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CREW
ABBREVIATED CHECKLIST
MISSION AS-204A
APOLLO SC012

Prepared Under Direction of
MISSION OPERATIONS BRANCH
FLIGHT CREW SUPPORT DIVISION

THIS CHECKLIST IS TO BE USED AS A WORK COPY ON A CONTROLLED BASIS. CHANGES TO THIS DRAFT WILL RESULT IN A FORMAL REISSUE REPLACING CHECKLIST DATED 6 MAY 1966.

NORTH AMERICAN AVIATION, INC.
SPACE and INFORMATION SYSTEMS DIVISION
TRAINING and SUPPORT DOCUMENTATION D/871

C = Com. Pilot = G. G.
S = Sen. Pilot =
P = Pilot =

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PRELAUNCH CHECKLISTS

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PRELAUNCH SWITCH-POSITIONS
AND INITIAL CHECKLISTS

Step	Procedure	Panel
BACKUP CREW INGRESS PROCEDURES (CSP)		
CSP	1 Ingress	
C	2 MASTER EVENT SEQ CONT-PYRO sw (2)—SAFE (locked)	24
CSP	3 Cobra cable—connect	
AUDIO PANEL/INTERCOM CHECK (CSP)		
	4 POWER sw—VOX	26, 13, 23
	5 S-BAND sw—REC (down)	
	6 HF sw—OFF (center)	
	7 VHF AM sw—T/R (up)	
	8 INTERCOM sw—T/R (up)	
	9 Cobra cable PTT/CW sw—PTT	
VOICE RECORDER CHECK (CSP)		
P	10 RECOVERY-HF sw—AM	20
C	11 HF sw—T/R	26
CP	12 Speak and ck VOICE RECORD ind— striped	19
	13 HF sw—OFF, VOICE RECORD ind—gray	26, 19
SP	14 Repeat procedures S&P AUDIO <i>panels</i>	13, 23
CRYOGENIC O ₂ SUPPLY CHECK (P)		
P	15 TANK PRESSURE-O ₂ ind (2)— 865 to 935 psia	13
	16 TANK QUANTITY-O ₂ ind (2)— 320 lb nominal	

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Step	Procedure	Panel
C&WS STATUS CHECK (CSP)		
S	17 C/W sw—NORMAL	13
	18 CAUT/WARN-MODE sw—CSM	11
	19 CAUT/WARN-POWER sw—2	
CP	20 MASTER ALARM sw lt—press	3, 18
S	21 CAUT/WARN FAIL lt—out	
CP	22 CAUT/WARN-POWER sw—1	
	23 MASTER ALARM sw lt—press	3, 18
P	24 C/W LAMP TEST sw—1	23
CP	25 MASTER ALARM lt (2)—on	3, 18
S	26 LH system status lights—on	10
P	27 C/W LAMP TEST sw—2	23
CP	28 MASTER ALARM lt (2)—out	3, 18
S	29 LH system status lt—out	10
	30 RH system status lt—on	11
P	31 C/W LAMP TEST sw—OFF	23
S	32 RH system status lt—out	11
G&N SYSTEM CHECK (CS)		
S	33 TRANSFER sw—COMPUTER	
	34 OPTICS-SLAVE TELESCOPE sw— STAR LOS	
	35 OPTICS HOLD sw—OFF	
	36 OPTICS selector sw—ZERO <i>OPTICS</i>	
	37 CONTROLLER-SPEED sw—HI	
	38 CONTROLLER-MODE sw—DIRECT	
	39 ATTITUDE IMPULSE-ENABLE <i>sw—OFF</i>	
	40 CONDITION LAMP sw—ON	
	41 IMU TEMP MODE selector sw— AUTO OVERRIDE	
	42 AGC MODE sw—ON	107
	43 TEST ALARM sw—press and <i>ck</i>	103, 106
	44 CHECK COOLANT sw—press and <i>CK</i>	105

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Step	Procedure	Panel
S	45 CHECK MODE LAMPS sw—press <i>fek</i>	101, 105
	46 CHECK CONDITION LAMPS sw— press and check	101, 105
CS	47 IMU TEMP MODE-GAIN-PIPA sw— press and check	10, 103, 105
	48 IMU TEMP MODE-GAIN-IRIG sw— press and check	
C&D PANELS CHECK (LEB) (S)		
S	49 GLYCOL PRESS RELIEF BYPASS (2) valves—ON	133
	50 GLYCOL ACCUMULATOR valve— <i>ON(CCW)</i>	137
	51 MAIN REGULATOR valve— <i>NORMAL</i>	139
	52 WATER & GLYCOL TANKS PRESSURE—REGULATOR cont SELECTOR INLET—NORMAL SELECTOR OUTLET—NORMAL	
	53 PLSS FILL valve—CLOSE	
	54 EMERG CABIN PRESSURE valve— <i>OFF</i>	
	55 CABIN REPRESS valve—closed (<i>CCW</i>)	
	56 WASTE TANK SERVICING valve— <i>CLOSE</i>	140
	57 PRESSURE RELIEF valve—BOTH	
	58 POTABLE TANK INLET valve— <i>OPEN</i>	
	59 WASTE TANK INLET valve—AUTO	
	60 DRINKING WATER SUPPLY valve— <i>ON</i>	130
	61 GMT clock—check	99
	62 CABIN AIR/AUTO/SUIT AIR sw— <i>AUTO</i>	120

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Step	Procedure	Panel
S	63 START/PREHEAT sw—START	120
	64 All cb's on panel 150—closed	
	65 FUNCTION SELECT sw—A	97
	66 TEST SELECT sw—1	
	67 Aux DC VOLTS meter—3.5 to <i>4.7vdc</i>	
	68 C/M RCS HTRS sw—OFF	122
	69 Waste management sys valves (2)— <i>OFF</i>	
	70 BATTERY VENT valve—VENT	123
	71 All cb's on panels 151, 152, 153 closed except: POST LDG-BAT BUS A—open BAT BUS B—open BAT C—open	
	72 Cabin PLV lockpins—out fwd <i>hatch</i>	
ECS STATUS CHECK (C)		
C	73 Suit pressure selector—1&2	134
	74 SUIT HT EXCH sw—GLY/EVAP	
	75 SURGE TANK PRESSURE RELIEF valve—NORMAL	131
	76 CABIN PRESSURE RELIEF valves (2)—BOOST ENTRY	
	77 GLYCOL TO RAD valve—OPEN	
	78 GLYCOL RESERVOIR-INLET <i>valve-OPEN</i>	
	79 GLYCOL RESERVOIR-BYPASS <i>valves-CLOSE</i>	
	80 GLYCOL RESERVOIR-OUTLET <i>valve-OPEN</i>	
	81 OXYGEN-ENTRY valve—ON	
	82 OXYGEN-S/M SUPPLY valve—ON	
83 OXYGEN-SURGE TANK valve—ON		
84 DIRECT O ₂ valve—closed (CW)	24	

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Step	Procedure	Panel
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ECS STATUS CHECK (P)

- | | | |
|-----|------------------------------------------------------------|----|
| ○ P | 85 O ₂ -PRESS IND sw—SURGE TANK | 13 |
| | 86 TANK PRESSURE-1-O ₂ ind—
865 to 935 psia | |
| | 87 GLY EVAP STEAM PRESS ind—
0.25 psia (pegged) | |
| | 88 PRESS GLY DISCH ind—40 to <i>45 psia</i> | |
| | 89 GLY ACCUM-QUANTITY ind—
45 to 55 percent | |
| ○ | 90 H ₂ O IND sw—POT | |
| | 91 <i>H₂O</i> -QUANTITY (POT) ind— <i>TBD</i> | |
| | 92 H ₂ O IND sw—WASTE | |
| | 93 <i>H₂O</i> -QUANTITY (WASTE) ind— <i>TBD</i> | |
| | 94 ECS RAD-OUTLET TEMP ind—
40° to 50°F | |
| | 95 GLY EVAP-OUTLET TEMP ind—
40° to 50°F | |
| | 96 H ₂ O ACCUM-AUTO/MAN sw— <i>AUTO 1</i> | |
| ○ | 97 WASTE H ₂ O TK REFILL sw—OFF | |
| | 98 SUIT EVAP sw—MAN | |
| | 99 GLYCOL EVAP-H ₂ O FLOW sw—off | |
| | 100 GLYCOL EVAP-STEAM PRESS-
AUTO/MAN sw—AUTO | |
| | 101 GLYCOL EVAP-TEMP IN sw— <i>MAN</i> | |
| ○ | 102 CABIN TEMP sw—AUTO | |
| | 103 ECS RAD OUT TEMP ind (2)—TBD | |
| | 104 ECS GLYCOL sw—PUMP 1-AC 1 | 21 |
| | 105 CABIN AIR FAN sw (2)—ON | |
| | 106 POT H ₂ O HEATER sw—MNA | |
| | 107 ECS RADIATOR sw (4)—on (up) | |

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Step	Procedure	Panel
C&D PANELS CHECK (CSP)		
C 108	POST LDG BEACON LIGHTS sw— OFF	26
109	C/M RCS sw—OFF (guarded)	
110	LH cb panel—all cb's closed	25
111	VENT FAN sw—OFF	
112	FLOAT BAG sw (3)—VENT	
113	ANTENNA DEPLOY sw (2)—OFF	
114	MESC LOGIC ARM sw (2)—OFF	
115	FDAI LTG sw—AC 1	
116	G&N SYNC sw—OFF	
117	SPS GAUGING sw—OFF	
118	EDS POWER sw—OFF	24
119	TVC 2 POWER sw—OFF	
120	BMAG POWER sw—AC 2	
121	TVC 1 POWER sw—OFF	
122	ROTATION CONTROL POWER sw— AC 2	
123	PARTIAL SCS POWER sw—AC 1	
124	RATE GYRO POWER sw—AC 1	
125	Translation controls (2)—LOCKED	
126	Rotation control (1)—pinned	
127	ALTIMETER—check	1
128	ALTIMETER index—set 3.3K	
129	FCSM-AUTO/OVERRIDE sw— AUTO	2
130	FCSM-ON/OFF/RESET sw—OFF	
131	G METER ind—check	
132	L/V AOA/SPS Pc sw—L/V AOA	3
133	L/V AOA meter—zero	
134	SPS-GIMBAL MOTORS sw (4)— OFF	
135	SPS-INJECT PRE-VALVES sw(2)— OFF	
136	FDAI error & rate ind (6)—0°	

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Step	Procedure	Panel
C	137 FDAI attitude ball—nav axis: R ████ —165° P ████ —58° Y ████ —10°	4
	138 Digital event timer—00 00	5
	139 Panel LOCK cont—LOCK	
	140 ATT SET sw—OFF	6
	141 Thrust control sw—OFF	7
	142 DIRECT RCS sw—OFF	8
	143 LIMIT CYCLE sw—OFF	
	144 ATT <i>DD</i> sw—MAX	
	145 .05 G ENTRY sw—OFF	
	146 LCL VERT sw—OFF	
	147 ΔV sw—ΔV	
	148 G&N/SCS sw—SCS	
	149 ATT /MONITOR/ENTRY <i>sw-MONITOR</i>	
	150 RATE GYRO sw (3)—NORMAL	
	151 SCS CHANNEL sw (4)—OFF	
	152 ELS LOGIC sw—OFF (guarded)	
	153 DIGITAL EVENT TIMER-RESET <i>sw-UP</i>	
	154 -START sw—center	
	155 CM PROP JETT-LOGIC sw— <i>LOGIC</i>	
S	156 -DUMP sw—OFF (guarded)	
	157 -PURGE sw—OFF (down)	
	158 Couch attenuator X-X' struts (4)— <i>LOCKED</i>	
CP	159 Couch attenuator Y-Y' struts (2)— <i>LOCKED</i>	
C&D PANELS CHECK (P)		
P	160 FUEL CELL-H ₂ /O ₂ PURGE sw <i>(3)-OFF</i>	18
	161 -REACTANTS event ind (3)—gray	
	162 MAIN BUS A-RESET sw—center	

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Step	Procedure	Panel
P	163 -MAIN BUS A event ind (3)—gray	18
	164 -MAIN BUS B-RESET sw—center	
	165 -MAIN BUS B event ind (3)—gray	
	166 F C INDICATORS sw—1	
	167 BATTERY CHARGER sw—OFF	
	168 DC INDICATORS sw—MAIN BUS A	
	169 DC VOLTS meter—27 to 31 vdc	
	170 DC AMPS meter—zero	
	171 AC INVERTERS sw 1—MN A	
	172 AC INVERTERS sw 2—MN B	
	173 AC INVERTERS sw 3—OFF	
	174 AC BUS 1 sw 1—ON	
	175 AC BUS 1 sw 2 & 3—OFF	
	176 AC BUS 1-RESET sw—center(<i>normal</i>)	
	177 AC BUS 2 sw 1—OFF	
	178 AC BUS 2 sw 2—ON	
	179 AC BUS 2 sw 3—OFF	
	180 AC BUS 2-RESET sw—center(<i>normal</i>)	
	181 AC INDICATORS sw—BUS 1- \emptyset A	
	182 AC VOLTS meter—113 to 117 vac	
	183 FREQUENCY meter—398 to <i>402 cps</i>	
	184 FLIGHT QUAL RCDR sw—REWIND- <i>STOP</i>	19
	185 S-BAND-XPONDER sw—XPONDER	20
	PWP AMPL	
	186 -PWR AMPL sw—LOW	
	187 -OSC sw—PRIM	
	188 -VOICE-RNG sw—OFF	
	189 -VOICE-TAPE/ANALOG sw—OFF(<i>center</i>)	
	190 -VOICE/TV sw—OFF (center)	
	191 -EMERG VOICE sw—OFF (center)	

