pagers wouldn't work, and that company lost millions and millions of dollars in revenue for that one hiccup. This woke everybody up to say, "Wow! Our dependence on space assets is much more than we ever realized." So, we've got to do something about maintaining the competitive edge and protecting space assets. All the sectors use it (commercial sector, civil sector, and the DoD) and we have got to get it organized. That's about the simplest way that I can put it. So, the Commission was formed up to take a look at how DoD space is organized and managed, and make recommendations.

Rumsfeld was the chairman of the Space Commission. He then resigned his Commission chair to accept Bush's offer to be the Secretary of Defense. We suspected that Rumsfeld would probably want to implement (under his Secretary of Defense role) all the Commission recommendations.

That report came out a year ago [11 January 2001], and we've done a lot since then to implement the Commission recommendations. The Air Force has the Executive Agent role for all of the Department of Defense space. The Air Force has reorganized itself to get one MAJCOM the responsibility of "cradle to grave" [responsibility] for space, and that's Air Force Space Command.

We've basically put the Department of Defense space responsibilities underneath one individual in the Pentagon who reports to the Secretary of the Air Force. That one individual (Under Secretary of the Air Force) will wear four hats: the director of the NRO hat, the Executive Agent for Space (responsible for space for the entire Department of Defense) hat, the Acquisition Executive for Space systems hat, and then the fourth hat is Milestone Decision Authority for space programs. I suspect underneath those four hats will be four staffs. It will be interesting to watch when a decision brief comes forward that may involve two or more of his hats. How is that going to roll out? It will be very interesting to watch that. Tremendous responsibility! But in the long term, an excellent... I'll put it in my own terms, "It's about time!"

We've got a long way to go within Air Force Space Command, with a "cradle to grave" responsibility for space. Just merging the acquisition culture and the OPS [Operations] culture together will take awhile. Not every job here at SMC requires a certified engineer, for instance. Not every job here at SMC requires an engineering degree.

There's a plan afoot to do a student exchange program, if you will. Before you come here to SMC right out of school, if not in your first assignment, then by your second assignment, officers headed to acquisition careers will have an operational assignment under their belts of two, three, possibly four years. We're going to bring in space operators into acquisition positions that do not require specialty engineering degrees. Space operator's AFSC [Air Force Specialty Code] is 13S [Space and Missile Operations], and we're going to bring them here and put them in our program office staffs to help them get a professional education, an academic education, on acquisition. We will be sending them to Acquisition 101 and Acquisition 201 classes for instance. It will take awhile to get there, but those are the kinds of initiatives that the general officers are going to implement.

Two other areas were brought out in the Commission report. One was dealing with the White House; there ought to be a more influential space focus within the White House. There is a policy coordinating committee within the National Security Council. The PCC [Policy Coordinating Committee] will be focused on space and other policy matters.

The other area was Congress. The Air Force recommended to the Commission (which the Commission resonated with) to suggest to Congress that there are multiple committees within Congress that manage, and guide and lead space. Perhaps the Congress ought to look at consolidating to only one or two committees that would work all aspects of this country's space. I'm not aware of any active move afoot to reorganize the space committees both on the House side and the Senate side. I don't think anything has moved there at this point.

Mulcahy: How would reorganizing the space organizations in the Air Force and in the intelligence community improve national defense in space?

Gardner: The two communities use and rely on space heavily for a variety of similar reasons and for their respective different reasons. In my personal opinion, this country can't afford two major communities going after the space medium in their own separate ways. We need to be able to cooperate and leverage with each other, because requirements are the same in many cases within the intelligence community as well as in the Department of Defense. Where the intelligence community and the DoD have unique requirements, we can still work ways to have the space assets addressed and satisfy those different requirements. There is absolutely no question that the two communities should work together, can work together, as we go forward in the use of space.

Mulcahy: Does it look like the NRO and the Air Force might join their space programs in the near future?

Gardner: No. Not in the sense of merging to one. That's probably sitting way out there somewhere in some timeframe. Eventually, I predict we may end up evolving to a point where the NRO and the Air Force space portfolios will merge into one. There was discussion by the Space Commission about merging NRO and the Air Force, but this wasn't a specific recommendation to be implemented. The first thing that we need to do is just get the Air Force organized and get the management structure in place. Let the dust settle on all of that for a couple, three, five years and then perhaps take a look at where the efficiencies are to merge the National Reconnaissance Office and the space part of the Air Force together.

Much of the Commission had identified that even the NRO perhaps had lost its original organizational intent - to be way out in front in highly innovative, quick turn, exploratory, highly classified activities. The NRO Commission made a recommendation to create a little cell inside the organization to do exactly what The NRO was formed to do back in the [19]60s. As far as merging NRO acquisition and operations with the Air Force systems, perhaps that will happen someday. But we really need to get the Air Force side of the house together first.

Mulcahy: How will the space missions change for the Army and the Navy with these new proposals?

Gardner: Early on, the Army and the Navy did not like what they saw coming down with respect to the Air Force taking on a tremendously huge role in DoD space. The Navy depends on space for Navy needs, likewise the Army for their needs. They were, rightly so, very skeptical that the Air Force, perhaps in their eyes, was not a good steward of space. So why should they trust the Air Force in the future to be good stewards of their needs with respect to space? I think we've gotten through a lot of that with the Navy and the Army.

The Army and the Navy will continue to be responsible for acquiring their unique space assets and space infrastructure. Typical examples would be user terminals, backpacks, and those kinds of service-unique items. The difference is, the Under Secretary of the Air Force (with the Executive Agent for Space role) will be the responsible for the decisions being made to budget for acquisition and operations of proposed service assets. The services will still be responsible for building their respective space POMs. It's just that when all those space POMs come together, that will probably happen with a purple staff to the Under Secretary of the Air Force.

Mulcahy: The Space Commission wrote a lot about the need to improve the Air Force's education, training and career development in regards to space. Please tell me about this need.

Gardner: There's been tremendous effort done in this area. A lot of people have come together to form up IPTs to take a look at, just what is this "space professional?" How do you define that? What's it mean? What's the career path look like for a space professional? The DAL [Developing Aerospace Leaders] at the Air Force corporate level, a separate effort from the Space Commission implementation activities, is looking at how we groom and grow aerospace leaders.

The space community has been working on what that three-dimensional triangle career path looks like in developing a space professional. That's got a ways to go yet, in my personal opinion. When you take a look at some of the three-dimensional pyramid models that have been put together, a 25-year career is not long enough to get all this under one's belt. You kind of look at it and say, "It's going to take an individual 40 or 50 years in order to get through all of these 'gates' [requirements], and come out with the ultimate goal of having flag rank space leaders."

The space professional model that's under development would allow a "logy" [logistician] to broaden to other disciplines as he or she climbs the ladder. So by the time that individual obtains senior ranks, he/she has been involved in several different areas of the space business. The model's not done. There's still a lot of debate and discussion going on. It's going to take time. We're transitioning into it. It's not going to happen overnight.

Mulcahy: What was a typical career path in space that a second lieutenant might experience?

Gardner: Let's take a second lieutenant coming into the Air Force with an engineering degree from AFIT [Air Force Institute of Technology]. Then he comes to SMC and gets put into a program office, for instance. He gets assigned the responsibility of a spacecraft subsystem of some sort, or perhaps a launch vehicle, and he does that for three or four years. At the same time, he did his acquisition course work.

