Weapon Systems Modernization

Priorities Book

2022

AIR NATIONAL GUARD

FOREWORD

Our Nation requires a strong, modernized, and well-equipped Air National Guard to realize the priorities outlined in the 2022 National Defense Strategy. As we urgently act to deter our most consequential strategic competitor and pacing challenge -China - increasing lethality is more critical today than it has ever been for our dual-use force. The shift from two decades of counterinsurgency operations to a one-war force exacerbates the requirement to ensure our Nation retains an effective, interoperable air combat reserve. Absent recapitalization, modernization efforts are the life-blood of this endeavor.

At the heart of the Air National Guard modernization process is the Air Reserve Component's Weapons and Tactics Conference (WEPTAC), where experts in every major weapon system and industry leaders deliberate to define clear capability requirements and implement off-the-shelf capabilities. Leveraging professionals across the defense ecosystem ensures the Air National Guard remains a lethal, resilient, sustainable, survivable, agile, and responsive partner in the Joint Force. This process also directly influences U.S. Air Force-wide weapon system transformation and interoperability.

The Air National Guard will continue to build tight linkages between our National Defense Strategy and our resources to bolster readiness and attain the lethality standard required of a combat credible force to meet pacing challenges. The requirements detailed in this book are vital to our ability to defend the homeland, deter strategic attack and aggression, and project power to prevail in conflict. I look forward to transitioning these requirements into capability in the hands of our warfighter ... *Your Air National Guard - Ready Today ... Stronger Tomorrow!*

MICHAEL A. LOH
Lieutenant General, USAF
Director, Air National Guard

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TABLE OF CONTENTS

Introduction

The 2022 Air National Guard (ANG) Weapons Systems Modernization Priorities Book documents capability priorities identified during the October 2021 Air Reserve Component Weapons and Tactics (WEPTAC) Conference. WEPTAC hosted representatives from all ANG and Air Force Reserve (AFR) units, as well as representation from the active component.

The 2022 WEPTAC Book is organized into 21 weapon system mission sets. Each Tab begins with a summary page of capabilities identified at WEPTAC, categorized as Critical (Crucial - within the next one to three years), Essential (Vital - within the next three to five years), or Desired (Enhances mission success in the five-year timeframe).

For each Critical capability identified, an information paper is included within the weapon system Tab. A header within each information paper identifies its appropriate Service Core Function or functional category as one of the following:

Air Superiority / Global Precision Attack
Rapid Global Mobility
Space Superiority / Cyberspace Superiority
Command and Control
Global Integrated ISR
Special Operations / Personnel Recovery
Simulation and Distributed Mission Operations
Agile Combat Support

Applicable Funding Appropriation Definitions

0350 – National Guard and Reserve Equipment Account
3840 – ANG Operations and Maintenance, one-year funding
3010 – Aircraft Procurement, three-year funding
3600 – Research and Development, two-year funding
3080 – Other Procurement, three-year funding
(NOTE: In most cases, Non-Recurring Engineering (NRE) costs are paid for with 3600 Research, Development, Test and Engineering (RDT&E) money, but in some cases they can be paid for with 3010, 3080, or 0350 procurement money.)

The State Matrix, found on the next page, identifies ANG weapons systems locations by state/territory. These depictions reflect the force structure as of 01 Dec 2020.

State Matrix

Weapons System Reference Table by State (01 Dec 2021)

Refer to Weapon System Tabs for Specific Information (Classic Associate Units are shown in red.)

	A-10	B-2	C-17	C-130H/J	Special Mission C- 130	C-32B, E-8C, C-40	F-15	F-16	F-22	HH-60	KC-135	KC-46	MQ-9	AOC, BCC, CRC	Cyber, Space	DCGS, MC-12W,	GA / ST / TACP	Range
AK			•	H	HC					•	•			BCC	Space		GA	
AL								•			•					DCGS		
AR				H									•		Cyber	DCGS		
AZ								•			•		•			RC-26B		
CA				J	HC		•			•			•		CY/SP(2)	DCGS	GA	
CO								•							Space(3)			Range
CT				H										CRC				
DC						C-40		•										
DE				H											Cyber			
FL							•							AOC	Space			
GA				H										CRC		DCGS	TACP	
GU															Space			
HI			•						•		•			AOC/BCC	Space	DCGS		
IA											•		•	CRC	Cyber	DCGS		DMO
ID	•														Cyber		TACP	
IL				H							•			AOC			TACP	
IN	•															DCGS	TACP	Range
KS											•			CRC	Cyber(3)	DCGS	TACP	Range
KY				H													ST	
LA							•										TACP	
MA							•									DCGS		
MD	•			H											Cyber(3)			
ME											•							
MI	•										•		•	AOC	Cyber			
MN				H				•										
MO		•		H										AOC				Range
MS			•								•			AOC/CRC			TACP	Range
MT				H														
NC			•	H													TACP	
ND													•			DCGS		
NE											•							
NH												•						
NJ						C-32B		•			•				Cyber		TACP	Range
NM					HC/MC					•						DCGS		
NV				H												DCGS		
NY			•		HC/LC					•			•	AOC/BCC	Space		GA/TACP	Range
OH				H				•			•		•	CRC				
OK								•								MC-12W	TACP	
OR							•							CRC			ST	
PA											•		•	AOC	Cyber		TACP	Range
PR				H										CRC				
RI				J											Cyber			
SC								•										
SD								•										
TN			•								•		•		Cyber	DCGS		
TX				H				•					•		Cyber		TACP	Range
UT											•			CRC		DCGS		
VA									•						Cyber	DCGS		
VI																		
VT								•							Cyber			
WA											•			BCC	Cyber(2)		TACP	
WI								•			•			CRC				Range
WV			•	H														
WY				H														

F-16

- **Close Air Support/Interdiction/Precision Strike**
- **Suppression/Destruction of Enemy Air Defenses**
- **Homeland / Base Defense**
- **ANG F-16 Units Provide 37% of the Total Fleet**

ANG F-16s are engaged around the globe in operations including NOBLE EAGLE and INHERENT RESOLVE. Since 2003, ANG F-16Cs have fulfilled many of CENTCOM's precision-guided munitions and close air support (CAS) taskings, including convoy escort, dedicated infrastructure defense, border patrol, and raid support. The ANG operates 332 Block 25/30/32/40/42/50/52 F-16C/Ds. The ANG F-16 aircraft make up 56% of the nation's Aerospace Control Alert (ACA) fighter force and provide a near-constant presence in operational theaters conducting CAS and armed reconnaissance. Capability enhancements to the Block 40/42 and Block 50/52 aircraft make them the Air Force's only 4th Generation suppression of enemy air defenses (SEAD)-capable aircraft.

Modernization efforts are underway to improve ANG F-16s by fielding affordable systems with secure line-of-sight and beyond-line-of-sight communication suites with 3-Dimensional audio, smart displays with data processing capability, advanced helmet-mounted target cueing for air and ground weapons employment, enhanced self-protection suites, and improved radar performance and reliability.

F-16
FY 2022 Weapons and Tactics Conference

Critical Capabilities List

F-16C+/CM (Block 25/30/32/40/42/50/52)

- Radar Providing Low-Observable Detection, Air-to-Air and Air-to-Ground Electronic Protection/ Electronic Attack, and Combat Identification Capability
- Rapidly Adaptable, Automated Digital Electronic Warfare Suite Capable of Detection, Precise Geolocation, and Protection from Radio Frequency and Infrared Threats
- Infrared Search and Track System (IRSTS) Capable of Completing a Beyond Visual Range Passive Kill Chain Outside of the Radio Frequency Spectrum Against Modern Airborne Threats
- Low Latency, High Bandwidth, Resilient, Secure, Two-Way Data Passage Capability
- Proliferation, Operation, and Sustainment of Aircraft Operational Flight Program/Hardware Concurrent High-Fidelity Simulators with Modern Threat Replication

Essential Capabilities List

- Lightweight, Color, Night-Compatible Helmet-Mounted Display with 3-D Audio
- Reliable Digital Standby Attitude and Heading Reference System
- High Power Processor Capable of Hosting Advanced Fusion/Correlation Algorithms
- Advanced Infrared/Radio Frequency Expendable Countermeasure Carriage Capability
- Tactical Autopilot with Auto-throttle, and an Advanced Flight Control Computer Capable of Integrating with Weapons Delivery

Desired Capabilities List

- Boresight Program Enhancement
- Certified Area Navigation Approach Capability
- Live Virtual Constructive Training Facilitator
- Increased Air-to-Air Weapon Carriage Capability
- Advanced Wide-Band Decoy
- Surface-to-Air Threat Simulation System Capable of Real-Time Cockpit Indications Across Aircraft Systems

F-16: RADAR PROVIDING LOW-OBSERVABLE DETECTION, AIR-TO-AIR AND AIR-TO-GROUND ELECTRONIC PROTECTION/ELECTRONIC ATTACK, AND COMBAT IDENTIFICATION CAPABILITY

1. Background. All ANG F-16 aircraft require Active Electronically Scanned Array (AESA) radar to execute tasked missions effectively. AESA radars provide the capability to detect and track multiple airborne targets of interest in dense air traffic environments. AESA radars will improve ANG F-16s capability to perform close air support, surface attack, and defensive counter-air. AESA radars can perform detection, tracking, communication, and jamming functions in multiple directions simultaneously. Additionally, AESA radars eliminate several components associated with mechanical radars, significantly improving reliability and maintainability costs. The survivability and lethality of the F-16 will diminish without the inherent capability and reliability of an AESA radar. 172 remaining ANG F-16s are requiring an AESA radar.

2. Program Details.

Quantity	Unit Cost	Program Cost
Radar Phase II and III Non-Recurring Engineering (3010)	**N/A**	**$25,000,000**
172 Radar Upgrades (3010)	**$2,114,943**	**$363,770,196**
Total		**$388,770,196**

F-16: RAPIDLY ADAPTABLE, AUTOMATED, AND DIGITAL ELECTRONIC WARFARE SUITE CAPABLE OF DETECTION, PRECISE GEOLOCATION, PROTECTION FROM, AND ATTACK OF MODERN RADIO FREQUENCY AND INFRARED THREATS

1. Background. ANG F-16 aircraft require a robust integrated electronic attack suite to counter current and future radars. All ANG F-16 aircraft electronic warfare (EW) suites are comprised of a series of EW equipment designed in the 1980s, which are incapable of providing adequate defensive situational awareness and countermeasures against some present and most future radar systems. Today, both systems suffer from sustainment issues and have significant capability issues against modern threat systems. The attributes of this integrated suite shall incorporate an upgraded radar warning receiver (RWR), a digital radio frequency memory upgraded electronic attack (EA) pod, a pylon missile warning system (MWS), and the ALQ-213 legacy electronic combat (EC) integration system. The F-16 fleet has two legacy analog RWRs (ALR-69 and ALR-56M) and two legacy analog EA pods (ALQ-131 and ALQ-184). All require sustainment and digital-based performance upgrades. The ALQ-213 EC integration system is installed on all F-16 Block 30/32 aircraft, but it must be installed on the remaining 30 F-16 Block 40/42/50/52, of which 174 have been procured. F-16s will remain at risk to many current and all advanced threat systems resulting in areas of denied access, significantly impacting the pilot's ability to survive, accomplish assigned missions, and meet combatant commander requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
ALR-69A Non-Recurring Engineering (3010)	**N/A**	**$25,000,000**
332 ALR-69A Upgrades (3010)	**$600,000**	**$199,200,000**
EA Pod Non-Recurring Engineering (3010)	**N/A**	**$10,000,000**
70 EA Pod Upgrades (3010)	**$1,320,000**	**$92,400,000**
ALQ-213 Non-Recurring Engineering (3010)	**N/A**	**$15,000,000**
30 ALQ-213 Kits (3010)	**$160,000**	**$4,800,000**
MWS Non-Recurring Engineering (3010)	**N/A**	**$10,000,000**
70 MWS Sets (3010)	**$1,100,000**	**$77,000,000**
Total		**$433,400,000**

F-16: INFRARED SEARCH AND TRACK SYSTEM CAPABLE OF COMPLETING A BVR PASSIVE KILL CHAIN OUTSIDE OF THE RF SPECTRUM AGAINST MODERN AIRBORNE THREATS

1. Background. All ANG F-16 aircraft require an Infrared Search and Track System (IRST) to execute defensive counter air (DCA), cruise missile defense, and offensive counter air missions effectively. IRST systems provide an additional method of target location, tracking, and identification of airborne threats regardless of radar cross section and presence of electronic attack. This is critically important given current adversaries focus and improvements on degradation and/or denial of the radio frequency spectrum. IRST will provide an improved capability for ANG F-16's to meet combatant commander requirements in homeland defense and DCA missions. All ANG F-16 squadrons require eight IRST kits. All 280 combat coded ANG F-16s require multifunction display kits (MFD).

2. Program Details.

Quantity	Unit Cost	Program Cost
IRST Non-Recurring Engineering (NRE) (3010)	**N/A**	**$30,000,000**
72 IRST Kits (3010)	**$1,500,000**	**$108,000,000**
MFD NRE (3600)	**N/A**	**$5,000,000**
280 MFD Kits (3010)	**$50,000**	**$14,000,000**
Total		**$157,000,000**

F-16: LOW LATENCY, HIGH BANDWIDTH, SECURE TWO-WAY DATA PASSAGE CAPABILITY

1. Background. ANG F-16s require secure, high speed, two-way data passage to operate in challenged/austere remote areas. Reception of off-board targeting, real time threat information, mission assignment changes, air tasking orders, mission data files, and the sharing of aircraft sensor data will be critical to success in the high end fight. A low latency, high bandwidth, resilient data pathway for information passage will increase the F-16s ability to operate in joint, multi-generation aircraft package while maximizing pilot situational and threat awareness, while also allowing real time dynamic targeting. Additionally, an improved data passage system will enable connectivity and communication to all players when F-16s are operating outside traditional communications architecture, as in Agile Combat Employment operations or when legacy communication or datalink is being denied. All 332 ANG F-16s require Tactical Targeting Network Technology (TTNT).

2. Program Details.

Quantity	Unit Cost	Program Cost
TTNT Non Recurring Engineering (3010)	**N/A**	**$10,000,000**
332 ARC-210 Gen 6 Radios with TTNT (3010)	**$500,000**	**$166,000,000**
Total		**$176,000,000**

F-16: PROLIFERATION, OPERATION, AND SUSTAINMENT OF AIRCRAFT OPERATIONAL FLIGHT PROGRAM/HARDWARE CONCURRENT SIMULATORS WITH MODERN THREAT REPLICATION

1. Background. ANG F-16s require the proliferation, operation, and sustainment of high fidelity aircrew simulators that are concurrent with aircraft operational flight program (OFP) and hardware. Currently, operational flight simulators do not exist at each F-16 unit and require TDY travel for aircrew training. Many collocated unit simulators only have two systems, which do not allow the execution of standard four ship tactics. Additionally, current simulators are lagging congruence with current aircraft software and hardware configurations. System capability upgrades (SCU) simulators supporting F-16C+ units are 3+ years behind the current aircraft software configuration, denying training of fielded complex aircraft and weapons systems such as APG-83, ASQ-236, ALQ-213, and SCU-10. F-16 squadrons upgrading to M7.3, and center display unit have no capability to learn or train to the systems such as ASQ-236 in their simulators. As aircraft OFPs continue to update at an increased rate, aircraft equipment and sensors continue to modernize, and new pilots arrive to units from an increasingly shortened pipeline, the disparity between the simulator and aircraft configuration will continue to degrade. Finally, lack of access to sufficient airspace, aircraft capable of replicating current and future threats in both capability and quantity, and modern surface-to-air threat systems, require training in a simulated environment. As the F-16 fleet continues to age, and pilot shortages continue to reduce the level of experience in fighter squadrons, emergency procedure training is also greatly affected by lack of simulator access. All ANG F-16 simulators require a software refresh.

2. Program Details.

Quantity	Unit Cost	Program Cost
Updated Simulator Software (3080)	**N/A**	**$50,000,000**
Total		**$50,000,000**

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Command and Control

- **Air Surveillance and Defense for North America and Hawaii**
- **Air Battle Management**
- **C-NAF Integration/Augmentation**
- **Military Range Control**
- **Ground Controlled Intercept**
- **Flight Safety Monitoring**

Air Operations Center (AOC). The AOC weapon system is employed by the Joint Forces Air Component Commander (JFACC), facilitating operational control and direction of theater air, and space and cyber forces. Air National Guard AOC and Air Force Forces (AFFOR) staffs are comprised of personnel and facilities postured to support Homeland Defense, Overseas Contingency Operations, and Defense Support of Civil Authorities (DSCA). AOC personnel are organized into multiple squadrons and flights. Each unit specializes in integrated, distributive Command and Control processes, and products. The AFFOR staff is organized as special and functional directorates which provide planning teams to the Commander Air Force Forces in support of the JFACC.

Battle Control Center (BCC). The BCC operations force includes four ARC operations groups and squadrons. BCCs support North American Aerospace Defense and Northern Command as part of the homeland defense mission, DSCA, and search and rescue. BCCs provide 24/7 aerospace surveillance, warning, control, and maritime warning in the defense of North America.

Control and Reporting Center (CRC). The CRC, at the operational and tactical level, provides surveillance, tactical communications, data links, and combat-related air battle management of joint air operations with real-time networked situational awareness. There are 10 CRC units across the enterprise that support both Active Duty and ANG missions.

Command and Control
FY 2022 Weapons and Tactics Conference

Critical Capabilities List

AOC

- Weapon System Modernization
- Virtual Application Desktop Delivery
- Secure Voice Capability
- Agile Operations Center
- Mission Defense Team Toolkit

BCC

- Agile Operations Center
- Network Radio Gateway
- Rapid Deployable Tactical Data Link and Secure/Anti-Jam Line of Sight Radio Kits
- Battle Management Training Next-Air Picture Management Iteration
- Enhanced Regional Situational Awareness Camera Modernization

CRC

- Tactical Operations Center-Light System
- Mode 5 Suite to Supplement TPS-75
- Remote Radar and Radio Access
- Link-16 Tactical Data Link Training Suite
- Mission Defense Team Cyber Training Suite

Essential Capabilities List

AOC

- Redundant Independent Circuit Path
- Coalition Network Access
- Joint Worldwide Intelligence Communications System with Video Teleconference
- Special Access Program/Special Technical Operations Capability
- Full Motion Video ISR Integration Applications and Hardware

BCC

- In-Sector Coder Software Licenses
- Data Ecosystem Technical Integration
- Advanced-Data Link Upgrade
- Battle Management Aids

CRC

- EA Training Suite
- Secure Terminal Equipment Replacement for Voice/Tactical Data Link
- Advanced Intelligence FC Interoperability
- Data Cross-Domain Solution Special Access Program/Top Secret/Secret

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5.

AOC: WEAPON SYSTEM MODERNIZATION

1. Background. ANG Air Operations Center (AOC) units require the modernized Block 20 Falconer Weapon System to maintain readiness with the impending termination of the current 10.1 Weapon System. The absence of an Air Reserve Component (ARC) Block-20 AOC weapon system fielding plan will significantly detriment the ARCs ability to provide the support aligned AOCs depend on for combat mission ready (CMR) manning and distributed Multi-Domain Operations (MDO). The current plan does not include fielding hardware to functional AOCs or ARC Air Operations Groups (AOG). Instead, ARC units are expected to access the weapon system strictly through the Cloud environment with no consideration for an external network outage. The planned approach presents multiple challenges to ARC AOGs combat mission readiness/operational training, ongoing distributed operations, and effective reach-back capability for aligned geographic AOCs. It presents a risk to the mission through degradation challenging ARC AOG unit's access to the cloud in a conflict where the cyber-enabled environment is contested and/or degraded. Program Action Directive 10-2 directs ARC units to train to the same standard as their aligned active-component AOC-requiring ARC-aligned systems to match as closely as possible. The current plan to field Block-20 Weapon System hardware only to active-component AOCs is inconsistent with this guidance, presenting a risk to readiness and potential risk to mission during operations necessitating Distributed Operations, Split Operations, Reach-Back, and Continuity of Operations (COOP). The six ANG AOCs require one Block-20 Lite AOC-Weapons System each consisting of scaled down hardware and software to directly support aligned AOC requirements for CMR augmentation and distributed operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Block-20 Lite Hardware/Block 20 Weapon System (3080)	**$3,000,000**	**$18,000,000**
Total		**$18,000,000**

AOC: VIRTUAL APPLICATION DESKTOP DELIVERY

1. Background. AOCs require Virtual Application Desktop Delivery replacement, commonly known as NetScalers. NetScalers is a virtual desktop application used for distributed operational training and technical support. The currently fielded NetScalers reached end of life on 1 January 2021 and are no longer supported by the vendor. A replacement NetScaler is currently being fielded by the AOC Systems Program Office (SPO) for the active component. There is no plan to fund the ANG. Each of the five ANG AOC locations require two NetScalers concurrent with their aligned AOC.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 x NetScaler Application Delivery Controllers (3080)	**$150,000**	**$1,500,000**
Total		**$1,500,000**

AOC: SECURE VOICE CAPABILITY

1. Background. ANG Air Operations Center (AOC) units require the capability to communicate directly via radio to supported commanders, fielded units, and state emergency agencies. ANG AOCs need a modernized secure core radio package (CRP), a Mobile User Objective System tactical satellite-compatible radio, a high-frequency (HF) radio, antenna systems, and radio-to-internet protocol (IP) bridge and communications security equipment. AOC units must train and operate on the same systems as their supported active component AOCs. Without these capabilities, units cannot train or execute to full mission requirements. ANG AOCs require five of the following: CRPs, HF radios, and IP bridges.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 CRPs (3080)	**$130,000**	**$650,000**
5 HF Radios (3080)	**$40,000**	**$200,000**
5 IP Bridges (3080)	**$300,000**	**$1,500,000**
Total		**$2,350,000**

AOC: AGILE OPERATIONS CENTER

1. Background. ANG Air Operation Groups (AOG) require modernization of the operation center infrastructure to increase operator efficiency, expedite decision making and accommodate the Joint All Domain Command and Control and the Advance Battle Management System. The Agile Operations Center accomplishes this through the use of a video matrix fusion engine, solving multi-classification issues on operation floors. The Agile Operations Center covers front-end information technology to include passive infrastructure, integrated furnishings systems, audio, visual, keyboard, video, and mouse switch, telephony, and video matrix technology. Additional items include backend active infrastructure. Agile Operations Center technology delivers continuous infrastructure and enhances decision making for homeland defense performance at the speed of relevance that are not possible with the current infrastructure. An upgraded Agile Operations Center decreases decision making from minutes to seconds. All ANG AOCs require an upgraded Agile Operations Center.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Agile Operations Centers (3080)	**$10,000,000**	**$60,000,000**
Total		**$60,000,000**

AOC: MISSION DEFENSE TEAM TOOLKIT

1. Background. ANG Air Operations Center (AOC) units require mission defense team (MDT) toolkits to maintain readiness support to protect local weapons systems (WSs) from compromise by adversaries in a continually contested environment. Program Action Directive 10-2 directs Air Reserve Component (ARC) units to train to the same standard as their aligned active-component AOC and requires ARC-aligned systems to be as similar as possible. The active component AOC's only have the manpower to sustain normal phase one daily operations, they rely heavily on the ARC to augment them during increased tempo operations. Without these MDT toolkits, the ARC Air Communications Squadrons (ACOMS) will be unable to meet the four Air Force information dominance strategic goals. Those goals of assuring freedom of action, providing trusted information, developing a cyber-workforce, and optimizing the planning/resources/acquisition requirements. The continued evolution of AOCs weapons system allows the active component AOCs the ability to remotely train and conduct distributed operations. These operations require ARC weapons systems to have the same level of data integrity, availability, and non-repudiation of the active duties AOCs. Without properly trained augmentation from aligned ARC ACOMS the active component is potentially vulnerable to cyber compromises. The inability to address a never-ending cyber threat may result in mission compromise or disruption. This capability is required for each of the six ANG AOCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Mission Defense Team Toolkits (3080)	**$500,000**	**$3,000,000**
Total		**$3,000,000**

BCC: AGILE OPERATIONS CENTER

1. Background. ANG Battle Control Centers (BCC) require the modernization of the operation center infrastructure at Eastern Air Defense Sector (EADS), Western Air Defense Sector (WADS), Alaskan Air Defense Sector (AADS), and Pacific Air Defense Sector (PADS), to increase operator efficiency, expedite decision making and accommodate the Joint All Domain Command and Control concept and the Advance Battle Management System. The Agile Operations Center accomplishes this through the use of a video matrix fusion engine, solving multi-classification issues on operation floors. The Agile Operations Center covers front-end information technology to include passive infrastructure, integrated furnishings systems, audio, visual, keyboard, video, and mouse switch, telephony, and video matrix technology. Additional items include backend active infrastructure. Agile Operations Center technology delivers continuous infrastructure and enhances decision making for homeland defense performance at the speed of relevance that are not possible with the current infrastructure. All ANG BCCs require upgraded Agile Operations Centers to detect, identify, track, and decide to alert/scramble intercept aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
EADS Agile Operations Center (3080)	**$10,600,000**	**$10,600,000**
WADS Agile Operations Center (3080)	**$10,000,000**	**$10,000,000**
AADS Agile Operations Center (3080)	**$9,000,000**	**$9,000,000**
PADS Agile Operations Center (3080)	**$9,000,000**	**$9,000,000**
Total		**$38,600,000**

BCC: NETWORK RADIO GATEWAY

1. Background. ANG Pacific Air Defense Sector (PADS) requires radio over internet protocol (RoIP) capability to directly access remote multi-function, secure, anti-jam, beyond line-of-sight and line-of-sight radios, internet protocol phones, and land mobile radios from multiple locations to meet evolving mission requirements. RoIP push-to-talk capabilities provide resilient communications using internet connections, satellite, LTE, or private networks that can be controlled from fixed or distributed locations. The system is scalable to meet current and future needs, to include contingency operations solutions. RoIP improves interoperability with joint forces and facilitates effective Battle Management Command and Control. Communicating by voice and data link with joint air and integrated air and missile defense assets enables PADS to effectively orient and pair aircraft, solve problems, speed decisions, and bring order to the battlespace. This capability is critical to execute command and control operations in the PADS area of operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 RM-12 Suite Option	**$110,000**	**$440,000**
Total		**$440,000**

BCC: RAPIDLY DEPLOYABLE TACTICAL DATA LINK AND SECURE/ANTI-JAM LINE-OF-SIGHT RADIO KITS

1. Background. ANG BCCs require the ability to extend anti-jam Tactical Data Link (TDL), coverage to locations that are not covered by persistent capabilities or do not provide the necessary low-level coverage to perform tasked missions. TDL coverage is critical to reduce time to intercept, shorten the kill chain, increase flight safety, help with management of congested airspace during domestic operations, and provide a secure and jam resistant method of communication. ANG BCCs require nine transportable anti-jam TDLs.

2. Program Details.

Quantity	Unit Cost	Program Cost
9 Transportable TDL Kits (3400)	**$610,000**	**$5,490,000**
Total		**$5,490,000**

BCC: BATTLE MANAGEMENT TRAINING NEXT – AIR PICTURE MANAGEMENT ITERATION

1. Background. ANG BCCs require an intelligent instruction system to optimize instructional areas where repetition and accessibility are critical. Training needs to be conducted by deployed in-garrison personnel. The solution should leverage advanced technology such as artificial intelligence, machine learning, natural language processing, and eye-tracking. The solution should present realistic, self-guided training scenarios, and debriefing tools, which will ultimately reduce the instructor support requirements. This capability is required for each of the four BCCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
Air Picture Management Suite (3080)	**N/A**	**$500,000**
User Licenses (3080)	**N/A**	**$200,000**
Total		**$700,000**

BCC: ENHANCED REGIONAL SITUATIONAL AWARENESS CAMERA MODERNIZATION

1. Background. CONUS ANG BCCs require modernization of 29 obsolete and failing Electro-Optical/Infrared cameras for the Enhanced Regional Situational Awareness (ERSA) system at the Joint Air Defense Operation Center to provide continuous support of the BCC mission. The demand on the ERSA system as a part of the National Capital Region Integrated Air Defense System has vastly increased since initial fielding. These cameras are used in validating radar reports as actual targets as well as visual identification of manned, small unmanned aircraft systems and cruise missiles. If ERSA cameras are not replaced/modernized, failure rates of the present camera systems will render ERSA ineffective starting in 2023. The Eastern Air Defense Sector and Western Air Defense Sector require 21 operational and 8 spare cameras.