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Step	Procedure	Panel
P	192 UP-DATA sw—UHF	20
	193 S-BAND ANTENNA sw—AUTO	
	194 VHF AM-T/R sw—T/R	
	195 -RCVR sw—1.	
	196 C-BAND sw—2 PULSE	
	197 VHF-FM sw—ON	
	198 RECOVERY-VHF-BCN sw—OFF	
	199 -HF-ON/OFF sw—OFF	
	200 TAPE RECORD/PLAY sw— NORM NORM	
	201 -SPEED sw—NORM (center)	
	202 -RECORD/PLAY sw—off (center)	
	203 -FWD/REV sw—off (center)	
	204 PWR-SCE sw—ON.	
	205 -PMP sw—ON	
	206 TLM INPUTS-PCM sw—HIGH	
	207 -ANALOG sw—1	
	208 -BIOMED sw—1	
	209 VHF ANTENNA sw—UPPER	
	210 SPS TANK PRESS sw—He	
	211 SPS He sw (2)—AUTO	
	212 OXID FLOW sw—INCREASE	
	213 VALVE sw—PRI	
	214 SENSOR sw—PRI	
	215 FUEL C PUMP sw (3)—AC 1	
216 MAIN BUS TIE sw (2)—OFF		
217 BAT CHGR sw—AC 1		
218 NON ESS BUS sw—MNA		
219 G&N VIEWER sw—AC 1		
220 TELECOM-ESS sw—AC 1		
221 TELECOM-NONESS sw—AC 2		
222 RH upper cb panel—all cb's closed except:		
-OPTICS-MNA & -MNB (2)—open		
223 RH lower cb panel—all cb's closed	21	
224 Rotation control (1)—pinned		

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Step	Procedure	Panel
PRIME CREW INGRESS PROCEDURES (CSP)		
○ CSP	1 Ingress	
C	2 MASTER EVENT SEQ CONT-PYRO sw (2)—SAFE (unlocked)	24
CSP	3 Disconnect portable ventilation unit <i>O₂</i>	
S	4 Connect C/M <i>O₂</i> and cobra cable	
CSP	5 Suit flow control valves (3)—SUIT FULL FLOW	125, 126, 127
CP	6 Connect couch restraints	26, 13, 23
○ CSP	7 Adjust audio controls	
PGA & PRESSURE SUIT CIRCUIT CHECK (CSP)		
P	8 SUIT COMPRESSOR sw— <i>COMPR 2-AC 1</i>	21
	9 FLOW <i>O₂</i> ind—0.2 to 0.45 lb/hr	13
	10 ΔP SUIT COMPR ind—0.7 to <i>0.9 psi</i>	
	11 TEMP-SUIT ind—45° to 55°F	
	12 PRESS-SUIT ind—14.7 psia (<i>ambient</i>)	
○	13 PART PRESS <i>CO₂</i> ind—0.0 to <i>7.6 mm Hg</i>	
	14 SUIT COMPRESSOR sw— COMPR 1-AC1	21
	15 ΔP SUIT COMPR ind—0.7 to 0.9 psi	13
C	16 SUIT TEST valve—PRESS	134
P	17 PRESS-SUIT ind—17 psia max (approx 40 sec)	13
○ S	18 Suit flow cont valves (3)—OFF for 15 sec	125, 126, 127
CSP	19 PGAs do not deflate noticeably	
S	20 Suit flow cont valves (3)—SUIT <i>FULL FLOW</i>	
C	21 SUIT TEST valve—DEPRESS	134

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Step	Procedure	Panel
P	22 PRESS-SUIT ind—14.3 to 14.9 psia (within 75 sec)	13
C	23 SUIT TEST valve—OFF	134
CABIN VERIFICATION AND PURGE CHECK (CSP)		
<p>NOTE This operation is performed in conjunction with ground crew personnel. Certain of the steps will be provided on command from the ground crew.</p>		
S	24 Inner hatch secure—check	
C	25 CABIN PRESSURE RELIEF valve (2) (upper & lower)—BOOST ENTRY	131
P	26 PRESS-CABIN ind—report	13
C	27 CABIN PRESSURE RELIEF valve (upper)—CLOSE	131
P	28 PRESS-CABIN ind—report	13
C	29 CABIN PRESSURE RELIEF valve (upper)—BOOST ENTRY	131
	30 CABIN PRESSURE RELIEF valve (lower)—CLOSE	
P	31 PRESS-CABIN ind—report	13
C	32 CABIN PRESSURE RELIEF valve (lower)—DUMP	131
	33 CABIN PRESSURE RELIEF valve (lower)—BOOST ENTRY	
C&D PANELS CHECK (S)		
S	34 Connect couch restraints	
	35 DIGITAL EVENT TIMER ind—00 00	11
	36 -RESET sw—UP	10, 11
	37 -START/STOP sw—center	11
	38 Mission elapsed time ind—zero	12

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Step	Procedure	Panel
S	39 UPTTEL sw—BLOCK	14
	40 S/M RCS-QTY GAUGING-POWER sw— <i>OFF</i>	15
	41 S/M RCS-HELIUM and PROPELLANT sw (12)—ON (<i>momentary</i>)	
	42 C/M-S/M SEP sw (2)—down (<i>guarded</i>)	
	43 C/M RCS PRPLNT sw (2)—center	
	44 RCS event ind (14)—gray	
	45 MAIN DEPLOY sw—AUTO	16
	46 ABORT SYSTEM-OX DUMP sw— <i>AUTO</i>	
	47 -2 ENG OUT sw—AUTO	
	48 -L/V RATES sw—AUTO	
	49 LES/TWR JETT MODE sw (2)— LES MODE (<i>guarded</i>)	
	50 REACTION CONTROL SYS-CMD sw—off (<i>momentary</i>)	
	51 -TRANS sw—S/M (<i>momentary</i>)	
	52 EDS sw—OFF	
	53 MAIN CHUTE RELEASE sw—down (<i>guarded</i>)	
<p>Warning This switch must never be actuated prior to splashdown.</p>		
	54 C/W sw—BOOST	13
	55 H ₂ HEATERS sw (2)—AUTO	
	56 O ₂ HEATERS sw (2)—AUTO	
	57 PRESS IND sw—TANK 1	
	58 H ₂ and O ₂ FANS sw (4)—AUTO	
	59 S-BAND ANT ind—TBD	19
	60 SPS LINE HTR sw—OFF	

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Step	Procedure	Panel
	RCS STATUS CHECK (S)	
S	61 S/M RCS-QTY GAUG ING - P OWER sw - ON	15
	62 RCS INDICATORS select—S/M A, B, C, & D consecutively (note & record values) For Each Position	12
	a. S/M RCS TEMP PKG ind—+63° to +100°F	
	b. PRESS-He ind—4500 or below -MANF ind—178 to 188 psia	
	c. SM RCS-QTY GAUGING-TEST sw—TEST (momentary)	15
	d. PROPELLANT QUANTITY- OXIDIZER & FUEL ind (2)— calib values	12
	e. PROPELLANT QUANTITY- OXIDIZER & FUEL ind (2)— return to ground servicing values	
	63 S/M RCS QTY GAUG ING - P OWER sw - OFF	15
	64 RCS INDICATORS sw—C/M A & B (consecutively) note & record C/M RCS-TEMP-He ind—95°F max -PRESS-He ind—3800 to 4500 psia -PRESS-F & OX ind (2)—205 psia <i>MAX</i>	12
	EPS STATUS CHECK (P)	
P	65 DC INDICATORS sw— <i>F/C 1, 3</i> (consecutively)-check	18
	DC AMPS ind—TBD	
	66 DC INDICATORS sw—MAIN BUS A & B (consecutively), check— <i>27 to 31 vdc</i>	

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Step	Procedure	Panel
P	67 DC INDICATORS sw—BAT BUS A & B, and BAT C (consecutively), check—37.2 vdc, zero amps	18
	68 DC INDICATORS sw—PYRO BAT A & B (consecutively), check— 37.2 vdc, zero amps	
	69 DC INDICATORS sw—MAIN BUS A	
	70 AC INDICATORS sw—BUS 1-ØA, -ØB, -ØC & BUS 2-ØA, ØB, ØC (consecutively), check—113 to 117 vac, 398 to 402 cps	
	71 AC INDICATORS sw—BUS 1-ØA	
	72 Cryogenic ind check TANK PRESSURE <i>-H₂ ind(2)—230 to 260 psia</i> -O ₂ ind (2)—865 to 935 psia TANK QUANTITY <i>-H₂ ind(2)—28 lb (nom)</i> -O ₂ ind (2)—320 lb (nom)	13
73	F C REACTANTS event <i>ind(2)—gray</i>	
74	F C INDICATORS sw—1, 2, 3 (consecutively) & check: Fuel cell event ind (5)—gray F C -FLOW <i>-H₂ ind—0.036 to 0.163 lb/hr</i> <i>-O₂ ind—0.288 to 1.304 lb/hr</i> -MODULE TEMP-SKIN ind— 385° to 495°F -MODULE TEMP-COND EXH ind— 157.2° to 172.5°F	
75	F C INDICATORS sw—1 SPS STATUS CHECK (PC)	
76	He TANK-TEMP ind—105°F max	20
77	He TANK-PRESS ind—4500 psia max	

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Step	Procedure	Panel
P	78 PRESSURE-FUEL & OX ind (2)— nominal 175 psia	20
	79 PRESSURE-ENG INLET-FUEL & OX ind (2)—nominal 175 psia	
	80 SPS TANK PRESS sw—N ₂ A & N ₂ B (consecutively) check TK PRESS-N ₂ ind—3000 psia max	
	81 SPS TANK PRESS sw—He	
	82 SPS HELIUM event ind (2)—gray	
	83 QUANTITY display (2)—record	
	84 UNBALANCE ind—0±50 lb	
C	85 SPS GAUGING sw—AC 1	25
P	86 TEST/AUTO sw—TEST (down 8 sec)	20
	87 QUANTITY-OX & FUEL ind— <i>dec</i>	
	88 OXID FLOW event ind— Upper—striped Lower—gray	
	89 OXID FLOW sw—DECREASE	
	90 TEST/AUTO sw—TEST (down 8 sec)	
	91 OXID FLOW event ind— Upper—gray Lower—striped	
	92 OXID FLOW sw—NORM	
	93 TEST/AUTO sw—TEST (down 8 sec)	
	94 OXID FLOW event ind—gray	
	95 UNBALANCE ind—c k	
	96 TEST/AUTO sw—TEST (up (OX & FUEL—within 2 digits of value recorded in step 83)	
	97 SENSOR sw—AUX	
	98 TEST/AUTO—TEST (down 5 sec)	
	99 QUANTITY-OX & FUEL ind— <i>decrease</i>	
	100 UNBALANCE ind—c k	

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Step	Procedure	Panel
P	101 TEST/AUTO sw—TEST (up) (OX & FUEL—within 2 digits of value recorded in step 83)	20
	102 SENSOR sw—NORM	
LAUNCH PREPARATION (CSP)		
CSP	103 LCC confirm launch ready—check	
	104 Couch restraints & inertial reels— <i>CK</i>	
S	105 EDS panel LOCK cont—LOCK	5
C	106 EDS P W R sw—ON	24
	107 MESC LOGIC ARM sw (2)— <i>LOGIC ARM</i>	25
	108 MASTER EVENT SEQ CONT sw (2)—PYRO ARM	24
P	109 MAIN BUS TIE sw (2)—BAT A&C— <i>Bfc</i>	22
	110 DC INDICATOR sw (consecutively) BAT BUS A & B, BAT C—TBD	18
	111 DC INDICATOR sw—MAIN BUS A	2, 4
C	112 FDAI-SELF TEST sw—SELF <i>TEST</i> (FDAI rate ind— c k 4/5 full <i>scale</i>)	
	113 FDAI-SELF TEST sw—OFF (FDAI rate ind—null)	
	114 ATT /MONITOR/ENTRY sw— <i>ATT</i>	8
	115 ATTITUDE SET cont (3)—c k R -165° P -58° Y -10°	6
	116 FDAI ALIGN sw—press and hold until ball motion stops	2, 4