In the past, that second lieutenant, now mostly likely a first lieutenant, would be reassigned to perhaps either Vandenberg [AFB, California] or the Cape [Cape Canaveral, Florida] and either do acquisition or more heavily OPS from a launch OPS prospective. Then after that, the captain would probably have gone to SOS [Squadron Officer School], and perhaps either gone to Hanscom AFB [Massachusetts] to another product center, or perhaps rotate it right back out here to SMC to a different SPO [system program office]. Then he would go the Defense Systems Management College to get certified, because the aspiration would be perhaps to be a SPO director. There might be a Pentagon tour in there somewhere, PME [Professional Military Education] schools in there, and perhaps a MAJCOM job. In this case, here, Air Force Material Command. So, that individual, now at an O-6 level, is stove-piped in the space acquisition business. Maybe he had an OPS tour in Colorado Springs, Schriever [AFB, Colorado] for instance, but highly unlikely, because that individual was groomed in the acquisition business right from school, and he had the headquarters assignments both at the MAJCOM and well as the Pentagon.

Likewise, the Liberal Arts major coming out of school gets assigned to Air Force Space Command. His first stop is undergraduate space and missile training at Vandenberg; it's sort of like the UPT (Undergraduate Pilot Training Course) but for space. All the graduates are racked and stacked. So if you come out number one, you go to the bulletin board and you pick the operational base of choice that you want to go to. Whether it be a missile base or space OPS at Schriever, that's where the individual would go. Then he just basically stays in the OPS business for pretty much his entire career.

What we're trying to do now is take those OPS cultures and acquisition cultures and cross-train them through their careers. Then they will get a pretty firm handle on the acquisition business and an understanding of the OPS business. In the past, that's been an "air-gap" [missing]. Once in awhile, there'll be an acquisition officer that's being pushed for general officer. He will be assigned to Air Force Space Command to get an OPS assignment under his belt. Ironically, the Space Command OPS officer being pushed for general officer, is not placed in the acquisition business. He would stay within the OPS and be more focused on getting a squadron commander's job, and group commander job, and a wing commander job. Those were the metrics in the operations world of climbing the ladder.

You don't have that model emphasized as much in the acquisition world. Not to say that there's no group command and no wing command jobs in Material Command, there are. The emphasis within the acquisition arena is not to push to get group, or push to get wing, but rather push to get the SPO director job. SPO director jobs produce general officers, which by the way, a two-letter SMC SPO like XR has produced general officers as well. There is hope for people coming in after me, after all (laughs).

In a nutshell, that's essentially the challenge that sits out there. This is a very unique opportunity, getting back to the Air Force Space Command having "cradle to grave" responsibility. From the innovative thinking of requirements, dreaming up the needs, dreaming up the vision all the way through the other end of disposal, whatever number of years later. This command has got that responsibility for space now.

Mulcahy: Please summarize how the Space Commission report will affect SMC in the future.

Gardner: It will insure that we remain as the space center of technical excellence. By that I mean, the acquisition smarts, the technical smarts for space systems is here at SMC. One of the major recommendations from the Commission was to transfer the PEO for Space position from the Pentagon to here at SMC. That allows the PEO for Space to have a much better management role and leadership role across the space and missile portfolio in being co-located with the bulk of the SPOs.

In the past, we basically had two leaders just for the SMC portfolio alone. We had the DAC (Designated Acquisition Commander) who was the local commander, and we had the PEO who was the manager and leader for big programs. The PEO programs here at SMC bypassed the DAC and reported directly to the PEO. Now what we've done is, we made all the programs PEO programs and put them all under one boss. That allows the PEO for Space to manage a portfolio as opposed to managing a bunch of "stovepipes." Hopefully, the results from that will allow us to be more efficient and accurate as we put budgets together. When the PEO is asked to take a budget cut, hopefully, the PEO can look across the portfolio and understand what the rippling affect will be as a result of taking budget cuts here and there. In the past it was stovepipe-by-stovepipe decision-making on budget cuts. Or the other way, if there was a budget add by the Pentagon to the portfolio somewhere, the PEO can see in the aggregate, "What does that mean across a portfolio if I plus up in this area?" It's an excellent opportunity for portfolio management and not stovepipe management.

Now the challenge is that the SMC commander has two hats. First, the PEO hat; read - the acquisition responsibility, reporting directly to the Under Secretary of the Air Force. The other boss that the commander here has is the [future] Air Force Space Command four-star who has the organize, train and equip hat.

We don't have an Air Force Space Command separate four-star billet identified yet. That was one of the Commission recommendations as well. Because of the nature of the Space portfolio, the CINC space hat, the NORAD hat and the Air Force Space Command commander's hat, are all being worn by one individual. We found in previous commanders that a tremendous amount of time was spent on the NORAD hat. That was not their fault, it was just the nature of the job. Certainly with the 9-11 [11 September 2001] attacks, the bulk of General Eberharts's time is tied up in that NORAD hat. To help that, we're going to have an Air Force Space Command four-star separately identified to wear that OT&E (organize, train and equip) hat.

Mulcahy: Do you have any final thoughts that you would like to add about the Space Commission?

Gardner: What it's really going to take to implement and keep the momentum going is top down leadership. The leadership knows that. As you watch where general officers, and what kind of general officers, are chosen to sit in these key positions, they come with the experience. They come with the leadership. They come with the breathe that's needed to make sure that from the top down, we don't slow the momentum, just do a couple of band aid fixes here and there. That was not the intent of the Commission recommendations.

We're being watched. There are anti-bodies out there that don't want to see us succeed. Where we allow opportunity for those anti-bodies to penetrate, shame on us! This is an historic opportunity. Essentially, the space portion of the Air Force got everything it asked for. It was handed to us. Nobody else is going to do it for us. It's got to be us.

The cautionary note is, I hope we don't create an air-gap between the "space" part of our Air Force and the "air" part of our Air Force. The two have got to be integrated together. The two have got to be able to operate and win the nation's wars together seamlessly. We've got to always keep that in mind. There's one Air Force and its got a space portfolio, an air portfolio, and a multitude of other portfolios in it. All of those portfolios have got to be working together seamlessly.

Mulcahy: I would like to thank you for your time.

Gardner: All right! Thanks Bob.

END OF INTERVIEW

Transcribed by Teresa Pleasant

Transcript edited by William Gardner, Robert Mulcahy and Teresa Pleasant

Oral histories available from the SMC History Office:

Corona Program: Colonel Frank Buzard and Colonel Robert Krumpe

Douglas Aircraft, El Segundo Division: Bruce Cunningham, William Johnson, William Small and Sylvia Zemo

El Segundo Farming (1900-1940): Edward Bennett

Memories of Charles Lindbergh: General James "Jimmy" Doolittle

Space Commission: Colonel William Gardner

Western Development Division (WDD): David Fleming and Lieutenant General Charles Terhune

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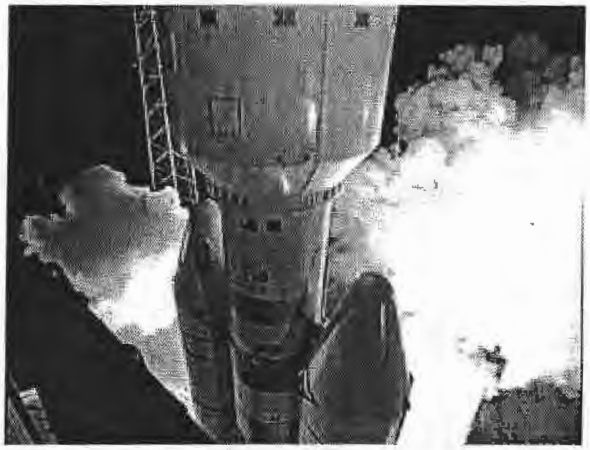

A Jan. 11 report submitted to Congress by the Space Commission calls for the consolidation of space functions into a single organization. (Courtesy photo) | High-Res Version of this photo

Commission calls for single space organization

by Staff Sgt. A.J. Bosker
Air Force Print News

01/12/01 - **WASHINGTON** -- A Jan. 11 report submitted to Congress by the Space Commission calls for the consolidation of space functions into a single organization to create a strong center of advocacy for space and an environment in which to develop a cadre of space professionals.