2. Program Details.

Quantity	Unit Cost	Program Cost
29 ERSA Camera Replacements (3080)	**$1,460,000**	**$42,340,000**
Total		**$42,340,000**

CRC: TACTICAL OPERATIONS CENTER – LIGHT SYSTEM

1. Background. ANG CRCs currently operate with a Tactical Operations Center (TOC), TRC-213 radio shelter, and Joint Tactical Information Distribution System Module within the main site. The CRC is moving towards an evolved Ground Tactical Air Control System supporting Agile Combat Employment. The new modular system will be scalable, and highly mobile. To train to the future of the CRC, each of the 10 ANG CRCs require a TOC-Light (TOC-L) system. A TOC-L system would also enable the 10 ANG CRCs to execute their state's request for support during wildfires, hurricanes, and other natural/manmade disasters by deploying a lightweight, portable TOC-L system for Command and Control.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 TOC-L Systems (3080)	**$4,300,000**	**$43,000,000**
Total		**$43,000,000**

CRC: MODE 5 SUITE TO SUPPLEMENT TPS-75

1. Background. The TPS-75 radar does not have the capability to interrogate Mode 5/S or access Automatic Dependent Surveillance-Broadcast (ADS-B) data to complete an identification matrix organically. The United States Department of Defense has already transitioned to the use of Mode 5 vice Mode 4, in accordance with Defense Security Cooperation Agency Memorandum dated 7 March 2018. The CRC needs the capability to interrogate Mode 5 and access ADS-B data to complete the surveillance and command and control mission. One sensor suite is required for each of the 10 CRCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Mode 5/S/ADS-B Suite (3080)	**$2,300,000**	**$23,000,000**
Total		**$23,000,000**

CRC: REMOTE RADAR AND RADIO ACCESS

1. Background. ANG Control and Reporting Centers (CRC) require a Remote Radar and Voice Communications (RRVC) integration package to execute specialized live-fly missions. This capability is needed to maintain proficiency and remain Combat Mission Ready (CMR). The RRVC capability would provide a first-time capability to control various types of live-fly missions remotely from each CRC unit, resulting in a significant reduction in personnel travel costs to maintain CMR. Each of the 10 ANG CRCs require an RRVC capability to access the Federal Aviation Administration communication and radar feeds in order to control missions remotely.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 RRVC Suites (3080)	**$275,000**	**$2,750,000**
Total		**$2,750,000**

CRC: LINK-16 TACTICAL DATA LINK TRAINING SUITE

1. Background. ANG Control and Reporting Centers (CRC) Joint Interface Control Officers and Interface Control Technicians require a deployable set of equipment and software with the ability to monitor the Link 16 Radio Frequency (RF) network. The equipment and software need to be able to connect to a CRC Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT 2) terminal, a Joint Tactical Radio System terminal, and be able to monitor all link traffic within an RF Link 16 network. Additionally, the program needs the ability to monitor time qualities, load file compliance, and time slot duty factor. The CRCs are expected to provide the manning and equipment for a Regional Interface Control Cell that is capable of integrated Air Force and Joint and Coalition assets into a Common Operational Picture that can be distributed to all link capable players in any current or potential combat environment. CRC's lack the equipment to train to this capability. The CRC requires the capability to inject simulated surveillance link data to the Multi-Source Correlation Tracker (MSCT), including the ability to preprogram track inputs, as well as support track production during the course of a scenario. The equipment and software will need to be fully customizable to emulate surveillance data like sending unit, track blocks, identification, location, and any other fields found in MIL-STD 6016. The equipment and software need to be able connect to the CRC Simulation Package's distributed interactive simulation (DIS) filter and connect directly to the MSCT. The CRC needs a terminal emulator to replicate realistic terminal RF performance in a simulated environment. The emulator needs to simulate equipment performances over Joint Range Extension Applications Protocol and RF Link 16; additionally, it needs to replicate the capabilities and limitations of various terminals across the DoD and coalition partners. The terminal emulator should include the capability to adjust settings for individual terminals, such as load files, Net Time Reference selection, and power settings. A Data Link Training Suite is needed for each of the 10 CRC units.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Tactical Datalink Training Suites (3080)	**$500,000**	**$5,000,000**
Total		**$5,000,000**

CRC: MISSION DEFENSE TEAM CYBER TRAINING SUITE

1. Background. ANG CRC units require a mission defense team (MDT) training suite to maintain readiness support to protect local weapons systems from compromise by adversaries in a continually contested environment. Without these MDT training suites, the ARC CRCs will be unable to meet the four Air Force information dominance strategic goals. The active component continues to evolve their CRC weapons system to include the ability to remotely train and conduct distributed operations. To maintain parity with the active component, ARC CRCs must have the same level of data integrity, availability, and non-repudiation of the active Air Force CRCs. Without properly trained augmentation from aligned ARC CRCs the active component is potentially vulnerable to cyber compromises. This capability is required for each of the ten ANG CRC units.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Mission Defense Team Training Suite (3080)	**$500,000**	**$5,000,000**
Total		**$5,000,000**

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C-17

- **Strategic Airlift**
- **Outsized and Oversized Cargo Airlift**
- **Aeromedical Evacuation Missions**
- **ANG C-17 Units Provide 23% of the Total Fleet**

The C-17 Globemaster III is the nation's primary strategic military airlifter and continues to excel in a wide range of operational mission scenarios. It supports both inter- and intra-theater missions and allows Air Mobility Command to significantly improve throughput during contingency operations. Using C-17s as an intra-theater airlift platform provides relief to the C-130 fleet and reduces ground forces' dependence on vehicle convoys.

The ANG operates 50 C-17 aircraft assigned to five wings and two associate units. The fully-equipped aircraft carries combat-ready military units to any point in the world on short notice and provides critical field support to sustain the fighting force.

C-17
FY 2022 Weapons and Tactics Conference

Critical Capabilities List

- C-17 Self-Protection
- Common Mobility Air Forces Mission Computer
- Extended Range Modification
- Common Maintenance Computer
- Ground Operations Communication System Modernization

Essential Capabilities List

- Automated-Hardened Position, Navigation, and Timing Solution
- EFVS With Synthetic Head-Up Display
- Objective Area Situational Awareness Imaging Sensor
- Loadmaster Situational Awareness Improvements with Defensive System Control
- Cockpit/Crew Rest Area Security Enhancements

Desired Capabilities List

- Three-Dimensional Audio Capability
- Ramp Toe Modernization
- Audible G-State Awareness
- Light-Emitting Diode Landing Lights
- Stratus Antenna/EFB Mount and Power Solution

C-17: C-17 SELF-PROTECTION

1. Background. ANG C-17s requires self-defense capabilities to detect and defeat enemy threats designed to target large Mobility Air Forces aircraft. To detect these threats, C-17s require an open mission system digital backbone capable of processing at the forward edge, and integrating the platform into Advanced Battle Management System and Joint All Domain Command and Control architectures. To defeat these threats, C-17s require onboard and/or off-board threat jamming, decoys, and kinetic and non-kinetic defense measures. The ANG C-17 fleet requires a common carry pod with open-architecture that is capable of quick modifications to address ever-changing contested environments. To increase survivability, C-17 aircraft require a radar warning receiver (RWR) capable of processing signals in a dense radio frequency environment that automatically directs countermeasures to defeat those threats. This capability enables C-17s to detect and defend against electronic threats in the likely scenario in which the aircraft is operating independently. Modular defensive systems provide a method for low-cost, simplified improvements to infrared detection and suppression capabilities, and degrading the enemy's ability to engage C-17 aircraft. Increased situational awareness is needed to correlate onboard and off-board threat detection, terrain masking, and optimized dynamic rerouting capabilities to minimize exposure to threats. Hardware for this digital backbone on the ANG C-17 fleet can be installed via a mission design series-specific aircraft-to-pylon interface for a mobility air forces common hardpoint. All 50 ANG C-17s require RWR, power and data to the hardpoints, and 12 common carry pods.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$12,000,000**
50 RWR Group A Kits (3010)	**$250,000**	**$12,500,000**
50 RWR Group B Kits (3010)	**$500,000**	**$25,000,000**
50 Hard-Point Kits (3010)	**$500,000**	**$25,000,000**
12 Mobility Air Forces Common Carry Pods (3010)	**$2,500,000**	**$30,000,000**
Total		**$104,500,000**

C-17: COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. ANG C-17s require secure airborne data communications with other aircraft, command and control (C2) nodes, and ground-based forces via line-of-sight and beyond-line-of-sight means. The Mobility Air Forces mission computer data link and data transfer capabilities provide aircrew the ability to report and receive battlespace information such as the position of other aircraft, weather, threat, mission events, mission status, task completion, and resource status. This increased situational awareness allows C2 nodes the ability to track mission progress and facilitate rapid decisions and adjustments during mission execution. C-17s operating across vast geographic areas can provide C2 reach-back capabilities to mitigate EM spectrum degradation in a contested environment. Next-generation military ultra-high frequency (UHF) satellite communication (SATCOM) radios and Ku/Ka radios provide both data and voice using satellites operating outside of traditional data link bandwidths. Inflight access to secure and unsecure high-speed internet data is a foundational capability upon which beyond-line-of-sight tactical datalink can be built. This enables the crew to receive real-time updates for weather, departure, and landing information, as well as provides C2 reach-back capability and can serve as a critical node for Joint All Domain Command and Control. Integrated secure Electronic flight bags can store and retrieve documents required for flight operations such as technical orders, Air Force Instructions, flight operations manuals, minimum equipment lists, and the most current flight information publications as well as display tactical information. ANG C-17s require one set of installation components for each of the 50 airframes and tactical display emulator software at each base to effectively employ data link tactics, techniques, and procedures as well as integration into existing aircrew simulators.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$15,000,000**
55 C-17 Group A Kits (3010)*	**$100,000**	**$5,500,000**
55 C-17 Group B Kits (3010)*	**$750,000**	**$41,250,000**
55 C-17 Data Link Processors (3010)*	**$100,000**	**$5,500,000**
55 Electronic Flight Bags (3010)*	**$240,000**	**$13,200,000**
55 UHF SATCOM Kits (3010)*	**$475,000**	**$26,125,000**
Emulator Software (3010)	**$4,000,000**	**$4,000,000**
50 High-Speed Data Systems (3010)	**$1,500,000**	**$75,000,000**
Total		**$185,575,000**

* Includes 10% spares

C-17: EXTENDED RANGE MODIFICATION

1. Background. ANG C-17As will continue to play an important role supporting United States Transportation Command missions, especially in the INDOPACOM area of operation. The C-17A, with Extended Range (ER) fuel tanks installed, has the capability to carry an additional 65,000 pounds of fuel and fly an additional 1,800 NM (empty aircraft) when compared to non-ER C-17As. This added capability reduces the need for fuel stops, enables faster cargo delivery and results in less wear and tear on the aircraft due to eliminating landing and takeoff cycles and reduces the fuel required at forward operating bases. ER fuel tanks also reduce the need for air-to-air refueling, freeing up critical airborne tanker assets for other operational requirements. 19 remaining ANG C-17As require extended range fuel tank modification.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 Extended Range Fuel Tanks (3010)	**$12,000,000**	**$228,000,000**
Total		**$228,000,000**

C-17: COMMON MAINTENANCE COMPUTER

1. Background. ARC C-17s require a maintenance computer to monitor, record, and share aircraft data bus information to enable Conditions-Based Maintenance and provide interface for tactical datalink systems. The capability would improve fleet-wide mission capable rates, decrease enroute downtimes, and preserve long-term MWS health. ARC C-17s have limited ability to capture aircraft system fault data, requiring reactive maintenance actions at main operating bases and while in austere enroute locations. To allow real-time proactive troubleshooting and positioning of repair parts and personnel, the maintenance computer should record all aircraft databus parameters at native rates and be able to transmit over beyond-line-of-sight links inflight and on the ground. The system should also provide interface for tactical datalink solutions to extract aircraft parameters for integration in Joint All Domain Command and Control. Flight data should be available for post-flight aircrew debrief to improve training value and reduce future training requirements. Data will also be available for fleet-wide safety trend analysis and fuel savings optimization.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$1,000,000**
50 Maintenance Computers (3010)	**$100,000**	**$5,000,000**
Total		**$6,000,000**

C-17: GROUND OPERATIONS COMMUNICATION SYSTEM MODERNIZATION

1. Background. During C-17 ground operations, it is imperative to minimize the ground time in hostile locations to maximize aircrew and aircraft protection. C-17 loadmasters and maintenance personnel are only equipped with cord-based communication systems that limit both freedom of movement and flexibility in communication locations. Additionally, corded communication systems make it difficult for loadmasters to interact with ground and cargo loading personnel due to the finite cord length. A wireless communication system will provide significant enhancement for loadmaster and ground personnel operations. The optimal wireless communication configuration would include a slim, user-friendly, noise-cancelling platform, which provides ear protection, freedom of movement, constant and reliable communication between the aircrew and ground personnel, extended range (100 meters from aircraft fuselage), and extended battery life. Direct benefits of such a system include more efficient ground times, safer loading and unloading conditions, added lookout and security options, and reduced permanent damage to air and ground crew hearing. Indirect benefits include better crew resource management and integration with supported and supporting personnel including Ravens, Flying Crew Chiefs, Jumpmasters, Medical Crew Directors, and fueling crews for Specialized Fuel Operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,000,000**
150 Wireless Communication Systems (3010)	**$4,000**	**$600,000**
Total		**$2,600,000**

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C-130 H/J

- **Tactical Airlift**
- **ANG C-130 Units Provide 49% of the Total Fleet**

With a legacy lasting over 63 years, the C-130 Hercules still remains the U.S. Military's primary combat delivery aircraft. In addition to its primary role in tactical airlift, ANG C-130s support humanitarian, peacekeeping, and disaster relief operations. Procurement efforts continue to address needed updates to the avionics suites, propulsion modernization, improved self-protection, fuel efficiency, and enhanced situational awareness. These improvements ensure that the ANG C-130 fleet remains capable of safely and effectively executing its missions globally and maintains relevancy in tomorrow's fight.

C-130 H/J
2020 Weapons and Tactics Conference

Critical Capabilities List

C-130H

- C-130H Self-Protection
- Integrated Defensive Systems for Common Mobility Air Forces Mission Computer
- Propulsion System Upgrades
- Updated Avionics / Instrumentation and Associated Training Devices
- Increased Fuel Efficiency and Range

C-130J

- C-130J Self-protection
- Integrated Defensive Systems for Common Mobility Air Forces Mission Computer
- Self-Contained Contested Training Suite
- Increased Fuel Efficiency and Range
- Radar Replacement

Essential Capabilities List

C-130H

- Radar Replacement
- High-Speed Ramp/Door
- Enhanced Cargo Compartment Efficiency and Capacity
- Self-Contained Contested Training Suite
- Synthetic Vision

C-130J

- Heads-up display Enhanced Flight Vision System
- Tactical Plot Suite
- Built-in Iridium Phone
- Cargo Compartment Camera/Backup Camera
- Secure Global High Speed Data

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5.

C-130H: SELF-PROTECTION

1. Background. The ANG C-130Hs require self-defense capabilities to detect and defeat modern threats specifically designed to target Mobility Air Forces aircraft. To detect these threats, C-130Hs require an open mission system compliant digital backbone executing processing at the forward edge and connecting the platform to Air Battle Management System and Joint All Domain Command and Control architectures. To defeat these threats, 104 C-130Hs require onboard and/or off-board threat jamming, decoys, and kinetic and non-kinetic defense measures. Some options to achieve these effects are; Block 30 or Block 35 AN/AAQ-24 Large Aircraft IR Countermeasures (LAIRCM) which improves detection and defeat of advanced MANPADS threats and replaces ageing and obsolete LAIRCM systems. The 104 C-130Hs require an Infrared Suppression System (IRSS) capable of reducing the aircraft's heat signature from engine exhaust in all aspects. To survive in modern combat, C-130H aircraft require a digital Radar Warning Receiver (RWR) capable of providing situational awareness on millimeter wavelength systems in addition to legacy systems, with geolocation ability, capable of processing signals in a dense radio frequency (RF) environment. The ability to dispense active expendable RF countermeasures is necessary to the C-130Hs survival against near-peer threats. To reduce IR signature 109 C-130H must replace incandescent landing lights with LED lights. This replacement increases reliability, night capability, and is critical to operations at austere locations in threat environments. These solutions can be accomplished utilizing a common carry open-architecture mission pod capable of supporting current and future networked architectures. A pod is flexible enough to alter quickly to address emerging threats in contested environments. The open-architecture mission system will provide additional capacity for electronic attack/electronic protection. An open architecture mission pod is a must in future combat because it is capable of providing terrain clearance, standoff acquisition and assessment of drop zones/landing zones ensuring first pass success and threat mitigation. The open-architecture pod requires hard-points for 94 unmodified C-130Hs, 38 common carry pods, 123 LAIRCM Group A kits and Group B kits, 123 RF Group A and 67 Group B Kits, and 24 digital RWR kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
38 MAF Common Carry Pods (3010)	**$2,000,000**	**$76,000,000**
104 C-130H LAIRCM Group A Kits (3010)	**$1,500,000**	**$156,000,000**
104 C-130H LAIRCM Group B Kits (3010)	**$3,000,000**	**$312,000,000**
104 C-130H Next-Generation RF Group A Kits (3010)	**$120,000**	**$12,480,000**
IRSS Non-Recurring Engineering (3010)	**$5,000,000**	**$5,000,000**
104 IRSS Kits (3010)	**$1,000,000**	**$104,000,000**
104 LED Landing Lights Kits	**$60,000**	**$6,240,000**
38 Active Expendable Countermeasures	**$300,000**	**$11,400,000**
67 C-130H Next-Generation RF Group B Kits (3010)	**$775,000**	**$51,925,000**
24 C-130H ALR-69As (3010)	**$500,000**	**$12,000,000**
102 Hard-Point Installations (3010)	**$330,000**	**$33,660,000**
Total		**$780,705,000**

C-130H: INTEGRATED DEFENSIVE SYSTEMS FOR COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. The ANG C-130H fleet requires comprehensive and networked battlespace awareness. The real-time information in the cockpit (RTIC) system allows C-130 aircraft to participate in multiple data link networks using technologies fielded on other Department of Defense assets. The system must be upgraded to Multifunctional Information Distribution System Joint Tactical Radio System (MIDS-JTRS) and ultimately a Tactical Targeting Network Technology (TTNT) with self-healing, jam resistance capabilities. Upgrades to the C-130 RTIC system increases the overarching network capability and provides a common processing and display platform for previously federated systems, resulting in a consolidated situational awareness picture. Integration with the Advanced Integrated Electronic Combat System (AIECS) software provides the capability for on-board and off-board threat correlations, data sharing, on-board radar threat system geolocation, route replanning, and automated countermeasures. Combining the control and outputs of multiple systems into one common graphical interface reduces crew workload, decreases "heads-down" time, and provides improved decision support for aircrews operating in the tactical environment. A Special Mission Processor allows integration of third-party software and hardware allowing the C-130H to rapidly and effectively innovate solutions at the speed of modern combat. All 114 C/LC-130H aircraft need RTIC systems with integrated AIECS.

2. Program Details.

Quantity	Unit Cost	Program Cost
AIECS Non Recurring Engineering (NRE) (3010)	**N/A**	**$10,000,000**
114 AIECS Kits (3010)	**$150,000**	**$17,100,000**
114 MIDS-JTRS Terminals (3010)	**$130,000**	**$14,820,000**
114 Special Mission Processor (3010)	**$150,000**	**$17,100,000**
Total		**$59,020,000**

C-130H: PROPULSION SYSTEM UPGRADES

1. Background. The ANG C-130H fleet requires a comprehensive propulsion upgrade for increased performance, efficiency, and reliability. Incorporating modular propeller blade technology (NP2000), and an electronic propeller control system (EPCS) provide increased performance and reliability. The T-56 3.5 engine upgrade, with redesigned compressors and turbines, decreases engine life-cycle costs, improves fuel economy, increases reliability, and improves aircraft availability. The modular design of NP2000 eight-bladed propellers decreases propeller maintenance time, increases airlift efficiency during transportation by taking up less pallet space, and increases operational performance. EPCS improves safety by accelerating response time when throttles are rapidly advanced, an issue in previous mishaps. EPCS increases propeller system reliability by 50 percent, decreasing maintenance costs. Each NP2000 kit contains four nacelle kits and each T-56 3.5 kit contains four-engine upgrades. All 104 ANG C-130H models require propulsion system upgrades. 24 ANG C-130Hs are already funded for NP2000 and 52 for the 3.5 upgrades. All 104 ANG C-130Hs were funded for EPCS.

2. Program Details.

Quantity	Unit Cost	Program Cost
76 NP2000 Kits (3010)	**$3,200,000**	**$243,200,000**
52 T-56 3.5 Modified Engines (3010)	**$5,000,000**	**$260,000,000**
Total		**$503,200,000**

C-130H: UPDATED AVIONICS/INSTRUMENTATION AND ASSOCIATED TRAINING DEVICES

1. Background. The ANG C-130H fleet requires avionics modernization. The C-130H faces severe sustainment challenges with current avionics and cockpit instrumentation. Additionally, tactical night operations continue to suffer from non-night vision imaging system (NVIS) compliant lighting. To eliminate critical sustainment issues due to diminishing manufacturing sources, this modernized cockpit will include: a multifunction engine instrument display system, NVIS compatibility, and a modern flight management system with a global positioning system approach and polar navigation capabilities. An NVIS-compatible and modernized glass cockpit, to include digital overhead panel, reduces crew workload, lowers maintenance costs, and increases capability and sustainability to operate safely at night. The integration of a noise-canceling, three-dimensional (3D) enhanced, voice activated transmit intercom system increases situational awareness through directional audio correlated to the most significant factor threat. Additionally, this system will reduce excess aircraft noise, eliminate the push-to-talk requirement of the current system, and ultimately reduce crew fatigue while increasing crew resource management. Mobile User Objective Systems (MUOS) and Second Generation Anti-jam Tactical UHF Radio for NATO (SATURN) Beyond-Line-of-Sight radios must be integrated to make the C-130H viable in the future fight. The C-130 requires secure global high-speed data access to realize Air Battle Management System and access the common operating picture that will be vital to any future conflict. It is imperative that infrastructure for future capability upgrades must be installed while the cockpit undergoes this significant modification. All 114 C/LC-130H models require updated avionics kits, digital overhead panels, and NVIS compatibility kits, 3D audio kits, and an ARC-210 Gen 6 radio. All Weapons Systems Trainers require conversion to the same modernized cockpit suite, all 12 units require access to Distributed Mission Operations Capable, level 6 or higher.

2. Program Details.

Quantity	Unit Cost	Program
Avionics Upgrade Non-Recurring Engineering (3010)	**N/A**	**$50,000,000**
114 Avionics Kits (3010)	**$2,800,000**	**$319,200,000**
114 NVIS Compatibility Kits (3010)	**$465,000**	**$53,010,000**
12 Aircrew Training Devices (3010)	**$14,000,000**	**$168,000,000**
114 Digital Overhead Panels (3010)	**$150,000**	**$17,100,000**
Directional Audio NRE (3600)	**N/A**	**$5,000,000**
114 Intercom Kits (3010)	**$50,000**	**$5,700,000**
114 MUOS/SATURN BLOS Radios (3010)	**$130,000**	**$14,820,000**
Total		**$632,830,000**

C-130H: INCREASED FUEL EFFICIENCY AND RANGE

1. Background. The C-130H fleet requires greater range and fuel efficiency measures to provide aerial delivery in large and geographically dispersed theaters of operation such as the INDOPACOM theater. The C-130H requires Increased Wing Fuel (IWF) to increase fuel capacity by more than 4,000 pounds and 300 nautical miles in range by reconfiguring wing tank plumbing and valves. IWF enables transportation of more fuel for Agile Combat Employment specialized fueling operations. Transporting fuel and performing fueling operations for Combat Air Forces aircraft is a critical role for the C-130H. IWF reduces fuel stops, increases loiter time and extends the C-130H's combat range. A complimentary critical fuel efficiency initiative are finlets which reduce parasitic drag and increase fuel efficiency between 3.6 percent and 6 percent which is a significant and decisive fuel advantage for long range missions. Finally, microvanes have been installed on C-130Hs to include USCG aircraft to increase fuel efficiency by reducing aft body drag. All C-130Hs require IWF, finlets and microvanes to increase fuel efficiency and range.

2. Program Details.

Quantity	Unit Cost	Program
114 Increased Wing Fuel (IWF) Kits and Installs	**$175,000**	**$19,950,000**
114 Finlets and Installations (3010)	**$700,000**	**$79,800,000**
Microvane NRE	**$2,000,000**	**$2,000,000**
114 Microvane Kits and Installs	**$100,000**	**$11,400,000**
Total		**$113,150,000**

C-130J: SELF-PROTECTION

1. Background. The ANG C-130J fleet requires self-defense capabilities to detect and defeat factor modern threats specifically designed to target large Mobility Air Forces aircraft. To detect these threats, C-130Js require an open mission system compliant digital backbone executing processing at the forward edge and connecting the platform to Air Battle Management System and Joint All Domain Command and Control architectures. To defeat these threats, C-130Js require onboard and/or off-board threat jamming, decoys, and kinetic and non-kinetic defense measures. Some options to achieve the aforementioned effects are; Block 30 or Block 35 AN/AAQ-24 Large Aircraft IR Countermeasures (LAIRCM) system, to improve detection against advanced man-portable air defense systems threats, while degrading the enemy's ability to engage. C-130Js require an Infrared Suppression System capable of reducing the aircraft's heat signature from engine exhaust in all aspects. C-130J aircraft require a digital radar warning require an Infrared Suppression System (IRSS) capable of reducing the aircraft's heat signature from engine exhaust in all aspects. To survive in modern combat, C-130H aircraft require a digital Radar Warning Receiver (RWR) capable of providing situational awareness on millimeter wavelength systems in addition to legacy systems, with geolocation ability, capable of processing signals in a dense radio frequency (RF) environment. The ability to dispense active expendable RF countermeasures is necessary to the C-130Js survival against near-peer threats. Many of these solutions can be accomplished utilizing a common carry open-architecture mission pod capable of supporting the current and future networked architecture, and flexible enough to be quickly altered to address the contested environments. The open-architecture mission system will provide additional capacity for electronic attack/electronic protection. A targeting pod capable of providing standoff acquisition and assessment of drop zones/landing zones ensuring first pass success is a must in future combat. The open-architecture pod requires 20 common carry pods, 40 LAIRCM Group A kits, 20 LAIRCM Group B kits, and 40 digital RWR kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$5,000,000**
40 C-130J ALR-69A (3010)	**$500,000**	**$20,000,000**
40 C-130J LAIRCM Group A Kits (3010)	**$970,000**	**$38,800,000**
20 C-130J LAIRCM Group B Kits (3010)	**$3,000,000**	**$60,000,000**
40 C-130J Next-Generation RF Group A Kits (3010)	**$420,000**	**$16,800,000**
20 C-130J Next-Generation RF Group B Kits (3010)	**$775,000**	**$15,500,000**
20 MAF Common Carry Pods (3010)	**$2,000,000**	**$40,000,000**
Total		**$196,100,000**

C-130J: INTEGRATED DEFENSIVE SYSTEMS FOR COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. ANG C-130Js require integrated battlespace awareness. Real-time information in the cockpit (RTIC) and Multifunctional Information Distribution System Joint Tactical Radio System (MIDS-JTRS) provide global data link communications, secure beyond-line-of-sight, and line-of-sight capabilities. RTIC and MIDS-JITRS offer a permanent modification to the aircraft and provides the capability to integrate with the advanced integrated electronic combat system (AIECS). AIECS provides capabilities for onboard and off-board threat correlations, data sharing, on-board radar threat system geolocation, and route re-planning. To ensure units can effectively train, operate, and deploy with secure global data link capability, all 40 ANG C-130J aircraft require these capabilities.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$5,000,000**
40 C-130J RTIC Group A Kits (3010)	**$150,000**	**$6,000,000**
40 C-130J RTIC Group B Kits (3010)	**$1,000,000**	**$40,000,000**
Total		**$51,000,000**

C-130J: INCREASED FUEL EFFICIENCY AND RANGE

1. Background. The C-130J fleet requires greater range and fuel efficiency measures to provide aerial delivery in large and geographically dispersed theaters of operation such as the INDOPACOM Theater. The C-130J lacks external fuel tanks and thus requires Increased Wing Fuel (IWF) to increase fuel capacity by more than 4,000 pounds and 300 nautical miles in range by reconfiguring wing tank plumbing and valves. IWF enables transportation of more fuel for Agile Combat Employment specialized fueling operations. Transporting fuel and performing fueling operations for Combat Air Forces aircraft is a critical role for the C-130J. IWF reduces fuel stops, increases loiter time and extends the C-130J combat range. A complimentary critical fuel efficiency initiative are finlets which reduce parasitic drag and increase fuel efficiency between 3.6 percent and 6 percent which is a significant and decisive fuel advantage for long duration/long range missions. Finally, microvanes have been installed on C-130Js to include USCG aircraft to increase fuel efficiency by reducing aft body drag. All C-130Js require IWF, finlets and microvanes to increase fuel efficiency and range.

2. Program Details.

Quantity	Unit Cost	Program
40 Increased Wing Fuel (IWF) Kits and Installs	**$175,000**	**$7,000,000**
40 Finlets and Installations (3010)	**$2,000,000**	**$80,000,000**
Microvane NRE	**N/A**	**$5,000,000**
40 Microvane Kits and Installs	**$350,000**	**$14,000,000**
Total		**$106,000,000**

C-130J: SELF-CONTAINED CONTESTED TRAINING SUITE

1. Background. ANG C-130J aircrews require the ability to train in a global positioning system (GPS) degraded environment and a simulated jamming scenario. A deception-based GPS jamming option is required to accurately reflect scenarios that are not simply GPS on/off scenarios. This system must allow user input to train aircrews before encountering operational situations. The system also needs to account for aircraft position relative to terrain to accurately simulate line-of-sight based threats. One self-contained contested training suite is required at each of the C-130J units.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$1,500,000**
5 Self-Contained Contested Training Suites (3010)	**$75,000**	**$375,000**
Total		**$1,875,000**

C-130J: APN-241 RADAR REPLACEMENT

1. Background. ANG C-130Js need the ability to conduct accurate combat aerial delivery in both instrument and visual meteorological conditions and contested, degraded and operationally limited environments. With the emergence of high-end threats, greater terrain awareness is required to enable lower altitude operations, ultimately degrading enemy capabilities. The APN-241 radar faces severe sustainment challenges and requires a technical refresh to a fully digital advanced electronically scanned array. A modern digital radar increases sweep speed 100 to 250 times and increases resolution by more than 160 times. Increased sweep speed and accuracy provides vital positioning, navigation and timing for contested and degraded battlespaces. Increased fidelity/resolution for radar updates provides greater airdrop accuracy, vital to ensure first pass airdrop success. Furthermore, as radio frequency threats become more advanced a radar becomes a critical defensive system by providing electronic protection, threat detection and avoidance. Digital radars are hardened against hostile electronic attack and denial schemes. At present the APN-241 lacks any ability to detect adversary airborne interceptors which are increasing in range and numbers. A modern fully digital radar would have long range airborne interceptors detection capability in addition to providing multiple degraded modes of operation which the APN-241 lacks. Replacing the APN-241 will increase reliability, detection range, sweep and processing speed, defensive capabilities and threat detection while retaining current radar modes and uses. Furthermore, the current APN-241 radar configuration is rapidly facing sustainment challenges and the mean time between failure continues to decrease. The APN-241 will not be sustainable beyond 2030. All ANG C-130Js require an APN-241 radar replacement.