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Step	Procedure	Panel
C 117	ATTITUDE SET cont (3)—check	6
	R -150°	
	P -80°	
	Y -20°	
118	ATT SET sw—ATT SET	
119	FDAI attitude error—c k	4
	-R —full left	
	-P .—full down	
	-Y —full left	
120	ATT SET sw—OFF	6
121	FDAI ALIGN sw—press & hold until ball motion stops	2, 4
122	FDAI attitude ball—nav axis	4
	-R -150°	
	-P -80°	
	-Y -20°	
123	ATTITUDE SET cont	6
	-R -164.8°	
	-P -58.3°	
	-Y -9.7°	
124	ATT SET sw—ATT SET	
125	FDAI att error ind	4
	-R -2/3 scale	
	-P -2/3 scale	
	-Y -2/3 scale	
126	ATT SET sw—OFF	6
127	FDAI ALIGN sw—press & hold until ball motion stops	2, 4
128	FDAI att ball—nav axis	4
	R -164.8	
	P -58.3°	
	Y -9.7°	
129	TVC-1 sw—AC 1	24
	TVC-2 sw—AC 2	
130	ΔV SET sw—plus (+) high drive hold (ΔV REMAINING ind—TBD)	7

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Step	Procedure	Panel
C 131	ΔV SET sw—minus (-) low drive hold (ΔV REMAINING ind—TBD)	7
132	GIMBAL POSITION cont -YAW—+4° -PITCH—0°	6
133	SPS-GIMBAL MOTORS sw (4)— <i>START-ON</i>	3
134	GIMBAL POSITION ind -YAW—+4° -PITCH—0°	6
135	GIMBAL POSITION cont -YAW—+6° -PITCH—+2°	
136	GIMBAL POSITION ind -YAW—+6° -PITCH—+2°	
137	SPS-GIMBAL MOTORS -PITCH-1 sw—OFF -YAW-1 sw—OFF	3
138	GIMBAL POSITION ind (<i>no change</i>)	6
139	GIMBAL POSITION cont -YAW—+3.6° -PITCH—+0.4°	
140	GIMBAL POSITION ind -YAW—+3.6° -PITCH—+0.4°	
141	SPS GIMBAL MOTORS PITCH-2 sw—OFF YAW-2 sw—OFF	3
142	ATT /MONITOR/ENTRY sw— <i>MON</i>	8
143	FDAI ball -R —164.8° -F —58.3° -Y —9.7°	4
144	DSKY PROGRAM—02	14

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Step	Procedure	Panel
C	145 SPS-INJECT PRE VALVES-A&B <i>sw(2)-ON</i>	3
	146 DIRECT RCS sw—DIRECT RCS	8
	147 DSKY-V75—Press	14
CS	148 Remove rotation cont pins (2)	
C	149 Thrust control sw—NORMAL	7
	150 EDS sw—AUTO	16
P	151 ECS RADIATOR sw (4)—OFF	21
S	152 PRESS GLY DISCH ind—TBD psia	13
	153 GLY ACCUM QNTY ind— <i>TBD %</i>	
C	154 SCS CHANNEL-A&C ROLL, B&D ROLL, & YAW sw (3)—on (up)	8
CSP	155 HF sw—T/R	26, 13, 23
P	156 TAPE REC'DR <i>-REC'D/PLAY sw-NCD</i>	20
	157 -FWD/REV sw—FWD	
C	158 FDAI ALIGN sw—press (10 sec)	6
	159 G&N/SCS sw—G&N	8
	160 DSKY PROGRAM—04 (T-3 sec)	14

ASCENT—CHECKLISTS

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ASCENT

ASCENT—CHECKLISTS

	Time Step	Procedure	Panel
		S-IB ENGINE IGNITION (CS)	
CS		1 L/V ENGINES lt (8)—on	5
S	TBD	2 DSKY PROGRAM—02 to 04	14
	-00:03	3 Ignition	
	-00:01	4 L/V ENGINES lt (8)—out	5
		LIFT-OFF (CS)	
	00:00	5 Liftoff	
	00:01	6 Event timer—check start	
		7 LIFT OFF lt—on (out in 5 sec)	
		8 NO AUTO ABORT lt—out, press	
CS		9 DSKY-PROGRAM—11, press VERB, KEY RLSE Backup—press ENTER	14
C		10 Rate limit 3°/sec, Mode IA—report	
		ROLL/PITCHOVER MANEUVER (CS)	
C	00:10	11 Roll initiated—report—pitch initiated	
CS		12 DSKY—V16, N40 -R1—inertial flight angle -R2—inertial velocity -R3—alt above pad	14
	00:38	13 L/V roll program complete	4
C	00:40	14 L/V AOA ind—monitor to T+1 min <i>40 sec</i>	3
	00:50	15 Rate limit change to 5°/sec	4
S		16 PRESS CABIN ind—monitor for <i>decrease</i>	13
C	01:01	17 Switchover to Mode IB—report	

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	Time Step	Procedure	Panel
C	18	ABORT SYSTEM-OX DUMP sw— RCS CMD AUTO	16
S	19	C/M RCS PRPLNT sw (2)—ON	15
	01:20	MAX DYNAMIC PRESS (CSP)	
CS	01:40	20 2 ENG OUT sw—OFF L/V RATES sw—OFF	16
		21 L/V AOA/SPS Pc sw—SPS Pc	3
	02:00	22 Mode 1C—report	
	02:10	23 Go/no-go staging—report	
S	24	24 GLYCOL EVAP-H ₂ O FLOW sw—AUTO	13
	25	25 GLY EVAP-OUTLET TEMP ind— 42° to 48°F	
	26	26 TEMP-SUIT ind—45° to 55°F	
C	27	27 L/V pitch termination—report	4
		S-IB/S-IVB SEPARATION (CS)	
C	02:21	28 L/V ENGINES 5, 6, 7, 8 lt—on	5
	02:27	29 L/V ENGINES 1, 2, 3, 4 lt—on	
	02:28	30 L/V ENGINES lt (8)—out (separation)	5
		S-IVB BOOST (CS)	
	02:29	31 L/V ENGINES-1 lt—on	
	02:31	32 L/V ENGINES-1 lt—out	
		33 S-IVB go no-go staging—report	

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	Time	Step	Procedure	Panel
C	02:35	34	Caution Wait 1 second between starting of each gimbal motor to prevent excessive overload. The motors should not be operated continuously for longer than 10 minutes.	
			SPS GIMBAL MOTORS	5
			-PITCH 1 sw—START—ON	
			-PITCH 2 sw—START—ON	
			-YAW 1 sw—START—ON	
			-YAW 2 sw—START—ON	
		35	GIMBAL POSITION ind—ck	
			-PITCH—+0.4°	
			-YAW—+3.6°	
	02:58	36	EDS AUTO sw—OFF	16
		37	SCS CHANNEL-PITCH sw— <i>ON(UP)</i>	8
			LAUNCH TOWER JETTISON (CSP)	
C	03:00	38	ABORT SYSTEM-MODE sw (2)— TWR JETT SPS MODE	16
			Backup: EDS panel LOCK cont— <i>UNLOCK</i>	5
			-LES MOTOR FIRE sw—press	
			-EDS panel LOCK cont—LOCK	
	03:02	39	Mode IIA—report	
S		40	DSKY—ck PROGRAM—12	
			-DSKY—V16 N41	
			-R1—max g's	
			-R2—perigee alt	
			-R3—time of free-fall	
	03:07	41	FDAI attitude errors—0°	4

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Time Step	Procedure	Panel
MAXIMUM ALTITUDE (CS)		
S 07:15	42 S/M RCS QTY GAUGING <i>PWR SW - ON</i>	15 <input type="radio"/>
C 07:40	43 Max altitude	
09:40	44 Mode IIB—report	
09:46	45 SPS to orbit capability	
10:07	ORBITAL INSERTION (CS)	
S 09:50	46 C/M is go	
C 10:07	47 L/V ENGINES-1 lt—on Backup: Trans cont—CCW, return w/in 1 second	5 <input type="radio"/>
S	48 S-IVB engine shutdown— -DSKY V16 N42 (flashing) -R1—delta range -R2—perigee alt -R3—time of free-fall	14
	49 DSKY—V33E	
	50 DSKY—V16 N43 -R1—apogee alt -R2—perigee alt -R3—time of free fall	<input type="radio"/>
	51 DSKY—V33E	
C 10:30	52 DSKY—PROGRAM 00 53 S-IVB stable—report	
POST ORBITAL INSERTION CHECK (CSP)		
C	54 SPS-INJECT PRE-VALVE <i>sw(2)-OFF</i>	
	55 SPS-GIMBAL MOTORS <i>sw(4)-OFF</i>	14 <input type="radio"/>
	56 MASTER EVENT SEQ CONT- PYRO ARM <i>sw (2)—SAFE</i>	

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Time Step	Procedure	Panel
C	57 MESC-LOGIC ARM sw (2)—OFF	14
	58 C/M PROP JETT-LOGIC sw—OFF	
	59 SPS-GIMBAL MOTOR CONTROL- PITCH-BAT A & YAW BAT A <i>E/O</i> (2)—open	
11:27	60 CABIN PRESSURE RELIEF valve (2)—NORMAL	131
	61 S-IVB pitchover & pitch rate—monitor	4
S	62 C/M RCS PRPLNT sw (2)—OFF	15
	63 S/M RCS status— <i>CK</i>	
	64 C/M RCS status— <i>CK</i>	
	65 S/M RCS-QTY GAUGING— <i>PWR - OFF</i>	
P	66 C&W sw—NORMAL	13
	67 FLIGHT QUAL RCDR sw—STOP	19
	68 EPS status— <i>CK</i>	
	69 ECS status— <i>CK</i>	
	70 SPS status— <i>CK</i>	
	71 TAPE RCDR— <i>FWD/REV - OFF (ENTER)</i>	20
	72 MAIN BUS TIE sw (2)—OFF—AUTO ECS INSERTION CHECK	
C	73 GLYCOL RESERVOIR BYPASS valve—OPEN	131
	74 RESERVOIR INLET valve—CLOSE	
	75 —RESERVOIR OUTLET valve— <i>CLOSE</i>	
S	76 GLYCOL PRESSURE RELIEF <i>BYPASS</i> valve (2)—OFF	133
	77 Remove attenuation panel	
	78 Suit circuit return valve—0 (open)	135
	79 GLYCOL RESERVE valve—ON	136

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	Time Step	Procedure	Panel
P		80 Monitor GLY ACCUM-QTY ind— 12 to 40%	13
S		81 GLYCOL RESERVE valve—OFF	136
P		82 PRESS GLY DISCH ind—26 to 46 psia	13
S		83 Replace attenuator panels	
		84 PLV lockpins—in	
P	15:00	85 ECS RADIATOR sw (4)—on (up) (before T+30 min.)	21
S		86 Verify ECS RAD OUTLET TEMP ind—below inlet temp Backup: ECS RADIATOR sw (4)— <i>OFF</i> ON in 5 min.	13, 97 21
P		87 GLYCOL EVAP TEMP IN sw—AUTO	13
C		88 DIGITAL EVENT TIMER sw—STOP	8

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CSM/S-IVB EARTH ORBIT & SEPARATION CHECKLISTS

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CSM/S-IVB EARTH ORBIT &
SEPARATION CHECKLISTS

Time Step	Procedure	Panel
SCS ATTITUDE REFERENCE COMPARISON CHECK (C)		
C	1 ATT DB sw—MIN	8
	2 G&N/SCS sw—SCS	
	3 ATT /MONITOR/ENTRY sw— ENTRY	
	4 ΔV sw—OFF	
	5 LIMIT CYCLE sw—LIMIT CYCLE	
	6 DIRECT RCS sw—OFF	
	7 SCS CHANNEL-A&C ROLL or B&D ROLL sw (2)—on (up)	
	8 SCS CHANNEL-PITCH and YAW sw (2)—on (up)	
	9 Thrust control sw—OFF	7
	10 TVC 1 and TVC 2 sw (2)—OFF	24
	11 DSKY-V16 N20E—press	14
	12 Record R1, R2, R3 DSKY V34E	
	13 Compare FDAI when DSKY	4
	14 Adjust ATT SET thumbwheel if different	6
	15 ATT SET sw—on (up)	
	16 Null FDAI attitude error with ATT SET thumbwheel	4, 6
	17 ATT SET ind R, P, Y, (N. record)	6
	18 ATT .DB sw—MAX	8
	19 ATT /MONITOR/ENTRY sw— MON	
	20 ATT SET sw—OFF	6

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Time Step	Procedure	Panel
SCS POWER DOWN CHECK (C)		
C	21 LIMIT CYCLE sw--OFF	8
	22 SCS CHANNEL sw (4)--OFF	
	23 PARTIAL SCS POWER sw--OFF	24
IMU ALIGNMENT CHECK (CSP)		
P	24 OPTICS-MN A and MN B cb (2) -- <i>closed</i>	22
C	25 RATE GYRO sw (3)--BMAG	8
S	26 Select star field	
	27 MODE-FINE DSKY V37E 52E--PROGRAM 52	106
	28 MODE-FINE ALIGN sw lt--on	101
	NOTE If MODE-COARS ALIGN sw MODE-FINE lt is on--record. MODE-FINE sw it (allow 20 sec) -- on <i>MODE-FINE SW (allow 20 sec) -- on</i>	
	29 DSKY-flash--V06 N30, R1 star code	106
	30 Star code table--star code satisfactory BACKUP: If unsatisfactory, load V21 N30E and correct star code in R1 and proceed with step 33	
	31 DSKY V33E -- MODE-FINE	
	32 DSKY ind--V50 N25, R1 00013	
	33 Perform AUTO-OPTICS sub-routine BACKUP: Perform MANUAL-OPTICS positioning	
	34 DSKY-flash V51 perform mark. Continue until sufficient marks MODE-FINE	
	35 Orient star field in SCT	104, 105