The commission, established by Congress last year to assess

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Command
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- Gen. Ralph E. "Ed" Eberhart

the organization and management of space activities in support of national security, determined that the right place for space is a realigned and rechartered Air Force, best suited to organize, train and equip space forces.

Air Force Space Command would become the focal point for developing this cadre and advocating education and training programs for space professionals. The command should be given the responsibility for providing the resources to execute space research, development and operations, the commission recommended in its report.

The Space Commission report also calls on the defense secretary to designate the Air Force as Executive Agent for Space within the Defense Department since the service already accounts for 85 percent of DOD's space-related budget activity.

Additionally, the commission recommends statutory responsibility be given to the Air Force to organize, train and equip for prompt and sustained offensive and defensive air and space operations.

The report also recommends assigning responsibility for command of AFSPC to a four-star officer other than the commander in chief of U.S. Space Command and North American Aerospace Defense Command.

Currently, the same general officer holds all three positions. This recommendation by the commission is designed to give each commander more time to focus on his primary roles and responsibilities.

The recommended realignment of space

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The recommended realignment of space activities within the Air Force would create a single chain of authority and give the service a clear opportunity to create a space-oriented culture comprising military professionals who could directly influence the development of systems and doctrine for use in space operations.

"As space becomes more integral -- and critical -- to military land, sea and air operations, the U.S. must devote more attention to the sensitive issues of space control and superiority," said Gen. Ralph E. Eberhart, commander in chief, NORAD and USSPACECOM; commander, AFSPACECOM.

"The importance of space control and space superiority will continue to grow as our economy becomes more reliant on space," he said.

The Air Force has long recognized the importance and potential of space capability to the nation and welcomes the report from the (Space Commission), Air Force officials said. As the primary provider of space capability within DOD, the service is encouraged by the attention national space security is receiving. The Air Force will assess the full Space Commission report and will develop a position on all its recommendations.

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Space Commission

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Secretary of Defense Donald Rumsfeld answers a reporter's question in the Pentagon pressroom after giving his assessment of the report of the Commission to Assess United States National Security Space Management and Organization, May 8. The commission recommended designating the Department of the Air Force as executive agent for space within the Department of Defense. (Photo by Tech. Sgt. Jim Varhegyi) | High-Res Version of this photo

Air Force begins the transformation of space

05/09/01 - **WASHINGTON (AFPN)** -- The Air Force is stepping out to implement decisions from the Secretary of Defense to transform the way military space is managed and organized.

The service will put into motion recommendations made by the congressionally chartered Space Commission, a group that looked at national security space activities and suggested steps to strengthen and streamline how national leaders, the Department of Defense and the Air Force manage space.

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The DOD recently reviewed the report and agreed with its recommendations.

"This is an historic event in the Air Force's ongoing pursuit of aerospace integration and advanced space capabilities, and we are excited to tackle these new challenges," said Acting Secretary of the Air Force (Dr.) Lawrence J. Delaney. "We recognize the trust the Secretary of Defense has placed in the Air Force and we are ready to implement his directives."

Air Force Space Command Commander Gen. Ed Eberhart describes this transformation of space as a critical step.

"This is a tremendous opportunity for the Air Force," Eberhart said. "We're excited about what this will mean for all aspects of our space program, and especially what it will mean for America's security. We're working closely with our service partners and all of DOD to implement the commission's recommendations."

The intensive planning underway by the Air Force and other services will implement the Space Commission's far-reaching set of recommendations involving space organization and management improvements, to include career force development, acquisition, operations, budgeting, and planning at the national, DOD and Air Force levels.

Among the commission's specific recommendations the Air Force will be designated as the executive agent for space within DOD and the undersecretary of the Air Force will be assigned as the Space Acquisition Executive and Director of the National Reconnaissance Office. The commission also recommended realigning the Space and Missile Systems Center to become part of Air Force Space Command and enhancing space career and professional development.

The SMC realignment under AFSPC will involve Air Force Materiel Command; and its four-star commander is enthused by the way ahead.

"SMC becoming part of Air Force Space Command consolidates space acquisition and operations functions under one commander, creating a strong center of advocacy for space systems and resources," said Gen. Lester Lyles, AFMC commander. "Space priorities will be set by a single command -- Air Force Space Command -- ensuring the Air Force continues to provide unrivaled military space capabilities and leadership. AFMC, meanwhile, will still provide acquisition and science and technology support to AFSPC after SMC has been realigned."

Gen. Michael E. Ryan, Air Force chief of staff, described the

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changes ahead in the DOD and Air Force space program as comprehensive and far-reaching, a true watershed event.

"As a nation, we are more dependent on space than ever before for our economic and security needs," Ryan said. "These changes to our space program are necessary, and truly profound. It's an exciting time to be on the leading edge of the transformation of our military space capabilities."

Related Images

Air Force Vice Chief of Staff Gen. John W. Handy, flanked by Acting Secretary of the Air Force Dr. Lawrence J. Delaney (left) and Secretary of Defense Donald Rumsfeld (right), answers reporters' questions, May 8, in the Pentagon pressroom. Rumsfeld gave his assessment of the report of the Commission to Assess United States National Security Space Management and Organization. The commission recommended designating the Department of the Air Force as executive agent for space within the Department of Defense. (Photo by Tech. Sgt. Jim Varhegyi)

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SPACE OBSERVER

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Friday, Aug. 17, 2001 Peterson Air Force Base, Colo. Vol. 45 No. 33

Page 1

Space doctrine starts from the ground up

By **Staff Sgt. Jason Tudor**
Air Force Print News

MAXWELL AIR FORCE BASE, Ala.—Nothing like what he is doing now has ever been done before. There is little history to it. It is being developed from the ground up. And everyone is watching.

That is why Maj. Smokey Reddoch, a doctrine writer for space operations, wants to ensure what he is doing now creates a legacy for the 37,200 airmen he serves in Air Force Space Command and for the armed services as a whole.

Reddoch, who has been in the Air Force 14 years, is working on what will become the new Air Force Doctrine Document 2-2, Space Operations, at the Air Force Doctrine Center here. For a little more than a year, Reddoch and Maj. Scott Cook have shared the burden of uniting the ideas and teachings of space operators across the Air Force and throughout the spectrum of services.

"Space is being accepted as a critical link, and it brings more attention to what goes on in our doctrine," Reddoch said. "It's extremely difficult to generate doctrine for space because of its visibility and the fact that we really have few historical experiences to follow."