2. Program Details.

Quantity	Unit Cost	Program Cost
Radar Upgrade NRE (3600)	**N/A**	**$40,000,000**
40 Radar Upgrade (3010)	**$2,000,000**	**$80,000,000**
Total		**$120,000,000**

C-130 Special Mission

- **Special Operations Forces/Combat Search and Rescue (SOF/CSAR)**
- **Special Mission (Airborne Firefighting, Antarctic Logistics)**
- **ANG CSAR HC-130 Units Provide 38% of the Total Fleet**
- **ANG LC-130s Provide 100% of the Total Fleet**

C-130 Special Mission aircraft include:

HC-130J - ANG HC-130 units continue to deploy in support of overseas contingency operations and provide emergency rescue and relief support during domestic operations.

LC-130H - The LC-130H operates on snowfields in remote areas of the Polar Regions in support of the National Science Foundation (NSF). To keep the aircraft up-to-date, several modification efforts are underway including eight bladed propellers and T-56 3.5 engine modification. The ANG is working with the NSF to support a pod-based scientific payload capability.

C-130 Special Mission
FY 2022 Weapons and Tactics Conference

Critical Capabilities List

HC-130J

- Combat Search and Rescue Mission Management Suite
- CAF-Standardized Joint Tactical Datalink
- On-Board Secure Global Connectivity
- Precision Geolocation and Authentication of Isolated Personnel
- Podded Solution Interface For Joint Force Standard Payloads

LC-130H

- Self-Protection Capability
- Propulsion System Upgrades
- Updated Avionics/Instrumentation and Associated Training Devices
- Common Mobility Air Forces Mission Computer
- Polar Construction Skiway Team Equipment/Gear

Essential Capabilities List

HC-130J

- Synthetic Aperture RADAR /Ground Moving Target Indicator to Locate Unique Survivor Signatures and Organic Threat Identification within the Battle Space.
- Electronic, Signals, and Communications Intelligence Collection Systems
- Increased Survivability for Anti-Access/Area Denial Environments through Radio Frequency Countermeasures
- Distributed Mission Operations Simulators to Enhance Combat Search and Rescue Coordinator Training for Major Combat Operations
- Integrated Second-Generation 406 Mhz Personnel Locator Beacon Interrogator.

LC-130H

- Digital Audio Interphone Communication System
- High-Speed Ramp and Door
- Center Wing Box Replacement Program
- High-Frequency Radios with SELCAL
- Radar Upgrade

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5.

HC-130J: COMBAT SEARCH AND RESCUE MISSION MANAGEMENT SUITE

1. Background. The HC-130J requires an integrated mission management suite utilizing a modular open systems approach to integrate and manage combat search and rescue data across multiple domains. Aircrew must have the ability to manage, sort and prioritize isolated personnel data to direct multiple recovery missions in a near-peer environment. The software-definable requirements for this integrated tactical mission suite must allow HC-130 aircrew to add, remove and modify multiple joint force standard payloads interfacing with open architecture podded solutions. Additionally, the interface must provide aircrew with a common operating picture to maximize the capability to coordinate the Combat Search and Rescue mission. One suite is required for each of the 12 HC-130J aircraft in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	**N/A**	**$10,000,000**
13 Software Definable Radio Suites (3010)*	**$250,000**	**$3,250,000**
13 Moving Map Display Group A Kits (3010)*	**$150,000**	**$1,950,000**
COP Engineering (3600)	**N/A**	**5.000.000**
Total		**$20,200,000**

* Includes 10% spares.

HC-130J: CAF STANDARDIZED JOINT TACTICAL DATA LINK

1. Background. ANG HC-130Js require the integration of modern radios, tactical data links, personnel locator devices, and defensive systems to enable successful joint interoperability for combat search and rescue during combat operations. Recent material solutions for technological capability have resulted in task-saturation and increased workload for HC-130J aircrews due to the federated nature of current mission systems. The rescue triad, HC-130J, HH-60G/W, Guardian Angel, does not share a common operating picture based on the diverging nature of their respective situational awareness enhancement systems. These systems provide line-of-sight and beyond-line-of-sight interactive data communications between combat search and rescue task force assets across the range of military operations. This network should include a Multifunctional Information Distribution System – Joint Tactical Radio System radio set and software-definable integrated tactical mission suite. One of each system is required for the 12 HC-130Js in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	**N/A**	**$9,000,000**
13 Software Definable Radio Suites (3010)*	**$250,000**	**$3,250,000**
13 Moving Map Display Group A Kits (3010)*	**$150,000**	**$1,950,000**
13 Moving Map Display Group B Kits (3010)*	**$1,000,000**	**$13,000,000**
13 BFT 2 Systems (3010)*	**$100,000**	**$1,300,000**
13 Link 16 Systems (3010)*	**$250,000**	**$3,250,000**
13 ADS-B Systems (3010)*	**$30,000**	**$390,000**
Total		**$32,140,000**

* Includes 10% spares.

HC-130J: ON-BOARD SECURE GLOBAL NETWORKED CONNECTIVITY

1. Background. ANG HC-130Js require secure, continuous, on-board connectivity over wide-band beyond-line-of-site (BLOS) systems. The requirement to communicate and disseminate information securely via BLOS with multiple assets is critical to the HC-130Js to execute its doctrinal role of combat search and rescue coordinator (CSAR-C). Currently, the HC-130J relies on an outdated BLOS voice communication radio to exchange critical survivor information from command and control sources, delaying the isolated personnel recovery effort. The existing satellite constellation has reached end-of-life and must be replaced with Mobile User Objective System-capable radios to ensure BLOS capability. Voice-only BLOS capability hinders the CSAR-C's ability to gather information in a timely manner and severely limits data flow during CSAR operations. The HC-130J needs the ability to utilize secure internet while on board the aircraft for rescue forces to fully support information superiority operations. Furthermore, the HC-130J requires enhanced situational awareness during domestic support operations with on-board unclassified internet capability for civil agency data and video interoperability. The integration of an organic digital network for unencrypted/encrypted internet on-board delivers efficient information sharing across Multi-User Internet Relay Chat, Secret Internet Protocol Router, Joint Worldwide Intelligence Communications System, and Non-Classified Internet Protocol Router architectures. One of each system and two ARC-210 Gen 6 radios are required for each of the 12 HC-130Js in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
ARC-210 Non-Recurring Engineering (NRE) (3010)	**N/A**	**$3,800,000**
30 ARC-210 GEN 6 Radios (3010)	**$220,000**	**$6,600,000**
Software Definable Radio NRE (3010)	**N/A**	**$9,000,000**
13 Software Definable Radio Suite (3010)*	**$250,000**	**$3,250,000**
13 Full Motion Video (3010)*	**$200,000**	**$2,600,000**
13 Internet On-Board (3010)*	**$300,000**	**$3,900,000**
Totals		**$29,150,000**

* Includes 10% spares.

HC-130J: PRECISION GEOLOCATION & AUTHENTICATION OF ISOLATED PERSONNEL

1. Background. ANG HC-130Js require the ability to carry theater/mission-specific capabilities of electro-optical sensors, Search and Rescue/Ground Moving Target Indicator (SAR/GMTI), and electronic intelligence (ELINT) payloads mounted on external hard points without detrimental effects to baseline aircraft capabilities, specifically aerial refueling. This would allow a tailored capability to geolocate and authenticate isolated personnel through low probability of intercept/low probability of exploitation or passive means. The sensors listed are joint force standard payloads capable of being integrated into a podded solution set. 12 ANG HC-130Js require an agile pod with one spare for each location (15 total) to outfit the HC-130J community. Additionally, two of each sensor type listed are required for each ANG HC-130J location.

2. Program Details.

Quantity	Unit Cost	Program Cost
RF Jammer Non-Recurring Engineering (NRE) (3010)	**N/A**	**$5,000,000**
6 SAR/GMTI (3010)*	**$5,000,000**	**$30,000,000**
SAR/GMTI NRE (3010)	**N/A**	**$5,000,000**
6 ELINT payload (3010)*	**$700,000**	**$4,200,000**
10 Pods (3010)**	**$900,000**	**$9,000,000**
Total		**$53,200,000**

* Includes 10% spares.
** ANG owns 5

HC-130J: PODDED SOLUTION INTERFACE FOR JOINT FORCE STANDARD PAYLOADS

1. Background. ANG HC-130Js require mounting modifications and electronics interface to incorporate mission capabilities found in podded payload solutions. The current aircraft configuration utilizes all existing wing stations for external fuel tanks and air-to-air refueling pods; both of which enable critical combat capability to the combat search and rescue task force. To prevent the degradation of helicopter air-to-air refueling capabilities, the HC-130J requires new paratroop doors and loadmaster stanchion seats built to interface with an articulating arm strut design employing podded solution sets. The doors and stanchion seats enable expanded visual scanning capabilities while simultaneously allowing the mounting and interface of podded solution requirements. This solution will not permanently modify the aircraft nor diminish cargo handling capabilities required for the Combat Search and Rescue mission. This interface will enable the HC-130J to execute tailored theater requirements for peer conflict. Two of each set of system components is required for the 12 HC-130Js in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
11 SABIR ARM/Bubble Door Assembly (3010)*	**$1,575,000**	**$17,325,000**
9 Pods (3010)**	**$900,000**	**$8,000,000**
Total		**$25,325,000**

*ANG already has 4 tails Modified with bubble doors. ANG will need 11 more sets.
** ANG owns 5 pods currently

LC-130: SELF-PROTECTION

1. Background. ANG LC-130Hs require the ability to operate in a contested environment as focus shifts to INDOPACOM and the Arctic AORs. The aircraft is devoid of the traditional defensive systems that all other C-130s have. The MAF common-carry pod closes the current capability gap. Furthermore, such a modular solution would be ideal to pivot from wartime mission to peacetime science support. However, baseline functions would need to be installed in order to meet this capability, including an ALR-69A radar warning receiver (or equivalent), ALE-40/47 countermeasures dispensing system (or equivalent), and power plus MIL-STD 1553 Bus to the outboard pylon positions for any podded solution. LC-130H aircraft have zero missile-launch detection and no ability to detect, degrade, or defeat infrared (IR) man-portable air defense systems. To integrate situational awareness into aircraft systems, LC-130Hs require a robust, secure tactical data link (TDL). TDL provides a command and control link and maximizes aircrew situational awareness with beyond-line-of-sight capabilities. TDL also provides critical real-time information to LC-130H aircrews including, friendly aircraft position, weather conditions, hostile threat locations. Operations in the polar regions require ARC-210 Generation 6 radios with Mobile User Objective System satellite communications capabilities. The open-architecture mission pod provides additional capacity for electronic attack/electronic protection, standoff acquisition, assessment of drop zones/landing zones (through a targeting pod), and beyond-line-of-sight communication with ground force commanders. All 10 LC-130Hs require the MAF open-architecture protection platform.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 MAF Common Carry Pods (3010)	**$2,000,000**	**$10,000,000**
10 LC-130 LAIRCM Group A Kits (3010)	**$1,500,000**	**$15,000,000**
10 LC-130 LAIRCM Group B Kits (3010)	**$3,000,000**	**$30,000,000**
10 LC-130 Next-Generation RF Group A Kits (3010)	**$120,000**	**$1,200,000**
10 LC-130 Next-Generation RF Group B Kits (3010)	**$775,000**	**$7,750,000**
10 LC-130 ALR-69A Kits (3010)	**$500,000**	**$5,000,000**
10 LC-130 Hard Point Installations (3010)	**$330,000**	**$3,300,000**
RTIC Non-Recurring Engineering (3600)	**N/A**	**$400,000**
10 RTIC Hardware Kits (3010)	**$560,000**	**$5,600,000**
10 ARC-210 GEN 6 Radios (3010)	**$220,000**	**$2,200,000**
Total		**$80,450,000**

LC-130: PROPULSION SYSTEM UPGRADES

1. Background. ANG LC-130Hs require increased performance, efficiency, and reliability. The LC-130H fleet has ski-equipped landing gear to enable landings and takeoffs on snow and ice. The present method to takeoff from deep snow field runways requires Jet Assisted Take-Off (JATO) rocket motors, which are no longer produced. Current operations require increased performance, efficiency, and reliability, which highlight the need for a comprehensive propulsion upgrade to the LC-130H fleet. The LC-130s have already received the NP2000 modification and have successfully completed three Operation Deep Freeze deployments. However, the LC-130s still require the 3.5 engine modification to complete the propulsion upgrade. Upgrading the T-56 engine with the Rolls Royce 3.5 modification, with redesigned compressors and turbines, increases engine life-cycle, improves fuel economy, and improves aircraft availability. All 10 ANG LC-130H aircraft require this final phase of the propulsion modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
50 3.5 Engine Installs (3010)	**$1,200,000**	**$60,000,000**
Total		**$60,000,000**

LC-130: GLOBAL AIRSPACE COMPLIANT AVIONICS/INSTRUMENTATION AND ASSOCIATED TRAINING DEVICES

1. Background. The ANG LC-130H fleet requires updated avionics to ensure continued global airspace access. LC-130Hs face severe sustainment challenges with current avionics and cockpit instrumentation, and will be out of compliance with Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) mandates if not modernized. Additionally, tactical night operations continue to suffer with non-Night Vision Imaging System (NVIS) compliant lighting. To eliminate critical sustainment issues due to diminishing manufacturing sources, and to meet required mandates and Air Force Instructions, this modernized cockpit will include: a multifunction engine instrument display system, automatic dependent surveillance-broadcast capability, NVIS compatibility, and a modern flight management system with global positioning system (GPS) approach and polar navigation capabilities. Updated avionics address CNS/ATM mandates and increase operational efficiency by opening up airspace routes with stringent navigational requirements and allow the use of GPS approaches. An NVIS compatible and modernized glass cockpit reduces crew workload, lowers maintenance costs and increases capability and sustainability to operate safely at night. To produce a fully NVIS compliant aircraft, all L1 (H2) and L1A (H2.5) aircraft must receive the NVIS baseline time compliant technical orders (TCTOs) that modify the side panels and center console. There are 6 LC-130H aircraft that need these TCTOs completed. Lastly, LC-130s require a hard-wired satellite voice/data terminal, based on available coverage over the polar regions, able to call both secure and unsecure cell phones, landlines, and tied into the ICS. Currently, the LC-130 requires additional Iridium radios to complete its mission. Emerging technologies such as Starlink may also be able to fulfill the requirement for robust, high-latitude satellite communications. All 10 ANG LC-130H aircraft require avionics and communication system upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$50,000,000**
10 Avionics Kit (3010)	**$5,700,000**	**$57,000,000**
6 NVIS TCTO Kits (3010)	**$50,000**	**$300,000**
10 NVIS Kits (3010)	**$465,000**	**$4,650,000**
Communications Upgrade Non-Recurring Engineering (3010)	**N/A**	**$1,000,000**
10 Flight Deck Communications Upgrade (3010)	**$220,000**	**$2,200,000**
Total		**115,150,000**

LC-130: GLOBAL COMMUNICATIONS SYSTEM

1. Background. ANG LC-130Hs require a robust, secure tactical data link (TDL). TDL provides a command and control (C2) link and maximizes aircrew situational awareness with beyond line-of-sight capabilities. TDL also provides critical real-time information to the LC-130H aircrews such as friendly aircraft position, weather conditions, and hostile threat locations and enables integration through podded solutions. This increases the LC-130H's ability to effectively participate in the network-centric battlespace. Recent operations have highlighted the need for comprehensive, networked C2 awareness, and integration of aircraft systems. Due to routine operations in the polar regions, the LC-130H will need to upgrade to ARC-210 Generation 6 Mobile User Objective System satellite communications radios. A common Mobility Air Forces mission computer will reduce communication transmission time and provide aircrew with the information necessary to adjust mission profiles in accordance with changing conditions and commander's guidance. All 10 ANG LC-130Hs require the common MAF mission computer.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$1,000,000**
10 Flight Deck Communications Upgrade (3010)	**$220,000**	**$2,200,000**
Total		**$3,200,000**

LC-130: POLAR CONSTRUCTION SKIWAY TEAM EQUIPMENT / GEAR

1. Background. ANG LC-130Hs require equipment for the polar construction skiway team (PCST) and the ski landing area control officer (SLACO) team. These teams are required to forward deploy to remote areas, establish a forward operating base, and construct a skiway to support LC-130H operations. The PCST is subject to harsh arctic conditions and requires specialized gear for survival. Additionally, specialized equipment is required to prepare the landing surface, on ice or snow, for a ski equipped aircraft. Extreme cold weather life sustaining gear such as cold weather tents, clothes, generators, heaters, cooking equipment, and communications equipment are required for the survival of the team. The team consists of 20 personnel, any member of which could be tasked with supporting the PCST. This requires all crew members and maintenance personnel to be issued the same highly specialized extreme cold weather clothing. To be able to successfully build a skiway, equipment such as snowmobiles, groomers, flagging, ice/snow measuring tools, general hand tools, overt/covert lights, and remote refueling operations equipment are needed. Before this UTC was formalized, the 109AW funded this equipment through unfunded requests, which is unsustainable. A formal sustainment program needs to be established to maintain all gear and equipment in good working order.

2. Program Details.

Quantity	Unit Cost	Program Cost
PCST Equipment (3080)	**N/A**	**$300,000**
210 Extreme Cold Weather Clothing Kits (3080)	**$2,000**	**$420,000**
SLACO Equipment (3080)	**N/A**	**$200,000**
50 Extreme Cold Weather Clothing Sustainment Kits (3080)	**$2,000**	**$100,000**
Total		**$1,020,000**

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C-32B and C-40C

C-32B: The C-32B provides dedicated rapid response worldwide airlift to the Commander, United States Special Operations Command, in support of the US Government domestic and overseas crisis response activities.

C-40C: The C-40C provides worldwide distinguished visitor transportation for Congressional, Department of Defense, Air Force, and National Guard missions. The primary mission of the C-40 is to ensure passenger safety and comfort while providing the utmost in reliability.

C-32B, and C-40C
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Critical Capabilities List

C-32B

- Enhanced Flight Vision System
- Satellite Based Augmentation System

C-40C

- Expand High-Speed Data Capacity
- Aircraft Communication Addressing and Reporting System and Controller-Pilot Data Link Communications Avionics Upgrade
- Large Aircraft Infrared Countermeasure System Replacement
- Satellite-Based Augmentation System
- Upgraded Weather Radar

Essential Capabilities List

-

C-32B

- None

C-40C

- None

Desired Capabilities List

C-32B

- None

C-40C

- None

C-32B: ENHANCED FLIGHT VISION SYSTEM

1. Background. The ANG C-32B mission requires an enhanced flight vision system (EFVS) to execute operations with reduced weather minimums. The EFVS increases situational awareness and safety during operations in weather and periods of low visibility. The EFVS package includes a heads-up display (HUD) fused with an enhanced vision system. The HUD is a means to provide all primary flight display information to the pilot, increasing pilot situational awareness, and decreasing pilot workload. This technology is commercially available and approved by the Federal Aviation Administration in a Supplemental Type Certificate for Boeing 757 installation and operation. One system is required for each of the two C-32Bs as well as spare parts for the system.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 EFVS Kits (3010)	**$5,500,000**	**$11,000,000**
Spare Parts (3010)	**$1,000,000**	**$1,000,000**
Total		**$12,000,000**

C-32B: SATELLITE BASED AUGMENTATION SYSTEM

1. Background. The ANG C-32B mission requires a Satellite-Based Augmentation System (SBAS) to increase the reliability and accuracy of GPS operations. SBAS enables satellite-based approaches to precision minimums and ensures full compliance with Automatic Dependent Surveillance-Broadcast mandates. Additionally, this system will reduce the C-32B's reliance on ground-based navigational aids for terminal area guidance. One system is required for each of the two C-32Bs as well as spare parts for the system.

2. Program Details.

Quantity	Unit Cost	Program Cost
SBAS Non-Recurring Engineering (3010)	**N/A**	**$4,500,000**
2 SBAS Kits (3010)	**$4,500,000**	**$9,000,000**
Spare Parts (3010)	**$500,000**	**$500,000**
Total		**$14,000,000**

C-40C: EXPAND HIGH-SPEED DATA CAPACITY

1. Background. ANG C-40Cs require a high-speed data system for seamless, worldwide satellite-based communications, and internet connectivity. This will enable the C-40C fleet to meet time-critical and persistent passenger mission requirements. Users from the highest levels of US government and military routinely travel via the C-40C with limited communications to conduct time-critical business. The current equipment does not meet current technological needs for conducting business while airborne. All three ANG C-40s require upgraded high-speed data systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$10,000,000**
3 Upgraded High-Speed Data Systems (3010)	**$5,000,000**	**$15,000,000**
Total		**$25,000,000**

C-40C: AIRCRAFT COMMUNICATION ADDRESSING AND REPORTING SYSTEM AND CONTROLLER PILOT DATA LINK COMMUNICATIONS

1. Background. ANG C-40Cs require upgraded Aircraft Communication Addressing and Reporting System (ACARS) and Controller Pilot Data Link Communications (CPDLC) for data link systems which sends messages between an aircraft and an operator's ground-base through various radio links. The current C-40C ACARS requires replacement due to obsolescence issues with component repairs starting in 2020. ACARS provides worldwide clear calling capability and is the primary means for unsecured calls to the flight deck and passengers. The FAA has mandated required avionics for aircraft using US Domestic Enroute CPDLC services. Currently, the C-40C does not meet these requirements. The aircraft's Communications Management Unit and Digital Radio must be upgraded to align with current FAA requirements. If not satisfied, the aircraft will not be allowed to fly in congested airspace, no longer report via ACARS, lose beyond-line-of-sight capability, and lose command and control capability. Furthermore, aircraft will be limited to flying below Flight Level 290. This will decrease safety margins as aircraft are forced to fly lower than optimal altitudes, which increases fuel cost and creates more enroute fuel stops. The ANG requires one upgraded ACARS/CPDLC per airframe plus one spare.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$5,000,000**
3 Upgraded ACARS/CPDLC Systems (3010)	**$2,000,000**	**$6,000,000**
Total		**$11,000,000**

C-40C: LARGE AIRCRAFT INFRARED COUNTERMEASURE SYSTEM REPLACEMENT

1. Background. ANG C-40Cs require upgraded Large Aircraft Infrared Countermeasure Systems (LAIRCM). C-40Cs rely on the LAIRCM system for self-defense in contested airspace. The current LAIRCM system requires replacement due to component obsolescence by 2025. Current CONOPS and aircraft minimum equipment listings require a functional LAIRCM system. Without an upgraded LAIRCM system, the C-40C will not be capable to perform its primary mission of transporting required distinguished visitors around the world. All ANG C-40Cs require an updated LAIRCM system.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$12,000,000**
3 Upgraded LAIRCM Systems (3010)	**$2,000,000**	**$6,000,000**
Total		**$18,000,000**

C-40C: SATELLITE BASED AUGMENTATION SYSTEM

1. Background. ANG C-40Cs require a satellite-based augmentation system (SBAS) to ensure travel anywhere in the world at any time. The C-40 does not currently possess the ability to fly GPS approaches to localizer minimums. Wide Area Augmentation System/Localizer Performance with Vertical Guidance (WAAS/LPV) increases safety with tighter navigation tolerances and increased capabilities including lower approach minima. WAAS provides a SBAS which increases availability and accuracy in position reporting in all phases of flight. WAAS/LPV enables aircraft to fly precision approaches into airports that do not have an instrument landing system (ILS). The US has already decommissioned a large number of ILSs in favor of the more cost-efficient LPV. More countries are acquiring LPV capabilities including European Nations, China, Japan, India, and Russia. The WAAS service is interoperable with other regional SBAS services including those operated by Japan, Europe, and India. ANG C-40Cs require three SBAS for the fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**$1,500,000**	**$1,500,000**
3 SBAS (3010)	**$3,000,000**	**$9,000,000**
Total		**$10,500,000**

C-40C: WEATHER RADAR UPGRADE

1. Background. ANG C-40Cs require an upgraded multi-scan radar that will standardize symbology and flight information on the flight displays, provide at a glance situational awareness of convective weather, detection and analysis of thunderstorm threats. This will provide automatic tracking of weather which will significantly reduce flight deck workload and greatly improve safety. All three ANG C-40Cs require upgraded weather radars.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$3,000,000**
3 Upgraded Weather Radars (3010)	**$1,000,000**	**$3,000,000**
Total		**$6,000,000**

F-15

- **Air Dominance**
- **Homeland Defense**
- **ANG F-15 Units Provide 58% of the Total Fleet**

The F-15C Eagle has been the backbone of our nation's Air Superiority fleet for over 30 years and will continue to be a key asset to the Combantant Commander and Homeland Defense. ANG F-15C units provide 31 percent of the nation's Aerospace Control Alert (ACA) fighters, spanning five alert sites in the continental United States. These alert sites provide 24-hour homeland defense.
Continued full data link interoperability gives F-15C/Ds the required capability to combat the advanced threat, providing combatant commanders essential air superiority and homeland defense options.

In FY21, ANG F-15s deployed overseas and CONUS locations on Theater Security Packages in support of Combatant Commander taskings, ensuring continued American air dominance presence in contested airspace throughout the areas of responsibility. Finally, ANG F-15C squadrons also took part in joint & international exercises including Checkered Flag, Vigilant Shield, Neptune Hawk, Northern Edge, Valley Thunder, Sentry Aloha, and Sentry Savannah.

Over half of USAF F-15C combat capability resides within the Air National Guard, which possesses 39% of all air superiority assets available for Air Expeditionary Forces (AEF) commitments and ACA tasking. The ANG also operates the USAF's only F-15C formal flying training unit, where all active and reserve component F-15C pilots are trained.

Modernization and sustainment programs are vital to improving aircraft capabilities for both overseas contingency operations and homeland defense. These upgrades recapitalize and repair long-range air superiority kill chains, while drastically increasing survivability in contested environments. These programs include the BU2 data link, new Air-to-Air weapons integration, multi-spectral search and track technologies, high-fidelity simulator upgrades and a modern integrated communications suite.

F-15
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Critical Capabilities List

- Data Link Interoperability
- Emerging Air-to-Air Weapons Integration
- Multi-Spectral Search/Track/Identification/Target with Advanced Data Link
- High-Fidelity Distributed Mission Operations-Capable Simulators with Modern Threat Replication
- Modernized Communications Suite Upgrade

Essential Capabilities List

- Modernized Range and Airspace / Threat Training System
- Modular Self Protection / Electronic Warfare System with Fiber Optic Towed Decoy

Desired Capabilities List

F-15: DATA LINK INTEROPERABILITY

1. Background. ANG F-15s require full secure data link interoperability to ensure safety-of-flight, continued lethality during combat operations, and effective command and control specifically during homeland defense missions. Legacy Link-16 crypto will expire at the end of the calendar year 2021 per National Security Agency mandates. When this occurs, any aircraft equipped with a legacy Link-16 terminal and outdated, unusable crypto will not have fighter data link (FDL). FDL is a key enabler of United States airpower and is a mandatory equipment item for Combatant Command employment in any Area of Responsibility worldwide. Link-16 age-out (without replacement) is a significant DoD-wide capability gap. For the F-15C in particular, only a certain subset of designated "Platinum" or long-term Eagles are slated to receive the Advanced Data Core Processor-II (ADCP-II) or central computer upgrade. That modification also comes with the modern Multifunctional Information Distribution System – Joint Tactical Radio System (MIDS-JTRS, more simply known as "MIDS-J"). The MIDS-J terminal replaces the legacy FDL line-replaceable unit. Due to ADCP-II program funding reductions, only 101 F-15Cs (of the 128 planned "Platinum" Eagles) are slated to receive the ADCP-II and MIDS-J upgrades, which will place 27 F-15C/Ds permanently "out of the link" and render them combat ineffective. All of these 27 aircraft reside or will reside in ANG squadrons. To ensure that all 128 long-term "Platinum" Eagles are fully combat-capable, the remaining 27 F-15C/D's, which are not allocated a MIDS-J/ADCP-II kit, must receive an upgraded Block Upgrade 2 (BU2) Link-16 terminal, which allows the use of modern crypto. This would also immediately re-enable these 27 aircraft to utilize their inherent Infrared Search and Track, a capability that ADCP-II aircraft will not have until CY23. 27 ANG F-15s require BU2 Terminal Conversion Kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
27 F-15C BU2 Terminal Conversion Kits (3010)	**$100,000**	**$2,700,000**
Total		**$2,700,000**

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-15: EMERGING AIR-TO-AIR WEAPONS INTEGRATION

1. Background. The rapid advancement in enemy threat weapons has degraded the F-15C's ability to retain first launch and first kill opportunities. Therefore, air dominance F-15C aircraft require the ability to carry and employ the latest air-to-air weaponry to remain viable in today's high end fight and to protect the homeland. To accomplish this, the F-15C's Operational Flight Program must be amended to support the latest air-to-air weapons. Lastly, hardware must be procured to allow carriage of new weapons that do not conform to legacy weapons stations. Weapons systems identified for divestment will focus on safety of flight and timeline-focused modernization programs.