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Time Step	Procedure	Panel
S	NOTE If desired star not in field, locate star with 25° offset.	104, 105
	36 Identify star in SXT	
	37 OPTICS-CONTROLLER-SPEED sw—adjust	
	38 OPTICS-CONTROLLER-MODE sw—RESOLVED	
	39 Center star with optics hand <i>controller</i> controller	
	40 MARK—press when star centered	
	41 DSKY-flash—V21 N30	106
	NOTE After second star, data load in step 43 will initiate display in step 47 to be recorded in flight log. If no flash, displays will terminate in 10 seconds, requiring immediate recording of values displayed.	
	42 DSKY-R1—enter star code	
	43 OPTICS-CONTROLLER-SPEED sw - <i>HI</i>	105
	44 OPTICS-CONTROLLER-MODE sw - <i>DIR</i>	
	45 First star sighting—return to step 30 second star, proceed to step 47	
	46 DSKY— <i>CR. F. RCL</i> V06 N05, R1—star angle difference	106
	NOTE If data out of tolerance: To continue, press V33E.	
	47 DSKY—check and record V06 N67 R1—X-gyro torquing angle R2—Y-gyro torquing angles R3—Z-gyro torquing angles	

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Time Step	Procedure	Panel
S	NOTE If data out of tolerance: To continue, V33E.	106
	48 ICDU's drive to angles displayed in step 47	102
	49 DSKY-flash—check V50 N25, <i>R1-00014</i>	106
	NOTE Fine align mode check desired, press ENTER and return to step 30. If not desired, enter V33E and check.	
	PROGRAM—00 MODE—FINE ALIGN	
	50 RATE GYRO sw (3)—NORMAL	8
	SYSTEMS STATUS & OPERATIONS <i>CHECK(SP)</i> CHECK(SP)	
SP	51 Systems status <i>cks</i> and consumable <i>logging</i> logging	
	52 ECS periodic verification <i>ck</i>	13
	53 EPS periodic verification <i>ck</i>	13, 18
P	54 Charge entry batteries	18
	AGC UPDATE—STATE VECTOR (CS)	
CS	55 Request AGC update or receive MSFN request.	
	NOTE For auto update, perform steps 57 thru 59. For manual update (voice comm) perform steps 60 <i>thru 67.</i> 	
	56 UPTTEL sw—ACCEPT	14

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Time Step	Procedure	Panel	
CS	57 DSKY ind—PROGRAM 27 ACTIVITY-UPTL lt—on	14	
	58 DSKY ind—program 00 ACTIVITY-UPTL lt—out		
	59 UPTL sw—BLOCK		
	60 Record octal position, velocity, and time data for MSFN		
	61 DSKY V76E		
	62 DSKY-flash—V05 N31 R1 000410, press ERROR RESET		
	NOTE Notify MSFN, and update when AGC will allow.		
S	63 DSKY ind —check V21 N01, <i>PROGRAM - 27</i> PROGRAM 27 ACTIVITY-UPTL lt—on R1—blank R2—blank R3—up data address	105	
	64 Load DSKY data recorded in step 61		
	65 DSKY V33E when data load completed		
	66 DSKY ind—PROGRAM 00 ACTIVITY-UPTL lt—out		
	67 Check MSFN receipt of optical data		
	EARTH ORBIT LANDMARK NAVIGATION— CHECK (SP)		
	68 OPTICS-CONTROLLER-MODE sw—RESOLVED		106
69 Select three landmarks from ground track chart			
70 DSKY—V37E 22E—press			
71 DSKY—PROGRAM 22			
72 MODE-FINE-ALIGN sw lt—on	101		

*Lat
Long/2*

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Time Step	Procedure	Panel
S	73 DSKY flash—V50 N25, R1 00011	106
	NOTE For AGC optics positioning proceed to step 75. For manual positioning, proceed to step 84.	
	74 DSKY—V33E	
	75 DSKY flash—V06 N44	
	76 DSKY V25 N44E	
	R1—landmark lat	
	R2—landmark long/2	
	R3—landmark altitude	
error (att) *	77 R1, R2, R3—c k	
	78 DSKY-ENTER—press	
	79 DSKY flash—V50 N25, R1 00013	
	80 OPTICS-MODE sw—COMPUTER	105
	81 DSKY-ENTER— press	
	82 DSKY—V16 N57	
	R1—optics shaft angle	
	R2—trunnion shaft angle	
	OCDU's drive and stop at displayed angles	102
	Proceed to step 87	
	83 DSKY-ENTER— press	106
	V51 flashes	
	NOTE Flash continues until sufficient MARKS mode.	
	84 OPTICS-MODE sw—MANUAL	105
	85 SCT—horizon tangent to FOV	104, 105
	86 Locate and identify landmark <i>in SCT.</i>	104
	If not visible, select <i>unknown LM</i>	
	unknown landmark.	
	87 OPTICS MODE sw—MANUAL	105

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Time Step	Procedure	Panel
S	99 Data acceptable, DSKY V33E— PROGRAM 00	106
	100 DSKY—PROGRAM 00	
	101 For additional sightings: OPTICS-CONTROLLER-SPEED sw— as reqd and return to step 70	
	102 After sightings completed, return optics controls to nominal positions	
	103 Compare orbital nav data with <i>NSFN</i>	
CSM/S-IVB SEPARATION CHECK (CSP)		
C TRF -05:00	104 MESC-LOGIC ARM sw (2)—LOGIC <i>ARM</i>	25
	105 MASTER EVENT SEQ CONT PYRO ARM sw (2)—PYRO ARM	24
S	106 DSKY—PROGRAM 00	106
	MODE-FINE ALIGN sw lt—on	101
C	G&N/SCS sw—SCS	8
CSP	107 Fasten restraints	
	108 RATE GYRO sw (3)—BMAG	
P	109 TAPE RECORDER-FWD/REV sw - <i>FWD</i>	20
TAPE RECORDER—RECORD		
C	110 PARTIAL SCS POWER sw—AC 2	24
CS	111 Set digital event timer for 00-00 at S-IVB separation	5, 8
S	112 SM/RCS monitoring check	12
C	113 TVC-1 POWER sw—AC 1	24
	114 Set ΔV REMAINING ind—(TBD)	7
	115 FDAI-SELF TEST sw—SELF TEST check check rate ind (3) 4/5 full scale deflection	2, 4
	116 RATE GYRO sw (3)—NORMAL	8

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	Time Step	Procedure	Panel
C	117	ATTITUDE SET cont -ROLL—0° -PITCH—approx 8° negative pitch from present FDAI nav axis -YAW—0°	6, 4
	118	DSKY—(TBD)	14
	119	DSKY flash—(TBD) PROGRAM—(TBD) R1—(TBD)	
TRF -02:00	120	FDAI ATTITUDE ball—verify S-IVB attitude hold	5, 4
	121	FDAI ALIGN sw—press and check ball movement	
	122	Note pitch angle	4
	123	ATT /MONITOR/ENTRY sw— <i>ATT</i>	8
	124	SCS CHANNEL sw (4)—on (up)	8
CS	125	Translation cont—ARMED Rotation cont—unpinned	
-00:15	126	Digital event timer—MIN 00, <i>SEC 15</i>	5
		Prepare for direct ullage—panel LOCK cont—UNLOCK	
-00:02	127	Digital event timer—MIN 00, <i>SEC-02</i>	
C		-DIRECT ULLAGE sw—press and <i>hold</i>	7
S		-DSKY ENTER—press -DSKY flash—V16 N13, R1 accum <i>ΔV</i>	14
00:00	128	Digital event timer—MIN-00, <i>SEC-00</i>	5
		-ADPT SEP sw—press BACKUP: Translation cont—CCW	
S	129	<i>RCS—CMD SW—ON</i> (momentarily)	16

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Time Step	Procedure	Panel
C +00:02 130	Digital event timer - <i>59 MIN 58 SEC</i>	5
	-Translation cont - press in <i>+ΔV_x</i>	
	-DIRECT ULLAGE sw - release	7
	-ΔV REMAINING ind - 00000	
	-Translational cont - center (neutral)	
S 131	DSKY R1 - note then load V33E	
C 132	Maneuver CSM to perform SLA <i>photos</i>	

POST SEPARATION CHECKS

S 133	TAPE RECORDER FWD/REV sw - OFF	20
C 134	EDS P W R sw - OFF	24
	135 MESC-LOGIC ARM sw (2) - OFF	25
	136 MASTER EVENT SEQUENCE CONT- PYRO ARM sw (2) - SAFE	24

SYSTEMS MANAGEMENT CHECKLISTS

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SYSTEMS MANAGEMENT CHECKLISTS

Step	Procedure	Panel
	SPS PERIODIC VERIFICATION & TESTS	
	SPS MONITORING—CHECK (P)	
P	1 He TANK TEMP ind—105°F max	20
	2 He TANK PRESS ind— <i>ck & record</i>	
	3 SPS TANK PRESS sw—N ₂ A & N ₂ B (consecutively), <i>ck & record N₂ ind</i>	
	4 SPS TANK PRESS sw—He	
	5 PRESSURE ind (4)—175 psia (<i>NOM</i>)	
	6 SPS ENGINE INJECT VALVE ind (<i>4</i>)- <i>CLOSE</i>	
	7 SPS HELIUM ind (2)—gray	
	<hr/>	
	SPS QUANTITY GAUGING & PU VALVE— CHECK (CP)	
P	1 SENSOR sw—PRI	
	2 QUANTITY-OXID & FUEL ind— <i>RCD</i>	
	3 UNBALANCE ind—record	
	4 VALVE sw—PRI	
	5 OXID FLOW sw—INCREASE	
	6 TEST sw—TEST (up) (8 sec)	
	7 QUANTITY-OXID & FUEL ind— reading increases	
	8 OXID FLOW ind— <i>ck</i>	20
	Upper—striped	
	Lower—gray	

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Step	Procedure	Panel
P	9 OXID FLOW sw—DECREASE	
	10 TEST sw—TEST (up) (8 sec)	○
	11 OXID FLOW ind—check Upper—gray Lower—striped	
	12 OXID FLOW sw—NORM	
	13 TEST sw—TEST (up) (8 sec)	
	14 OXID FLOW ind (2)—gray	
	15 UNBALANCE ind—new reading	
	16 TEST sw—TEST (down) OXID & FUEL ind—±2 of values in step 2	
	17 SENSOR sw—AUX	○
	18 TEST sw—TEST (up) (5 sec)	
	19 QUANTITY-OXID & FUEL ind— reading increases	
	20 UNBALANCE ind—new reading	
	21 TEST sw—TEST (down) OXID & FUEL ind—±2 of values in step 2	
	22 SENSOR sw—NORMAL	

RCS PERIODIC VERIFICATION & TESTS

S/M RCS MONITORING—CHECK (S)

S	1 SM RCS-QTY GAUGING POWER <i>sw-ON</i>	15	○
	2 RCS INDICATORS sw—SM A	12	
	3 QTY GAUGING-TEST sw—TEST	15	
	4 PROPELLANT QUANTITY ind (2)—same as last calib values	12	
	5 Repeat for quads B, C, & D		
	6 SM RCS-HELIUM & PROPELLANT ind (12)—gray	15	○
	7 RCS INDICATORS sw—SM A	12	
	8 SM RCS TEMP PKG ind—+63°F to <i>+175°F</i>		

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Step	Procedure	Panel
S	9 S/M RCS PRESS He ind— CK <i>RCB</i>	
	10 S/M RCS PRESS MANF ind— <i>177 to 192 psia</i>	
	11 PROPELLANT QNTY ind (2)— CK <i>RCB</i>	
	12 Repeat for quads B, C, & D	
	13 S/M RCS QTY GAUGING <i>PWR sw-OFF</i>	15

C/M RCS MONITORING—CHECK (S)

S	1 PRPLNT ind (2)—gray	
	2 RCS INDICATORS sw—C/M A	12
	3 C/M RCS TEMP He ind—Below 95	
	4 C/M RCS PRESS He ind—4000 to <i>4500</i>	
	5 C/M RCS PRESS-F & OX ind— <i>RCB</i>	
	6 Repeat for C/M sys B	

EPS PERIODIC VERIFICATION & TESTS

D-C VOLTAGE-AMPERAGE—CHECK (P)

P	1 DC INDICATORS sw— <i>F.C. 1, 2, & 3 ck loads</i>	18
	2 DC INDICATORS sw—MAIN BUS-A <i>FB</i> check 27 to 31 vdc	
	3 MAIN BUS TIE sw (2)—OFF	22
	DC INDICATORS sw—BAT BUS-A, B and BAT C—check 37.2 vdc, <i>0 amps</i>	18
	4 DC INDICATORS sw—PYRO BAT-A & B, check 37.2 vdc, <i>0 amps</i>	