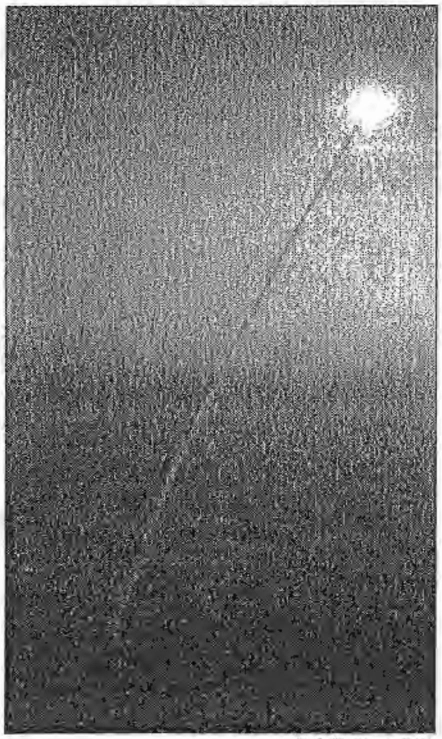
The major's work is watershed. Eighty-five percent of all military funding for space assets goes to the Air Force (with other funds distributed between the Army and Navy).

Also, several recommendations were made by the Congressional Space Commission and approved by Secretary of Defense Donald H. Rumsfeld, including:

- The Department of the Air Force is assigned responsibility to organize, train and equip for prompt and sustained offensive and defensive space operations.
- The Department of the Air Force is designated as the executive agent for space within the Department of Defense, with Department-wide responsibility for planning, programming and acquisition of space systems.
- The Secretary of the Air Force will realign headquarters and field commands to more effectively organize, train, and equip for prompt and sustained space operations. Air Force Space Command will be assigned responsibility for and provided the resources to execute space research, development, acquisition and operations.

These recommendations and others by the commission set forth a number of opportunities for the Air Force, said Brig. Gen. Michael A. Hamel, space operations and integration director, and deputy chief of staff for air and space operations.

See DOCTRINE, Page 3



U.S. Air Force photo

"Space is being accepted as a critical link, and it brings more attention to what goes on in our doctrine," said Maj. Smokey Reddoch, a doctrine writer for space operations at the Air Force Doctrine Center at Maxwell Air Force Base, Ala. "It's extremely difficult to generate doctrine for space because of its visibility and the fact that we really have few historical experiences to follow."

— DOCTRINE, From Page 1

"I personally believe the recommendations of the space commission have the potential to bring about the most profound changes in military space operations and in the role and leadership of space by the Air Force that I have witnessed in my career," he said.

On the basis of those recommendations and the counsel of his superiors, Reddoch said, he and Cook have several challenges ahead to revise the doctrine for the space team.

"For the most part, we're bringing folks around to believing that space is a critical component for fighting the war, but there are still a few resisters," Reddoch said. "We're being very meticulous in how we phrase things. We're focused to think in terms of the end result — the effects desired at the operational level of war. We're thinking for the future."

In addition, command and control is the main doctrine issue in which all services believe they have a stake, Reddoch said.

"Our doctrine today is working to articulate command and control. We're making ground," he said.

Reddoch said ultimately, doctrine is advice, but his incentive for finishing the revision is when people discover its benefits and put it to use.

"When I see people discussing doctrine and attempting to apply it, that is what's most rewarding for me," he said.

Some critics say the United States will not need such enhanced capabilities for 25 years or more, when a peer may arise to challenge America militarily in space. Other critics say there should be no military use of space, but Gen. Ralph E. Eberhart, commander of Air Force Space Command, said May 6 he believes this has already occurred.

"We have, in fact, militarized space," he said. "We use space assets, space information for military applications. We've been doing that for decades. The trend is increasing; not just the United States of America, but also other countries, friends, and possible foes.

"So, I think we've crossed that bridge," Eberhart said.

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SECRETARY OF THE AIR FORCE
WASHINGTON

23 Feb 01

MEMORANDUM FOR ASD/C3I

SUBJECT: Air Force Input to SecDef Response to Space Commission Report

The Air Force is pleased to provide its input to the SecDef's Response to the Space Commission Report. The Report proposes a number of actions and recommendations that the Air Force believes will significantly enhance national security space and the contributions of space to Joint warfighting. After a thorough review of the Report, the Air Force fully supports all findings and recommendations.

The attached input provides the Air Force position on the various recommendations and the initial Air Force approach for implementation. The Air Force is fully prepared to move out and to work closely with all the OSD, Joint Staff, Services and all Agencies in promptly implementing all recommendations. We look forward to working with your staff during this implementation process.

//signed//

Lawrence J. Delaney
Acting Secretary of the Air Force

The Air Force supports the Commission recommendation to assign it as the DOD Executive Agent for Space and believes it is the critical cornerstone for meeting the Commission's intent to consolidate overall national security space responsibilities. Nevertheless, preserving service and defense agency equities will be a key objective. Service prerogatives for programming, budgeting, acquiring and fielding service-unique and organic space capabilities should remain intact. The Space Executive Agent should guide and consolidate all service and defense agency space plans and programs in order to harmonize efforts across the DOD. The overall architectures produced by the NSSA will be essential to enable this. The intent is to ensure that national security space programs and architectures are fully integrated. There is no intent to replace service and defense agency internal processes. Rather, service and joint requirements, programming and staffing processes should continue to function and be used to the maximum extent.

A single individual should become responsible for acquisition of DOD and Intelligence Community (IC) space programs. By implementing this recommendation national security space planning, acquisition, resource management and oversight will be elevated within DOD and centrally managed to ensure more efficient and effective satisfaction of our national security requirements and interests. The Commission's solution to meet this objective was to specifically recommend "Assign[ing] the Under Secretary of the Air Force as the Director of the National Reconnaissance Office [and] Designate the Under Secretary as the Air Force Acquisition Executive for Space". This single Space AE will be responsible for executing DOD and intelligence space acquisition activities to ensure efficiencies and provide space support to warfighting commands and national customers. To fully empower this position with the authorities to effectively, efficiently and coherently manage national security space programs, the Space AE should have Milestone Decision Authority (MDA) for all DOD space programs. We believe this should receive priority as we implement the Commission's recommendations.

Closer integration and alignment of Air Force and NRO space activities is critical and should be based on partnership and "best practices" of each. Any realignment of Air Force and NRO activities must preserve SecDef and DCI chains of accountability/responsibility and enhance mission benefits to both the DOD and the Intelligence Community. Closer cooperation and integration will provide increased support to joint warfighters and CINCs through increased interoperability and improved presentation and delivery of space capabilities and products

The Commission has recommended modifications to OSD staff roles and responsibilities, which will clarify OSD and Joint Staff oversight of military space program activities, policy development, processes and coordination. Air Force implementation plans will be consistent with what OSD and the Joint Staff decide regarding these changes. Close cooperation with USCINCSPACE as the advocate for joint space operations will be required during all phases of the process.

AIR FORCE ORGANIZATION AND MANAGEMENT RECOMMENDATIONS

TITLE 10

The Commission recommended the Air Force be assigned statutory responsibility under Title 10 U.S.C. to "organize, train and equip" for space. While such authority is inherent in the current statutory authority, the Air Force concurs 10 U.S.C. § 8062 should be amended to clarify the Air Force responsibility as follows: " (C) **In general, the Air Force includes aviation <u>and space</u> forces both combat and service not otherwise assigned. It shall be organized,**

trained and equipped primarily for prompt and sustained offensive and defensive air <u>and space</u> operations. It is responsible for the preparation of the air <u>and space</u> forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Air Force to meet the needs of war." These proposed changes recognize the intent of the Commission to vest the Air Force with primary space acquisition and management authority within the DOD.