2. Program Details.

Quantity	Unit	Program Cost
New Air-To-Air Weapons Non-Recurring Engineering (3010)	**N/A**	**$10,000,000**
128 Missile Launchers (3010)	**$1,000,000**	**$128,000,000**
Total		**$138,000,000**

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-15: MULTI-SPECTRAL SEARCH/TRACK/IDENTIFICATION/TARGET WITH ADVANCED DATA LINK

1. Background. ANG F-15Cs require multi-spectral search/track/identification/target systems with advanced data link on all 128 "Platinum" Eagles. These capabilities will supplement on-board threat detection, identification, and tracking as part of a time-synchronized, integrated function of the existing sensor systems for detection and weapons cueing. Adversary aircraft and integrated air defense networks employ sophisticated detection and electronic attack methods that complicate F-15C employment and leave the F-15Cs vulnerable to attack. Infrared Search and Track (IRST) capabilities for forward-deployed and homeland defense missions require 20 pods at each of the five ANG combat-coded squadrons.

2. Program Details.

Quantity	Unit	Program Cost
IRST Pod Non-Recurring Engineering (3010)	**N/A**	**$10,000,000**
100 IRST Pods (3010)	**$3,500,000**	**$350,000,000**
Total		**$360 ,000,000**

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-15: HIGH-FIDELITY DMO CAPABLE SIMULATORS WITH UPDATED THREAT REPLICATION

1. Background. ANG F-15s require the ability to participate in networked, high-fidelity simulators with a wide variety of aircraft types and squadrons around the globe in real-time against modern threats. Current ANG F-15 simulator network connectivity is limited to specific ANG squadrons and types of aircraft. Additionally, the current simulated threat has been vastly outpaced by the real-world threat, relegating simulator training to more of a procedural exercise as opposed to a training opportunity against an advanced adversary. Additionally, ANG simulators have been limited in their ability to fully replicate fielded aircraft tactical systems. For example, Joint Helmet Mounted Cueing System (JHMCS) and night vision goggle (NVG) capabilities are not replicated in the current simulators, so the only way for F-15 pilots to train with these systems is during actual (and limited) sorties. High-fidelity DMO-capable simulators would allow ANG F-15 squadrons to fully train for their assigned missions and develop advanced tactics against a constantly improving baseline adversary. Higher-quality simulators that fully match the configuration of the Eagles on ANG flight lines would also allow F-15 squadrons to simulate real-world combat deployments with other package assets before deployment, allowing a full force-integration rehearsal against the latest threat aircraft and weapons systems in a representative geographical location and environment. Each of the six ANG F-15C units requires a simulator upgrade.

2. Program Details.

Quantity	Unit Cost	Program Cost
Simulator Threat Replication Enhancement (3010)	**N/A**	**$5,000,000**
6 F-15C JHMCS and NVG Simulator Systems (3010)	**$250,000**	**$1,500,000**
Total		**$6,500,000**

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-15: MODERNIZED COMMUNICATIONS SUITE UPGRADE

1. Background. ANG F-15C/Ds require a communications technical refresh to enhance combat capability/effective command and control, improve flight safety, and enhance performance by reducing physiological stressors. The F-15 has experienced steady growth in capability due to modernization of sensors, weapons, and other mission systems, but the communications systems and layout are based on outdated 1970s technology. Fully utilizing the F-15 weapon system requires a complex pilot vehicle interface that imposes an extremely demanding workload on the pilot, limiting effectiveness and presenting a safety concern. Satellite communication (SATCOM) was added to the F-15 but the legacy antenna is inoperable in low graze angle situations often encountered in many parts of the globe. In today's fight, effective secure communications are vital to the success of the warfighter despite global position. A new upper SATCOM antenna with advanced datalink is required to operate anywhere on the globe and participate in the newest communication systems. In addition, the legacy radios switch was only intended to operate two radios and therefore currently requires increased pilot workload to operate additional radios. Therefore, a microphone switch with more than two positions is required to limit pilot workload, enhance safety, and increase lethality. Lastly, current F-15 radio interface does not include a centralized up-front control (UFC) as planned. The F-15 requires a commercial-off-the-shelf UFC to control three radios in one place that also has growth potential to integrate additional communications, navigation, datalink, and select mission data control functions. The F-15 also requires a three-dimensional (3D) audio system that allows the pilot to spatially separate and process multiple radio frequencies and directional self-protection warning tones. All of these upgrades enhance mission execution and flight safety in real-world and training environments by reducing workload and physiological stress while increasing a pilot's 3D situational awareness of the battlespace. ANG F-15s require 150 modernized communication suite upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
150 upper SATCOM Antennae (3010)*	**$50,000**	**$7,500,000**
150 4-Way Microphone Switches (3010)*	**$15,000**	**$2,250,000**
150 Up-Front Control (3010)*	**$50,000**	**$7,500,000**
150 3D Audio Kits (3010)*	**$100,000**	**$15,000,000**
Total		**$32,250,000**

* Includes 10% spare

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

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F-22

- **Air Dominance**
- **Homeland Defense**
- **ANG F-22 Units Provide 11% of the Total Fleet**

The ANG flies and maintains F-22s at all three F-22 basing locations. The ANG has two F-22 classic associate units and one operational F-22 squadron. Aerospace Control Alert (ACA) support is provided by F-22s flying out of Alaska and Hawaii. For the past 5 consecutive years, ANG F-22 pilots, maintainers, and aircraft have participated in combat operations in support of Operation INHERENT RESOLVE as well as participated in several major exercises. In addition to combat and exercise operations, ANG F-22s play an essential role in Operational Test (OT) and training future F-22 pilots at the F-22 Formal Training Unit (FTU).

Primary ANG F-22 modernization focuses on common configuration and modernization to counter technological advances made by near peer competitors. Enhancements in fuel and communication systems will allow F-22s to maintain air dominance at longer ranges from support assets. Improved GPS capabilities and a helmet-mounted display will increase the F-22's distinct first-shot, first-kill advantage.

F-22
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Critical Capabilities List

- Helmet-Mounted Display
- Cockpit Global Positioning System Signal Repeater
- Data Link Improvements
- External Multi-Communication Node
- Beyond-Line-of-Sight Communications

Essential Capabilities List

- Improved Simulator Capabilities
- Accurate Training Platforms for Peer Threats
- Combat Identification Improvements
- Leverage F-35 Capabilities and Technologies
- Common Countermeasure Dispensers and Controllers For F-22 and F-35 Aircraft

Desired Capabilities List

- New Integrated Forebody and Radar Improvements
- Engine Upgrades
- Common Configuration
- Low-Observable Reduction and Sustainment Improvements

F-22: HELMET-MOUNTED DISPLAY

1. Background. ANG F-22 pilots require a night vision compatible, color helmet-mounted display (HMD). Multiple simulations and an operational utility assessment conducted by the 422nd Test and Evaluation Squadron demonstrated that using an HMD provides a distinct first-shot, first-kill advantage. Although this advantage applies to within-visual-range engagements, the HMD also substantially increases friend and foe situational awareness during beyond-visual-range intercepts. HMD technology provides the capability to cue and verify high-off-boresight (HOBS) sensor and weapon information through the display of weapons employment zones and visual cues of target and friendly aircraft locations. Originally conceived as a weapons cueing system, the HMD has evolved into a force multiplier because of its ability to enhance situational awareness during all phases of flight and across all mission sets. For example, the HMD provides threat information visual cues while the pilot is "eyes-out" of the cockpit, warning of dangers and providing critical information to allow the pilot to maneuver the aircraft away from terrain or threats. Similarly, F-22s tasked with identifying targets of interest during homeland defense missions would be better able to quickly and efficiently visually locate and identify small aircraft, unmanned systems, and cruise missiles. Lack of an HMD limits the lethality of the F-22, and puts the aircraft at a disadvantage in certain situations against less formidable and less capable aircraft. The acquisition of an HMD for each ANG F-22 aircraft will greatly increase the lethality and survivability of the F-22.

2. Program Details.

Quantity	Unit Cost	Program Cost
Helmet Mounted Display Non-Recurring Engineering (3010)	**N/A**	**$41,000,000**
50 Helmet Mounted Displays (3010)*	**$300,000**	**$15,000,000**
Total		**$56,000,000**

* Includes 10% spares

F-22: COCKPIT GLOBAL POSITIONING SYSTEM SIGNAL REPEATER

1. Background. ANG F-22s require Global Positioning System (GPS) cockpit repeater kits as a backup means of GPS-based navigation. Various tactical aircraft are already utilizing Electronic Flight Bag (EFB) tablets in the Central Command area of responsibility under local commander authority for use during combat sorties. USAF F-15E and U.S. Navy F/A-18E/Fs use these tablets for navigational situational awareness but also for blue force tracking; often this tablet technology is the only tool available to discriminate between friendly and hostile locations during dynamic targeting scenarios, especially considering the recent loss of Mode 4. Air Combat Command is currently resourcing EFBs for use in F-22 aircraft; however, the F-22 cannot receive GPS signals in the cockpit due to proprietary canopy characteristics. A lack of GPS signal reception in the cockpit limits the EFB to usage as a digital repository of flight information publications. To utilize the EFB as a backup means of GPS based navigation and in cases of various electrical failures, the F-22 requires a simple repeater of the aircraft's received GPS signal in the cockpit for all 21 ANG F-22 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
23 GPS Repeater Kits (3010)*	**$5,000**	**$115,000**
Total		**$115,000**

* Includes 10% spares

F-22: DATA LINK IMPROVEMENTS

1. Background. ANG F-22s require improvements to data link infrastructure to improve interoperability with differing platforms. The F-22 has a very capable intra-flight data link system. The F-35 also has a very capable, but incompatible intra-flight data link system. In the future, both aircraft will be able to transmit and receive a Link-16 data link. However, a majority of the high-quality data available within F-22/F-35 formations will not be passed over Link-16. Upgrading the F-22 data link will allow more F-22 formation members to receive high-quality data and will allow for more F-22/F-35 data link interoperability. All 21 ANG F-22s require an updated data link capability.

2. Program Details.

Quantity	Unit Cost	Program Cost
Data Link Hardware Non-Recurring Engineering (3010)	**N/A**	**$69,000,000**
23 Data Link Kits (3010)*	**$2,000,000**	**$46,000,000**
Total		**$115,000,000**

* Includes 10% spares

F-22: EXTERNAL MULTI-COMMUNICATION NODE

1. Background. ANG F-22s require an external multi-communication node. US INDOPACOM has outlined a requirement for combat air force (CAF) platforms to demonstrate and execute combat operations in austere locations utilizing flexible self-contained multifunctioning units that will complicate enemy targeting of tactical forces. Agile Combat Employment (ACE) or adaptive basing are the terms most often used to describe these operations. There are significant challenges associated with agile forces receiving and sending communications in contested and austere locations while maintaining a small logistical footprint. There are currently several commercial off the shelf communication nodes that would provide encrypted satellite voice, messaging, and internet services enhancing CAF ability to execute ACE communications with limited to no modifications. ANG F-22s require five communication nodes to execute these operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Multi-Communication Nodes (3010)	**$200,000**	**$1,000,000**
Total		**$1,000,000**

* Includes 10% spares

F-22: BEYOND LINE-OF-SIGHT COMMUNICATION

1. Background. The F-22 requires a communication system capable of beyond-line-of-sight (BLOS) function. As the air and surface threat advances, command and control assets are required to be further from the fight. As these ranges increase, secure communication that relies on line-of-sight becomes significantly less reliable. Installing a system capable of allowing F-22s to transmit and receive secure voice communications over the horizon will allow higher situational awareness while fighting against the current and future threats. All 21 ANG F-22s require BLOS communication capability.

2. Program Details.

Quantity	Unit Cost	Program Cost
BLOS Hardware Non-Recurring Engineering (3010)	**N/A**	**$47,000,000**
23 BLOS Communication Hardware Kits (3010)*	**$100,000**	**$2,300,000**
Total		**$49,300,000**

* Includes 10% spares

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A-10

- **Close Air Support (CAS)**
- **Forward Air Controller – Airborne (FAC-A)**
- **Combat Search and Rescue**
- **ANG Units Provide 40% of the Total Fleet**

The A-10 is well-suited to execute current and future Overseas Contingency Operations. With eleven weapons stations, the A-10 can engage any target with a wide variety of general-purpose and precision munitions, including its 30-millimeter cannon. The A-10's combat survivability, wide combat radius, and ability to land at and operate from austere airfields provide flexibility beyond that of other fixed-wing Air Force close air support assets. Its extensive loiter time and advanced targeting pod capabilities provide superior support for ground forces in its Forward Air Controller-Airborne role.

The ANG operates 84 A-10s in four squadrons. ANG aircraft have the helmet-mounted integrated targeting modification, drastically reducing the time required to acquire targets. This ultimately increases both survivability and lethality. ANG A-10 aircraft are equipped with two ARC-210 radios, giving them a unique capability to simultaneously communicate via secure line-of-sight and beyond-line-of-sight, extensively contributing toward successful combat search and rescue missions.

Current A-10 modernization priorities include a high-resolution center display, which allows pilots to see the high-definition picture provided by targeting pods. Display upgrades improve an A-10 pilots' ability to positively identify friendly forces while aiding in the search, identification, surveillance, and tracking of enemy personnel. Additional upgrades include an integrated noise-canceling a three-dimensional cockpit audio system, and an anti-jam embedded Global Positioning System.

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A-10
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Critical Capabilities List

- Digital High-Definition Targeting Pod Interface, Display, and Recording
- Automated, Digital Electronic Warfare Suite
- Find, Fix, and Target Within a Contested, Degraded, and Operationally Limited Environment
- Upgraded Communications Systems which Function within Contested, Degraded, and Operationally Limited Environments
- Integrate Standoff Munitions to Support $5^{th}/6^{th}$ Generation Operations in a Contested, Degraded, and Operationally Limited Environments

Essential Capabilities List

- Integrate Fire and Forget Autonomous Targeting and Sorting Anti-Armor Weapon Capable of Standoff from Modern Threat Systems from All Altitudes in a Contested, Degraded, and Operationally Limited Environment
- Full AIM-9X Integration
- Improved High Definition Digital Recording Capability of All Displays, Heads Up Display, and Sensors
- All-Weather Capability to Find/Fix/Target within a Contested, Degraded, and Operationally Limited Environment
- Digital Suspension Equipment Integration (1760/Ethernet to All Stations)

Desired Capabilities List

- Integration of Network-Enabled Long-Range/Stand-Off Munitions
- Improved Zero Illumination Night Vision, Capable of Viewing in Multiple Spectrums
- Rapid and Agile Hardware Integration Capability
- Standardized Squadron Deployable Communications and Mission Planning Suite

A-10: DIGITAL HIGH-DEFINITION TARGETING POD INTERFACE, DISPLAY, AND RECORDING

1. Background. ANG A-10s require improved Positive Identification (PID), intelligence, surveillance, reconnaissance, and battle-tracking capabilities. Friendly forces and enemy combatant PID are crucial in any conflict. Advanced targeting pod digital output upgrades with color video provide high-resolution feeds, coupled with high-definition displays, and enable visual identification of friendly and enemy forces from greatly increased standoff ranges. High-resolution displays in the A-10 enable full utilization of targeting pod color improvements. A modern digital camera and video recorder capable of recording high definition video of Heads-Up Display and forward pilot view as well as the High Resolution Display System (HRDS) display in full resolution is required. This modification will fulfill classified recording and data storage requirements of the current Digital Video Air Data Recorder system and comply with cybersecurity mandates regarding classified data storage and removable media. Each of the 84 ANG A-10s require an upgraded HRDS, a 2nd Gigabit Ethernet switch as well as video recorders and data servers.

2. Program Details.

Quantity	Unit Cost	Program Cost
High-Resolution Display Non-Recurring Engineering (3010)	**N/A**	**$9,000,000**
93 High-Resolution Displays (3010) *	**$420,000**	**$39,060,000**
93 2nd Gigabit Ethernet Switches (3010) *	**$27,100**	**$2,520,300**
Video Recorder and Data Server Non-Recurring Engineering (3010)	**N/A**	**$1,000,000**
93 Video Recorder and Data Server (3010) *	**$131,260**	**$12,207,180**
Ground Equipment (3010)	**$325,000**	**1,300,000**
Total		**$65,087,480**

* Includes 10% spares

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

A-10: AUTOMATED DIGITAL ELECTRONIC WARFARE SUITE

1. Background. The A-10 electronic warfare (EW) suite requires considerable modernization to keep pace with surface-to-air threat technology advancements and proliferation. The Air Force identified these vulnerabilities in the 2012 A-10 Operational Viability and Sustainment Gap Analysis Report. A-10 EW modernization requires a focus on several critical capabilities in the radio frequency spectrum: radar warning receiver (RWR) modernization and improved countermeasures program development. The A-10 fleet has a legacy analog electronic attack (EA) Pod (ALQ-184). All require replacements that are digital-based. A-10 vulnerabilities in the infrared (IR) spectrum must also be addressed through the development of IR countermeasures (IRCM) which effectively decoy modern IR threats by replacing the AAR-47 with a missile warning system capable of detecting those threats more reliably and at greater distances. Modernized EW suite subsystems, architecture, and countermeasures will allow the A-10 to conduct full-spectrum combat operations in the vast majority of today's contested environments. Each of the 84 ANG A-10s require an ALR-69A kit and advanced IRCM system as well as a new EA pod.

2. Program Details.

Quantity	Unit Cost	Program Cost
ALR-69A RWR Non-Recurring Engineering (NRE) (3010)	**N/A**	**$5,000,000**
93 ALR-69A Upgrades (3010) *	**$600,000**	**$55,800,000**
Advanced IRCM System NRE (3010)	**N/A**	**$10,000,000**
93 Advanced IRCM Systems (3010) *	**$500,000**	**$46,500,000**
Advanced Countermeasures Integration (3010)	**N/A**	**$5,000,000**
EA Pod NRE (3010)	**N/A**	**$10,000,000**
89 EA Pod Replacement (3010)	**$1,320,000**	**$117,480,000**
Total		**$249,780,000**

* Includes 10% spares

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

A-10: FIND, FIX, AND TARGET WITHIN A CONTESTED, DEGRADED, AND OPERATIONALLY LIMITED ENVIRONMENT

1. Background. The A-10 requires the ability to operate in a Global Positioning System (GPS) degraded environment. Virtually every system on the A-10 depends on the highly accurate timing, position, orientation, and velocity data the Embedded GPS/Inertial Navigation System (INS) [EGI] provides. Adversary attempts to deny GPS capability may degrade or limit the precision of A-10 navigation solutions, decreasing positional awareness, and weapons employment accuracy. The first step to counter or minimize this threat is the installation of a controlled reception pattern antenna, coupled with a digital antenna electronics unit, to nullify the effects of jamming systems. The integration of selective availability anti-spoofing modules reduces the impact of jamming and protects GPS military precise positioning service accuracies. The A-10 needs greater precision and reliability to comply with the national airspace system transition to satellite-based air traffic control. Upgrading the A-10 EGI supports the FAA mandate and provides increased capability to preserve GPS integrity in a contested or degraded electromagnetic environment. Each of the 84 ANG A-10s require an anti-jam EGI.

2. Program Details.

Quantity	Unit Cost	Program Cost
Anti-Jam EGI Non-Recurring Engineering (3010)	**N/A**	**$15,500,000**
93 Anti-Jam Kits (3010) *	**$225,000**	**$20,925,000**
Total		**$36,425,000**

* Includes 10% spares

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

A-10: UPGRADED COMMUNICATIONS SYSTEMS FOR CONTESTED, DEGRADED, AND OPERATIONALLY LIMITED ENVIRONMENTS

1. Background. ANG A-10s require an improved communications suite due to the lack of interconnectivity and security compatibility with many fielded communication and data link systems. An improved A-10 communication suite consists of three-dimensional (3D) audio, enhanced data link and associated equipment. Two ARC-210 Generation (Gen) 6, Mobile User Objective System (MUOS) multi-mode digital radios, meet the need for simultaneous beyond-line-of-sight and secure line-of-sight communications. The integration of noise-canceling and 3D audio in the cockpit increases situational awareness by spatially separating aural warning and radio signals and providing angular cueing to ground and air threats when used in conjunction with a Helmet Mounted Cueing System (HMCS). Spatial separation and reduction in ambient noise significantly increase the pilot's ability to process information simultaneously arriving from multiple radios and warning systems. Legacy Situational Awareness Data Link (SADL) equipment has proven inadequate due to a lack of currently fielded support infrastructure, frequency band constraints, and Joint Interface Control Cell support. The transition of A-10 aircraft to Link 16 will allow seamless deployment, connectivity, and interoperability with the entire A-10 fleet. All ANG A-10s require growth in data link equipment due to the future mandates that will eliminate current SADL communications equipment.

2. Program Details.

Quantity	Unit Cost	Program Cost
ARC-210 Gen 6 MUOS Capable Radios NRE (3010)	**N/A**	**$3,000,000**
186 ARC-210 Gen 6 MUOS Radios (3010) * **	**$100,000**	**$18,600,000**
Directional Audio Non-Recurring Engineering (NRE) (3010)	**N/A**	**$5,000,000**
93 Directional Audio Kits (3010) *	**$80,000**	**$7,440,000**
200 Directional Audio Pilot Equipment (3010) *	**$7,000**	**$1,400,000**
12 Unit Test Equipment (3010) *	**$45,000**	**$540,000**
Data Link (Link 16) Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
84 Data Link Upgrades (3010)	**$200,000**	**$16,800,000**
Total		**$55,780,000**

* Includes 10% spares
** Two radios per aircraft

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

A-10: INTEGRATE STANDOFF MUNITIONS TO SUPPORT 5TH / 6TH GENERATION OPERATIONS IN A CONTESTED, DEGRADED, AND OPERATIONALLY LIMITED ENVIRONMENTS

1. Background. ANG A-10s require an enhanced ability to support operations in high- threat areas of operation through integrating additional standoff munition capabilities. These capabilities provide combatant commanders the flexibility to integrate ANG A-10s into operations that directly support 5th / 6th generation operations and will significantly augment 4th generation operations by freeing up valuable weapons stations to F-16, F-15E, F-18, B-1, and B-52 aircraft. Standoff munitions integration can initially be accomplished through the employment of ADM-160, while future standoff munitions integration should include AGM-158. The ability of the A-10 to forward to deploy to austere locations, combined with a robust combat radius, offers combatant commanders, and their planners, a remarkable upgrade to options available in highly contested areas of operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
ADM-160 Integration Non-Recurring Engineering (NRE) (3010)	**N/A**	**$1,000,000**
AGM-158 Integration Non-Recurring Integration (NRE) (3010)	**N/A**	**$11,000,000**
Total		**$12,000,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

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HH-60G

- **Combat Search and Rescue**
- **ANG HH-60 Units Provide 18% of the Total Fleet**

ANG Personnel Recovery (PR) helicopters and aircrew play a critical role in support of overseas contingency operations while responding to increasingly high demand for domestic operations. There are three ANG PR helicopter units and one ANG PR training unit associated with an active-duty unit.

In 2021, ANG Rescue Squadrons (RQS) deployed in support of multiple contingency operations. The 129 RQS worked with several agencies to fight fires in Northern California. Additionally, HH-60Gs conducted numerous counter-drug missions throughout the state and supported search and rescue operations including a long-range recovery in the Pacific Ocean.

The 101 RQS performed multiple missions in support of both overseas and domestic operations. The 210 RQS held a 24-hour state-wide, rescue alert in Alaska resulting in many lives saved. The 188 RQS supported aircrew training for the 58 Special Operations Wing.

The HH-60G modernization priorities include mission systems software upgrades, training tools for contested environments, equipment for degraded visual environments, improvements to aircraft weapons systems, and carry on situational awareness devices.

HH-60G
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Critical Capabilities List

- Software Upgrades to Missions Systems
- In-Flight Simulations for Contested Degraded Operations Training Tasks
- Degraded Visual Environment System
- Weapons Lethality Enhancements to Mounts, Targeting System, and Configuration
- Carry-On Shared SA Suite

Essential Capabilities List

- Carry-On Container to Rapidly Employ Emergent Technologies
- Improved Generators
- Integrated Mission Debrief Capability
- Virtual Reality Training Devices At Every Air Reserve Component Base
- Defensive Systems Upgrades

Desired Capabilities List

- Performance Based Navigation Certified Area Navigation
- Agile Combat Search And Rescue Basing Capability
- Aircrew Flight Equipment Enhancements
- Instrumentation Upgrade
- Helicopter Hovering In-Flight Refueling

HH-60G: SOFTWARE UPGRADES TO MISSION SYSTEMS

1. Background. ANG HH-60Gs require software upgrades to existing mission systems which are critical to battlefield situational awareness, survivor location capabilities, and defensive systems. These upgrades enable software defined radios and computers to incorporate improved human factors for operator displays, faster processing, more user selectable options for locating advanced survival radios, and improved threat processing and display for defensive systems. The systems that require upgrades and updates are the Smart Multi-Function Color Display, control display unit, Situational Awareness Datalink, Air Force Tactical Receiver System – Ruggedized, lightweight airborne recovery system, and Distributed Aperture Infrared Counter Measures. All ANG helicopters require software upgrades to be developed and fielded amongst the fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
Mission System Software Upgrade (3080)	**N/A**	**$12,000,000**
Total		**$12,000.000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

HH-60G: IN-FLIGHT SIMULATIONS FOR CONTESTED DEGRADED OPERATIONS TRAINING TASKS

1. Background. ANG HH-60Gs require training software integrated into the electronic warfare and navigation suite to prepare for combat. Training for a GPS denied/degraded environment and against radar threats is difficult. Range schedules, cost, and threat simulator availability are all significant constraints to achieving the tasked quantity of training. Restricting training to range airspace and against only available threat simulators does not prepare aircrew for realistic combat engagements. To meet training requirements in both quantity and quality, on-board threat emulation is required. This includes radar warning receiver (RWR) training modes and threat representation such as the currently fielded Virtual Electronic Combat Training System (VECTS) and in-line navigation degradation such as Air Force Research Lab's Space Jam. RWR training modes must support pre-planned threat environments. It also must support real time simple threat injects by an on-board instructor through an easy-to-use handheld device. For navigation degradation, threat simulators shall operate in-line with no external emissions. Training systems should be software-based. No hardware modifications should be planned to existing systems. All ANG HH-60G units require VECTS and Space Jam.

2. Program Details.

Quantity	Unit Cost	Program Cost
VECTS NRE (3080)	**N/A**	**$2,000,000**
18 VECTS (3080)	**$1,300,000**	**$23,400,000**
6 SPACE JAM Systems (3010)*	**$50,000**	**$300,000**
Total		**$25,700,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

HH-60G: DEGRADED VISUAL ENVIRONMENT SYSTEM

1. Background. ANG HH-60Gs require day and night augmented display capability to increase aircrew situational awareness, terminal area search and rescue operations, and enable crews to safely land a helicopter in a degraded visual environment. This display can either be helmet or aircraft mounted. The ability to display sensor pictures, hazards, terrain, and data link information greatly enhances safety while flying in the low-level environment. The system should be night vision goggle compatible. The ANG requires one kit for each of the 18 aircraft, plus spares, for each of the three ANG HH-60G rescue squadrons. An improved and modernized electro-optical/infrared (EO/IR) sensor is needed on the HH-60G to provide crews a better ability to operate in fog, snow, and dust while providing the capabilities for laser designation/spot track and IR pointer capability. An upgraded sensor is needed for each of the 18 HH-60Gs in the ANG along with three spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
Degraded Visual Environment (DVE) NRE (3010)	**N/A**	**$1,000,000**
18 DVEs System (3010)	**$1,200,000**	**$21,600,000**
EO/IR NRE(3080)	**N/A**	**$5,000,000**
21 EO/IR Sensor Upgrade	**$5,000,000**	**$105,000,000**
Total		**$132,600,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

HH-60G: WEAPONS LETHALITY ENHANCEMENTS TO MOUNTS, TARGETING SYSTEM, AND CONFIGURATION

1. Background. ANG HH-60Gs require enhanced lethality from currently fielded weapons systems to ensure crew survivability and mission accomplishment in a contested environment. These weapons enhancements ensure HH-60Gs can suppress enroute and terminal area threats when force-packaged aircraft are not available or are unable to identify the threat. The enhancements enable rapid configuration changes and flexibility. The enhancements include refurbishing all existing GAU-18 weapons cradles, installing a holographic sight which displays a continuously calculated impact point, and cabin floor mounts for additional weapons carriage. All ANG GAU-18 cradles require refurbishment by the manufacturer to replace worn parts and an inspection of wear points to ensure the mounts meet specifications. The holographic sight accounts for aircraft movement through the air mass and continuously calculates and displays the bullet impact point based on external ballistics. Two cabin floor mounts are required to carry additional crew-served weapons to exploit the advantages of flexible, side-fire weapons while still maintaining a forward firing weapon. This design allows the GAU-2s to be mounted fixed forward on the existing external gun mount system with GAU-18s mounted in the cabin for reactive side fires. All 18 ANG HH-60G will also require two holographic sights and two floor gun mounts per aircraft plus 10% spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
40 GAU-18 Cradle Refurbishment (3010)	**$17,000**	**$680,000**
40 Weapons Sights (3010)*	**$10,000**	**$400,000**
Cabin Floor Weapons Mounts NRE (3010)*	**N/A**	**$45,000**
40 Cabin Floor Weapons Mounts (3010)	**$1,000**	**$40,000**
Total		**$1,165,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

HH-60G: CARRY-ON SHARED SITUATIONAL AWARENESS SUITE

1. Background. ANG HH-60G aircrew require shared situational awareness (SA) systems to quickly understand the common operating picture. The entire suite of systems shall be carry-on/carry-off and airframe agnostic. The independent systems will send and receive information from well-established combat protocols that fuse data onto a portable Android Tactical Assault Kit (ATAK) hub. The hub will share information to individual nodes carried on by individual crewmembers. Each crewmember shall interface with the shared SA suite via a handheld ATAK and/or a AN/AVS-6/9-compatible clip-on imager. The clip-on imager enhances the spectral response of the ANV-6/9 to include shortwave infrared or thermal and display compatible tactical information such as waypoints, route, and datalink tracks on the eyepiece. Airframe interaction will be via temporary internal antenna mounts and temporarily secured cables. The ability to interface with already-owned military electronic flight bags, Foreflight, and automated dependent surveillance-broadcast is desired. Finally, the ATAK hub and modular nature of the shared SA Suite will inherently support rapid integration of emerging technologies, theater-specific applications, and rapid modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
72 Clip-on Imagers	**$20,000**	**$1,440,000**
72 ATAK Tablets	**$1,000**	**$72,000**
18 Mounting Brackets, Cable Kits	**$100**	**$1,800**
18 GPS Antennas	**$100**	**$1,800**
18 Portable Remotely Operated Video Enhanced Receivers	**$60,000**	**$1,080,000**
18 Modular Radio Carrying Case With Power	**$70,000**	**$1,260,000**
18 Handheld Link 16	**$25,000**	**$450,000**
Total		**$4,305,600**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

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KC-135

- **Air Refueling**
- **Aeromedical Evacuation**
- **Airlift**
- **ANG KC-135 Units Provide 44% of the Total Fleet**

The KC-135 Stratotanker is Air Mobility Command's primary air refueling platform providing approximately 87 percent of air refueling in support of US, allied, and coalition military aircraft. The KC-135 supports deployment, employment, sustainment, and redeployment of joint forces across the full range of military operations, including nuclear warfare, routine military activities, and irregular warfare. The KC-135 is tasked to operate close to high-threat areas. Defensive systems are necessary to prevent shoulder-fired surface-to-air missile systems from destroying aircraft during takeoff, landing, and in low altitude flight over mountainous terrain. Tactical data link technologies and situational awareness displays that bring real-time threat information, as well as secure radio capability, greatly enhance KC-135 air refueling, airlift, and aeromedical evacuation missions.