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Step	Procedure	Panel
P	5 MAIN BUS TIE sw (2)—AUTO	22
	6 DC INDICATORS sw—MAIN BUS-A	18

A-C VOLTAGE-FREQUENCY—CHECK (P)

- 1 AC INDICATORS sw—BUS 1-ØA
ØB, ØC & BUS 2—ØA, ØB, ØC,
check 113 to 117 vac, 398 to 402 cps
- 2 AC INDICATORS sw—BUS 1-ØA

CRYOGENIC PRESSURE-QUANTITY—CHECK (S)

- S 1 TANK PRESSURE H₂-1 (and ^{H₂}-2)—*230 to 260*
- 2 TANK PRESSURE O₂-1 (and ^{O₂}-2)—*865 - 935*
- 3 TANK QUANTITY H₂-1 (and ^{H₂}-2)—*RCD*
- 4 TANK QUANTITY O₂-1 (and ^{O₂}-2)—*RCD*

FUEL CELL POWER PLANT—CHECK (P)

- P 1 F / C -REACTANTS ind (3)—*gray* 18
- 2 F / C INDICATORS sw—1 - *ck*

F/C event ind (5)—gray
 FLOW-H₂ ind—0.036 to 0.163
 FLOW-O₂ ind—0.288 to 1.304
 MODULE TEMP-SKIN—385 to 500
 MODULE TEMP-COND EXH—*155 to 165*

- 3 Repeat for F/C 2 & 3
- 4 F / C INDICATORS sw—1

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Step	Procedure	Panel
BATTERY A CHARGING—CHECK (P)		
P	1 MAIN BUS TIE sw (A&C)—OFF 2 DC INDICATORS sw—BAT CHARGER 3 BATTERY CHARGER sw—A check 32 to 40, 2.8 to 0.3 4 BATTERY CHARGER sw—OFF 5 DC INDICATORS sw—MAIN BUS A 6 MAIN BUS TIE sw (2)—AUTO	
BATTERY B CHARGING—CHECK (P)		
	1 MAIN BUS TIE (B&C) sw—OFF 2 DC INDICATORS sw—BAT CHARGER 3 BATTERY CHARGER sw—B check 32 to 40 vdc, 2.8 to 0.3 amps 4 BATTERY CHARGER sw—OFF 5 DC INDICATORS sw—MAIN BUS A 6 MAIN BUS TIE (B&C) sw—AUTO	22 18 22
BATTERY C CHARGING—CHECK (P)		
	1 MAIN BUS TIE sw ¹ (2)—OFF 2 DC INDICATORS sw—BAT CHARGER 3 BATTERY CHARGER sw—C check 32 to 40 vdc, 2.8 to 0.3 amps 4 BATTERY CHARGER sw—OFF 5 DC INDICATORS sw—MAIN BUS A 6 MAIN BUS TIE sw ² (2)—AUTO	22
FUEL CELL POWER PLANT PURGING— CHECK (P)		
O₂ PURGING		
P	1 F / C INDICATORS sw—1 (2a3)	18

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Step	Procedure	Panel
P	2 O ₂ purge—2 min	
	3 F / C FLOW-O ₂ ind— <i>increases 0.6</i>	
	4 C&WS—check	11
	5 O ₂ PURGE sw—OFF	18
	6 Repeat for F/C 2 & 3	
	<u>H₂ PURGING</u>	
	1 FUEL CELL INDICATORS sw—1 (2 or 3)	
	2 H ₂ purge—1 min 20 sec	
	3 F / C -FLOW-H ₂ — <i>increases 0.75</i>	
	4 C&WS—check	11
	5 H ₂ PURGE sw—OFF	18
	6 Repeat for F/C 2 & 3	
<u>CRYOGENIC QUANTITY BALANCE (S)</u>		
H ₂ OR O ₂ QUANTITY BALANCE CORRECTION— CHECK (S)		
S	1 On low quantity tank, H ₂ or O ₂ HEATER & FANS—OFF	13
	2 Resume normal operation when <i>balanced</i>	
<u>ECS PERIODIC VERIFICATION & TESTS (P)</u>		
ECS PERIODIC VERIFICATION—CHECK		
P	1 GLY EVAP STEAM PRESS—0.05 - <i>0.25</i>	
	2 PRESS GLY DISCH—26 to 46	13
	3 FLOW O ₂ —0.20 to 0.45	

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Step	Procedure	Panel
P	4 ΔP SUIT COMPR—0.3 to 0.4	
	5 GLY ACCUM-QUANTITY—12 to 40	
	6 <i>H₂O</i> -QUANTITY (POT)—TBD	
	7 <i>H₂O</i> -QUANTITY (WASTE)—TBD	
	8 ECS RAD-OUTLET TEMP—15 to 97	
	9 GLY EVAP-OUTLET TEMP—42 to 48	
	10 TEMP-SUIT—45 to 55	
	11 TEMP-CABIN—70 to 80	
	12 PRESS-SUIT—4.7 to 5.3	
	13 PRESS-CABIN—4.8 to 5.2	
	14 PART PRESS CO ₂ —0.0 to 7.6	
	15 RAD 1 OUTLET TEMP ind—TBD	
	16 RAD 2 OUTLET TEMP ind—TBD	
	17 RAD INLET TEMP—TBD	

REDUNDANT COMPONENT PERIODIC
OPERATION—CHECK (CSP)

P	1 SUIT COMPRESSOR sw—redundant compressor	21
	2 ΔP SUIT COMPR ind—0.3 to 0.4	13
	3 ECS GLYCOL sw—redundant pump	21
	4 PRESS GLY DISCH ind—26 to 46	13
C	5 Select suit demand reg sel—1 SUIT TEST valve—pressurize	134
P	6 FLOW O ₂ ind—increase	13
C	7 SUIT TEST valve—depressurize	134
P	8 FLOW O ₂ ind—normal	13
C	9 SUIT TEST valve—OFF	134
	10 Repeat for reg 2	
P	11 Return to suit reg 1 & 2 at end <i>of test</i>	
S	12 MAIN REGULATOR sel—1	139
	13 EMERG CABIN PRESSURE <i>sel-1</i>	
	14 PRESS TO TEST—press	
	15 FLOW O ₂ ind—increase	13

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Step	Procedure	Panel
S	16 O ₂ FLOW HI lt—on	11
C	17 MSFN reports—100±10	
S	18 Repeat for MAIN REGULATOR <i>sel-2</i>	139
	19 MAIN REGULATOR <i>sel</i> —NORMAL	
	20 EMERG. CABIN PRESSURE <i>sel-OFF</i>	
P	21 H ₂ O ACCUM sw—select redundant <i>accum</i>	
	22 H ₂ O ACCUM FAIL lt—monitor	
S	23 GLYCOL PRESSURE RELIEF BYPASS valves—redundant valve	133
P	24 PRESS GLY DISCH ind—no change	

CABIN COLD-SOAK OPERATION (CSP)

P	1 CABIN TEMP sw—MAN	13
S	2 CABIN TEMP valve—C (full cold)	128
P	3 SUIT EVAP sw—AUTO	13
C	4 SUIT HT EXCH sw—EVAP	134

PGA/SHIRTSLEEVE MODE CHANGE (CSP)

PGA-TO-SHIRTSLEEVE MODE

CSP	1 EMERG CABIN PRESSURE <i>sel-NORM</i>	139
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SHIRTSLEEVE-TO-PGA MODE

	1 EMERG CABIN PRESSURE <i>sel-OFF</i>	
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Step	Procedure	Panel
CABIN REPRESSURIZATION—0 TO 5 PSIA (CSP)		
MINIMUM REPRESSURIZATION TIME (52 MIN)		
C	1 CABIN PRESSURE RELIEF cont— <i>NORM</i>	131
S	2 EMERG CABIN PRESSURE <i>sel-NORM</i>	139
	3 CABIN REPRESS valve—OPEN	
P	4 O ₂ PRESS IND sw—SURGE TANK, - <i>MONITOR</i>	13
TANK PRESSURE-1-O ₂ ind—150		
S	5 EMERG CABIN PRESSURE <i>sel-OFF</i>	139
	6 CABIN REPRESS valve—adjust <i>for 150</i>	
SP	7 PRESS-CABIN ind—5.0	13
	CABIN REPRESS valve—close	139
NORMAL REPRESSURIZATION TIME (74 MIN)		
C	1 CABIN PRESSURE RELIEF cont— <i>NORMAL</i>	131
S	2 EMERG CABIN PRESSURE <i>sel-OFF</i>	139
	3 CABIN REPRESS valve—OPEN	
SP	4 PRESS-CABIN ind—5.0	13
	CABIN REPRESS valve—close	139
PGA VERIFICATION—CHECK (CSP)		
C	1 SUIT TEST valve—PRESS	134
P	2 PGA PRESS-SUIT ind—9.25±0.3	
S	3 Suit flow valve—OFF	125, 126, 127
	4	
	5	
	6	
	7	
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Step	Procedure	Panel
CSP	4 PGA press ind—normal decay	
S	5 Suit flow valve—SUIT FULL FLOW	125, 126, 127
C	6 SUIT TEST valve—DEPRESS	134
	7 SUIT TEST valve—OFF	



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TELECOMMUNICATIONS—CHECKLISTS

Step	Procedure	Panel
	DATA STORAGE, TRANSMISSION & RECEPTION	
	ACTIVATE VOICE RECORDER (CSP)	
P	1 RECOVERY-HF-ON/OFF sw—OFF	20
	2 RECOVERY-SSB/BCN/AM sw—AM	
CSP	3 HF-T/R/OFF/REC sw—T/R	13, 23, 26
	4 POWER-PTT/VOX sw—VOX	
	ACTIVATE VHF-FM TRANSMITTER (P)	
S	1 VHF-FM sw—ON	20
	2 PWR-SCE sw—ON	
	3 PWR-PMP sw—ON	
	4 TLM INPUTS-BIOMED sw—1 (2 or 3)	
	TRANSMIT HIGH OR LOW BIT RATE PCM, VHF-FM (P)	
S	1 VHF-FM sw—ON	
	2 S-BAND-VOICE-TAPE/ANALOG sw—OFF	
	3 TLM INPUTS-PCM sw—HI or LO	
	RECORD HIGH OR LOW BIT RATE PCM (P)	
S	1 TAPE RECORDER-SPEED sw—NORM or LO	20
	2 TAPE RECORDER-RECORD/PLAY sw— RCD	
	3 TAPE RECORDER-FWD/REV sw—FWD	
	4 PWR-SCE sw—ON	
	5 TLM INPUTS-PCM sw—HI or LO	

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Step	Procedure	Panel
REWIND TAPE FOR PLAYBACK OF RECORDED DATA (P)		
S	1 TAPE RECORDER-SPEED sw—HI 2 TAPE RECORDER-FWD/REV sw—REV 3 TAPE RECORDER-RECORD/PLAY sw— <i>PLAY</i>	20

TRANSMIT RECORDED HBR (OR LBR) PCM, VHF-FM (P)		
S	1 VHF-FM sw—ON 2 S-BAND-VOICE-TAPE/ANALOG sw—TAPE 3 TAPE RECORDER-PLAY sw—PCM or NORM 4 TAPE RECORDER-SPEED sw—NORM for HBR, HIGH for LBR 5 TAPE RECORDER-RECORD/PLAY sw—PLAY 6 TAPE RECORDER-FWD/REV sw—FWD	20

RECORDED HBR (OR LBR) PCM REVERSE DUMP (VHF-FM)		
P	1 VHF-FM sw—ON 2 S-BAND-VOICE-RNG/RNG ONLY sw—OFF 3 S-BAND-VOICE-TAPE/ANALOG sw—TAPE 4 TAPE RECORDER-PCM/NORM/ANALOG sw— <i>PCM</i> 5 TAPE RECORDER-SPEED sw—NORM (HBR) HIGH (LBR) 6 TAPE RECORDER-RECORD/PLAY sw— <i>PLAY</i> 7 TAPE RECORDER-FWD/REV sw—REV (opposite to record direction) 8 POWER-PMP sw—ON	20

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Step Procedure Panel

UNIFIED S-BAND OPERATIONS

ACTIVATE USBS WITH PA IN BYPASS MODE (P)

- S
- 1 S-BAND-XPONDER sw—XPONDER 20
 - 2 S-BAND-OSC sw—PRIM
 - 3 S-BAND ANTENNA sw—AUTO

ACTIVATE USBS WITH PA IN HIGH OR LOW-POWER MODE (P)

- S
- 1 S-BAND-XPONDER sw—XPONDER 20
PWR AMPL
 - 2 S-BAND-PWR AMPL sw—HI or LO
 - 3 S-BAND-OSC sw—PRIM
 - 4 S-BAND ANTENNA sw—AUTO

COMMUNICATE WITH MSFN, USBS (CSP)

- CSP
- 1 Activate USBS in any mode
 - 2 S-BAND sw—REC (DOWN) 26, 13,
23

Press Cobra Cable PTT button

TRANSMIT VOICE, HBR (OR LBR) PCM, USBS (P)