Additionally, 10 U.S.C. § 8014 should be amended to permit the Secretary of the Air Force to designate the Under Secretary of the Air Force to conduct acquisition functions related to space, without the Under Secretary being required to conduct all other Air Force acquisition functions. Presently, section 8014 stipulates that only one office or entity may carry out all acquisition functions. Amending section 8014 would clarify that the Assistant Secretary of the Air Force (Acquisition) would continue to be responsible for non-space related acquisition.

Schedule: Within one week of SECDEF approval, the Air Force will transmit a legislative proposal for OSD consideration. Enactment date could reasonably be expected to coincide with the 2002 Defense Authorization Act.

DOD EXECUTIVE AGENT FOR SPACE (Space EA)

The Commission recommended "The SECDEF should designate the Air Force as Executive Agent for Space within the DOD."

The Air Force proposes it be assigned the following specific space authorities and responsibilities by the SECDEF:

> **As the DOD Executive Agent for Space, the USAF will execute Title 10 responsibility within the DOD to organize, train, equip, operate and sustain forces for space mission and capabilities, and the USECAF will serve as the acquisition executive for all DOD space systems. The USAF will serve as the DOD authority for the research, development, testing, integration, and advocacy of DOD space forces and programs. The USECAF will be responsible to the SECAF for direction and oversight of space matters in the Department of the Air Force. As Executive Agent, the USAF will develop a Space Program Plan and consolidate and advocate to OSD the Space MFP. Specifically, the USAF will...**

- **Perform Executive Agent responsibilities for Department of Defense space activities**
- **Assess and sponsor joint and multi-user operational space requirements for review by the JROC and develop military space CONOPS and doctrine**
- **Develop, in coordination with the NSSA, a Space Program Plan that meets near, mid and long-term DOD space requirements**
- **Develop space guidance for the DPG based on National/DOD policy and the National Military Strategy formulate space program priorities and provide guidance for creating Service/Agency Program Objective Memorandum (POM) submissions**
- **Consolidate, assess and advocate Service/Agency POM submission by Means of an MFP (space) for submission to OSD**

AE) who will oversee and direct the AF Space PEO/Designated Acquisition Commander (DAC), the other Services and Agencies and the National Security Space Architect (NSSA).

The Space Executive Agent should also be responsible for developing the Space Major Force Program (MFP) and oversee Service/Agency space programs for consistency with the Space Program Plan. The USECAF will provide space advocacy and guidance within the Air Force corporate structure for AF space programs.

Schedule: The Air Force is developing draft legislative language, proposed changes to DOD Directives and internal Air Force directives to accomplish these objectives. With enabling OSD and necessary legislative actions the Air Force will be ready to implement these actions within 2 weeks.

SPACE ACQUISITION EXECUTIVE (Space AE)

The Commission's Report specifically states "Designate the Under Secretary as the Air Force Acquisition Executive for Space" and also that "the services would continue to acquire service-specific programs, but for these, would report through the AF Space AE." The intent of the Commission is to vest with a single person, authority to acquire space systems for the DOD and the NRO. This approach streamlines DOD space acquisition processes, mirrors the NRO's model, supports the Commission's proposals for the USECAF and realignment of AFSPC/SMC realignment.

Air Force acquisition authorities are vested with the Secretary of the Air Force (SECAF). The SECAF shall designate the USECAF as a second acquisition executive within the Air Force with specific responsibilities for space programs. The SECDEF should designate the Air Force as the DOD Space Acquisition Executive for other service and defense agency space and space-related programs, consistent with the recommendations of the Commission.

The Space AE would have the following roles and responsibilities:

Serve as the Space Milestone Decision Authority (MDA)
Execute joint, multi-user space and space-related programs from other Services/Agencies (e.g. MUOS, SBL, SBIRS Low, etc)
Guide and direct Service/Agency Space PEO's and DAC' s
Conduct systems acquisition using a hybrid Directive 7 with DOD 5000 "Best Practices" acquisition practices
Chair the Space Acquisition Board (SAB)
Serve as DOD Space procurement official
Develop space acquisition plans, strategies, guidance and assessments
Prescribe space DT&E program
Coordinate military space R&D efforts
Establish space industrial base policies

Streamlining DOD space acquisition and empowering a single AE with authority to integrate and align military space efforts with approved national security space architectures and plans would significantly enhance national security space capabilities. The Air Force believes the consolidation of acquisition responsibility and authority with the Space AE is key to future space advancements.

The Air Force is reviewing organizational structures to realign space research, development, acquisition and operations functions under AFSPC to establish a "cradle-to-grave" space culture. The Air Force believes it will be important to expand joint manning and cooperation in joint space program offices to ensure joint needs are met and to provide opportunities to enhance space expertise developed in other Services and Agencies.

Schedule: Pending enabling legislation for a four star AFSPC/CC and DOD directives, the Air Force is prepared to implement organizational realignments within 60 days.

PROFESSIONAL DEVELOPMENT:

The Commission recommends the Air Force create and sustain a cadre of space professionals and that the DOD (including all services), intelligence community and the nation must place a high priority on intensifying career development, education and training.

The Air Force agrees with this critical need and has initiatives underway to define and implement enhanced career and leadership development. These efforts will develop space professionals with comprehensive skills and experience to operate space systems, develop space doctrine and CONOPS, perform space launch, satellite operations, integrate space capabilities into joint warfighting and promote space power.

The Air Force intends to develop internal processes (Developing Aerospace Leaders) and to work with the NRO and other services to implement a program that builds on cross-cutting strategies that grow and interflow operators, acquisition professionals, scientists, engineers and other career fields across Air Force, NRO and other service space activities.

Schedule: This is a long-term project. Implementation of some specific programs related to space professionals can begin within 90 days.

AF-NRO INTEGRATION:

The recommendation from the Commission was that "once the realignment in the Air Force is complete...could involve integration of Air Force and NRO acquisition and operations activities for space systems. "

The Air Force believes that any realignment or merger with the NRO should be based on "best practices" and implemented in a phased approach. Inherent in improving AF and NRO integration is the need to align "cradle-to-grave" acquisition and operations functions within the Air Force. In addition, the DCI will continue to provide direction on intelligence requirements and priorities.

Schedule: Implementation is contingent on a logical set of transition criteria and "pathfinder" successes set to begin when the Air Force completes its initial AFSCP/SMC/AFMC realignment and dual-hats the USECAF as the Space AE and DNRO.

23 February 01

MEMORANDUM FOR: SMC/CC

SUBJECT: Trip Report – Col Hackmeier, SMC Participation in Development of AF Response to OSD on Implementation of the Space Commission Recommendations

As part of the recent CORONA discussions, the Chief established as an internal AF milestone 23 Feb 01 as the date we would provide an initial AF position to OSD in response to the Space Commission report. In order to meet that date, AF/XO chartered within AF/XOS several teams to address critical issues associated with key areas of the Commission's report. In order to meet that date, SMC, HQ AFMC and AFSPC personnel were assigned to assist the AF/XOS team chiefs in developing the AF position. That final version of the AF position paper is attached.

The paper highlights several important objectives and views that the corporate AF has established in response to the Commission's recommendations and our "plan" to move toward full implementation. In general, the AF concurs with all the findings and recommendations included in the Commission's report.