KC-135
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Critical Capabilities List

- KC-135 Self-Protection
- Integrated Defensive Systems for Common Mobility Air Forces Mission Computer
- Automated, Hardened Position, Navigation, and Timing Solution
- Portable, Aircraft-Powered Ground Transfer Fuel Pump
- Aircraft/Aircrew Ground Cooling Capability

Essential Capabilities List

- Soft Basket Quick Connect Boom Drogue Adapter
- Electromagnetic Pulse Hardened, In-flight Capable, Auxiliary Power Unit with Increased Air and Electrical Power
- Updated Aircraft Electrical System
- Winglets for Increased Fuel Efficiency
- Targeted Secure Communications

Desired Capabilities List

- Loyal Wingman
- Autonomous Aerial Refueling
- Aircrew Head-mounted Situational Awareness Display
- Electromagnetic Pulse Hardened Flight Deck
- Fuel Tank Fire Explosion Protection

KC-135 SELF-PROTECTION

1. Background. ANG KC-135s require self-defense capabilities to detect and defeat modern threats specifically designed to target large high-value airborne assets (HVAA). To survive HVAA threats, KC-135s require an open mission system compliant digital and physical backbone to execute processing at the forward edge by connecting the platform to joint all domain command and control architectures. KC-135s require onboard/off-board threat jamming, decoys, and kinetic/non-kinetic defense measures to defeat modern threats. A model, simulation, and analysis of the KC-135 incorporating Air Mobility Command Pacing Threats will determine which systems drive mission failure and/or survivability. In accordance with National Defense Strategy defined competitors, mission modernizations must ensure overmatch including but not limited to: radio frequency (RF), infrared (IR) self-protection systems, expendables, jammers, and signals intelligence/electronic intelligence detection capability and data. Routine operations subject the KC-135 to increasingly hostile environments. To survive, KC-135s require a digital radar warning receiver (RWR) capable of processing signals in a dense RF environment and automatically direct countermeasures to degrade or defeat RF threats. Multi-modal Active Electronically Scanned Array (AESA) radar capability increases survivability with an increased number of sensors available to the common operating picture, The KC-135s require an IR countermeasure system that does not rely on pyrotechnic expendables to counter widely proliferated shoulder-fired IR man-portable air defense systems and other IR-guided weapons. The RF and IR countermeasures should be capable of being moved between aircraft; therefore, all 166 ANG KC-135s require digital RWR Group A kits, RF/IR Group A kits, Large Aircraft Infrared Countermeasures (LAIRCM) Group A kits and AESA Radar Group A kits. ANG KC-135s require 38 modular LAIRCM Group B-kits to equip the 17 ANG KC-135 units, including four spares and 76 AESA radars.

2. Program Details.

Quantity	Unit Cost	Program Cost
HVAA NRE (3010)	**N/A**	**$15,000,000**
166 LAIRCM Group A Kits (3010)	**$500,000**	**$83,000,000**
38 LAIRCM Group B Kits (3010)*	**$3,000,000**	**$114,000,000**
166 Digital RWR Group A Kits (3010)	**$800,000**	**$132,800,000**
38 Digital RWR Group B Kits (3010)*	**$500,000**	**$19,000,000**
AESA NRE (3010)	**N/A**	**$15,000,000**
76 AESA Radars	**$3,000,000**	**$228,000,000**
Total		**$606,800,000**

KC-135: INTEGRATED DEFENSIVE SYSTEMS FOR COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. ANG KC-135s require a robust, secure tactical data link (TDL). Combat operations highlighted the need for comprehensive, networked command and control (C2) throughout all operation theaters. TDL provides near-real-time monitoring of mission events, mission status, task completion, and resource status. It also enhances all participant aircraft's situational awareness, including tanker aircraft, receiver aircraft, and coalition network participants. TDL provides a command and control link and maximizes KC-135 aircrew situational awareness with beyond-line-of-sight (BLOS) and line-of-sight (LOS) capabilities. TDL provides critical real-time information to KC-135 aircrews, such as friendly aircraft position, weather conditions, and hostile threat locations. Coupled with remote radio relay, the KC-135 can act as a node for BLOS coordination via joint range extension applications protocol C to LOS players. Reach back capability is extended by global high speed data and the ability for secure wireless transfer. Additionally, to complement the TDL and to decrease aircrew workload, a comprehensive Quick Reaction Handbook (QRH) is required to address the aircraft's normal/abnormal operations. All 166 ANG KC-135s require TDL radios, processors, and a QRH.

2. Program Details.

Quantity	Unit Cost	Program Cost
166 Group A Kits (3010)	**$120,000**	**$19,920,000**
183 TDL Radios and Processors (3010)*	**$700,000**	**$128,100,000**
QRH (3010)	**$600,000**	**$600,000**
Total		**$148,620,000**

* Includes 10% spares

KC-135: AUTOMATED, HARDENED POSITION, NAVIGATION, AND TIMING SOLUTION

1. Background. ANG KC-135s require an automated hardened position, navigation, and timing (PNT) system integrated into the existing navigation equipment. ANG KC-135s fulfill almost 70% of the nuclear refueling mission. KC-135s require the ability to navigate oceanic airspace in a post-strike environment where traditional navigation aids and satellites would not be available. Astro-inertial navigation systems provide the greatest accuracy and a bounded position error over an extended use-time and distance. Solutions should provide organic PNT updates. These systems are autonomous, passive, non-jammable, and automatic. All 166 ANG KC-135s require automated, hardened PNT systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
166 PNT Kits (3010)	**$200,000**	**$33,200,000**
Total		**$36,200,000**

KC-135: PORTABLE, AIRCRAFT-POWERED GROUND TRANSFER FUEL PUMP

1. Background. ANG KC-135s require portable, aircraft-powered, ground transfer fuel pumps to onload/offload fuel for agile combat employment, post-nuclear recovery locations, or forward deployed environments where ground support is unavailable. This capability provides combatant commanders with greater flexibility in staging KC-135s during conventional or nuclear contingency operations, natural disasters, and humanitarian support operations. Aircrews can fuel/defuel KC-135s to support participating aircraft in austere locations without the logistical challenges associated with conventional, over-the-road fuel delivery. All 166 ANG KC-135s require portable, aircraft-powered, ground transfer fuel pumps.

2. Program Details.

Quantity	Unit Cost	Program Cost
166 Ground Fuel Transfer Pumps (3010)	**$80,000**	**$13,280,000**
Total		**$13,280,000**

KC-135: AIRCRAFT / AIRCREW GROUND COOLING CAPABILITY

1. Background. ANG KC-135s require cockpit and cabin cooling during ground and low-level operations. Temperatures at deployed locations routinely result in cockpit temperatures of 140° F and cargo compartment temperatures of 170° F. Aircrews generally spend greater than one hour in these conditions, which is not conducive to mission accomplishment. Ground cooling carts are the primary method for temperature reduction. Ground cooling carts are removed before engine start and are not usable if mission delays occur. Roll-on/roll-off vapor cycle air conditioning units placed onboard can provide ground cooling. This system provides crews and aircraft a more robust operating capability, reduces crew fatigue, and minimizes unsafe temperature conditions. To further enhance the ground cooling capability, personnel water cooling systems are needed for KC-135 aircrews. These systems regulate aircrew body temperature by distributing cooled fluid through a combat thermal shirt. This system provides improved mission performance, decreases fatigue, and increases situational awareness. 102 aircraft ground cooling kits are required to provide a cooling capability for 60 percent of the ANG KC-135 fleet. Additionally, 1020 personnel water cooling systems are required to equip all aircrew members.

2. Program Details.

Quantity	Unit Cost	Program Cost
102 Ground Cooling Units (3080)	**$80,000**	**$8,160,000**
1020 Personnel Water Cooling Systems (3080)	**$3,000**	**$3,060,000**
Total		**$11,220,000**

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Logistics

Logistics activities support every ANG mission area, and it ranges from aircraft maintenance and inventory management to traffic management and petroleum, oils, and lubricants management. Logisticians in the 54 states, territories, and the District of Columbia prepare for and execute worldwide contingency deployments and domestic emergency response operations. The logistics team is key to getting people and supplies where and when they need to be.

The ANG operates and maintains the oldest aircraft in the Air Force inventory. Aircraft support and test equipment are critical to daily maintenance operations at all ANG flying units. Much of the equipment used in testing aircraft systems is nearing or has surpassed the end of its designed useful life and is increasingly difficult to sustain and expensive to repair. The ANG functions at a prolonged high operations tempo, driving the need for efficient maintenance processes and robust supply chains.

Logisticians strive to reduce product lifecycle costs and the costs of logistics processes. Devices enhancing maintenance efficiency and safety while improving capabilities also improve aircraft availability, reduce operating costs, and enhance agile combat support. Equipment such as the maintenance inspection platforms and digital test equipment reduce aircraft downtime, allow logistics personnel to maintain a high rate of sortie generation, and ensure the longevity, relevance, reliability, and responsiveness of the aging fleet.

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Critical Capabilities List

Support Equipment (SE)

- Isochronal/Phase Stands (Multi-MDS)
- Towbarless Towing Equipment (Multi-MDS)
- On-Board Oxygen Generation Systems (CAF)
- Communication Fly-Away Kits
- Clear Water Rinse (Multi-MDS)
- High Capacity Federal Aviation Administration-Approved Toilet (MAF)

Test Equipment (TE)

- Smart Weapons Armament Tester (Multi-MDS)
- Video Data Link Tester (Multi-MDS)
- Enhanced Wire Testing Capability (Multi-MDS)
- Thermal Imaging (Multi-MDS)

Essential Capabilities List

- Additive Structural Manufacturing
- Multi-MDS Enhanced IAIS Capability
- Data System Exploitation
- Agile Combat Employment (ACE) Support
- Advanced Engine Borescope

Desired Capabilities List

- Laser Paint Removal
- Corrosion Control and Prevention
- Active Aircraft Bus/Operational Flight Program (OFP) Analyzer
- Component Manufacturing Software
- MQ-9 C-Band Emulator

SE: ISOCHRONAL(ISO)/PHASE STANDS (MULTI-MDS)

1. Background. The ANG requires A-10, F-15, F-22, C-17, and C-130J ISO/phase inspection stands. Aircraft maintenance is currently accomplished using a mix of antiquated inspection platforms, ladders, and B-series stands. These maintenance workaround activities do not meet Air Force Occupational Safety and Health Administration or Occupational Safety and Health Administration standards. Current inspection stands require frequent maintenance actions and numerous man-hours to maintain their serviceability. Modernized stands incorporate electric power, lighting, and pneumatics to the point of use. These stands enable maintainers to complete inspections and maintenance more effectively in a reduced time frame, leading to increased aircraft availability and enhanced mission effectiveness. By standardizing stands for maintenance activities, a smaller, more efficient supply chain with common parts and stock numbers can be established. The ANG requires two A-10, five F-15, four F-22, four C-17, and three C-130J stands.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 A-10 Phase Stands (3080)	**$900,000**	**$1,800,000**
5 F-15 Phase Stands (3080)	**$900,000**	**$4,500,000**
4 F-22 Phase Stands (3080)	**$1,000,000**	**$4,000,000**
4 C-17 ISO Stands (3080)	**$1,500,500**	**$6,002,000**
3 C-130J ISO Stands (3080)	**$1,200,000**	**$3,600,000**
Total		**$19,902,000**

SE: TOWBARLESS TOWING EQUIPMENT (MULTI-MDS)

1. Background. ANG flying wings require towbarless towing equipment capable of maneuvering aircraft in and out of hangars and/or hardened aircraft structures with "on the spot" turning capability. Aircraft positioning is currently accomplished by utilizing a full-size MB-4 tow tractor, or similar model, and a long tow bar that results in a high turn radius. Current equipment limitations do not allow for maximum hangar utilization when sheltering aircraft during severe weather events. ANG units need compact towing equipment, not requiring a tow bar for maneuvering aircraft in areas with limited space. The ANG requires two sets of towbarless aircraft towing equipment for each of the 78 flying wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
156 Towbarless Aircraft Towing Sets (3080)	**$75,000**	**$11,700,000**
Total		**$11,700,000**

ON-BOARD OXYGEN GENERATION SYSTEMS (CAF)

1. **Background:** Oxygen generating systems in fighter aircraft are an increased combat capability, but not all fighter aircraft in the ANG have self-generating oxygen systems. The F-16 blocks 40 and 42 need the enhanced self-generating oxygen systems to ensure the aircraft is not reliant on civilian resourced liquid oxygen (LOX). In combat and especially when deploying to remote locations, it is extremely difficult to resource LOX under such austere conditions. The current LOX systems have deployable LOX carts for storage, but these carts are prone to issues over short periods of time. The F-16 will be able deploy to any location without being limited by the availability of LOX support equipment, increasing support for agile combat operations.

2. **Program Details:**

Quantity	Unit Cost	Program Cost
24 LOX Systems for Block 40 F-16s (3080)	**$250,000**	**$6,000,000**
48 LOX Systems for Block 42 F-16s (3080)	**$250,000**	**$12,000,000**
Total		**$18,000,000**

SE: COMMUNICATION FLY-AWAY KITS (CFKs)

1. **Background:** CFKs increase the agile combat capability for every fighter wing in the ANG. A CFK is a ground communication kit that can provide multi-level secure communication needs within the span of operations. Current combat communication squadrons use CFKs, but there are not enough combat communication squadrons to support the agile combat employment construct for all possible flying wing missions. Allocating CFKs to every flying wing will ensure the wing can deploy and support the agile movement of aircraft in contested environments. CFKs can be used for all communication needs such as reach back to commanders, forward operating orders, targeting, and incoming threats. Ground communication is vital to being agile and the CFKs will ensure units are able to efficiently operationalize lethal capabilities.

2. **Program Details:**

Quantity	Unit Cost	Program Cost
F-22 (1 CFK) (3080)	**$100,000**	**$100,000**
F-15 (10 CFKs) (3080)	**$100,000**	**$1,000,000**
F-16 (12 CFKs) (3080)	**$100,000**	**$1,200,000**
A-10 (4 CFKs) (3080)	**$100,000**	**$400,000**
F-35 (16 CFKs) (3080)	**$100,000**	**$1,600,000**
Total		**$4,300,000**

SE: CLEAR WATER RINSE (MULTI-MDS)

1. Background. Combat Search and Rescue Guard units in a "severe" environment as defined in Technical Order 1-1-691 are required to receive a clear water rinse (CWR) after the last flight of the day or every 15 days if flying below 3,000 feet and stationed within 1.25 miles of salt water. Accordingly, CWR operations demand up to 2,000 man-hours annually with costs amounting to approximately $5 billion dollars per year. Affected units lack the manpower to properly sustain robust flying operations while simultaneously facilitating these daily rinse requirements. Modernizing CWR capabilities will not only increase aircraft availability for operations, but will also mitigate risks of injury to personnel or damage to aircraft during towing operations.

2. **Program Details**

Quantity	Unit Cost	Program Cost
2 Clear Water Rinse Systems (3080)	**$5,689,239**	**$11,378,478**
Total		**$11,378,478**

SE: HIGH CAPACITY FEDERAL AVIATION ADMINISTRATION-APPROVED TOILET (MAF)

1. Background. ANG KC-135 aircraft require a toilet with increased capacity and structural integrity in order to meet the full range of anticipated flying operations. The original legacy suitcase-style toilet's capacity level is inadequate and presents an overflow hazard when passengers are on long-duration flights. Moreover, these toilets are susceptible to corrosion-causing leakage. The upgraded toilet must fit within the current allotted area, have a large waste capacity, and provide sanitary/low biohazard risks to accommodate aeromedical missions at a manageable cost. Higher capacity toilets are required for all 164 KC-135 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
164 KC-135 Higher Capacity Toilet Assemblies (3010)	**$30,000**	**$4,920,000**
Total		**$4,920,000**

TE: SMART WEAPONS ARMAMENT TESTER (MULTI-MDS)

1. Background. The ANG requires a common armament tester to replace existing equivalents that are obsolete and costly to repair. A modernized model will retain basic test capabilities, provide complete interaction with the aircraft weapons bus, and perform operational checks of multiple breaches simultaneously. A modernized tester will provide capabilities to emulate smart weapons on stations and test advancements in modern missiles. This equipment will be used to troubleshoot and maintain stores, tanks, racks, adapters, and pylons. This hand-held tester will provide the capability to verify the condition of critical aircraft circuitry in an energized state. The tester shall have the capability to perform active and automated tests that exercise the full weapons launch/release functionality, provide visual cues of aircraft response, and display the test results through a digital display. The improved armament tester shall contain all mission design series-specific accessories necessary to perform all the functions listed as system requirements on the aircraft. A total of 5 armament testers remain required to support ANG fighter operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Armament Circuit Preload Test Sets (3080)	**$160,000**	**$800,000**
Total		**$800,000**

TE: VIDEO DATA LINK TESTER (MULTI-MDS)

1. Background. ANG A-10 and F-16 wings require video data link (VDL) testers. Currently, A-10 and F-16 avionics specialists do not have the capability to verify the operation of the targeting pod (TGP) VDL. The need for VDL test equipment is critical to ensure 100% mission capability/reliability of the TGP VDL. ANG A-10 and F-16 maintenance personnel require VDL link testers to allow maintainers to accurately and effectively troubleshoot and repair all TGP and VDL systems. The ANG requires one VDL tester for each A-10 and F-16 wing.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 ANG A-10 Video Data Link (3080)	**$40,000**	**$160,000**
12 ANG F-16 Video Data Link (3080)	**$40,000**	**$480,000**
Total		**$640,000**

TE: ENHANCED WIRE TESTING CAPABILITY (MULTI-MDS)

1. Background. ANG requires modernized wire analysis capability to rapidly and accurately troubleshoot aircraft wiring while the systems are active. The requirement is for a portable, ruggedized analyzer designed to test/analyze cables and monitor system signals while in an active state to identify signal loss or degradation. Additionally, the device should be capable of placing a load on the system under test to identify partial shorts or opens in the signal path. The tester's embedded software must enable users to save and recall bus topology, test data, and historical references that can be used later for preventative maintenance and prognostics of an airframe's numerous wiring systems. Device software should also measure signal strength, determine line loss, and find the distance to the fault. The required system should be useable on all ANG platforms after proper integration. The ANG initially requires two testers at each of its 78 flying wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
156 Wire System Analyzers (3080)	**$65,000**	**$10,140,000**
Total		**$10,140,000**

TE: THERMAL IMAGING (MULTI-MDS)

1. Background. ANG aircraft maintenance units require thermal imaging devices to facilitate improved diagnostic capabilities for aircraft environmental, electrical, and mechanical systems. Current testers measure system functionality at either the input or output with no ability to identify faults occurring in valves, relays, ducting, pumps, or other transition points. Thermal imaging provides the capability to observe valves and relays opening and closing, identify leaks occurring in submerged or hard to reach ducts and lines, and monitor pump functionality during operation. Additionally, thermal imaging reduces aircraft downtime by reducing the maintenance actions typically required to remove components for bench or pressure checks. There are currently numerous commercial off-the-shelf solutions that can be used across multiple mission design series and maintenance functional areas.

2. Program Details.

Quantity	Unit Cost	Program Cost
96 Thermal Imaging Devices (3080)	**$45,000**	**$4,320,000**
Total		**$4,320,000**

Airborne Intelligence, Surveillance, and Reconnaissance

MC-12W – The MC-12W is tasked to support U.S. Special Operations Command directed missions. The MC-12W aircrews are specifically trained to support special operations ground forces through the find, fix, finish, exploit, and analyze model. Aircrews train, brief, support, advise, and assist special operations forces (SOF) elements from the ground assaulter to SOF commanders while executing across the full spectrum of SOF mission sets, manned intelligence, surveillance, and reconnaissance (ISR), and fires.

Airborne Intelligence, Surveillance, and Reconnaissance
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Critical Capabilities List

MC-12W

- Airborne Mission Network
- Additional SIGINT Antenna
- Second Full-Motion Video Sensor
- Five-Blade Propellers
- Synthetic Aperture Radar / Moving Target Indicator

Essential Capabilities List

MC-12W

- Onboard Android Team Awareness Kit and Mobile Ad Hoc Network Radio Integration.
- Combat LST hardware Module to Provide the Capability to the MX-15 Sensor Ball.
- Combat Systems Officer / Tactical Systems Operator Aircraft Oxygen System Integration.
- Combat System Officer / Tactical Systems Operator Aircraft Intercom Integration for Traffic and Ground Collision Avoidance Systems.
- Selective Availability Anti-Spoofing Module Global Positioning System

Desired Capabilities List

MC-12W

- Improved Ku Spread Spectrum Antenna
- Cockpit Voice Recorder Cutout Adjustment
- Left Pilot Mission System Access
- Improved Right Pilot Mission System Controls

MC-12W: AIRBORNE MISSION NETWORK

1. Background. ANG MC-12W aircraft require an onboard tactical data link (TDL) radio, with associated hardware and antennas, to employ across multiple areas of responsibility. MC-12Ws lack the means to establish and maintain direct TDL communications with command and control, tactical agencies, and other TDL users. TDLs are used to share aircraft position, targeting data, sensor points of interest, cursor-on-target data, and target-track information derived from various intelligence sources via an airborne network. The lack of onboard TDL slows the kill chain, delays effects for supported commanders, and poses a safety risk with regard to aircraft position and airspace de-confliction. Lack of direct information sharing with other TDL participants degrades overall situational awareness. The system must be roll-on/roll-off capable. Each of the 13 ANG MC-12W aircraft require one Link 16 radio.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
13 Link 16 Radio A-Kits (3010)	**$100,000**	**$1,300,000**
13 Link 16 Radio B-Kits (3010)	**$250,000**	**$3,250,000**
Total		**$7,550,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: ADDITIONAL SIGINT ANTENNA

1. Background. ANG MC-12W aircrews cannot meet the full scope of deployment taskings with current equipment on their aircraft. Permanent modifications of a 2.4GHz WLAN antenna, a 5GHz antenna, and a second JEM dual band antenna is required on board all 137 SOW assigned MC-12Ws using approved engineering in the lower tub faring. The second JEM antenna is used for survey systems and miscellaneous collection boxes (DRT/ICS). Two MC-12Ws were modified for deployment. Nine ANG MC-12Ws require the full modification to meet Signal Intelligence requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
9-WLAN Antennae (3010)	**$210,000**	**$1,890,000**
9-5 GHz Antennae (3010)	**$270,000**	**$2,430,000**
9-JEM Antennae (3010)	**$300,000**	**$2,700,000**
Total		**$10,020,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: SECOND FULL MOTION VIDEO SENSOR

1. Background. ANG MC-12Ws require a more capable optical sensor to bring the MC-12W to the SOCOM manned platform standard. The additional full motion video system will double the imagery intelligence capability for MC-12W crews and provide a substantial increase of situational awareness to the commanders on the battlefield. By extension, this capability will greatly enhance the ability of MC-12W crews to provide collateral damage estimates and scans for kinetic strike and close air support situations, positively identify enemy combatants, and protect the ground force with added defensive scans. Increased fidelity enable the MC-12W to fly higher, mitigate surface-to-air threats, identify more details of high value targets, and identify hostile intent by detecting armed personnel. All 13 ANG MC-12Ws require a second sensor with more capability than the MX-15DiD sensor.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,500,000**
13 EO/IR Sensors (3010)	**$1,500,000**	**$19,500,000**
Total		**$22,000,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: FIVE-BLADE PROPELLERS

1. Background. ANG MC-12s require five-blade propellers with installation and testing. Due to the MC-12 continually operating at its maximum gross weight with a high amount of drag due to add-on mission equipment, it is constantly at a performance disadvantage. This often means carrying less fuel, which translates to less time on station and less mission capability to combatant commanders. New propellers will offer a substantial performance increase, mitigating these losses. ANG MC-12s require six additional five-blade propeller sets along with installation and flight testing for all acquired sets to outfit all 13 aircraft and additional spare sets.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$6,000,000**
6 Five-Blade Propeller Sets (3010)*	**$500,000**	**$2,500,000**
Total		**$8,500,000**

*includes 10% spares.

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: SYNTHETIC APERTURE RADAR / MOVING TARGET INDICATOR

1. Background. ANG MC-12Ws currently operate with a single MX-15DiD visual infrared (IR)/electro-optical (EO) sensor for use during image intelligence collection activities A limitation-of-visual sensor systems, is operating in reduced or obscured visibility conditions, such as clouds, fog, or smoke. Lightweight Synthetic Aperture Radar - Moving Target Indicator (SAR-MTI) offer small and lightweight pod or turret-based radar sensor platforms that can seamlessly integrate with existing MC-12W mission software. This SAR-MTI sensor would allow the MC-12W to provide a greater degree of support and flexibility to ground commanders. 13 systems are required for the MC-12W.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$10,000,000**
13 Synthetic Aperture Radars (3010)	**$2,000,000**	**$26,000,000**
Total		**$36,000,000**

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

Global Integrated Intelligence, Surveillance, and Reconnaissance

Intelligence – Intelligence, Surveillance, and Reconnaissance (ISR) production centers are the analytical engines behind timely environment characterization and in-the-moment awareness to enable decisions and action. ANG production enterprises include the following:

Distributed Common Ground System (DCGS) - With seven locations, DCGS sites process, exploit, and disseminate near real-time intelligence derived from U-2, RQ-4, and MQ-9 sensors for combatant commands, component numbered air forces, and national command authorities.

Targeting – Nine squadrons at six locations provide federated intermediate and advanced target development, battle damage assessments, collateral damage estimates, and analytical assessment for steady-state planning and contingency operations.

Cyber ISR – Enables operations across air, space, and cyber domains. Seven sites across the country create all-source products derived from digital network intelligence.

Unit Level Intelligence - Supports 23 Mission Design Series weapons systems across 143 ANG units and imbeds with other mission sets to tailor intelligence for Air Tasking Order execution and integration.

Intelligence
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Critical Capabilities List

- Multi-Domain Network Communications Kit
- High-Performance Workstations
- Advanced Artificial Intelligence and Machine Learning High Performance Computing Capability
- Open Architecture Artificial Intelligence Advanced Battle Management Systems
- Augmented Reality for Unmanned Aircraft System Feed

Essential Capabilities List

- Publicly Available Information Toolkit Access
- Deployable Emitter For Simulation of Threats
- Distributed Training Operations Servers to Enable Realistic Mission Training
- Joint Targeting Cycle Simulation Capability
- Advanced Geospatial Information Systems Suite for Targeting Workflow

Desired Capabilities List

- Virtual Target Modeling for Enabling Offensive Cyber Operations and Other Non-Lethal Fires
- Redundant Power Supplies for Targeting Units
- Multi-National Information Sharing Cross-Domain Integration - Mission Partner Environment
- Virtual Reality Training and Mission Planning Tool
- Cognitive Performance Training Tool

INTELLIGENCE: MULTI-DOMAIN NETWORK COMMUNICATIONS KIT

1. Background. ANG personnel recovery/combat search and rescue and tactical airlift unit-level intelligence (ULI) organizations lack the ability to independently access multi-domain intelligence to provide decision enabling information to the warfighter in agile combat employment (ACE) during contested and degraded operations. To meet ACE taskings, the fight on Joint Worldwide Intelligence Communications System initiative, and align with the distributed intelligence combat element concept of operations, ULI requires a multi-domain network communications kit. This kit must also have primary, alternate, contingency, and emergency communication mediums and a standalone power capability with redundant backup. It must have a high volume beyond-line-of-sight satellite communications, simultaneous secure high-frequency / very high-frequency voice and data, tactical data link integration, and cellular voice and data. Changes to the tactical combat environment, the unpredictability of operating location, and mission tasking are driving ULI organizations to operate in remote locations with minimal infrastructure. ULI organizations require five kits to be used as a proof of concept before being fielded to all organizations.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Equipment Chassis (3080)	**$230,000**	**$1,150,00**
5 Secure Voice and Data Encryption Devices (3080)	**$40,000**	**$200,000**
5 Ka/Ku/X-Band SATCOM Dishes (3080)	**$300,000**	**$1,500,000**
5 HF/VHF Radios (3080)	**$30,000**	**$150,000**
5 Link-16 Radios (3080)	**$50,000**	**$250,000**
5 IBS Radios (3080)	**$32,000**	**$160,000**
5 LTE Router (3080)	**$1,000**	**$5,000**
60 High-Powered Solid-State Laptops (3080)	**$5,000**	**$300,000**
5 Solar, Battery, Generator Power Solutions (3080)	**$20,000**	**$100,000**
Total		**$3,815,000**

INTELLIGENCE: HIGH-PERFORMANCE WORKSTATIONS

1. Background. The ANG Intelligence Surveillance and Reconnaissance (ISR) enterprise requires more processing power to fuse multiple-intelligence data effectively. The current workstations available to the ANG ISR enterprise do not have the capacity to run available government off-the-shelf applications without significantly slowing down and/or freezing the system. Thick client workstations and graphic processing units (GPUs) will allow units to utilize applications and capacity for future growth for targeting fully, Distributed Common Ground System, and remotely piloted aircraft. 157-unit level intelligence organizations and 65 ISR organizations require workstations/GPUs for on-going analysis usage.