- P
- 1 Activate USBS in PA high or low *pwr mode*
 - 2 S-BAND-VOICE-RNG/RNG ONLY sw—OFF 20
 - 3 S-BAND-VOICE-TAPE/ANALOG sw—OFF
 - 4 S-BAND-VOICE-TV/PLSS sw—OFF
 - 5 S-BAND-EMERG sw—OFF
 - 6 PWR-SCE sw—ON
 - 7 PWR-PMP sw—ON
 - 8 TLM INPUTS-PCM sw—HI or LO

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Step	Procedure	Panel
TRANSMIT VOICE, HBR (OR LBR) PCM & RANGING, USBS (P)		
P	1 Activate USBS in PA high or low <i>pwr mode</i>	
	2 S-BAND-VOICE-RNG/RNG ONLY sw—RNG	20
	3 S-BAND-VOICE-TAPE/ANALOG sw—OFF	
	4 S-BAND-VOICE-TV/PLSS sw—OFF	
	5 PWR-SCE sw—ON	
	6 PWR-PMP sw—ON	
	7 TLM INPUTS-PCM sw—HI or LO	
TRANSMIT VOICE AND RANGING ONLY, USBS (P)		
P	1 Activate USBS in PA high or low <i>pwr mode</i>	
	2 S-BAND-VOICE-RNG/RNG ONLY sw—RNG ONLY	20
	3 S-BAND-VOICE-TAPE/ANALOG sw—OFF	
	4 S-BAND-VOICE-TV/PLSS sw—OFF	
TRANSMIT VOICE, HBR (OR LBR) PCM & TV, USBS (P)		
P	1 Activate USBS in PA high power mode	
	2 S-BAND-VOICE-RNG/RNG ONLY sw—OFF	20
	3 S-BAND-VOICE-TAPE/ANALOG sw—OFF	
	4 S-BAND-VOICE-TV/PLSS sw—TV	
	5 PWR-SCE sw—ON	
	6 PWR-PMP sw—ON	
	7 TLM INPUTS-PCM sw—HI or LO	

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Step	Procedure	Panel
P	3 S-BAND-EMERG sw—VOICE 4 POWER sw—VOX	26, 13, 23
	5 S-BAND sw—REC	○
CSP	6 Press Cobra cable PTT button	

~~TRANSMIT CW CODE IN EMERGENCY MODE,
USBS (CSP)~~

P	1 S-BAND-XPONDER sw—XPONDER 2 S-BAND OSC sw—SEC 3 S-BAND-EMERG sw—KEY	20
CSP	4 Cobra cable PTT/CW sw—CW 5 Cobra cable or translation control PTT pushbutton—key	○

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Step	Procedure	Panel
	TRANSMIT VOICE, RECORDED HBR (OR LBR) PCM DATA, USBS (P)	

- | | | |
|---|---------------------------------------------------|----|
| P | 1 Activate USBS in high power mode | |
| | 2 S-BAND-VOICE-RNG/RNG ONLY sw—OFF | 20 |
| | 3 S-BAND-VOICE-TAPE/ANALOG sw—TAPE | |
| | 4 S-BAND-VOICE-TV/PLSS sw—OFF | |
| | 5 TAPE RECORDER-PLAY sw—PCM | |
| | 6 TAPE RECORDER-SPEED sw—NORM
(HBR) HIGH (LBR) | |
| | 7 TAPE RECORDER-RECORD/PLAY sw— <i>PLAY</i> | |
| | 8 TAPE RECORDER-FWD/REV sw— <i>FWD or REV</i> | |
| | 9 POWER-PMP sw—ON | |

RECORDED HBR (or LBR) PCM REVERSE DUMP
(S-BAND)

- | | | |
|---|------------------------------------------------------------------|----|
| P | 1 Activate S-BAND in high or low power mode | 20 |
| | 2 S-BAND-VOICE-RNG/RNG ONLY sw—OFF | |
| | 3 S-BAND-VOICE-TAPE/ANALOG sw—TAPE | |
| | 4 TAPE RECORDER-PCM/NORM/ANALOG
sw—PCM | |
| | 5 TAPE RECORDER-SPEED sw—NORM
(HBR) HIGH (LBR) | |
| | 6 TAPE RECORDER-RECORD/PLAY sw—PLAY | |
| | 7 TAPE RECORDER-FWD/REV sw—REV
(opposite to record direction) | |
| | 8 POWER-PMP sw—ON | |

TRANSMIT VOICE IN EMERGENCY MODE, USBS (P)

- | | | |
|---|---------------------------------------------|--|
| P | 1 S-BAND-XPONDER sw—XPONDER <i>PWR AMPL</i> | |
| | 2 PWR AMPL sw—HI | |

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GUIDANCE & CONTROL

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GUIDANCE & CONTROL

Step	Procedure	Panel
	G&N/SCS MTVC ΔV (IMU ALIGNED) (C)	
C	1 Translation control—CW stop 2 Rotation control—S/C att per FIDAI	
	SCS MTVC ΔV (IMU NOT ALIGNED) (C)	
C	1 Translation control—CW stop 2 Rotation control—S/C att per docking window (COAS)	
	MANUAL TAKEOVER OF G&N ATT MAN (C)	
C	1 Translation control—CW stop 2 Rotation control—desired att man 3 Translation/rotation controls—neutral (if desired)	
	MANUAL CONT SPS FIRING (2ND LEVEL) (CS)	
CS	1 Verify sufficient ullage 2 SPS ROUGH ECO/MASTER ALARM—not illuminated	10
	3 DSKY—no AGC alarms	14
C	4 FDAI—normal	4
	5 Wait 10 sec for SPS ignition	
	6 Verify SPS ignition not occurred	
	7 THRUST ON sw—press	7
	8 ΔV REMAINING reads 00000—THRUST ON sw lt off	
	9 NORMAL/OFF/DIRECT ON sw— <i>off</i>	

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Step	Procedure	Panel
MANUAL CONT SPS FIRING (3RD LEVEL) (CS)		
	1 Verify sufficient ullage	
CS	2 SPS ROUGH ECO/MASTER ALARM—not illuminated	10
	3 DSKY—no AGC alarms	14
C	4 FDAI—normal	4
	5 NORMAL/OFF/DIRECT ON sw— <i>DIRECT ON</i>	7
	6 NORMAL/OFF/DIRECT ON sw— <i>OFF</i>	
DIRECT ULLAGE (C)		
C	1 DIRECT ULLAGE sw—press & hold	7
	2 SPS ignition +1 sec—release DIRECT ULLAGE sw	
DIRECT ROTATION CONTROL (C)		
C	1 DIRECT RCS sw—DIRECT RCS	8
	2 SCS CHANNEL sw (4)—OFF	
	3 Rotation control—unpin	
	4 Rotation control—desired S/C att	
	5 SCS CHANNEL sw (4)—on (up)	
	6 DIRECT RCS sw—OFF	
	7 Rotation control—pin	
NOMINAL G&C SWITCH POSITIONS (CSP)		
C	1 DIRECT RCS/OFF sw—OFF	8
	2 LIMIT CYCLE/OFF sw— <i>LIMIT CYCLE</i>	
	3 ATT DB sw—MAX	
	4 RATE GYRO sw (3)—BMAG	
	5 .05G ENTRY/OFF sw—OFF	

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Step	Procedure	Panel	
C	6 LCL VERT/OFF sw—OFF	8	
	7 ΔV/OFF sw—OFF		
	8 G&N/SCS sw—SCS		
	9 ATTITUDE/MONITOR/ENTRY sw— <i>MON</i>		
	10 SCS CHANNEL sw (4)—OFF		
	11 FDAI LTG sw—AC1	25	
	12 G&N SYNC sw—OFF		
	13 SCS cb's— <i>except</i> -GIMBAL MOTOR CONTROL cb's <i>(4)-OPEN</i>		
	14 ATT SET sw—OFF	6	
	15 NORMAL/OFF/DIRECT ON sw— <i>OFF</i>	7	
	16 FCSM-AUTO/OVERRIDE sw— <i>AUTO</i>	2	
	17 FCSM-ON/OFF/RESET sw—OFF		
	18 FDAI BRIGHTNESS cont—as <i>req</i>		
	CP 19 Rotation control—pinned		
	C	20 Translation control—LOCKED	
		21 PARTIAL SCS POWER sw—AC1	24
		22 RATE GYRO POWER sw—AC1	
		23 ROTATION CONTROL POWER sw— <i>AC1</i>	
24 BMAG POWER sw—AC1			
25 TVC1 POWER sw—OFF			
26 TVC2 POWER sw—OFF			
27 UPTTEL sw—BLOCK	14		
P	28 G&N VIEWER sw—AC1	22	
	29 G&N-OPTICS cb's (2)— <i>OFF</i>		
C	30 G&N cb's (all others)—in (engaged)		
	31 SPS-GIMBAL MOTORS-PITCH 1 and 2 YAW 1 and 2 sw (4)—OFF	3	
	32 SPS-INJECT PRE-VALVES-A&B sw <i>(2)-OFF</i>		

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Step	Procedure	Panel
C	33 L/V AOA/SPS P _C —SPS P _C	3
	34 TRANSFER sw—COMPUTER	101
	35 OPTICS-SLAVE TELESCOPE sw— STAR LOS	105
	36 OPTICS-OPTICS HOLD sw—OFF	
	37 OPTICS mode sw—ZERO OPTICS	
	38 OPTICS CONTROLLER SPEED sw— <i>HI</i>	
	39 OPTICS CONTROLLER MODE sw— <i>DIR</i>	
	40 ATTITUDE IMPULSE-ENABLE sw— <i>OFF</i>	
	41 CONDITIONS LAMPS sw—ON	
	42 IMU TEMP MODE sw—AUTO <i>OVERHADE</i>	
	43 AGC MODE sw—ON	107
	G&C POWER UP (CNS)	
	1 Set controls to nominal positions, <i>except</i>	
	LIMIT CYCLE/OFF sw—OFF	8
P	G&N-IMU-MN A cb—	22
C	G&N-IMU-MN B cb—	
	G&N-VIEWER AC1 cb—	
	G&N-VIEWER AC2 cb—	
S	CONDITION LAMPS sw—OFF	105
	AGC MODE sw—STANDBY	107
C	2 RATE GYRO sw (3)—BMAG	8
	3 FDAI-SELF TEST sw—check	2
	4 RATE GYRO sw (3)—NORMAL	8
	5 Configure system for next G&C event	

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Step	Procedure	Panel
G&C POWER DOWN (CSP)		
C	1 DSKY-PROGRAM—00	14
	2 Set controls to nominal positions, <i>except</i>	
	LIMIT CYCLE/OFF sw—OFF	8
	RATE GYRO sw (3)—BMAG	
	PARTIAL SCS POWER sw—OFF	24
	G&N-IMU-MNA, MNB cb's (2)— <i>open</i>	22
P	G&N-VIEWER-AC1 cb— <i>off</i>	
	G&N-VIEWER-AC2 cb— <i>off</i>	
S	CONDITIONS LAMPS sw—OFF	105
	AGC MODE sw—STANDBY	107
G&N POWER UP (CSP)		
	1 Set controls to nominal positions, <i>except</i>	
C	LIMIT CYCLE/OFF sw—OFF	8
	PARTIAL SCS POWER sw—OFF	24
P	G&N-IMU cb's (2)— <i>off</i>	22
S	CONDITIONS LAMPS sw—OFF	105
C	2 DSKY-PROGRAM—00	14
G&N POWER DOWN (CSP)		
	1 DSKY-PROGRAM—00	14
	2 Set controls to nominal positions, <i>except</i>	
P	LIMIT CYCLE/OFF sw—OFF	8
	G&N-IMU-MN A cb— <i>off</i>	22
	G&N-IMU-MN B cb— <i>off</i>	

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Step	Procedure	Panel
S	CONDITION LAMPS sw—OFF	105
	AGC MODE sw—STANDBY	107
	SCS POWER-UP (C)	
C	1 Set controls to nominal positions, <i>except</i>	
	LIMIT CYCLE sw—OFF	8
	G&N-IMU cb's (2)—	22
	RATE GYRO sw (3)—NORMAL	8
	CONDITION LAMPS sw—OFF	105
	2 Configure system for next event.	
	SCS POWER DOWN—CHECK (C)	
C	1 Set controls to nominal, <i>positions, except</i>	
	LIMIT CYCLE/OFF sw—OFF	8
	PARTIAL SCS POWER sw—OFF	24
	FREE DRIFT ESTABLISHMENT & ADJUSTMENT— CHECK (CSP)	
C	1 DSKY-PROGRAM—00	14
	2 Free drift establishment—set controls to nominal C&C positions, <i>except:</i>	
	FDAI LTG sw—OFF	25
	A&C, B&D-MN A, MN B cb's (4)— one for fullest quad closed, three <i>open</i>	
	PITCH MN A, MN B cb's (2)—one closed, one open	
	YAW MN A, MN B cb's (2)—one closed, one open	
	PARTIAL SCS POWER sw—OFF	24