Key AF tasks remaining to be worked over the next several weeks include:

1. Completion of the PAD defining AF objectives for realignment and implementation of the Commission recommendations.
2. Development of the detailed P-Plan for AFMC and AFSPC delineation of specific tasks associated with the AF realignment and our new focus on "Space".
3. Review of the AF response to the Commission recommendations with OSD and Service representatives in order to initiate a process where we will reflect views from outside the AF concerning implementation of the Commission's recommendations. A meeting is scheduled with OSD and representatives of the other Services' for Monday, Feb 26, in order to define the mechanisim for development of a unified DoD response to Congress by 5 March. General Hamel will recommend to OSD and the Service representatives that we retain the existing AF/XOS IPT structure as a way of ensuring a timely and integrated response.
4. The "Tank" session on 22 Feb did not go well. The Army in particular is concerned with the implications of Executive Agency on their internal role and position in guiding the development and operations of Army and DoD space systems.
5. There are a number of open tasks remaining in order to facilitate the DoD response to Congress on implementation of the Commission's recommendations. Two of the most important near term issues are Executive Agency (EA) and the establishment of a Major Force Program – Space, as a tracking mechanism for funding associated with the implementation of the Space

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2001-1-22

January 22, 2001

FOR IMMEDIATE RELEASE

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Space Commission calls for consolidation

Air Force Space Command News Service

By Staff Sgt. A.J. Bosker
Air Force Print News

WASHINGTON -- A Jan. 11 report submitted to Congress by the Space Commission calls for the consolidation of Air Force space functions into a single organization to create a strong center of advocacy for space and an environment in which to develop a cadre of space professionals.

The commission, established by Congress last year to assess the organization and management of space activities in support of national security, determined that the right place for space is a realigned and rechartered Air Force, best suited to organize, train and equip space forces.

Air Force Space Command wonld become the focal point for developing this cadre and advocating education and training programs for space professionals. The command should be given the responsibility for providing the resonrces to execute space research, development and operations, the commission recommended in its report.

The Space Commission report also calls on the defense secretary to designate the Air Force as Executive Agent for Space within the Defense Department since the service already accounts for 85 percent of DOD's space-related budget activity.

Additionally, the commission recommends statutory responsibility be given to the Air Force to organize, train and equip for prompt and sustained offensive and defensive air and space operations.

The report also recommends assigning responsibility for command of AFSPC to a four-star officer other than the commander in chief of U.S. Space Command and North American Aerospace Defense Command.

Currently, the same general officer holds all three positions. This recommendation by the commission is designed to give each commander more time to focus on his primary roles and responsibilities.

The recommended realignment of space activities within the Air Force would create a single chain of authority and give the service a clear opportunity to create a space-oriented culture comprising military professionals who could directly influence the development of systems and doctrine for use in space operations.

"As space becomes more integral -- and critical -- to military land, sea and air operations, the U.S. must devote more attention to the sensitive issues of space control and superiority," said Gen. Ralph E. Eberhart, commander in chief, NORAD and USSPACECOM; commander, AFSPACECOM.

"The importance of space control and space superiority will continue to grow as our economy becomes more reliant on space," he said.

The Air Force has long recognized the importance and potential of space capability to the nation and welcomes the report from the (Space Commission), Air Force officials said. As the primary provider of space capability within DOD, the service is encouraged by the attention national space security is receiving. The Air Force will assess the full Space Commission report and will develop a position on all its recommendations.

AFSPC

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Space commission Doc I 60

A Titan IV rocket lifts off from Vandenberg Air Force Base's Space Launch Complex-4 East carrying a National Reconnaissance Satellite into polar orbit. (Photo by Airman 1st Class Amanda Edwards) | High-Res Version of this photo

Air Force welcomes Space Commission's recommendations

by Staff Sgt. A.J. Bosker
Air Force Print News

02/08/01 - **WASHINGTON** -- The Air Force welcomes the Space Commission's report and is enthusiastic about the observations and recommendations that determined a realigned and rechartered Air Force is best suited to organize, train and equip space forces.

The service is analyzing recommendations, providing inputs to the Department of Defense and developing preliminary

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implementation plans in response to the Jan. 11 report that was submitted to Congress by the Space Commission.

"We are very happy the commission made solid recommendations to improve the way military space is organized and managed," said Brig. Gen. Michael A. Hamel, space operations and integration director, and deputy chief of staff for air and space operations. "I personally believe the recommendations of the Space Commission have the potential to bring about the most profound changes in military space operations and in the role and leadership of space by the Air Force that I have witnessed in my career."

The Space Commission was established by Congress last year to assess the organization and management of space activities in support of national security. Among the steps proposed by the report is assigning Title 10 authority and Executive Agency for space to the Air Force, a budgeting mechanism to provide funding visibility and increased integration of space organizations, people and processes within the Air Force.

The tools, capabilities, authority and accountability proposed for the Air Force by the commission's recommendations will challenge the service to bring about the full vision and potential argued for in aerospace integration, Hamel said.

The Air Force is working on creating implementation plans to make full-spectrum aerospace integration a reality, he said.

"This is a golden opportunity for the Air Force to create a strong center of advocacy and commitment to national security space efforts," Hamel said. "It will really enable bringing true integrated aerospace capabilities for the joint warfighter.

"The most important thing all airmen should take away from this is that, after an exhaustive study by a very illustrious panel, the conclusion was reached there is not another service or institution within this nation that can take on the challenges our growing dependence on space means for national security," Hamel said. "That is a huge vote of confidence for the men and women in the Air Force, and the commission's recommendations will give us the tools needed to step up to that leadership challenge."

RELATED LINKS

- Commission calls for consolidation of AF space functions
- Brig. Gen. Michael A. Hamel

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SPACECOM chief: Space must be top national priority

By Gerry Gilmore
American Forces Press Service

WASHINGTON (AFPN) – American military involvement in space will become more critical to national security in coming years, said U.S. Space Command's top officer.

"Most anyone involved in military operations, whether military or civilian, would tell you space is becoming increasingly important," said Gen. Ralph E. Eberhart, SPACECOM commander in chief.

U.S. Space Command, headquartered at Peterson Air Force Base, Colo., coordinates the use of U.S. military and civilian space assets to support, enhance and control space operations and computer-network defensive and offensive missions. It is one of the nine unified commands in the Department of Defense that have operational control of U.S. combat forces.

Satellite imagery, missile warning and targeting information that space-based systems provide have proven their military worth to U.S. defense planners throughout the past decade, Eberhart said. That data, for instance, contributed to victory during Operation Desert Storm and the 1999 Kosovo air campaign.

"Look back to how we leveraged our space assets in Desert Storm, compare that to Kosovo — or how we can leverage them even today as we have made advancements since Kosovo — and I think it is obvious how important and how much we rely on capabilities that are resident in our

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SPACECOM, from Page 1

information that moves through space," he said.

Sometime in April, Secretary of Defense Donald Rumsfeld is expected to provide his formal response to recommendations in a report issued Jan. 11 by the Commission to Assess U.S. National Security Space Management and Organization. Prior to his nomination to be secretary, Rumsfeld chaired the commission, which, among other things, sought to determine if any changes need to be made to improve the United States' national security posture and capabilities in space.

Six months of research and interviews with the country's leading space experts, including Eberhart, convinced the commission that space should become a top national security priority.

"We'd be kidding ourselves if we said we couldn't do it better, (and) our goal ought to be to do it better tomorrow," Eberhart said.

For example, DOD space specialists could make more effective use of available communications bandwidth, and become better at processing and disseminating information "to get inside the enemy's decision-cycle," he said.