2. Program Details.

Quantity	Unit Cost	Program Cost
222 Thick Client Workstations with GPU (3080)	**$7,000**	**$1,554,000**
Total		**$1,554,000**

INTELLIGENCE: ADVANCED ARTIFICIAL INTELLIGENCE / MACHINE LEARNING HIGH PERFORMANCE COMPUTING CAPABILITY

1. Background. Intelligence analysts require an open architecture system with advanced artificial intelligence (AI) capabilities to streamline decision-making cycles across multi-domain boundaries. The system must include Neuromorphic Computing Bio-inspired technology and feature advanced analytics. This system must deliver petaflops of computational power at gigaflops per watt providing warfighters with advanced analytics without large energy requirements. This system must leverage machine learning techniques to process data on board, deliver enhanced situational awareness, adaptive decision making, multi-mode, multi-mission, massive analytics and heterogeneous information processing, helping operators to recognize and act on actionable intel. Multiple systems should be procured for unit level intelligence, the DCGS enterprise, and operational analysts tasked with intelligence analysis and production. This system should include capabilities and support necessary to operate and update the system. Lastly, this system must be open architecture to ensure analysts can upload AI capabilities to suit their mission requirements and provide human to machine interfacing in both deployed and in garrison environments.

2. Program Details.

Quantity	Unit Cost	Program Cost
400 High Performance Computers (3080)	**$500,000**	**$200,000,000**
Total		**$200,000,000**

INTELLIGENCE: OPEN ARCHITECTURE ARTIFICIAL INTELLIGENCE ADVANCED BATTLE MANAGEMENT SYSTEM

1. Background. Intelligence analysts require a multi-layered common operating picture (COP) with advanced artificial intelligence (AI) capabilities in order to converge effects across multi-domain boundaries through globally integrated operations in accordance with the United States Air Force Advanced Battle Management System (ABMS) Campaign Plan, the Next Generation ISR Dominance Flight Plan, and the Interim National Defense Strategy. This COP will allow improved operational readiness and is essential for allowing intelligence units to contribute to ABMS. The COP must feature a two-way communication link paired with advanced analytic tools and human-to-machine interfacing allowing for the compression of the mission planning process, the find, fix, target, track, engage, assess, and the processing, exploitation, and dissemination processes. This COP should feature AI processes that allows for near-real-time collaboration, automated data storage and retrieval, link analysis, automated target recognition, predictive assessment of selectors, digital terrain and elevation data analysis and assessment, and multi-INT integration. The COP must be automated into a cross domain solution for classified and unclassified networks, while being interoperable with the Distributed Common Ground Station Open Architecture enterprise, the Air Operations Centers, and other mission partners.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Multilayer Interoperable Cloud-Based COP (3080)	**$7,500,000**	**$7,500,000**
Total		**$7,500,000**

INTELLIGENCE: AUGMENTED REALITY FOR UNMANNED AIRCRAFT SYSTEM FEED

1. Background. Remotely piloted aircraft (RPA) intelligence requires augmented reality to overlay threat and situational awareness data to crew members. Intelligence operators working in RPA squadron operations centers do not currently have a capability to overlay threat or situational awareness data on the pilot or sensor operator's heads up displays. This results in lengthy, and at times confusing, threat and target identification for the pilot and sensor operator. Augmented reality allows for increased situational awareness to RPA aircrew and customers, increasing survivability by providing real-time threat information overlaid onto the full-motion video feed. This capability also provides increased situational awareness on targets, reducing the find, fix, track, target, engage, and assess timeline, which allows for increased lethality of the RPA enterprise. This matching of human and machine interface is in line with the Next-Generation ISR Dominance Flight Plan and the National Defense Strategy. The ANG requires one RPA kit for each of the 35 ground control stations.

2. Program Details.

Quantity	Unit Cost	Program Cost
35 RPA Kits (3080)	**$100,000**	**$3,500,000**
Total		**$3,500,000**

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Special Warfare

- **Combat Search and Rescue**
- **Special Operations**
- **ANG Guardian Angel Units Provide 30% of the Total Force**
- **ANG Special Tactics Units Provide 25% of the Total Force**
- **ANG Air Support Operations Units Provide 38% of the Total Force**

Special Warfare is made up of the following three squadron types:

Guardian Angel (GA) - The ANG has three squadrons consisting of combat rescue officers and pararescue. Their mission is to execute personnel recovery of downed and injured aircrew members by providing recovery and emergency medical treatment necessary to stabilize and evacuate injured personnel.

Special Tactics (ST) - The ANG has two Special Tactics squadrons that are uniquely organized, trained, and equipped to conduct joint special operations and sensitive recovery missions. Special Tactics combat controllers, pararescue, and special reconnaissance provide quick-reaction global access to include austere airfield operations, command and control, close air support (CAS), and casualty recovery.

Air Support Operations Squadrons (ASOS) - The ANG has 16 squadrons under two operations groups providing airspace integration and terminal attack control of CAS firepower against enemy ground targets. ASOS units are composed of tactical air control party specialists (TACP) and primarily imbed with the Army. They establish and maintain command, control, and communications of all combat air assets, including the integration of surface-to-surface and air-to-surface fires.

Special Warfare
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Critical Capabilities List

Guardian Angel

- Combat Survivability Suite
- Marksmanship Trainer
- Human Performance Optimization
- Maritime Operations Modernization
- Tactical Awareness Tracking

Special Tactics

- Austere Airfield Operations Kit
- Modernized Aerial Cargo Delivery
- Extreme Cold Weather Package
- Tactical Communications Suite
- Spectrum Battlefield Identification Broad

Air Support Operations Squadron

- ASPEC Warfare Mobile Communications Package
- Mission Planning and Debrief System (T-MPDS)
- Long Range Unmanned Aerial System
- Mission Command Server System
- Ground Radio Optimization

Essential Capabilities List

Guardian Angel

- Maritime Support Package
- Mountain Warfare Equipment
- Small Arms/Indirect Fire Enhancement
- Fixed-Wing Recovery System
- Battlespace Mobility

Special Tactics

- Reconnaissance Modernization Suite
- Information Share Server Suite
- Diver's Underwater Navigation and Sonar Modernization
- Mobile/Deployable Preservation of the Force and Family Suite
- Container Express Deployable Diver Decompression Chamber

Air Support Operations Squadron

- Mounted Vehicle Agnostic Laser Range Finder/Laser Target Designator
- Radio Antenna Package for Vehicles
- Human Performance Optimization Program
- Portable Augmented Reality Precision Strike Simulator
- Short Wave Infra-Red /Laser Range Finder/Laser Target Designator

Desired Capabilities List

In an effort to save space, desired lists can be obtained upon request from NGB/A5.

GA: COMBAT SURVIVABILITY SUITE

1. Background. ANG Guardian Angel (GA) requires modernization of the combat survivability suite, which includes a target enhancement suite, neutral buoyant body armor, modern water communications upgrades, and next-generation helmet systems. Missions in the maritime environment require hydrophobic plate carriers and current armor systems are not maritime-compliant. GA needs modern water communications devices capable of clear communication between team members in all maritime environments. The GA combat survivability system includes: one hydrophobic plate carrier; one neutral buoyancy plate set; magnetic induction communication devices; chemical, biological, radiation, nuclear environment (CBRNE) suit and breathing device with a spare training suit; a next-generation modular helmet.

2. Program Details.

Quantity	Unit Cost	Program Cost
200 Magnetic Induction Communication Devices (3080)	**$5,000**	**$1,000,000**
200 Hydrophobic Plate Carriers (3080)	**$1,500**	**$300,000**
200 Neutral Buoyancy Plate Sets (3080)	**$2,000**	**$400,000**
200 Next-Generation Modular Helmets (3080)	**$2,000**	**$400,000**
200 Enhanced CBRNE Suits (3080)	**$1,000**	**$200,000**
200 PAPR Mask/Blower Sets (3080)	**$1,000**	**$200,000**
200 Enhanced CBRNE Training Suits (3080)	**$500**	**$100,000**
Total		**$3,600,000**

GA: MARKSMANSHIP TRAINER

1. Background. ANG Guardian Angel (GA) and Special Tactics (ST) teams require a modular indoor containerized range (MICR). It will provide a fully enclosed zero surface danger zone and vertical danger zone environment allowing personnel to train and qualify safely 365 days a year. Guardian Angel unit's tasking and mobilization status require them to maintain their weapons qualifications currencies as a readiness baseline. Additionally, GA units have a weapon employment (WE) requirement from the ACC mandated ready angel program (RAP) Tasking Memorandum. This WE RAP requirement is intended to improve and track small arms combat proficiency and goes well beyond basic AF Group A qualification and currency. The WE RAP includes live-fire immediate action drills (IAD), close quarters battle (CQB), and target discrimination training. ST units also have extensive pre-deployment small arms training mandated by SOCOM. The modular ranges must be able to support these Special Warfare specific live-fire training standards. To meet these readiness and training requirements, GA and ST units require a multilane range with firing lanes that extend beyond the Combat Arms standard of 25m, with 100m lanes being ideal. The ranges must-have sections that allow for lateral movement to facilitate live fire IADs. The ranges must be rated up to .50 caliber to allow training on all unit assigned and UTC tasked GA and ST weapon systems. The ranges must meet the Air Force engineering technical letter (ETL) 11-18: Small Arms Range Design and Construction. Modular ranges may be scaled to meet each GA and ST unit's host Wing space requirements. Each of the three GA squadrons require a Modular Small Arms Range, and one of the two ST squadrons still requires a Modular Small Arms Range.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Small Arms Ranges (3080)	**$8,000,000**	**$32,000,000**
Total		**$32,000,000**

GA: HUMAN PERFORMANCE OPTIMIZATION

1. Background. ANG Guardian Angel (GA) and Tactical Air Control Party (TACP) require rehabilitation and recovery equipment to support emerging human performance optimization (HPO) programs and associated trainers. Special Warfare Airmen have long lacked progressive methods of fitness, rest, and rehabilitation of injuries and combat fatigue sustained while executing or training for missions consistent with other special operations forces weapon systems. Injuries and combat fatigue negatively impact the health and readiness of the special warfare weapon systems and result in excessive and unnecessary lost work-days and subsequently impact mission-ready status. The current medical system does not provide a detailed initial medical screening for special operations operators, nor does it address past injuries and structural concerns. Each of the three GA squadrons requires two sensory deprivation pods, three cranial electrotherapy devices, one infrared recovery unit, one anti-gravity cardio rehabilitation unit, one athlete data management software system, and one low-impact cardio unit. Each of the 16 TACP squadrons requires 60 tailored Human Performance Programs, 60 vital sign monitoring systems, 60 vital fluid monitoring systems, and 60 full body performance kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Sensory Deprivation Pods (3080)	**$30,000**	**$180,000**
9 Cranial Electrotherapy (3080)	**$1,100**	**$9,900**
3 Infrared Saunas (3080)	**$4,820**	**$14,460**
3 Anti-Gravity Rehabilitation Treadmills (3080)	**$100,000**	**$300,000**
3 Athlete Data Management Software Packages (3080)	**$15,000**	**$45,000**
3 Rotating Stairmill Systems (3080)	**$10,000**	**$30,000**
840 HPO Programs (3080)	**$315**	**$264,600**
840 Vital Sign Monitoring Systems (3080)	**$3,600**	**$3,024,000**
840 Vital Fluid Monitoring Systems (3080)	**$7,500**	**$6,300,000**
840 Full Body Performance Kits (3080)	**$995**	**$835,800**
Total		**$11,003,760**

GA: MARITIME OPERATIONS MODERNIZATION

1. Background. ANG Guardian Angel (GA) and Special Tactics (ST) personnel require open ocean maritime operations equipment. GA needs a hard hulled boat (HHB) or rigid-hulled inflatable boat (RHIB), air-droppable by C-130s. Boats capable of supporting up to 4 litter patients and 6-8 operators, propeller-driven, compatible with GA communications equipment, and equipped with forward-looking infrared, sonar, and radar. Existing Joint and GA maritime equipment does not meet the current combatant command requirements for the personnel recovery (PR) mission, presenting a significant risk to the mission and friendly forces. Current unit type code-tasked maritime mobility is primarily filled by inflatable boats with significant limitations. Modernization requirements include rapidly-deployable, air-droppable, defensible, hard-hulled watercraft that are open-ocean and littoral-capable to support PR training and operations. Current mission sets require GA to operate in the open ocean in extreme environmental conditions without direct support for several days. Combatant command requirements also require GA to have organic defensive capability. This platform requires a modular mounting system capable of supporting crew-served weapons and other accessories. Each of the three GA squadrons require three HHB/RHIB boat delivery platforms, and associated equipment parachutes. Both ST squadrons require one HHB/RHIB boat delivery platform, and associated equipment parachutes.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Maritime Operations Simulator (3080) *	**$2,200,000**	**$6,600,000**
11 Aerial Delivery Platforms (3080)*	**$250,000**	**$2,750,000**
11 Equipment Parachute Packages (3080)*	**$76,000**	**$836,000**
20 Advanced Rescue Craft (3080)*	**$20,000**	**$400,000**
22 Towable Support Inflatables (3080)*	**$7,500**	**$165,000**
Total		**$10,751,000**

* Complete, Pending Delivery

GA: TACTICAL AWARENESS TRACKING

1. Background. ANG Guardian Angels (GA) require a tablet, satellite-based hotspot, and radio hardware upgrades to prepare them for personnel recovery operations. GAs require access to over 25 publications encompassing tens-of-thousands of pages of Air Force Instructions, tactics, techniques and procedures, and other regulations; current tablets are unable to meet mission requirements. Due to squadron growth, more than 40% of the operators lack these capabilities. An end user device capable of running Tactical Awareness Kit (TAK) provides situational awareness, communications, command, control, and coordination required for mission success. Tablet upgrades and satellite-based global hotspots are critical to support TAK in remote locations, where other signals are unavailable. Line-of-sight and beyond line-of-sight radio accessory and hardware lifecycle replacements are required to replace aging and unserviceable components.

2. Program Details.

Quantity	Unit Cost	Program Cost
200 TAK/SWAK Compatible Tablet (3080)*	**$490**	**$98,000**
200 Iridium Hotspot (3080)*	**$279**	**$55,800**
200 SD Cards (3080)*	**$50**	**$10,000**
200 GPS w/Text and Email Capability (3080)*	**$450**	**$90,000**
36 Antenna VHF (3080)*	**$2,500**	**$90,000**
36 Antenna SATCOM 2010 (3080)*	**$3,850**	**$138,600**
4 Battery Eliminators (3080)*	**$2,800**	**$11,200**
6 X-Wing Antenna (3080)*	**$2,000**	**$12,000**
18 SATCOM Antenna AV2011 (3080)*	**$3,850**	**$69,300**
300 Battery AN/PRC 152 (3080)*	**$456**	**$136,800**
18 Charger Battery 6 Bay (3080)*	**$600**	**$10,800**
90 Tactical Headsets (3080)*	**$90**	**$8,100**
200 Tactical Push To Talks (3080)*	**$275**	**$55,000**
Total		**$785,600**

* Complete, Pending Delivery

ST: AUSTERE AIRFIELD OPERATIONS KIT

1. Background. ANG Special Tactics (ST) squadrons require a revamping of survey data collection capabilities in both the geometric and surface/subsurface domain. For geometric collections, a drone based solution coupled with geometric data collection software can provide expeditious survey data collection and significantly reduce soil sample reading time. An automated dynamic cone penetrometer (DCP) will reduce time per reading. ST needs a more holistic interpretation of airfield capacity such as a ground penetrating radar (GPR) type system. GPR technology has the potential to provide a broad spectrum assessment of the entire aircraft movement area sub-surface while reducing operator time on location, improving the ability to find critical subsurface failure areas unsuitable for aircraft operations. ST needs a foldable, all terrain, electric mountain bike. These can be inserted via Military Free-Fall with minimal additional training, are much more cost effective with little maintenance, and are far lighter for small-platform infiltration payload requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Survey Drone (3080)	**$172,000**	**$688,000**
2 Automated DCP (3080)	**$50,000**	**$100,000**
2 GPR Systems (3080)	**$180,000**	**$360,000**
20 Foldable Electric Mountain Bikes (3080)	**$2,000**	**$40,000**
20 ADS-B (IN) Receivers (3080)	**$500**	**$10,000**
8 Geolocation Markers (3080)	**$25,000**	**$200,000**
4 Man Portable Cellular Towers (3080)	**$200,000**	**$800,000**
6 Short Wave Infrared Assault Zone Maker Systems (3080)	**$20,000**	**$120,000**
Total		**$2,318,000**

ST: MODERNIZED AERIAL CARGO DELIVERY

1. Background. ANG Special Tactics (ST) and Guardian Angel (GA) squadrons require aerial delivery equipment, equipment parachutes, and personnel parachutes. Containers and parachutes for equipment and parachute equipment release assemblies need to be updated to fit the vast scope of mission sets. High-mount equipment conversion for military free fall (MFF) harnesses must be accomplished on both new and existing MFF parachute systems to create transparency in training and improve safety on equipment jumps. Panoramic night vision devices (NVD) provide a greater field of view and improve depth perception. Short-wave infrared (SWIR) clip-on systems should be utilized in conjunction with NVDs to view SWIR strobes on jumpers. Jumpmaster-specific tablets are vital to building situational awareness by providing moving map and real-time position to jumper release point. Both of the ANG ST squadrons and all three ANG GA squadrons each require 40 T-10 disposable parachutes, 20 G-12 disposable parachutes, 12 sets of panoramic night-vision goggles, an 8-ring equipment conversion for MFF harnesses, 12 SWIR clip-on devices, a parachute equipment release assembly, four aerial cargo delivery systems, six Android Tactical Assault Kit (ATAK) tablets, and 100 SWIR strobes.

2. Program Details.

Quantity	Unit Cost	Program Cost
200 T-10 Disposable Parachutes (3080)	**$200**	**$40,000**
100 G-12 Disposable Parachutes (3080)	**$1,800**	**$180,000**
60 Panoramic Night-Vision Devices (3080)	**$40,000**	**$2,400,000**
14 Tandem Parachute Systems (3080)	**$22,660**	**$317,240**
5 8-Ring Equipment Conversion for MFF Harnesses (3080)	**$400,000**	**$2,000,000**
60 SWIR, Clip-On Devices (3080)	**$14,750**	**$885,000**
5 Parachute Equipment Release Assemblies (3080)	**$50,000**	**$250,000**
20 Aerial Cargo Delivery Systems (3080)	**$20,000**	**$400,000**
30 ATAK Tablets (3080)	**$800**	**$24,000**
500 SWIR Strobes (3080)	**$400**	**$200,000**
28 Vigil EAD (3080)	**$3,300**	**$92,400**
14 Butler Recovery Systems (3080)	**$10,080**	**$141,120**
Total		**$6,929,760**

ST: EXTREME COLD WEATHER PACKAGE

1. Background. ANG Special Tactics (ST) and Guardian Angel (GA) units require vehicles and protective equipment to operate in extreme cold weather environments. This modernized equipment includes shelters and sustainment for up to 36 personnel, mobility platforms capable of carrying one to four personnel, and tools required to establish and maintain ski landing areas. Modernized equipment and training are required to revive ST and GA's arctic capability. Both ANG ST units and all three ANG GA squadrons require a mobility platform, a sustainment package, and a personal performance equipment package. ANG ST units require an all-terrain vehicle that can operate in deep snow and carry up to four operators. ANG ST squadrons require sustainment packages for troop plus size elements. ST units require durable personal equipment that is tested in extreme cold weather for multi-day operations to increase survivability.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Mobility Platforms (3080)	**$90,000**	**$450,000**
5 Sustainment Packages (3080)	**$81,000**	**$405,000**
5 Personal Performance Equipment Packages (3080)	**$152,000**	**$760,000**
Total		**$1,615,000**

ST: TACTICAL COMMUNICATIONS SUITE

1. Background. ANG Special Tactics (ST) squadrons require communication kits for current and emerging wartime operations. As commercial communications continue to improve faster than military technology, constant modernization of end-user devices, cabling, and integration solutions are needed to remain compatible with the battlefield. Integration of battle-tracking technology is needed to be modular through all vehicle types (aircraft, tactical vehicles, and watercraft) to allow the warfighter to travel through and integrate with any transportation medium. Communication kits consist of radios, antennae, push-to-talks, headsets, power and data management hubs, and a small light-weight, high-capacity power solution. Communication kits must meet waterproof requirements while being ruggedized, dustproof, and meet electromagnetic and security requirements. This must also be scalable and upgradeable to keep up with emerging technology. An individual must communicate from aircraft, tactical vehicles, and maritime vehicles, transitioning in minimal time with minimal burden for quick-action. Each of the two ST squadrons requires 130 communication operations kits and 20 transportable communication kits, and two modular gateway solution kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
260 Communication Operations Kits (3080)*	**$13,000**	**$3,380,000**
40 Transportable Communication Kits (3080)*	**$44,500**	**$1,780,000**
4 Modular Gateway Solution Kits (3080)*	**$218,000**	**$872,000**
Total		**$6,032,000**

* Complete, Pending Delivery

ASOS/ST: SPECTRUM BATTLEFIELD IDENTIFICATION BROAD

1. Background. ANG Air Support Operations Squadrons (ASOS) and Special Tactics (ST) require supplemental capability to conduct close air support and deep battlefield reconnaissance/surveillance in support of Joint Force Intelligence Preparation of the Operational Environment. Additionally, ANG ASOS and ST must be fully equipped with a diverse menu of advanced sensors to integrate with the Joint All-Domain Command and Control infrastructure. Operators require a packable / low noise short range small unmanned aerial vehicle (UAV) capable of providing electro-optical and infrared (IR) full motion video to include the ability to operate in inclement weather conditions at altitudes of up to 2,000 feet and a tactical range of up to 2.5 km with no less than 30 minutes of endurance. The UAV must be capable of autonomous flight and execute user defined flight plans through a light-weight ground control station and a wearable device capable of gesture control for hotkey execution. ASOS and ST also require a tripod mounted laser range finding (LRF) device to acquire long range targets at distances greater than 10 km under day/night conditions and capable of generating target locations accurate within 0-6 meters target location error to accommodate static operations in the over watch position. The LRF device will be interoperable with Special Warfare Assault Kit that defeats GPS jamming and spoofing.

2. Program Details.

Quantity	Unit Cost	Program Cost
56 VTOL Quadcopter-Based Aerial Platform (3080)	**$14,000**	**$784,000**
545 Gesture Control Wearable Device (3080)	**$7000**	**$3,815,000**
384 Compact IR / Coded Laser Camera (3080)	**$39,000**	**$14,976,000**
336 Compact IR / Coded Laser Marking Device (3080)	**$55,000**	**$12,432,000**
4 Combined Laser Designator / Coded Laser Camera (3080)	**$193,000**	**$772,000**
64 Long Range multi-spectrum LRF (3080) (3080) (3080)	**$98,000**	**$6,272,000**
64 Advanced Anti-Jam / Spoof Tripod (3080)	**$51,000**	**$3,264,000**
1060 Laser Early Warning Device (3080)	**$700**	**$742,000**
Total		**$43,057,000**

ASOS/ST/GA: MOBILE COMMUNICATIONS PACKAGES

1. Background. ANG ASOS/ST/GA operators require an agile, vehicle agnostic, modular and scalable C4ISR capability. Special Warfare Squadrons require 119 TAC-C2 systems boxes and 21 lower echelon network systems. This capability will provide combatant commanders with an agile, highly mobile, scalable, resilient, and durable command and control, precision strike and joint integration capability at the tactical edge to execute the kill chain in highly contested environments.

2. Program Details.

Quantity	Unit Cost	Program Cost
119 Tactical C2 Box (3080)*	**$82,000**	**$9,758,000**
21 Lower Echelon Network Systems (3080)*	**$400,000**	**$8,400,000**
Total		**$18,158,000**

* Complete, Pending Delivery

ASOS: MISSION PLANNING AND DEBRIEF SYSTEM

1. Background. ANG Air Support Operations Squadrons (ASOS) require a mission planning and debrief capability. The system will be used for mission planning and must be compatible with the tactical air control party (TACP) radio and peripheral device suite and be able to build, distribute, and store tactical mission plans. Tactical-mission planning debrief systems (T-MPDS) must be fully compatible with Special Warfare Assault Kit (SWAK) and the Android Tactical Assault Kit (ATAK) software and aid in the development of mission products for SWAK and ATAK as well as physical copies of mission products such as maps. The system must fully integrate TACP point of view video, screen capture of the TACP multi-function display, and multi-channel audio recording without interfering with the TACP during operations both day and night. The T-MPDS must be able to provide a log of all actions during the mission and a single file that synchronizes video and audio to facilitate debrief.

2. Program Details.

Quantity	Unit Cost	Program Cost
15 Garrison Mission Planning/Debrief Systems (3080)	**$30,000**	**$450.000**
883 JTAC Mission Recording Systems (3080)	**$1,500**	**$1,324,500**
144 Deployed Mission Planning/Debrief (3080)	**$15,000**	**$2,160.000**
Total		**$3,934,500**

ASOS: LONG RANGE SMALL UNMANNED AERIAL SYSTEM

1. Background. ANG Air Support Operations Squadrons (ASOS) require a long range small unmanned aerial system (sUAS) to conduct reconnaissance and optimize situational awareness during Domestic Operations (DOMOPS). The sUAS must be under three pounds and modular with the ability to be assembled and disassembled without tools during infiltration and exfiltration. The sUAS must have no less than two hours of endurance, day/night capable, and able to perform during inclement weather with up to 40 knot winds. The sUAS must also have the ability to be recharged from existing TACP power solutions. The sUAS must be able to carry a payload of up to 350g and include an Electro Optical/Infrared, terrain mapping, multispectral, and LASER designator payload. The sUAS must have a low noise signature and undetectable at altitudes above 60ft AGL. Additionally, the sUAS must be capable of autonomous flight and execute user defined flight plans through a light-weight ground control station and a wearable device capable of gesture control via electron urography to accommodate tactical night operations. Finally, the sUAS must have the ability to launch remotely at distances up to 5km offset to increase survivability and to mitigate detection of the operator. Each ASOS requires 2 sUAS, 2 payload packages, and 2 operator training events.

2. Program Details.

Quantity	Unit Cost	Program Cost
28 Tactical Long Range sUAS (3080)	**$15,000**	**$420,000**
28 Tactical Long Range sUAS Payload Packages (3080)	**$20,000**	**$560,000**
2 Training Events (3080)	**$30,000**	**$30,000**
Total		**$1,010,000**

ASOS: MISSION COMMAND SERVER SYSTEM

Background. Air Support Operations Squadrons (ASOS) require a cloud based server to Team Awareness Kit (TAK) Server for training and Domestic Operations. The cloud based server configuration must support dual layer authentication through the use of virtual private network and secure sockets layer. Tactical Air Control Party (TACP) must have the capability to pull TAK data, share Cursor on Target data, stream and share video, and provide server federation. The server must have a web browser interface and fully support remote management that can be accessed by either TACP or combat mission support personnel from home station or a deployed location. TACP's require a portable single board computing server solution that can be deployed in vehicle and dismounted situations to extend TAK server capability into environments with limited to no broadband connectivity. TACPs need a lightweight satellite hotspot that can provide server connectivity in austere environments. TACP members require an effective and efficient command and control communications capability. The ASOS require overall hardware for their lightweight, transportable, tactical network suite capable of linking JTACs, aircrews, and senior echelons.

1. Program Details.

Quantity	Unit Cost	Program Cost
14 Cloud Based TAK Servers (3080)	**$20,000**	**$280,000**
1 Digital Training Suite (3080)	**$35,000**	**$35,000**
28 Single Board Servers (3080)	**$1,000**	**$28,000**
600 Lightweight Satellite Hotspots (3080)	**$900**	**$540,000**
4 Mission Application Platforms (3080)	**$55,988**	**$223,952**
4 Tactical Network Systems (3080)	**$33,287**	**$133,112**
4 15M, 50M, 100M Fiber Optic Cables/SFP+ Connectors (3080)	**$1,287**	**$5,148**
Total		**$1,245,212**

ASOS: GROUND RADIO OPTIMIZATION

1. Background. Air Support Operations Squadrons (ASOS) requires upgraded peripherals for their ground radios to adapt to next-generation waveforms and agile-redundant communications. Each of the 16 squadrons require upgraded BDAT/SWAK kits, PRC-117G upgrade kits, PRC-160 upgrade kits, PRC-163 upgrade kits, and PRC-161 upgrade kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
168 SWAK Upgrade Kits (3080)	**$13,300**	**$2,234,400**
56 PRC 117G Upgrade Kits (3080)	**$19,500**	**$1,092,000**
56 PRC 160 Upgrade Kits (3080)	**$5,000**	**$280,000**
280 PRC 163 Upgrade Kits (3080)	**$25,000**	**$7,000,000**
280 PRC 161 Upgrade Kits (3080)	**$1,500**	**$420,000**
Total		**$11,026,400**

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MQ-9

- **Persistent Attack and Long Endurance Battlespace Awareness**
- **ANG MQ-9 Units Execute 55% of All Conventional MQ-9 Combat Lines**
- **ANG MQ-9 aircraft comprise 6% of all Total Force MQ-9 Aircraft**

The MQ-9 remotely piloted aircraft (RPA) comprises the largest Major Weapons System community in the Air Force. The MQ-9 Reaper is a medium-to-high altitude, long-endurance, remotely piloted system. Due to the robust weapons payload capacity and long-endurance, the MQ-9 is able to prosecute time-sensitive targets through precision targeting. The aircraft employs up to eight laser-guided AGM-114 Hellfire missiles and/or four GBU-12 / GBU-38 / GBU-49 / GBU-54 500-pound precision-guided bombs. Additionally, the MQ-9's long-endurance makes it the ideal platform to provide intelligence, surveillance, and reconnaissance by employing multiple sensors to provide real-time data to commanders and intelligence specialists at all levels.