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Step	Procedure	Panel
P	G&N VIEWER AC1 and AC2 cb's <i>(2) open</i>	22
S	CONDITIONS LAMPS sw—OFF	105
	AGC MODE sw—STANDBY	107
3	Free drift adjustment—set controls:	
C	PARTIAL SCS POWER sw—AC1	24
	SCS CHANNEL-PITCH and YAW sw <i>(2) on (up)</i>	8
	SCS CHANNEL A&C, B&D sw—on (up) for closed cb on panel 25	
	ATT /MONITOR/ENTRY sw— <i>ATT</i>	
S	ATT IMPULSE-ENABLE <i>sw ON</i>	105
	Adjust vehicle rates	
C	SCS CHANNEL sw (3)—OFF	8
	PARTIAL SCS POWER sw—OFF	24
	ATT /MONITOR/ENTRY sw— <i>MIN</i>	8
	SCS ATTITUDE REFERENCE COMPARISON—CHECK (C)	
C	1 Set controls to nominal positions, <i>except</i>	
	ATT /MONITOR/ENTRY sw— <i>ATT</i>	8
	ATT DB sw—MIN	
	SCS CHANNEL-ROLL sw—one with fullest quad on	
	SCS CHANNEL-PITCH, YAW sw <i>(2) on</i>	
	RATE GYRO sw (3)—NORMAL	
2	DSKY—V16 N20 E - <i>check</i>	14
3	REGISTERS	
	DSKY—V34 E	
4	FDAI—check	4

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Step	Procedure	Panel
C	5 ATT SET ind (3)—set	6
	6 ATT SET sw—ATT SET	
	7 ATT SET dial (3)—null att <i>errors</i>	
	8 ATT SET ind (3)—record	
	9 ATT DB sw—MAX	8
	10 ATT SET sw—OFF	6

SCS ATTITUDE HOLD (CS)

C	1 SCS ATT HOLD set controls to nominal G&C positions, except: ATT /MONITOR/ENTRY sw— <i>ATT</i>	8
---	----------------------------------------------------------------------------------------------------	---

SCS CHANNEL A&C, B&D ROLL sw
(2)—one for fullest quad on (up), *ONE OFF*

SCS CHANNEL PITCH, YAW sw(2)—*ON (UP)*

RATE GYRO sw (3)—NORMAL
A&C, B&D-MN A, MN B cb's (4)— 25
open one for channels enabled on *panel 8*

PITCH MN A, MN B cb's—one closed, one open
YAW, MN A, MN B cb's—one closed, one open

S	2 If G&N on, DSKY-PROGRAM—00	106
	MODE-FINE ALIGN It—on	101
C	3 FDAI attitude error ind rates— <i>CK</i>	4

4 External reference—check

G&N ATTITUDE HOLD—CHECK (CN)

CS	1 DSKY-PROGRAM—00 (if not) DSKY—V37 E 00 E	14
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Step	Procedure	Panel
S	2 MODE-FINE ALIGN ind/sw—on	101
C	3 Set controls to nominal positions, except: ATT /MONITOR/ENTRY sw— <i>ATT</i>	8
	RATE GYRO sw (3)—NORMAL SCS CHANNEL sw (4)—on	
	4 G&N/SCS sw—G&N	
CS	5 DSKY—V44 E	14
S	6 MODE-ATT CONT ind/sw—on	101
C	7 FDAI—check	4
	PRECISE SCS ATTITUDE REFERENCE ALIGNMENT TO IMU GIMBAL ANGLES (CS)	
C	1 Set controls to nominal positions, <i>except:</i> ATT DB sw—MIN ATT /MONITOR/ENTRY sw— <i>ATT</i>	8
	RATE GYRO sw (3)—NORMAL G&N/SCS sw—set to mode	
	2 SCS CHANNEL-ROLL sw, one for fullest quad—on (up)	
	3 -PITCH, YAW sw (2)—on (up)	
	4 A&C ROLL-MNA or MNB and B&D ROLL-MNA or MNB cb's—two	25
	5 PITCH-MNA or MNB cb's—one	
	6 YAW-MNA or MNB cb's—one	
CS	7 Verify DSKY PROGRAM—00	14
	8 DSKY—V16 N20 E	
C	9 ATT SET dial (3)—set to DSKY IMU gimbals angles	6
	10 FDAI ALIGN sw—press (32 sec)	

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Step	Procedure	Panel
C	11 G&N/SCS sw—set to alternate	8
	12 FDAI—verify no movement of ball or <i>roll bug</i>	4
	13 G&N/SCS sw—reset	8
	14 ATT .DB sw—MAX	
CS	15 DSKY—V34 E	14

COARSE SCS ATTITUDE REFERENCE ALIGNMENT
TO IMU GIMBAL ANGLES (CS)

	1 Set controls to nominal positions, <i>except</i>	
	G&N/SCS sw—G&N	8
	ATT /MONITOR/ENTRY sw— <i>ATT</i>	
	RATE GYRO sw (3)—NORMAL	
	SCS CHANNEL-ROLL sw, one for fullest quad—on (up)	
	A&C ROLL-MNA or MNB and B&D ROLL-MNA or MNB cb's—two <i>OPEN</i>	25
	PITCH-MNA or MNB cb's—one <i>OPEN</i>	
	YAW-MNA or MNB cb's—one <i>OPEN</i>	
CS	2 DSKY-PROGRAM—00	14
C	3 FDAI—nav axis	4
	4 ATT SET dial—set FDAI att	6
	5 FDAI ALIGN sw—press (32 sec)	
	6 G&N/SCS sw—SCS	8
	7 FDAI—verify no movement of ball or <i>roll bug</i>	4
	8 G&N/SCS sw—G&N	8

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Step	Procedure	Panel
	ATTITUDE MANEUVER TO ATTITUDE SET REFERENCE (C)	
	1 Set controls to nominal position, <i>except:</i>	
C	ATT /MONITOR/ENTRY sw — <i>ATT</i>	8
	SCS CHANNEL-ROLL sw, one with fullest quad—on (up)	
	PITCH sw—on (up)	
	YAW sw—on (up)	
	RATE GYRO sw (3)—NORMAL	
	2 FDAI attitude error ind—confirm limit cycling	4
	3 Uplink—S/C attitude desire	
	R	
	P	
	Y	
	4 ATT SET ind—set to S/C <i>desired att 6</i>	
	5 Magnitude and direction of attitude maneuver—determine	
	6 Rotation cont—unpinned	
	7 ATT SET sw—ATT SET	
	8 LIMIT CYCLE sw—OFF	8
	9 Rotation control/FDAI—maneuver S/C to desired attitude	4
	10 ATT DB sw—MIN (null FDAI att errors)	8
	11 Rotation control—neutral (FDAI-desired attitude)	
	12 FDAI ind—attitude errors nulled	4
	13 LIMIT CYCLE sw—LIMIT CYCLE	8
	14 Confirm attitude to external <i>reference</i>	
	15 ATT DB sw—MAX	
	16 Rotation cont—pinned	

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Step	Procedure	Panel
C	17 If G&N on: DSKY—V16 N20 E REGISTERS 1, 2, 3—record DSKY—V34 E	14
	ATTITUDE MANEUVER TO ATTITUDE BALL REFERENCE (C)	
	1 Set controls to nominal positions, <i>except</i>	
C	RATE GYRO sw (3)—NORMAL ATT MONITOR/ENTRY sw— <i>RTT</i>	8
	SCS CHANNEL-ROLL sw (2), one with fullest quad—on (up), one off PITCH sw—on (up) YAW sw—on (up)	
	2 If G&N on, DSKY-PROGRAM—00	14
	3 FDAI—check (deadbanding)	4
	4 Uplink—desired attitude	
	5 Desired attitude present attitude— compare—determine magnitude, direction of maneuver	
	6 Rotation cont—unpinned	
	7 LIMIT CYCLE sw—OFF	8
	8 ATT DB sw—MIN	
	9 Maneuver S/C to desired attitude	
	10 FDAI ball—check	4
	11 Obtain final attitude—check external <i>ref</i>	
	12 LIMIT CYCLE sw—LIMIT CYCLE	8
	13 Rotation cont—pinned	
	14 ATT . . sw—MAX	
	15 If G&N on:	14
	DSKY—V16 N20 E	14
	REGISTERS 1, 2, 3—record	
	DSKY—V34 E	

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Step	Procedure	Panel
	ATTITUDE MANEUVER TO EXTERNAL REFERENCE (CSP)	
CSP	1 ATT MANEUVER to EXTERNAL REF—set control	
	<i>Caution</i> If final attitude within ± 15 degrees of sun, do not use this procedure. Use precise S/C orientation using SCT procedure.	
C	ATT MONITOR/ENTRY sw— <i>HIT</i>	8
	SCS CHANNEL-A&C ROLL or B&D ROLL sw—on (up)	
	SCS CHANNEL-PITCH, YAW sw— <i>ON (up)</i>	
	2 DSKY PROGRAM—00	14
	3 FDAI—check (deadbanding)	4
CS	4 Uplink—desired attitude	
	5 Desired attitude/present attitude—compare—determine magnitude, direction of maneuver.	
C	6 LH couch—dock position	
CP	7 Rotation control—unpinned	
	8 LIMIT CYCLE/OFF sw—OFF	8
C	9 ATT DB sw—MIN	
	10 Maneuver S/C to desired attitude	
	11 Obtain final attitude— <i>... final ref</i>	
	12 Rotation control—neutral	
	13 LIMIT CYCLE/OFF sw—LIMIT <i>CYCLE</i>	
	14 SCS attitude ref comparison—check	
CP	15 Rotation control—pinned	

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Step	Procedure	Panel
C	16 ATT .DB. sw—MAX (this proc. only) —MIN (RCS deorbit, G&N & SCS inoperative)	8
	17 LH couch—normal position	
	S/C INERTIAL ATTITUDE DETERMINATION USING SCT (CSP)	
CSP	1 Inertial attitude determination using telescope—set control.	
C	G&N/SCS sw—SCS ATT /MONITOR/ENTRY sw—ATT	
	RATE GYRO-R	
	SCS CHANNEL-A&C ROLL/OFF, - ROLL B&D ROLL/OFF, -	
P	G&N-OPTICS-MN A, MN B s—engage	22
S	OPTICS-mode sw—MANUAL	105
	2 SCT—identify star field	104
	3 Star field-select 2 stars—included angle 2.2"	
	4 Optics hand controller-position stars (one centered FOV, other on M or R line)	105
	5 ATT IMPULSE-ENABLE sw—(M/255-6)	
	6 MARK sw—press	
	7 ATT IMPULSE-ENABLE sw—(M/255-6)	
	8 SCT SHAFT ANGLE, TRUNNION ANGLE—record	102

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Step	Procedure	Panel
S	9 Downlink Centered star (star code) Star M or R line (star code) Included angle SHAFT ANGLE TRUNNION ANGLE	106
	10 Uplink—define S/C attitude R _____ P _____ Y _____	
C	11 ATTITUDE SET-ROLL, PITCH, YAW ind—set angles defined by <i>MSFN</i>	6
	12 FDAI ALIGN sw—press (≈10 sec)	106
S	13 DSKY—V16 N20 E	
	14 DSKY—record R1 _____ R2 _____ R3 _____	
	15 DSKY—V34 E	
	PRECISE S/C ORIENTATION USING SCT (CSP)	
CSP	1 Precise S/C orientation using telescope—set controls.	
C	G&N/SCS sw—SCS ATTITUDE/MONITOR/ENTRY sw— <i>ATT</i>	8
	RATE GYRO-R, <i>P</i> , <i>Y</i> sw(<i>3</i>)— <i>NORM</i>	
	SCS CHANNEL-A&C ROLL/OFF or B&D ROLL/OFF sw (fullest <i>grad</i>) —A&C ROLL or B&D ROLL SCS CHANNEL-PITCH/OFF sw— <i>PITCH</i>	

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Step	Procedure	Panel
C	SCS CHANNEL-YAW/OFF sw—YAW	8
	PARTIAL SCS POWER sw—AC1	24
CS	2 Uplink	
	External ref (gross +X orientation)	104
	SCT shaft and trunnion angles	
	Star pair and location FOV	
S	3 Star/earth landmark ref data — <i>review</i>	
	4 G&N operating	
	Perform IMU align	
	Offset S/C $\approx 5^\circ$ /axis from fine align <i>att</i>	
	Proceed to step 10.	
	5 G&N not operating	
	Proceed to step 6.	
C	6 Perform procedure—S/C maneuver to external ref	
	7 ATT .DB sw—MIN	8
S	8 Rotation control (RH couch)—move <i>to LEB</i>	
P	9 G&N-Optics-MN A, MN B cb's— <i>CLOSED</i>	22
S	10 OPTICS mode sw—MANUAL	105
	11 DSKY—V16 N20 E	
	12 Optics Hand Controller—set SCT shaft, trunnion angles in OCDU ind	
	13 SCT—locate key star pair in FOV	104
	14 Rotation control—unpinned	
	15 Maneuver S/C—center prime star <i>IN</i> FOV, secondary star near R or <i>M line</i>	
	16 Rotation control—unpinned	
	17 ATT IMPULSE-ENABLE sw— <i>ON</i>	105
	18 ATT IMPULSE cont—adjust <i>S/C</i> rates—precisely position stars <i>IN FOV</i>	