"We gather data," Eberhart said. "How can we change that data to information which can lead to decisions? That is the real key. We're working hard, we have some wonderful people out there, and we have a great partnership with industry, with commercial suppliers."

A Rumsfeld space commission news release called the likelihood of future conflict in space "a virtual certainty." Because of this, the commission noted, the United States should take immediate steps to develop superior space capabilities.

Some critics say the U.S. will not need such enhanced capabilities for 25 years, when a peer may arise to challenge America militarily in space. Other critics say there should be no military use of space, but Eberhart said he believes this has already occurred.

"We have, in fact, militarized space," he said. "We use space assets, space information for military applications. "We've been doing that for decades. The trend is increasing, not just the United States of America, but also other countries, friends, and possible foes.

"So, I think we've crossed that bridge," he said.

Action Line

The Action Line is your direct link to Col. Phil Parker, 61st Air Base Group commander. Its purpose is to make Los Angeles AFB a better place to live and work. If you have an issue that needs to be resolved, discuss it first with your supervisor or First Sergeant. Call the Action Line at 363-2255 if you can't find a solution through your chain of command. Your call will be recorded and, if you leave your name and number, you will get an answer to your question.

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www.losangeles.af.mil "Forging the shape of military space for the 21st century" Los Angeles Air Force Base, Calif., July 27, 2001

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Page 1

SMC commander talks realignment, addresses concerns at town hall

By Tim Dougherty
Astro News Editor

"There are some really big changes coming down for the command and these changes will affect all of us in one way or another. I wanted to take this opportunity to make sure our families understand what is going on," said Space and Missile Systems Center commander Lt. Gen. Brian Arnold as he addressed the transition to Air Force Space Command and many other issues with the Los Angeles AFB community at a town hall meeting July 17.

"The biggest event happening for Los Angeles AFB is that we are going to become members of Space Command on Oct. 1. This realignment stems from recommendations from a recent Space Commission Report. To get ready for this transition, we've moved out smartly and have spent lots of time working on the details and the planning," Arnold said. The general said he has recently been in working meetings with AFSPC commander Gen. Ed Eberhart and vice commander, Lt. Gen. Roger Dekok, and says that although the realignment is a very significant change, everyone within the leadership of both commands is working on the details to ensure the transition is as smooth as possible.

Photo by Joe Juarez

Lt. Gen. Brian Arnold discusses quality-of-life issues with a Los Angeles AFB family member.

One of the significant details in the realignment is the transition of the Program Executive Office for Space from Washington, D.C., to SMC.

Photo by Joe Juarez

Lt. Gen. Brian Arnold speaks to a packed house at a Town Hall meeting July 17 at Fort MacArthur.

"The Air Force will become the executive agent for all of space for the Department of Defense and secondly, the Program Executive Officer, who is now Brig. Gen. Craig Cooning, will come out here and I will become the PEO," Arnold said. "In the past, the PEO has been in Washington yet the programs have been running here. So one of the biggest changes is to bring that person here to SMC, and I will become that person. We'll have the PEO right here which will give us much better control of the programs because we'll have eyes on the target every day, which is really a great way to run the business."

Also with the realignment, decision-making authority will shift to the Under Secretary of the Air Force who will become the acquisition authority for space for the Air Force and all of DoD.

"We're in a very exciting time because space is in the forefront of our national security

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TOWN HALL, from Page 1

policy in every way," Arnold said.

Arnold addressed several other issues at the town hall. Some of the highlights:

Systems Acquisition Management Support Complex

"We're getting ready to get out of our old buildings in Area A and move into new buildings in Area B in a land swap. This is a novel approach and everyone in the Air Force and in Washington supports us. We are going to trade our old buildings and land to a developer who will in turn build us a new complex. The proposal will soon be sent to Congress and I am expecting construction to begin next summer.. I'm going to push this forward as quickly as possible. Ultimately we'll have a new base appearing right in front of our eyes. There is going to be a tremendous amount of construction, but, in the end, we'll have a completely new complex – new fitness center, new clinic, new base exchange, new People Center, new mall and much more. It will be a modern complex which will be very good for our people and very good for all the folks we snpport."

Fort MacArthur Shoppette for your convenience

"I want everyone to realize the Fort MacArthur Shoppette operates at a loss. If it were a commercial venture, it would

Force Exchange Service runs the shoppette as a convenience for family housing residents, and I urge everyone to use it. It's very kind of the BX and AAFES to run the shoppette."

Thrift Shop to relocate

"The Thrift Shop will soon move into Building 220. I hope everyone realizes that when they support the Thrift Shop they are supporting such things as scholarships for our high school students and other great programs. It's a really neat thing for our community as we take care of onrselves."

School issues for families new to Los Angeles AFB

"For those families who are new to the area, I know that from my experience as a father of five children, one of the most important factors for you is schools. You need to get involved in the process because parents here have had great success in getting their children into the right schools. The place to start is the family support center. They can walk you through a web site that shows where the good schools are. You can also talk to other parents about the schools. But don't be satisfied by just sending your kids off to school thinking you don't have any control, because you do have control. If yon feel like you aren't getting the support you need, come see me and we'll

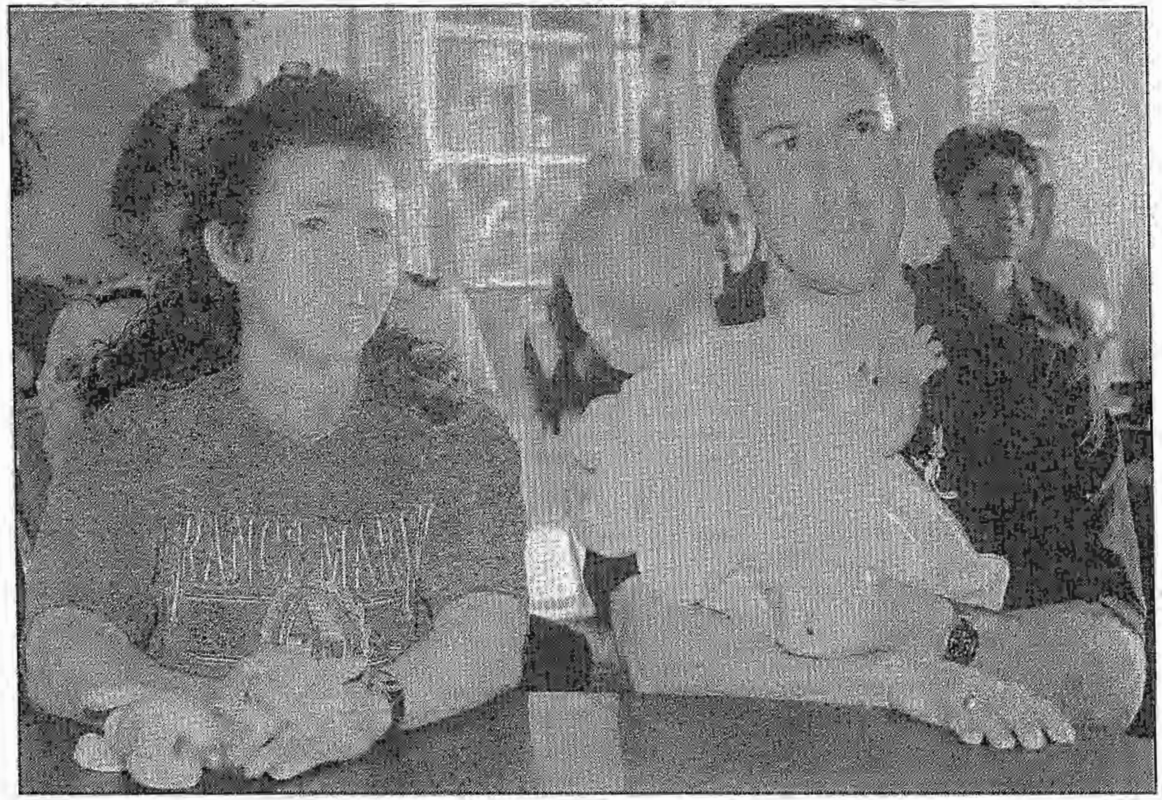

Photo by Joe Juarez

Linda Poole, left, along with husband 2nd Lt. Lynn Poole from SMC's Launch Programs directorate, listen to Lt. Gen. Arnold at the July 17 town hall meeting as daughter Lauren checks out the crowd.

let somebody tell you that you can't choose the school you want your children to attend because you do have the choice."