In addition to supporting their individual state requirements, ANG units fly combat missions 24 hours a day, 365 days a year in every major combat theater. The ANG manages flight training operations at two locations and supports test and evaluation at a third. Five launch and recovery element sites can support continuation training and support to domestic operations over the continental United States. In 2021, the ANG flew 579 MQ-9 flight hours in support of wildfire fighting operations. ANG MQ-9 crews, equipment, and maintenance personnel were credited with saving multiple California towns from wildfires by detecting and real-time reporting unanticipated wildfire movements.

MQ-9
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Critical Capabilities List

- Command and Control Resiliency
- Ground and Air Based Detect and Avoid Systems
- Multi-Spectral Targeting System Resolution and Computing Improvements
- Air Domain Awareness
- Alternate Precision Navigation and Timing System

Essential Capabilities List

- Minimal Latency Tactical Data Link and Communications Pod
- Edge Processing For Artificial Intelligence / Machine Learning
- Radar Horizon SIGINT Collection
- Modular Electronic Warfare Capabilities
- Open Mission System Architecture

Desired Capabilities List

- Range and Payload Enhancements
- Cockpit Human-Machine Interface Improvements
- Multi-Aircraft Operation via Airborne Distributed Control Network
- Link to Heads-Up Display Augmented Reality Integration
- Weather Tolerance Hardening

MQ-9: COMMAND AND CONTROL RESILIENCY

1. Background. ANG MQ-9 aircraft require an upgrade to the existing satellite communications (SATCOM) equipment used for command and control (C2) and payload dissemination. The current SATCOM set up does not allow the MQ-9 to continue to provide the effects required by the joint force. Transitioning C2 and payload dissemination to satellites in low earth orbit, will provide the increased resiliency and data throughput to drastically change the way MQ-9s are employed. Additional beyond line-of-sight connections and capabilities, to include mesh networks, minimum latency datalinks, and Manned-Unmanned Teaming will provide further resiliency for command and control and allow the MQ-9 to be an edge node for connecting other players within the larger Joint Force communications network. 10 ANG MQ-9 aircraft will require upgraded C2 communications equipment.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$9,000,000**
10 C2 Phased Array Antennas (3010)	**$200,000**	**$2,000,000**
Total		**$11,000,000**

MQ-9: GROUND AND AIR BASED DETECT AND AVOID SYSTEMS

1. Background. ANG MQ-9 units require both a ground-based and air-based detect and avoid radar solution to meet international airspace due regard rules and host nation restrictions. Additionally, these systems will fulfill Federal Aviation Administration requirements to safely operate within the National Airspace System alongside civilian aircraft. Currently the lack of these capabilities is a barrier to entry to many regions in the world where MQ-9 operations are requested and needed. The ANG requires three ground based systems to enable Agile Combat Employment and 10 airborne detect and avoid systems for ANG MQ-9 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Ground Based Detect and Avoid Sites (3010)	**$3,200,000**	**$9,600,000**
10 Airborne-Based Detect and Avoid Systems (3010)	**$2,200,000**	**$22,000,000**
Total		**$31,600,000**

MQ-9: MULTI-SPECTRAL TARGETING SYSTEM RESOLUTION AND COMPUTING IMPROVEMENTS

1. Background. ANG MQ-9s require an upgrade to the Multi-Spectral Targeting System (MTS) for deep-look, find, and fix effects. The current electronics unit (EU) for the MTS is outdated and is the limiting factor in improving the capabilities of the MTS. The intelligent electronics unit (iEU), using Sensor Open Systems Architecture compliant hardware, provides the computational power to dramatically improve combat identification and enable artificial intelligence/machine learning algorithms to run on the sensor data inside the MTS. This iEU upgrade provides a significant improvement in the MQ-9s passive find/fix capability, filling one of the Combat Air Force's critical capability gaps in that area. Militarized systems in emission control or highly mobile systems executing emit-and-move tactics are still susceptible to passive find/fix tactics utilized by the MQ-9 MTS. 10 ANG MQ-9 aircraft will require an iEU.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$9,000,000**
10 MTS Intelligent Electronic Units (3010)	**$400,000**	**$4,000,000**
Total		**$13,000,000**

MQ-9: AIR DOMAIN AWARNESS

1. Background. ANG MQ-9s are unable to contribute to the air picture for future conflicts. With the refocusing on military efforts away from previous conflicts towards potential larger force on force conflicts, the Air Force needs to recapitalize the existing MQ-9 fleet to help fill critical capability gaps in the current Combat Air Force. The persistent on-station time provided by MQ-9s equipped with Infrared Search and Track (IRST) sensors are a key contributor to the overall air domain picture. The ANG requires 10 IRST sensors for MQ-9s.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$10,000,000**
10 IRST sensors (3010)	**$5,000,000**	**$50,000,000**
Total		**$60,000,000**

MQ-9: ALTERNATE POSITION NAVIGATION AND TIMING SYSTEM

1. Background. ANG MQ-9s require an alternate position, navigation, and timing (PNT) system integrated into the existing navigation equipment. MQ-9s currently rely on GPS for many aspects of operations, and need a redundant system that does not rely on GPS for backup in case of operations in a GPS degraded or denied environment. 10 ANG MQ-9s require alternate PNT systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$1,000,000**
10 Alternate PNT systems (3010)	**$300,000**	**$3,000,000**
Total		**$4,000,000**

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Operational Training Infrastructure and Ranges

- **Operational Training Environments**
- **Range Infrastructure**

This tab supports two components: Operational Training Infrastructure (OTI) and Ranges. The first tab component is a key facet of readiness training. Operational Training Infrastructure (OTI) elements such as the ANG's Distributed Training Operations Center (DTOC) provide persistent networks, modeling and simulation expertise, and operational support for daily Distributed Mission Operations (DMO) training. DMO links a wide array of simulators at ANG, Air Force Reserve, Active Component units, and other Services, preparing warfighters for combat in joint and coalition environments.

Air Combat Command released its Enterprise Range Plan, the second tab component. As part of this plan, the ANG's OTI requires realistic, static, multispectral target surrogates to replicate real-world complex target sets and realistic full-spectrum electronic warfare emitters to replicate an Integrated Air Defense System environment. These are complemented by a Digital Radio Management System, Link 16, updated range radios, and a training data link management system.

This portfolio effectively exposes our forces to realistic, sufficiently dense, and advanced threat capability live training environments while protecting our 5th generation weapon systems' capabilities and tactics.

Operational Training Infrastructure and Ranges
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Critical Capabilities List

Operational Training Infrastructure

- Air Reserve Component Network Connectivity Across the Air Reserve Components
- Networked Radio Solutions
- Networked Live-Virtual-Constructive-Operational Training Data Link Solution
- Common Debrief System for Distributed Live and Synthetic Mission Operations
- Air National Guard Operating Location

Ranges

- Air Combat Maneuvering Instrumentation
- Frequency Communications Suite For Enhanced Live-Fly Training
- High-Fidelity Surrogate Targets
- Realistic Integrated Electronic Warfare Threat Emitters
- Joint Advanced Weapon Scoring System

Essential Capabilities List

Operational Training Infrastructure

- LVC-OT Distributed Mission Operations Network Nodes that Facilitate Integrated Training with Joint Weapons Systems
- LVC-OT Cross-Domain Solutions for Persistent, Integrated Distributed Mission Operations Training Across Different Security Levels.
- LVC-OT Synthetic Entity Interaction with Live Weapon System Sensors and Capabilities Integrated Into the Blended Live and Synthetic Training Environment
- LVC-OT Contested and Degraded Operations Tools for Synthetic Environments that Provide Realistic, Physics-Based Effects Into the Virtual Training Environment
- LVC-OT Live and Synthetic Training Environment Common Operating Picture Displaying Fused Information From Multiple Sources and Protocols

Ranges

- Ground-based Electronic Attack System Compatible with Currently Fielded Threat Emitters

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5.

OPERATIONAL TRAINING INFRASTRUCTURE: AIR RESERVE COMPONENT NETWORK CONNECTIVITY ACROSS THE AIR RESERVE COMPONENTS

1. Background. The ANG requires additional connections to the Air Reserve Component Network (ARCNet). To expand the ARC distributed training network, additional sites will require portals to connect to ARCNet. Currently, there are 40 units connected to ARCNet. This is insufficient for ARC Mission Design Series (MDS) to maintain their annual training requirements. Adding additional connectivity for units will increase the ability for more units to participate in Distributed Mission Operations to provide realistic tactical synthetic training. This training allows members to maintain their annual Ready Aircrew Program requirements. Distributed Training Operation Center portals must be acquired and placed at each unit to provide connectivity to ARCNet, which allows units to utilize simulated training, connections to other ARCNet users, and connectivity to other Air Force owned networks.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Portals (3080)	**$40,000**	**$400,000**
Total		**$400,000**

OPERATIONAL TRAINING INFRASTRUCTURE: NETWORKED RADIO SOLUTIONS

1. Background. The ANG operational training infrastructure requires a networked communications capability for live, virtual, and constructive training. One of the 13 lines-of-effort in the Air Force Operational Training Infrastructure (OTI) 2035 Flight Plan is the fielding of a synthetic-to-live / live-to-synthetic training capability at live training ranges, distributed training centers (DTC), and operational units. The Air Combat Command Range Enterprise Plan intends to equip fighter wings and primary training ranges with a networked communications capability. A networked communications capability will allow users to communicate with live assets in any instrumented airspace. This will allow units to participate in live scenarios beyond-line-of-sight from the unit's location, effectively eliminating proximity as a factor that limits training with geographically separated units. This capability will also enable virtual entities to train with live assets operating in distributed airspaces. To achieve this capability, right-sized radio solutions will be procured and distributed to 11 ANG DTCs, command and control units, four A-10 units, and units conducting Joint Terminal Air Controller training.

2. Program Details.

Quantity	Unit Cost	Program Cost
15 Radio Solutions (3080)	**$50,000**	**$750,000**
Total		**$750,000**

OPERATIONAL TRAINING INFRASTRUCTURE: NETWORKED LIVE AND VIRTUAL CONSTRUCTIVE-OPERATIONAL TRAINING DATA LINK SOLUTIONS

1. Background. The ANG's Operational Training Infrastructure (OTI) requires a networked data link capability for live and virtual and constructive training. One of the 13 lines-of-effort in the Air Force OTI 2035 Flight Plan is the fielding of a synthetic-to-live/live-to-synthetic training capability at live training ranges, distributed training centers (DTC), and operational units. The Air Combat Command Range Enterprise Plan intends to equip fighter wings and primary training ranges with a networked datalink capability. There is no plan to provide this capability for other primary users of these ranges. A networked data link capability will allow users to conduct data link enabled training with live assets in any instrumented airspace. This allows units to participate in live scenarios beyond-line-of-sight from the unit's location, effectively eliminating proximity as a factor that limits training with geographically separated units. This capability will also enable unit-level constructive data link entity generation to bolster training scenarios with live assets operating in distributed airspaces. To achieve this capability, right-sized data link solutions will be procured and distributed to four A-10 units, and fourteen units conducting Joint Terminal Air Controller training.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 Data link Solutions (3080)	**$200,000**	**$3,600,000**
Total		**$3,600,000**

OPERATIONAL TRAINING INFRASTRUCTURE: COMMON DEBRIEF SYSTEM FOR DISTRIBUTED LIVE AND SYNTHETIC MISSION OPERATIONS

1. Background. The ANG Distributed Training Operations Center (DTOC) requires briefing and debriefing geographically separate units via a video teleconference system capable of mission recording and distributed playback. The debrief is the most valuable phase of both live and synthetic training missions. Mission playback facilitates debriefing, where errors and deviations are noted, instruction is given, and lessons learned are captured. A classified debrief system, dedicated to ANG distributed mission operation (DMO), allows the capture of live, virtual and constructive video sources for live viewing and mission playback. Finally, the debrief system should be compatible with the DMO network and Air Reserve Component Network. The DTOC requires three debriefing systems for scheduling flexibility and mission continuity.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Debrief Systems (3080)	**$200,000**	**$600,000**
Total		**$600,000**

OPERATIONAL TRAINING INFRASTRUCTURE: ANG OPERATING LOCATION

1. Background. The ANG's Distributed Training Operations Center (DTOC) requires increased capacity of event control centers (ECCs) through an ANG Operating Location. The DTOC denies events and decreases event sizes based on the limiting factor of the availability of ECCs. Denial and decreased event sizes mean that the ARC units are not receiving their distributed mission operations training needed to complete their annual training requirements. An additional ANG operating location allows more training events and large force exercises to be properly manned for timely and accurate scenario input to the trainee for tactical decision making.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Training Area Workstations (3080)	**$500,000**	**$2,000,000**
Total		**$2,000,000**

RANGES: AIR COMBAT MANEUVERING INSTRUMENTATION

1. Background. The ANG ranges require expanded instrumentation training opportunities in the live environment to provide tracking data for threat emitter systems and record air and ground system interactions to provide after action reviews (AAR). The P5 Combat Training System (P5CTS) is composed of a remote range unit (RRU), a live monitor system utilized at the range training officer (RTO) location, and an AAR system used at squadron debriefing locations and training centers. The P5CTS has been deployed to less than half of the ANG locations that require the capability. To complete fielding to the remaining wings and training ranges, the ANG requires 18 RRUs, 14 RTO systems, 34 AAR systems and 44 additional P5CTS pods. Additionally, the ANG requires a standard configuration of software and hardware to provide a common architecture for live training ranges to improve training and centralize modernization and sustainment. This configuration would provide a shared arrangement of range training systems and applications that is a central component of ACC's Enterprise Range Plan. It is composed of networks, servers, and workstations that consolidate training systems and software.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 RRUs (3080)*	**$400,000**	**$7,200,000**
14 RTO Systems (3080)*	**$50,000**	**$700,000**
34 AAR Systems (3080)*	**$10,000**	**$340,000**
44 P5CTS Pods (3080)*	**$180,000**	**$7,920,000**
4 Regional Level Control Suites (3080)*	**$750,000**	**$3,000,000**
23 Unit Level Control Suites (3080)*	**$300,000**	**$6,900,000**
Total		**$26,060,000**

* Complete, Pending Delivery

RANGES: FREQUENCY COMMUNICATIONS SUITE FOR ENHANCED LIVE-FLY TRAINING

1. Background. The ANG operational training infrastructure (OTI) enterprise requires realistic, standardized, full spectrum, and immersive data link and radio communication systems. The ANG continues to have shortfalls in standardized communication and data link systems at critical nodes in the range training infrastructure. The OTI enterprise consists of the flying squadrons, primary training ranges, live mission operations centers, training centers, and forward operating locations. Acquisition of the digital radio management system (DRMS), Link 16, situational advanced data link (SADL), range radios, and a training data link management system with man-in-the-loop data input capability will enhance ANG units' ability to accomplish realistic full-spectrum, multi-domain training. The ANG requires communication upgrades for four Combat Readiness Training Centers (CRTCs), 11 Primary Training Ranges (4 co-located with CRTCs), and 23 fighter wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
34 Link 16 Radios (3080)*	**$360,000**	**$12,240,000**
34 SADL Radios (3080)*	**$30,000**	**$1,020,000**
34 Data Link Management Systems (3080) *	**$297,000**	**$10,098,000**
34 Range Radio Systems (3080)*	**$150,000**	**$5,100,000**
34 DRMS (3080)*	**$480,000**	**$16,320,000**
Total		**$44,778,000**

* Complete, Pending Delivery

RANGES: HIGH-FIDELITY SURROGATE TARGETS

1. Background. To meet Ready Aircrew Program tasking requirements, the ANG operational training infrastructure enterprise requires realistic, multispectral target surrogates to replicate real-world complex target sets. The ANG currently employs a variety of high and medium fidelity surrogate targets, but still has shortfalls in realistic target acquisition and identification training. High-value complex target arrays are needed to mimic specific surface-to-air missile and anti-aircraft artillery sites and associated equipment. These arrays require the same characteristics as the actual entity to include visual footprint, density, and heat signatures. The ANG's four electronic warfare (EW) training ranges require fifteen high fidelity targets each to be associated with specific EW threat emitters.

2. Program Details.

Quantity	Unit Cost	Program Cost
58 High-Fidelity Targets (3080)	**$190,966**	**$11,076,027**
Total		**$11,076,027**

RANGES: REALISTIC INTEGRATED ELECTRONIC WARFARE THREAT EMITTERS

1. Background. ANG Operational Training Enterprise (OTE) requires realistic electronic warfare (EW) simulators to replicate an integrated air defense system (IADS) environment. High fidelity range emitters are needed to replicate an array of threat representative surface-to-air missile and anti-aircraft artillery systems in an IADS. Air Combat Command is fielding EW threat emitters in concert with their Enterprise Range Plan (ERP) but will not fully fund the ANG OTE. The EW Server, which acts as the range training officer's link between the P5 Air Combat Training System and the threat systems, must be replaced to incorporate full duplex joint threat emitter linkage to the ranges with relevant simulations for the new threat systems. The threat emitter system version 2 is integrated into the EW Server but still requires relevant flyout simulations. Air Combat Command is fielding these in concert with their ERP but will not fully fund all ANG ranges. Additionally, the ANG requires four advanced threat systems compatible with training requirements for both 4th and 5th generation aircraft, four EW servers and 10 weapons flyout simulations to fully equip all four ANG EW ranges.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Advanced Threat Systems (3080)	**$30,000,000**	**$120,000,000**
10 Weapons Flyout Simulations (3080)	**$1,000,000**	**$10,000,000**
4 EW Servers (3080)	**$100,000**	**$400,000**
Total		**$130,400,000**

RANGES: JOINT ADVANCED WEAPON SCORING SYSTEM

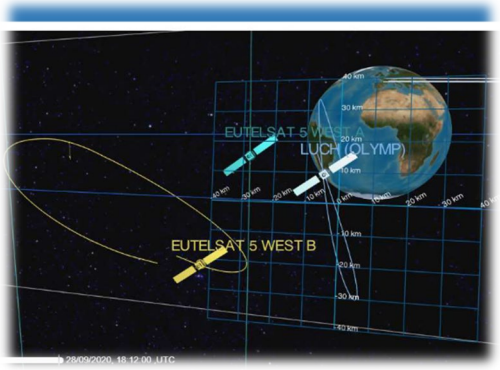
1. Background. ANG requires an upgrade to the tactical ordnance scoring system (TOSS). The TOSS system in place at ANG ranges no longer supports the expanding gamut of ANG training requirements. The Joint Advanced Weapon Scoring System (JAWSS) provides greater accuracy, night and day scoring capabilities, laser scoring, and strafe scoring capabilities. JAWSS also provides virtual reality imaging weapons training system (IWTS), no-drop weapon scoring, and automated remote feedback for home-station debrief. JAWSS consists of five systems: weapon impact scoring system; laser evaluation system-mobile; large-scale target sensor system; remote strafe scoring system and, the IWTS. Each of the ANG's 11 ranges will require one JAWSS capability and two laser/target displays. Five are currently funded through Air Combat Command. All range radios have been upgraded.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Replacement WISS Systems (3080)	**$750,000**	**$4,500,000**
11 JAWSS Spare/Upgrade (3080)	**$200,000**	**$2,200,000**
22 Laser/Target Scope and Display (3080)	**$50,000**	**$1,100,000**
Total		**$7,800,000**

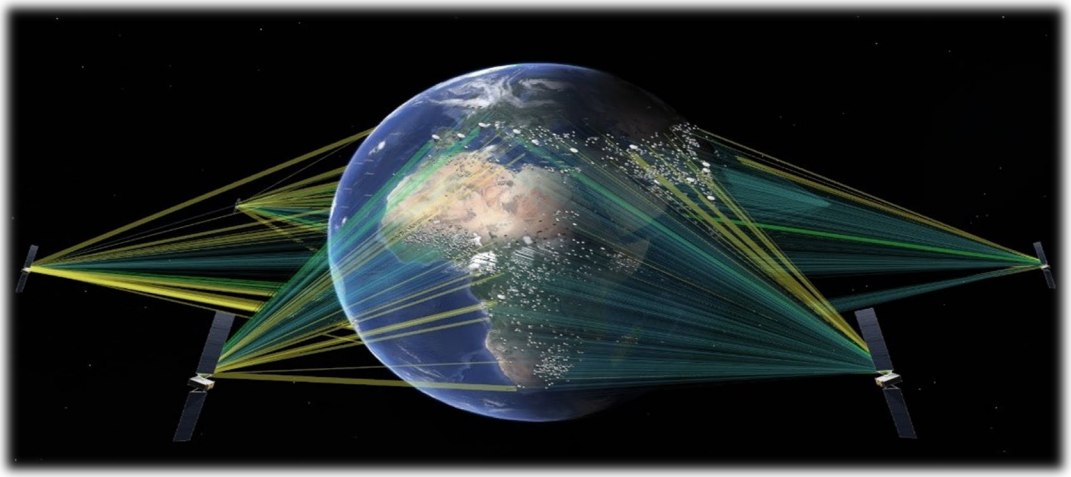
Space Operations

- **ANG Space Units Provide 60%+ of Space Electronic Warfare Operations**
- **40% Military Satellite Communication & C2**
- **Unique Mobile and Fixed Missile Warning Missions**
- **Commercial & State Partnerships providing Space Domain awareness**



The ANG contribution to United States Space Force (USSF) missions includes over 1,100 personnel within nine squadrons. Space capabilities support federal- and state-level agencies, USAF, the nuclear command and control community, and combatant commands.

Space units provide missile warning, space situational awareness, space intelligence, satellite communications, space electronic warfare capabilitiesto support operational, exercise, andplanning activities along with other space support as requested. Air National Guardsmen participating in these missions draw upon skills from their related civilian careers. Specific missions assigned to ANG units include mobile, survivable missile warning, commandand control of military strategic and tactical relay satellite constellation, space intelligence, and offensive and defensive space electronic warfare to support exercises and contingency operations. Execution of these activities occurs from the home station and deployed locations.



Space
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Critical Capabilities List

- Multi-domain Data Integration and Resiliency
- Electronic Warfare Operations Enhancement
- Electronic Warfare Training Capability
- Digital Service Integration
- Space-Domain Intelligence Toolset

Essential Capabilities List

- Defensive SEW equipment training range integration
- Fully remote operations capabilities across core mission platforms
- Small form factor CCS capacity expansion

Desired Capabilities List

- Multi-Aperture Phased Array Antenna Family

SPACE: MULTI-DOMAIN DATA INTEGRATION & RESILIENCY

1. Background. ANG space units routinely derive situational awareness of adversary maneuver and terrain that would be of immediate benefit to air, ground, and maritime forces. However, air-gapped weapon systems and operations inherently at compartmented or special access security protections inherently limit the ability to disseminate data in a timely manner, nor at appropriate operational classifications. Adding an Air & Space Electronic-Warfare Translator (ASET) to primary offensive and defensive space electronic warfare weapons allows for the rapid dissemination of space derived situational awareness. Enhancements to this side car capability would further allow the capture and dissemination of battlefield electromagnetic environments, which when provided to a combined range capability would allow deploying Airmen to train on current threats, and unit tacticians to develop new techniques against emerging adversary threats and tactics. This integration should be further expanded to include existing multi-domain range capabilities, for example, the cyber Joint Integration Operations Range (JIOR) and air-ground distributed training operations center, allowing for integrated training and tactics development amongst multi-domain battle packages. Finally, leveraging space integration provides redundancy and robustness to air, ground, and maritime domain space dependencies, such as battlespace awareness and positioning, navigation, and timing.

2.Program Details.

Quantity	Unit Cost	Program Cost
10.2 Counter Communications System (3080)	**$5,700,000**	**$5,700,000**
3 ASET MMP-X base H/W (3080)	**$225,000**	**$675,000**
ASET Integration (3080)	**$2,000,000**	**$2,000,000**
Live Range JIOR Connection (3080)	**$750,000**	**$750,000**
Live Range Enhancement Suite (3080)	**$2,000,000**	**$2,000,000**
Small Form Factor Training Range (3080)	**$2,000,000**	**$2,000,000**
Range Integration & Control Suite (3080)	**$3,000,000**	**$3,000,000**
Total		**$16,125,000**

SPACE: ELECTRONIC WARFARE OPERATIONS ENHANCEMENT

1. Background. ANG space control squadrons require Counter Communication System (CCS) hardware and software modifications to rapidly deploy electronic warfare (EW) support equipment. The current CCS is not compact nor able to perform to combatant commander's wartime requirements. Hardware footprint reduction should include a software upgrade to support the utilization of additional high-transportability antennas with the baseline CCS system and porting advanced capabilities onto a small form factor variant. Software upgrades are required to automate signal detection, characterization, and electronic positive identification for signals of interest. In addition to on-weapon enhancements, intelligence support oriented sidecars for providing rapid data dissemination, operational preparation of the environment, and battle damage assessment from attached space intelligence forces. The four ANG offensive space control squadrons require one common platform graphics user interface, signal characterization monitor and hardware, four signal characterization kit, two operational use antennas, eight antennae for training in the space EW range, CCS automation hardware, mission automation, Space EW Translator, Data handling display and eight small form factor CCS and an antenna agnostic upgrade from CCS to facilitatedecoupling the system software and hardware to enable the Antennae Families project.

2.Program Details.

Quantity	Unit Cost	Program Cost
Signal Characterization Monitor and Hardware (3080)	**$560,000**	**$560,000**
4 Signal Characterization Kits (3080)	**$1,500,000**	**$6,000,000**
10 Antennas (3080)	**$900,000**	**$9,000,000**
Antenna Agnostic CCS Upgrade (3080)	**1,500,000**	**1,500,000**
CCS Automation Hardware (3080)	**$850,000**	**$850,000**
Mission Automation (3080)	**$5,544,000**	**$5,544,000**
Space EW Translator (3080)	**$2,700,000**	**$2,700,000**
Data Handling Display (3080)	**$250,000**	**$250,000**
8 Small Form Factor CCS (3080)	**$250,000**	**$2,000,000**
Total	**$14,054,000**	**$28,404,000**

SPACE: ELECTRONIC WARFARE TRAINING CAPABILITY

1. Background. ANG space control squadrons require the ability to conduct electronic warfare advanced training (AT) scenarios in a live, virtual, and constructive (LVC) environment from multiple distributed locations. Currently, the space control community has limited ability to conduct basic continuation training and cannot interface across multiple units for enterprise-level scenarios. A multi-domain LVC environment will help meet the mission-critical requirement to provide realistic threat-based training that integrates multiple space control units, allows flexible scheduling, and provides significantly increased AT throughput to meet requirements. The initial LVC hub will require a facility that can operate at the TS/SCI level. Each of the four offensive space control squadrons require two counter communication emulation laptops for unit level training capable of networking to the space training range, radio frequency (RF) training lab suite, small form factor RF training range, and range integration and control suite. The ANG defensive space control squadron will require at least three MACE small form-factor link protection suites to train electronic protection tactics in a multi-footprint hub-and-spoke configuration. One additional RF training lab suite is required for the emerging defensive space control squadron.

2. Program Details.

Quantity	Unit Cost	Program Cost
10.2 Counter Communications System (3080)	**$5,700,000**	**$5,700,000**
Big Top Trainer (3080)	**$1,500,000**	**$1,500,000**
8 Combined Advanced Network Emulators (3080)	**$500,000**	**$4,000,000**
Network Equipment (3080)	**$500,000**	**$500,000**
8 Counter Communication Emulation Laptops (3080)	**$400,000**	**$3,200,000**
Web Based RF Fundamentals Trainer (3080)	**$750,000**	**$750,000**
5 RF Training Lab Suites (3080)	**$200,000**	**$1,000,000**
3 MACE Link Monitoring Suites (3080)	**$600,000**	**$1,800,000**
Total		**$18,450,000**

SPACE: DIGITAL SERVICE INTEGRATION

1. Background. Despite operating some of the most technologically advanced weapons in the ANG inventory, ANG Space Operations and space electronic warfare units are reliant on binders of hardcopy checklists, whiteboard based planning and mission management, and possess almost no mission playback, or post-analysis tools. Creating a Mission Data Digital Toolkit would enable the integration of digital checklists, job aids, and mission procedures with electronically available intelligence and mission tasking products, enabling smooth and repeatable mission execution, and enhanced mission debrief. Similarly, with increased congestion in useful orbits meeting outdated paper-and-pen based techniques for maneuver analysis, Space Battle Management enhancement for units operating blue orbital assets can greatly improve mission outcomes and reduce the likelihood of on-orbit conjunctions or reduced spacecraft life. To accommodate non-traditional space-derived situational awareness, expanded Fusion Analysis Development Effort Multi-INT Spatial Temporal (FADE MIST) integration will allow for intelligence community awareness and inclusion of space operations data. As space operations become more multi-domain centric, integrated digital planning tools will allow for cooperative campaign and mission planning amongst multiple MDS, allowing space to truly become the highest asset in a strike stack.

2. Program Details.

Quantity	Unit Cost	Program Cost
Mission Data Digital Toolkit (3080)	**$500,000**	**$500,000**
Space Battle Management Enhancements (3080)	**$900,000**	**$900,000**
FADE MIST Integration (3080)	**$150,000**	**$150,000**
Enhanced Digital Planning Tools (3080)	**$500,000**	**$500,000**
Total		**$2,050,000**

SPACE: SPACE-DOMAIN INTELLIGENCE TOOLKIT

1. Background. ANG non-kinetic space targeting and intelligence support units require advanced space situational awareness and target development tools to model high fidelity and accurate non-kinetic and orbital weapon effects. Space targeting units are tasked with developing non-kinetic space targeting solutions in support of target systems analysis,and entity level (person, place, or thing) target development. The products take the form of analytical reports on target vulnerability and effects assessments that are not validated against any modeling or simulation data due to a lack of viable tools to model non-kinetic effects on any given target effectively. Development of space situational awareness products requires high fidelity orbital analysis and space domain awareness tools. A common analysis and visualization tool incorporates the appropriate modules to enable Space Intel support to Space Electronic Warfare, Orbital Warfare, and Space Battle Management. The ability to store, organize, access, and disseminate targeting and all-source space intelligence data across multiple space warfighting functions will provide a vital linkage between the visualization, data fusion, and threat modeling space intelligence systems. The ANG space command and control squadron and five ANG intelligence squadrons require a Space Intel Analysis and Visualization Tool, Data Synthesis and Fusion Tool, and Dynamic Space Intelligence Repository to produce standardized, all source, and space domain threat analysis.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Space Intel Analysis & Visualization Tools (3080)	**$1,200,000**	**$7,200,000**
6 Data Synthesis & Fusion Tools (3080)	**$1,100,000**	**$6,600,000**
6 Dynamic Space Intelligence Repositories (3080)	**$500,000**	**$3,000,000**
Total		**$16,800,000**

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Cyber Warfare Operations

- **ANG Cyberspace Units Provide 15% of Cyber Mission Force Teams**
- **Cyber Effects Operations and DoD Information Network Operations**
- **Defend DoD Networks, Systems, and Information**
- **Defend U.S. Homeland and National Interests Against Cyberattacks**
- **Operate and Maintain the Air Force Information Network**
- **Provide Cyber Support to Military Operational and Contingency Plans**

Source: GAO file photo. | www.gao.gov

The United States relies on information and operational technology networks, systems, and information for a wide range of critical infrastructure and critical services. Modern weapon systems, such as aircraft and satellites, have evolved into computers with wings and computers in orbit. They are filled with 4th and 5th generation technology and rely on the cyberspace domain to function. This reliance leaves the U.S. vulnerable in the face of dangerous cyber threats, as state and non-state actors plan to conduct disruptive and destructive cyberattacks on critical infrastructure and steal U.S. intellectual property to undercut our technological and military advantage. ANG Cyber Warfare Operations units are postured for cyber deterrence and cyber defense, focusing on building cyber effects capabilities to defend warfighting capability and homeland/national interests against cyberattacks.

The ANG Cyber Warfare Operations force includes three cyber operations groups, twenty cyber mission force units, and a host of intrinsic cyber capabilities including mission defense teams and information aggressors. Cyber capabilities support federal- and state-level agencies, the Air Force, and combatant commands. Cyber units provide offensive and defensive cyberspace capabilities to support operational and tactical planning activities and other cyberspace support as requested. Guardsmen participating in these missions draw upon skills from their related industry careers. Specific missions assigned to ANG units include vulnerability assessments, hunt operations, incident response, command and control, and the full-spectrum cyber warfare in both exercises and operations.

Cyber Warfare Operations
FY 2022 Weapons and Tactics Conference

Critical Capabilities List

Offensive Cyber Operations

- Advanced Capability Developer Training
- Cyber Decision Determining Objective Operator Resiliency System
- Classified Environments for Malware Analysis and Development

Defensive Cyber Operations

- Automated Collaboration and Execution System
- Cloud Cyber Operations Platform
- Part Task Trainer TTP Observable Model

Department of Defense Information Network

- Automated Collaborative and Execution System
- Expanded Virtual Interconnected Training Environment
- Operational Technology Traffic Analysis Tool

Essential Capabilities List

Offensive Cyber Operations

- Platform for Offensive Cyber Operations in the Cloud
- MITRE ATT&CK Mapped Training Modules
- Part Task Trainer ICS

Defensive Cyber Operations

- Part Task Trainer ICS
- Full Spectrum Information Warfare Capability
- Open Source Internet Research Tool

Department of Defense Information Network

- Cloud Cyber Operations Platform

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5

OCO: ADVANCED CAPABILITY DEVELOPER TRAINING

1. Background. ANG Offensive Cyberspace Operations (OCO) units require training to fulfill USCYBERCOM missions under the Cyber Capability Developer (CCD) work role. USCYBERCOM has opened these roles to ANG OCO units, but units do not currently have the training material nor workstations to move from basic to senior CCD. Each Advanced Capability Developer Training (ACDT) module will include hardware and software to conduct advanced training in developing OCO toolkits. The ACDT system supports loading of additional software through industry-common package management solutions and accredited for TS/SCI environments. ACDT hardware modules include workstations with compute, memory, storage, and networking. ACDT software modules include code versioning and repository software, integrated development environments, and representative adversary environments in which to test code. ACDT training modules include the development of: weapons, sensors, and payloads. Weapons implement initial access, command execution, and exploitation tactics. Sensors implement collection, credential access, discovery, and defense evasion tactics. Payloads implement command and control, exfiltration, and impact tactics. ACDT interconnects with the Virtual Interconnected Training Environment platform, enabling CCD participation in exercises. One ACDT is required for each of the three OCO units.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 ACDT (3080)	**$400,000**	**$1,200,000**
Total		**$1,200,000**

OCO: CYBER DECISION - DETERMINING OBJECTIVE OPERATOR RESILIENCY SYSTEM

1. Background. ANG Offensive Cyberspace Operations (OCO) units require the ability to train operators to support combatant command requirements. The current training timeline is extensive and cost prohibitive due to historical attrition rates. Units typically use traditional assessment tools (e.g., ASVAB, EDT, CART, etc.) to assess if a candidate is ready to enter advanced cyber training. To support more candidates passing advance training and retaining qualified personnel, factors that impact daily optimal performance must be addressed. Cyber Decision – Determining Objective Operator Resiliency System (CYDE-DOORS) requires a tool that uses biometric and cognitive/psychometric information to address the mental, physical, and emotional performance of airmen to enhance the objective assessment of a candidate when paired with today's subjective measures (e.g., resume, in-person interviews, evaluations, etc.). CYDE-DOORS is a data-driven method to identify candidates who present a higher propensity of passing training. This will enable a real-time assessment of each airmen's operational readiness and mission performance. Commanders, leaders, and personnel can use the tool to address FORGE burnout symptoms in order to achieve and sustain the expected high level of performance. Three CYDE-DOORS are required for all OCO squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 CYDE DOORS (3080)	**$750,000**	**$2,250,000**
Total		**$2,250,000**

OCO: CLASSIFIED ENVIRONMENTS FOR MALWARE ANALYSIS AND DEVELOPMENT

1. Background. ANG Offensive Cyberspace Operations (OCO) units require the ability to perform malware analysis, reverse engineering, and development of indicators and warning. Each Classified Environment Malware Analysis and Development (CEMAD) system includes the hardware and software necessary to collect, store, process, analyze, and report on malware. The CEMAD collection allows OCO units to import malware from various sources to include the commercial internet and from missions via a cross-domain solution. The CEMAD store creates a repository of collected malware that allows operators and analysts to sort, filter, and perform statistics. The CEMAD process extracts information from stored malware to support sort, filter, and statistics functions. The analyze function allows analysts to perform static and dynamic malware analysis on malware of different formats to include, but not limited to, Portable Executable, Executable and Linker Format while implementing the industry standard disassembler, decompiler, and reverse engineering tools. The report function allows analysts to export their results, redact information as necessary, and distribute information in formats suitable for human or machine transfer. Two CEMADs are required for the three OCO units.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 CEMAD (3080)	**$400,000**	**$800,000**
Total		**$800,000**

DCO: AUTOMATED COLLABORATION AND EXECUTION SYSTEM

1. Background. ANG defensive cyberspace operations (DCO) units are currently using manual processes and legacy software to plan, brief, execute, and debrief (PBED) missions. This includes the use of whiteboards, spreadsheets, emails, and briefing software to drive increasingly complicated cyber operations. Information captured on whiteboards is geographically bound, not being properly tracked or disseminated, and is static in nature. Legacy software does not support collaboration/multi-user, requires operators to hand type metrics, indicators, and mission status making them all prone to human error. All of these manual limitations induce latency into the battle rhythm preventing rapid response. DCO units require an automated collaboration, mission planning, and debrief system to provide a framework for and aid in cyber PBED process. The system will allow for seamless collaboration across geographically separated units and operators. It should support manual and automatic ingestion of data from mission systems, planning guidance to previous mission data, current operations, and capture real-time metrics for assessment of measures of effectiveness/performance to aid in debriefing focal points and mission debriefs. It will leverage machine learning to provide appropriate suggestions to planning operations and support manual entry, when necessary, of elements to include mission objectives, tactical objectives, tactical tasks, priority intelligence requirements, essential elements of information, and any other free form data a team would deem necessary. Additionally, this capability will visualize schemes of maneuver and team status for leadership. DCO requires 15 systems that integrate into multiple mission and weapon systems to inform the PBED process.

2. Program Details.

Quantity	Unit Cost	Program Cost
15 Automated Collaboration And Execution Systems (3080)	**$250,000**	**$3,750,000**
Total		**$3,750,000**

DCO: CLOUD CYBER OPERATIONS PLATFORM

1. Background. ANG defensive cyberspace operations (DCO) units are currently using a large server rack of equipment for both on and off Department of Defense Information Network (DODIN) vulnerability assessment and hunt operations. The current hardware is limited to conducting operations within a physical environment and prevents DCO units from conducting Incident Response (IR) operations in the cloud. DCO requires an agile, minimal footprint, on and off DODIN cloud based IR capability that integrates with other ANG mission systems for executing Federal and State missions for both cloud based, on premise, and hybrid based mission partners. Cloud based operations will prevent low density/high demand cyber operations hardware from being "burned", near-instant software deployments to mission partner environments, and reduced operations and maintenance costs. Cloud based systems are agile and allow adversary engagement from geographically separated locations while maintaining collaboration between operators and analysts. The Cloud based solution will implement enhanced operational security and be matrixed across multiple cloud service providers (CSP) utilizing secure connections or similar National Institute of Standards and Technology approved secure technologies. The solution is required to be CSP agnostic to allow for maximum scalability and provide rapid deployment and reconstitution in less than 30 minutes. A single Cloud Cyber Operations Platform can simultaneously support a single mission element or all ANG DCO Squadrons, which is not currently possible with existing hardware.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Cloud Cyber Operations Platforms (3080)	**$19,000,000**	**$19,000,000**
Total		**$19,000,000**

DCO: PART TASK TRAINER - TTP OBSERVABLE MODEL

1. Background. Defensive Cyber Operation (DCO) units are required to stay up to date with the latest adversary tactics, techniques and procedures (TTPs). DCO can practice and train on TTPs, but they currently lack a tool to enable DCO TTP training which limits their understanding of an attacker's decision calculus. To stop the attacker before completing the cyber kill-chain, operators must anticipate likely actions and block them from taking place. DCO units require a tool to practice offensive TTPs including the ability to execute tactics from across the MITRE ATT&CK matrix, assess their effectiveness, and track their performance over time. The system should also allow for the testing of the proper defensive tactic that would stop that attack. The system will integrate a cognitive learning assessment to identify qualified candidates and their readiness to integrate into the cyber mission force. The system provides pre-defined individual challenges and events to limit the potential compromise of scenarios in a training environment. The system is maintained locally, enabling personnel to connect remotely, and will be managed through an intuitive administration page. The system must not require a recurring licensing or subscription fee to operate. All DCO units will require this task trainer.

2. Program Details.

Quantity	Unit Cost	Program Cost
15 PTT-TOM (3080)	**$185,000**	**$2,775,000**
Total		**$2,775,000**

DoDIN: AUTOMATED COLLABORATION AND EXECUTION SYSTEM

1. Background. ANG Department of Defense Information Network (DODIN) units are currently using manual processes and legacy software to plan, brief, execute, and debrief (PBED) missions. This includes the use of whiteboards, spreadsheets, emails, and briefing software to drive increasingly complicated cyber operations. Information captured on whiteboards is geographically bound, not being properly tracked or disseminated and is static in nature. Legacy software does not support collaboration/multi-user, requires operators to hand type metrics, indicators, and mission status making them all prone to human error. All of these manual limitations induce latency into the battle rhythm preventing rapid response. DODIN units require an automated collaboration, mission planning, and de-brief system to provide a frame for and aid in cyber PBED process. The system will allow for seamless collaboration across geographically separated units and operators. It should support manual and automatic ingestion of data from mission systems, planning guidance to previous mission data, current operations, and capture real-time metrics for assessment of measures effectiveness/performance to aid in debrief focal points and mission debrief. It will leverage machine learning to provide appropriate suggestions to planning operations and support manual entry of elements to include mission objectives, tactical objectives, tactical tasks, priority intelligence requirements, essential elements of information, and any other free form data a team would deem necessary. Additionally, this capability will visualize schemes of maneuver and team status for leadership. DODIN units require 17 systems that integrate into multiple mission and weapon systems to inform the PBED process.

2. Program Details.

Quantity	Unit Cost	Program Cost
17 Automated Collaboration And Execution Systems (3080)	**$250,000**	**$4,250,000**
Total		**$4,250000**

DoDIN: EXPANDED VIRTUAL INTERCONNECTED TRAINING ENVIRONMENT

1. Background. Mission Defense Teams (MDTs) and the Information Aggressor Squadron (Aggressors) do not have access to a range environment for training that simulates their operational environment. MDTs and Aggressors require an Expanded Virtual Interconnected Training Environment (E-VITE) to support Tier 1, 2, and 3 exercises, conduct training, and maintain combat mission ready proficiency. E-VITE is fully integrated into the physical VITE systems fielded across the DoD. E-VITE provides a persistent training environment accessed via a cloud frontend with access to collective training, assessments and learning management. E-VITE is a scalable capability configurable to any cyber environment, allows import and export of large virtual training environments, hardware in the loop and has the ability to provide a playbooks and debrief function. It provides realistic network environments with the ability to simulate adaptive opposing forces and threats. It simulates the internet-based critical infrastructure and key resources with add-on modules to provide more realistic cyberspace threats, targets, and terrain. E-VITE provides simulation for operational technology, commercial and government networks. VITE hosts a wide variety of software and integrates with other system training environments without additional licensing costs. Additionally, both the MDTs and the Aggressors require a vulnerability (threat) repository updated with threat intelligence. Additionally, the Aggressors also require a 1553 Bus Training Environment hosted on this platform. An E-VITE can simultaneously support a single mission element or up to 125 simultaneous users, which is not currently possible with existing hardware.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 E-VITE (3080)	**$2,256,000**	**$2,256,000**
Total		**$2,256,000**

DODIN: OPERATIONAL TECHNOLOGY TRAFFIC ANALYSIS

1. Background. Mission Defense Teams (MDTs) are required to identify, digest, and analyze non-standard, non-internet protocol suite network traffic properly defend the operational technology (OT) within USAF weapon system and Critical Infrastructure Key Resources (CIKR) terrain. MDT members operate in traditional network internet protocol traffic environment, but lack capabilities within the OT protocols and services that constitute the traffic traversing weapon system and CIKR terrain. To properly operate on OT networks, MDTs require a tool that identifies OT protocols and services that are "known good" for USAF assets and related to their associated baseline communication standards. The tool must provide additional details from "known good" to include potential vulnerabilities, threats and anomalies in the network. The system would be maintained locally and provide an intuitive dashboard. The system must not require a recurring licensing or subscription fee to operate.

2. Program Details.

Quantity	Unit Cost	Program Cost
16 Operational Technology Traffic Analysis Systems (3080)	**$150,000**	**$2,400,000**
Total		**$2,400,000**

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Security Forces

- **ANG Security Forces Units Provide 7% of the Total Force**
- **Integrated Base Defense**
- **Combat Arms Support**
- **Law Enforcement**

Air National Guard security forces include over 7,755 defenders from all wings in each of the 54 States, Territories, and the District of Columbia. Security forces protect and support worldwide contingencies and home station installations.

The security forces missions include: installation access control, base defense, asset security, suspect apprehension and detention, high-risk vehicle inspections, heavy weapons support with military operations in urban terrain, mounted and dismounted individual and team patrols, convoy operations, detainee movement operations, personal security details, fly-away security, Raven tasking, close precision engagement teams, active shooter response, and weapons qualifications to maintain combat readiness.

Security Forces
FY 2022 Weapons and Tactics Conference

Critical Capabilities List

- Counter-Small Unmanned Aircraft Systems Defense Platform
- Modular Small Arms Ranges
- Climate Clothing System
- Improved Modular Ballistic Protection System
- M18 Block II Kit (Optical Sighting System, Illuminator, and Holster)

Essential Capabilities List

- Enhanced Communications and Hearing Protection System
- Portable Intrusion Detection System and Alarm Annunciator
- Enhanced Explosives, Narcotics and Chemical Detections System
- Enhanced Base Defense Operations Center Integrated Base Defense Sensor Fusion and Analytics System
- Security Forces Trauma Kit and Training

Desired Capabilities List

- Personnel-Based Weight Distribution System
- PVS-31C Night Vision Optic and Accessory Kit
- Vehicle Payload/Undercarriage Inspection System
- Counter Laser Suite (Laser Hailing and Protective Eyewear System)
- Security Forces Individual / Squad Tracking and Awareness
- Augmented Reality Use of Force Training System
- Lightweight Personal Renewable Power Source

SECURITY FORCES: COUNTER-SMALL UNMANNED AIRCRAFT SYSTEM DEFENSE PLATFORM

1. Background. ANG Security Forces (SF) require implementation of a Counter Small Unmanned Aircraft System (C-sUAS) for installations to defend vital installation assets and personnel from Group 1-3 UAS threats. Recent threat analysis show that sUAS operators (overseas and domestically) have the capability and intent to employ sUAS to disrupt the generation of air power, conduct criminal surveillance and planned attacks against friendly forces. The employment of a system able to minimally detect sUAS platforms at 10km, identify platforms, and subsequently mitigate sUAS threats enables ANG Security Forces to execute their Integrated Base Defense mission and protect resources vital to national security in a manner consistent with this emerging threat. The system should identify most commonly known sUAS electronic signatures, be able to receive upgrades as technology matures and new sUAS platforms are released, and integrate into a common command and control system (e.g, MEDUSA). C-sUAS systems require redundant radar capability to detect sUAS platforms not currently catalogued nor have a known associated electronic signature. Implementing a C-sUAS system closes an existing capability gap within the SF enterprise and helps mitigate risk to ANG resources. C-sUAS systems enabling detection, tracking, identifying and defeating threat capabilities to all installations with missions identified in 10 U.S. Code § 130i helps ensure SF units can preserve and sustain our ability to globally project and sustain forces in support of combatant command missions.

2. Program Details.

Quantity	Unit Cost	Program Cost
24 C-sUAS Platforms (3080)*	**$400,000**	**$9,600,000**
Total		**$9,600,000**

* Complete, Pending Delivery

SECURITY FORCES: MODULAR SMALL ARMS RANGES

1. Background. ANG Combat Arms (CA) personnel need a Modular Indoor Containerized Range (MICR) that will provide a fully enclosed zero surface danger zone and vertical danger zone environment allowing personnel to train and qualify safely 365 days a year, day and night regardless of external environmental conditions. With the MICR, CA personnel will be able to ensure all of the Air Force's assigned combat personnel, an average of over 250 personnel per installation, will receive weapons qualification training in a timely and cost-effective manner. The need for modular small arms ranges is magnified because eight of the remaining 25 ranges are permanently closed and 17 are in a state of degraded operations. Those degraded ranges are currently operating with waivers, until repairs become too costly or waivers are withdrawn and they will be closed. Due to significant health and safety concerns, regulations prohibit major or component repairs of an existing range if it will cost more than 50 percent of the estimated replacement cost.

2. Program Details.

Quantity	Unit Cost	Program Cost
14 Small Arms Ranges (3080)	**$5,500,000**	**$77,000,000**
Total		**$77,000,000**

SECURITY FORCES: CLIMATE CLOTHING SYSTEM

1. Background. ANG Security Forces (SF) require a modernized duty specific all-weather layered climate clothing system ensuring our Defenders can perform and survive in a variety of environments. This requirement narrows a capability gap that presently exists and does not afford Defenders proper protection to their entire body; such as head, torso, lower body, and extremities. This systems must provide Defenders dexterity, mobility, and accessibility to required duty equipment. A multi-component and scalable climate clothing system allows Defenders to be equipped for current mission sets while adapting to future operational environments.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,600 Layered Climate Clothing Systems (3080)	**$4,400**	**$33,440,000**
Total		**$33,440,000**

SECURITY FORCES: IMPROVED MODULAR BALLISTIC PROTECTION SYSTEM

1. Background. ANG Security Forces (SF) require modernized body armor to provide SF personnel the capability to improve Defender survivability as well as reduce chronic fatigue and injury. In order to preserve and maintain the currently strained manpower in the SF field, armor must integrate with currently fielded SF duty gear at a lighter and more effective overall weight. These semi-rigid panels are intended to support the current duty gear as well as distribute weight more evenly across the Defender. As these panels (no greater than 0.80 pounds per square foot in density) are to be required in combination with hard plates issued in theater, they must meet or exceed National Institute of Justice (NIJ) Level IIIA, MilStd 662f, and MilStd 3027 (V50, fragmentation, etc.), while maintaining standard (SAPI) sizing.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,600 Hard Armor (Front/Rear) Sets (3080)	**$1200**	**$9,120,000**
7,600 Hard Armor (Side Plate) Sets (3080)	**$600**	**$4,560,000**
7,600 Semi-Rigid Panel (Front/Rear) Sets (3080)	**$375**	**$2,850,000**
7,600 Semi-Rigid Panel (Side) Sets (3080)	**$200**	**$1,520,000**
7,600 Individual ANG SFLCS Cummerbund Sets (3080)	**$120**	**$912,000**
Total		**$18,962,000**

SECURITY FORCES: M18 Block II KIT (OPTICAL SIGHTING SYSTEM, ILLUMINATOR, AND HOLSTER)

1. Background. ANG Security Forces (SF) require a modernized pistol mounted optic to provide SF personnel the capability to improve rapid target acquisition and multi-threat engagement in low light environments. An illuminated "dot" reflex sight would allow for detecting and engaging multiple targets with greater accuracy at greater distances. Having the ability to superimpose an illuminated dot on a suspect increases situational awareness by allowing Defenders to focus on the individual and the surrounding area. This optic must be night vision compatible, have adjustable brightness levels to include manual on/off setting, windage and elevation capabilities. Tritium suppressor height front sights and optic plate-integrated rear sights are required for a co-witness sight picture in the case of optic failure. Additionally, SF personnel require a pistol mounted flashlight to increase the ability to positively identify and accurately engage targets in a limited visibility environment. Security Forces require a durable, quick detachable, 1000 lumen LED light source with a minimum of 10,000 candela in order to illuminate common indoor and outdoor environments. The product must have an ambidextrous on-off switch and at least momentary-on and constant-on modes. With the upgraded light attachment the holster will also need to be updated.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,600 Reflex Sight with Mounting Plate/Sight Set (3080)	**$675.00**	**$5,130,000**
7,600 Pistol Mounted Flashlight (3080)	**$150.00**	**$1,140,000**
7,600 Optic and Light Compatible Holster (3080)	**$170.00**	**$1,292,000**
Total	**$995.00**	**$7,562,000**

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Explosive Ordnance Disposal

The ANG has 18 explosive ordnance disposal (EOD) flights. These units are uniquely trained and equipped to facilitate explosive operations during joint wartime missions. In the deployed environment, EOD operators routinely defeat improvised explosive devices (IED), render safe unexploded ordnance (UXO), perform route clearance operations, conduct post-blast analysis, evidence collection, and embed with special operations forces. Furthermore, EOD technicians must also be prepared to respond to incidents involving chemical/biological weapons, weapons of mass destruction (WMD), and nuclear weapons.

EOD technicians perform an extremely dangerous military mission and must continually adapt their equipment and technology to meet our adversaries' ever-changing tactics. The breadth and variety of IEDs/UXOs/WMDs encountered by EOD technicians in the field forces units to maintain many single-purpose items while simultaneously staying at the forefront of technology. Technological advancement within the EOD program is imperative to match the advancements of our enemies.

Explosive Ordnance Disposal
FY 2022 Weapons and Tactics Conference

Critical Capabilities List

- Dual Arm Manipulator Robotic Attachment
- Enhanced Night Vision Device
- Short-range EOD Aerial Recon Platform
- Lightweight Multi-Sensor Mine Detector
- Chemical Warfare Personal Protective Equipment Modernization

Essential Capabilities List

- Versatile Lightweight Multi-Threat Disruptor
- Mobile Ad Hoc Network Optimization Platform
- Augmented/Virtual Reality Unexploded Ordnance (UXO) Simulators
- Multi-modal Agile Respiratory PPE
- All-Domain Flame Retardant PPE Ensemble

Desired Capabilities List

- Unexploded Ordnance (UXO) Optimized X-Ray System
- Vehicle-Mounted GPR for Deep Buried Ordnance
- State-of-the-Art High Mobility EOD Robot
- Portable Sensitive Compartmented Information Facility
- Advanced Human Performance Suite

EOD: DUAL ARM MANIPULATOR ROBOTIC ATTACHMENT

1. Background. ANG explosive ordnance disposal (EOD) units require an updated robotic arm attachment with more precise manipulation capability to replicate human dexterity better. While the safest method is to remain remote, current robotic limitations require the EOD Operator to get close to an improvised explosive device (IED) to perform delicate or complicated actions. Current remote platform manipulators are robust, able to make gross movements, lift relatively heavy loads. A dual arm manipulator robotic attachment will allow the robot operator to perform previously not achievable actions. Access to such a platform will greatly increase the safety and efficiency of any ANG EOD team during reconnaissance and execution of IED operations. ANG requires 21 total systems, one for each of the 18 ANG EOD flights and three to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 Dual Arm Manipulator attachments (3080)	**$250,000**	**$5,250,000**
Total		**$5,250,000**

EOD: ENHANCED NIGHT VISION DEVICES

1. Background. ANG explosive ordnance disposal (EOD) personnel require a modernized visual enhancement device for tactical low/no light operations. Currently, EOD Flights are using legacy night vision devices that are a generation behind the DoD standard. EOD personnel require a upgraded system capable of integrating with current situational awareness systems. This device must enhance ability to operate in contested environments where infrared discipline is paramount, and function in all domains with no ambient illumination. ANG EOD requires 220 kits, distributed across 18 EOD units, for one kit per EOD professional.

2. Program Details.

Quantity	Unit Cost	Program Cost
220 Enhanced Night Vision Devices (3080)	**$20,000**	**$4,400,000**
Total		**$4,400,000**

EOD: SHORT-RANGE EXPLOSIVE ORDNANCE DISPOSAL AERIAL RECON PLATFORM

1. Background. ANG explosive ordnance disposal (EOD) technicians require an enhanced capability to conduct short-range situational awareness assessments of critical mission targets before sending a team into a potentially hazardous area. The use of short and medium-range optics and cameras limits the team to viewing a threat from a single line-of-sight, preventing a complete picture for comprehensive risk analysis. To increase situational awareness, a lightweight, compact, airborne sensor capable of creating a day or night 360-degree picture of the incident site is required. Each of the 18 EOD flights and three regional training sites require one system.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 Short Range EOD Reconnaissance Platforms (3080)	**$70,000**	**$1,470,000**
Total		**$1,470,000**

EOD: LIGHTWEIGHT MULTI-SENSOR MINE DETECTOR

1. Background. ANG Explosive Ordnance Disposal (EOD) teams require a lightweight, multi-sensor mine detector for counter improvised explosive devices and area denial enemy munitions. Current detectors are unable to meet mission requirements. The lightweight multi-sensor mine detector should incorporate metal detection and ground-penetrating radar. ANG EOD requires one detector per operational EOD team for a total of 65 detectors.

2. Program Details.

Quantity	Unit Cost	Program Cost
65 Lightweight Multi-Sensor Mine Detector (3080)	**$12,500**	**$812,500**
Total		**$812,500**

EOD: CHEMICAL WARFARE PERSONAL PROTECTIVE EQUIPMENT MODERNIZATION

1. Background. ANG Explosive Ordnance Disposal (EOD) teams require updated personal protective equipment (PPE) that protects against current and emergent chemical warfare agents (CWA). Current PPE is not effective against all CWAs and impedes the ability of EOD teams to conduct successful operations. The chemical warfare modernization kit should afford protection against all current CWAs, not require third-party additions to afford gross contamination protection, feature a reduced thermal burden on the wearer, and allow for wear for extended periods of time even while contaminated. Additionally, scalability is desired to allow EOD teams to wear PPE during full gamut of combat operations and avoid current undesirable tradeoffs (e.g., having to wear thick over boots and gloves that reduce dexterity and mobility). The kit includes a full PPE system sans a field protective mask that satisfies all levels of Mission Oriented Protective Posture (MOPP). ANG EOD teams require two kits consisting of training and operational ensembles per all operational personnel UTCs for all 18 flights.

2. Program Details.

Quantity	Unit Cost	Program Cost
440 Chemical Warfare PPE Kits (3080)	**$5,350**	**$2,354,000**
Total		**$2,354,000**