New youth center nears completion

"As we complete the new youth center at MacArthur Hall, we are seeking your suggestions on improvements we can make to programs we offer to our younger folks."

Ft. Mac Fitness Center

asked 61st Air Base Group commander Col. Phil Parker to get some new equipment into the gym. We jnst installed two new CrossTrainers and two upright bikes. Some of the items in that gym are old. I'm trying to get some extra funds to fix up the gym. If anyone has any ideas for the gym, please make sure you get those ideas to us and we'll try to get them on the list. We're going to make it a good place to work out."

Outdoor Recreation

Recreation. They had some of their items displayed at the Summer Bash, and I think you'll be impressed at all the equipment available. It's amazing."

Tops in Blue

"Tops in Blne is the Air Force's premiere entertainment group and they will be here July 27. This is a great activity for the children. It's the first time Tops in Bluc has ever visited Los Angeles AFB and it should be a great

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New career cross-flow between space ops and acquisitions

By Cleota Drysdale
Public Affairs

Big changes are coming to the Space and Missile Systems Center; changes driven by the fact that SMC is now a part of Air Force Space Command. One key challenge SMC faces as a part of those changes is the continued need for scientific, engineering and program management specialists. That need has neither changed nor lessened—yet 93 percent of engineers and scientists are assigned to Air Force Materiel Command. Overcoming this challenge is vital to the success of the SMC mission.

"SMC leaders are always looking for ways to ensure the right people are matched with the right jobs," said Kathern Gaskins, SMC Director of Systems Acquisition. "At the same time, we are taking into consideration the recommendations made by the Space Commission. That influential document states that 'Perhaps more than other areas, space benefits from a unique and close relationship among research, development, acquisition and operations, as spacecraft are usually procured in far fewer numbers . . . than are tanks, airplanes or missiles.'" Thus, the goal is to train space operators in scientific, engineering and program management specialist skills. According to Gaskins, acquisition engineers and program manangers will be assigned to operational tours to broaden their understanding and, as a result, officers trained in any of the specialties can move back and forth between disciplines while maintaining a positive career progression.

"One major thrust of the Space Commission recommendations was to move us toward greater integration between space operations and acquisition of space systems. One of the initiatives to contribute towards that end is an agreement made between the most senior levels here at SMC and our new major command headquarters. This would begin the cross feed of our program managers and engineers with experienced space operators," said Gaskins.

SMC's first step has been to identify a number of positions traditionally filled by engineering or program management staff to convert to 13SX, the Air Force specialty code for space and missile operations. "The SMC Systems Acquisition Directorate, 61st ABG Military Personnel Branch and Air Force Personnel Center are working with Headquarters Air Force Space Command to start rotating their officer-level space operators into SMC system programs to give them an 'up close and personal' experience with how we do major system acquisition and program management from a life cycle perspective," said Gaskins.

Initially, SMC has committed to convert up to 20 positions, at a rate of 3 to 5 per quarter. In addition, consideration is being given to assigning other operational staff to positions where the AFSCs will remain as they are today; that is AFSCs 61XX(Scientists), 62XX(Engineers) and 63AX(Program Managers). Questions of how the operational staff can obtain credit for their accrued experience at SMC and apply it towards certification under the Acquisition Professional Development Program (APDP) are still being worked out. Additionally, this strategy will be blended with planning related to the Developing Space Professionals (DAL) initiative, also prompted by the Space Commission report.

Graphic by Tom Fritz, compliments of the Northrup Grumman Corporation

"At the same time, the staff at the major command is looking for ways to facilitate the movement of our engineering and program management officers (AFSCs 61, 62 and 63) into space operator or 13 positions at the wing and headquarters level," said Gaskins. "It is expected this will enhance SMC's understanding of operational needs. This is a major shift in the Air Force's approach to manning positions at the Center. Before this time,

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SMC Vision

"Become the Center of Excellence for Space & Missiles by building a reputation of producing

Taverney moves to AFSPC

By 2nd Lt. Tomika Powell
Public Affairs

Brig. Gen. Thomas Taverney, the

and its people a significant part of the Command," Taverney said.

The Center's new MAJCOM

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Pat M. Tom of SMC Dec 12. The rest

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there had been some space operators serving as liaison staff at the Center but, typically, they had not been fully incorporated into 13 program office staff *per se*".

Feedback on the performance of these individuals has been excellent to date. Assigned operational staff members have been singled out for quarterly recognition, external awards and have competed well for promotions, professional military education and Defense Acquisition University course selections. System program office managers have enthusiastically embraced increasing the operational presence in the acquisition processes. "This initiative gives us the chance to complete and formalize the integration of the acquisition and operational communities," Gaskins said.

"Clearly both communities can profit from improved understanding of each other's requirements, processes and constraints, and that can move us incrementally towards complete management integration of the space domain, which is what the Space Commission was seeking to achieve," said Gaskins. "This will help us better define requirements and clearly capture the needs and expectations of the users and operators while providing more comprehensive evaluation of alternative capabilities, and allow deployment of more effective systems. Ideally, it will also improve our approaches and reduce the cost of sustaining those systems over their useful life."

"It was immensely helpful to have an operational background," said Major Taurus Brackett, Space-Base Infrared System Program Office. "It enabled me to understand and predict how the system would be used, and how decisions would truly impact the crew."

"SMC welcomed us with open arms," said Major Gordon Boyd, an operator who recently departed the center. "Hopefully, we will do the same for those Center personnel coming into space operations."

SMC Commander, Lt. Gen. Brian Arnold, recently participated in the Air Force Space Command's Vigilant Eagle Selection process where new space operations commanders are selected.. As a result of this Board's deliberations and evidence of the command's commitment to these cross flow objectives, seven SMC field grade officers were chosen for operational squadron commander assignments next summer, positions traditionally dominated by the 13SX career field. "We are going to capitalize upon the expertise and leadership that each of these communities brings to the table," said Arnold. "Our decisions, as well as the quality and utility of the space systems we acquire and deploy on behalf of the nation will ALL get better as a result of this approach to building a new cadre of Space Professionals."

While continuing to work out the details with the Air Force Personnel Center, SMC leaders remain optimistic and look forward to the integration of operations and acquisition. "We are excited about the prospect of seeing increased operational talent come our way," said Gaskins. "This effort will provide opportunities for our officers to gain experience throughout a command that has been our primary customer and user. Over the next two decades the Space Command, indeed, all of DOD will profit from this new breed of more broadly experienced, interdisciplinary military space leaders."

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