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Step	Procedure	Panel
S	19 ATT IMPULSE-ENABLE sw — <i>015</i>	105
	20 DSKY — record	106
	R1 —	
	R2 —	
	R3 —	
	21 DSKY — V34 E	

MIDCOURSE NAVIGATION SIGHTING (CSP)

Prerequisite — S/C orientation with SCT (moon ref)

CSP	1 SCS attitude control mode	8
CS	2 Star/lunar landmark ref data — review/select star and landmark.	
S	3 DSKY — V37 E23 E	106
	4 DSKY PROGRAM — 23	
	5 DSKY — flashes V51	
	6 SCT — locate/identify lunar <i>landmark</i>	104

Landmark not centered — proceed *step 7*

Landmark centered — proceed *step 10*

	7 ATT IMPULSE-ENABLE sw — <i>015</i>	105
	8 ATTITUDE IMPULSE cont — center landmark (SCT FOV)	
	9 ATT IMPULSE-ENABLE sw — <i>015</i>	
	10 OPTICS mode sw — MANUAL	
	11 SCT — observe star field.	104
	Star in SCT FOV — proceed step 12.	
	Star not in SCT FOV — proceed <i>step 14</i>	
	12 Optics hand controller (shaft axis) — position star on R line.	105

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Step	Procedure	Panel
S	13 Optics hand controller (trunnion axis)—center star in FOV, proceed step 18.	105
	14 OPTICS-SLAVE TELESCOPE sw—OFFSET 25°	
	15 Optics hand controller (shaft axis)—position star on R line.	
	16 OPTICS-SLAVE TELESCOPE sw—STAR LOS	
	17 Optics hand controller (trunnion axis)—center star in FOV.	
	18 SXT—star and landmark in FOV	104
	19 OPTICS-CONTROLLER mode sw—RESOLVED	105
	20 ATT IMPULSE-ENABLE sw— <i>ON</i>	
	21 Superimpose star/landmark—on R line, or near or center of FOV Optics hand controller—move star ATT IMPULSE cont—move <i>landmark</i>	104
	22 Mark sw—press	105
	Mark not exact—DSKY V52 E repeat steps 21 and 22.	106
	23 DSKY—flashes and displays V06 N57 - <i>Record & downlink</i> R1—shaft angle R2—trunnion angle	
* 24		
	25 DSKY—V33 E	
	26 DSKY—flashes and displays V06 N34 - <i>Record & downlink</i> R1—hours R2—min R3—sec	
* 27		

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Step	Procedure	Panel
S	28 DSKY V33 E 29 DSKY—PROGRAM—00	106
	IMU ALIGNMENT (CS)	
C	1 Confirm or set ATI /MONITOR/ENTRY sw— <i>ATT</i> <i>S.S. CHANNEL</i> <i>.../.../...-A&C ROLL</i> B&D ROLL/OFF sw— <i>... ROLL</i>	8
	SCS CHANNEL-PITCH/OFF <i>PITCH</i> YAW/OFF sw— <i>...</i> RATE GYRO sw (3)—NORMAL G&N-OPTICS-MN A and MN B <i>'s—... 22</i>	
S	2 DSKY—V37 E53 E 3 MODE-FINE ALIGN sw—on 4 DSKY displays— V—50, <i>N 25</i>	106 101 106
	R1—00001	
C	5 G&N/SCS sw—G&N 6 DSKY—V33 E	8 14
S	7 MODE-ATT CONT sw—on 8 Confirm; MODE-FINE ALIGN sw— <i>CA</i>	101
	MODE-COARS ALIGN sw—on IMU-CDU DIFFERENCE ind—±1.50 MODE-FINE ALIGN sw—on MODE-ATT CONT sw—on	
	9 DSKY displays— V—16, <i>N-20</i>	106
	R1—OG ICDU angle R2—IG ICDU angle R3—MG ICDU angle	

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Step	Procedure	Panel
S	10 DSKY—V33 E	106
	11 DSKY displays— <i>...</i> V—06, <i>N 17</i>	
	R1—OG ICDU angle desired R2—IG ICDU angle desired R3—MG ICDU angle desired	
	12 Confirm Attitude maneuver to ICDU angles	
C	LIMIT CYCLE/OFF sw—OFF	8
S	DSKY—V33 E	106
	FDAI—maneuver is to ICDU angles FDAI rate needles—0.5°/sec	4
C	LIMIT CYCLE/OFF sw—LIMIT <i>CYCLE</i>	8
S	13 DSKY displays— <i>...</i> V—06, <i>N 30</i>	106
	R1—star code	
	14 Star code— <i>...</i> Good-DSKY—V33 E No good-DSKY—V21 N30 E, <i>...</i> star code, E.	
	15 DSKY displays— <i>...</i> V—50, <i>N 25</i>	
	R1—00013	
	16 Auto optic position OPTICS mode sw—COMPUTER DSKY—E DSKY displays— <i>...</i> V—16, <i>N 37</i>	
	R1—shaft OCDU angle R2—trunnion OCDU angle	

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Step	Procedure	Panel
S	Confirm OCDUs drive to above <i>angle</i>	
	OPTICS mode sw—MANUAL	105
17	Manual optics positioning	
	OPTICS mode sw—MANUAL	
	DSKY—V33 E	106
18	Confirm	
	MODE-FINE ALIGN sw—on	101
	DSKY display—	
	V—51	
19	Center star in SCT	105
20	Track star in SXT	
21	When star is centered—press MARK	
22	DSKY displays— V—21, <i>N30</i>	106
	Enter star code number	
23	DSKY—E	
24	MODE-FINE ALIGN sw—on	101
25	Set (for second star)	
	OPTICS-CONTROLLER-SPEED <i>sw-N1</i>	105
	OPTICS-CONTROLLER-MODE <i>sw-D1A</i>	
	Return to step 13	
26	DSKY displays— V—06, <i>N05</i>	106
	R1—star angular error	
	Flight log—record	
	If in tolerance, proceed to 28.	
27	Determine subsequent program.	
	Out of tolerance but desire to continue—V33 E	
	Out of tolerance and desire to terminate—V37 E XXE	

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Step	Procedure	Panel
S 28	DSKY displays — <i>CL</i> V—06, <i>117</i>	○
	R1—X-gyro torque angles R2—Y-gyro torque angles R3—Z-gyro torque angles Flight log—record If in tolerance, proceed to step 30.	
29	Determine subsequent program. Out of tolerance but desire continue—V 33 E Out of tolerance and desire terminate—V34 E	○
30	Confirm ICDUs drive to new angles.	102
31	DSKY displays — <i>CL</i> V—50, <i>N 25</i>	106
	R1—00014	
32	Fine align— If desired, press E, return to <i>step 12</i>	
33	DSKY—V33 E	
34	DSKY displays — <i>CL</i> V—16, <i>120</i>	○
	R1—OC ICDU angle R2—IG ICDU angle R3—MG ICDU angle	
35	DSKY—V33 E	
36	DSKY displays — <i>CL</i> V—06, <i>117</i>	
	R1—OG ICDU angle desired R2—IG ICDU angle desired R3—MG ICDU angle desired	○

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Step	Procedure	Panel
S	37 Confirm or set LIMIT CYCLE/OFF sw—OFF DSKY—V33 E FDAI—maneuver is to displayed <i>angles</i> FDAI-rate needles—0.5°/second LIMIT CYCLE/OFF sw—LIMIT <i>CYCLE</i>	106
	38 Confirm SCS cb's set for min <i>NO. 1...</i>	
	39 DSKY displays— <i>OK</i> If PROGRAM-21, go to local vertical procedure. If PROGRAM-31, 32, 33, or 53— DSKY V37 E00 E	
	40 DSKY-PROGRAM—00. <hr/> EARTH ORBIT LANDMARK NAVIGATION (TBD)	
C	1 Precise wobble mode—set controls nominal except, ATT DB sw—MIN G&N/SCS sw—SCS ATT /MONITOR/ENTRY sw— <i>ATT</i> RATE GRYO— SCS CHANNEL-A&C-B&D ROLL/OFF sw <i>(2) ON(UP)</i>	8
	SCS CHANNEL-PITCH-YAW/OFF sw <i>(2) - ON(UP)</i>	
CP	Rotation control (2)—unpinned	

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Step	Procedure	Panel
C	2 Rotation control—maneuver S/C to desired attitude.	8
	3 FDAI—pitch/yaw rates less than <i>deg/sec</i>	4
	4 FDAI—pitchdown/yaw left movement indication	
	5 SCS CHANNEL-PITCH/OFF, -OFF	8
	6 Rotation control—positive roll rate 0.5 degrees/second	
	7 SCS CHANNEL-A&C-B&D ROLL/ sw (2)—OFF	
	8 Rotation control—neutral	
	9 PARTIAL SCS F W R sw—OFF	24
	10 ATT DB sw—MAX	8
	11 LIMIT CYCLE/OFF sw—OFF	
CP	12 Rotation control (2)—pinned	
C	13 Monitor attitude to external reference. Re-establish precise wobble mode, if necessary.	

PRECISE WOBBLE MODE (CP)

C	1 Coarse wobble mode—set controls nominal, except ATT DB sw—MIN G&N/SCS sw—SCS ATT / MONITOR/ENTRY sw— <i>ATT</i>	8
---	----------------------------------------------------------------------------------------------------------------------------	---

RATE GYRO-R,

SCS CHANNEL-A&C-B&D ROLL/
sw (2)—on (up)

SCS CHANNEL-PITCH, YAW/OFF
sw (2)—on (up)

CP	Rotation control (2)—unpinned	
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Step	Procedure	Panel
C	2 SCS CHANNEL <i>ATTEN-YAW/OFF sw(2) - OFF</i>	8
	3 Rotation control—0.5 deg. <i>rate</i>	
	4 SCS CHANNEL <i>ATTEN-YAW/OFF sw(2) - OFF</i>	
	5 Rotation control—neutral	
	6 PARTIAL SCS P W R sw—OFF	24
	ATT DB sw—MAX	8
	LIMIT CYCLE/OFF sw—OFF	
CP	Rotation control (2)—pinned	
C	7 Monitor att to external reference. Re-establish coarse wobble mode, if necessary.	
BAR-B-Q MODE (CP)		
C	1 Bar-B-Q mode—set controls <i>nominal except</i>	
	DIRECT RCS/OFF sw—DIRECT RCS	8
	ATT /MONITOR/ENTRY sw— <i>ATT</i>	
	RATE GYRO-PITCH, YAW sw (2)— <i>NORMAL</i>	
	SCS CHANNEL-A&C or B&D ROLL— <i>ON (UP)</i>	
	SCS CHANNEL-PITCH, YAW/OFF sw(2)— <i>ON (UP)</i>	
	A&C ROLL-MN A, MN B or B&D ROLL-	1
	MN A, MN B cb's (4)—two <i>OPEN</i>	
	PITCH-MN A, MN B cb's (2)— <i>one OPEN</i>	25
	YAW-MN A, MN B cb's (2)— <i>one OPEN</i>	
P	IMU-MN A, MN B cb's (2)— <i>OFF</i>	22

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Step	Procedure	Panel
P	G&N-VIEWER-AC1, AC2 cb's (2) — <i>OFF</i>	22
	AGC MODE sw — STANDBY	107
	CONDITION LAMPS sw — OFF	105
C	2 Verify DSKY PROGRAM — 00	14
CP	3 Rotation control (2) — unpinned	
C	4 Rotation control — positive roll rate 0.6 degrees/second	
	5 Rotation control — neutral	
	6 DIRECT RCS/OFF sw — OFF	8
CP	7 Rotation control (2) — pinned	
C	8 Monitor attitude to external reference. Re-establish bar-B-Q mode, if <i>necessary</i>	
RCS DEORBIT/G&N & SPS INOPERATIVE (CSP)		
C	1 Set controls to nom G&C <i>positions except</i>	
	ATT /MONITOR/ENTRY sw — <i>OFF</i>	8
	SCS CHANNEL-B&D ROLL sw — <i>ON</i>	
	SCS CHANNEL-PITCH, YAW sw — <i>OFF</i>	
	RATE GYRO-R,	
	SPS-GIMBAL MOTOR CONTROL- PITCH-BAT B cb —	3
	SPS-GIMBAL MOTOR CONTROL- YAW-BAT B cb —	
	G&N-COMPUTER-MN A, MN B <i>OFF</i>	22
	G&N-VIEWER-AC1, AC2 cb's (2) —	

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Step	Procedure	Panel
C	CONDITION LAMSP sw—OFF	105
	AGC MODE sw—STANDBY	107
2	Check MSFN—deorbit and entry data	
3	Digital event timer—time to fire	5
4	Maneuver S/C—deorbit attitude	
5	TVC 1 POWER sw—AC1	24
6	ΔV REMAINING ind— ΔV required	7
7	ATT SET/PITCH—deorbit <i>att req.</i>	6
	8 Translation control (2)—ARMED	
CP	9 Rotation control (2)—unpinned	
C	10 DIRECT RCS/OFF sw—DIRECT RCS	8
	11 LIMIT CYCLE/OFF sw—OFF	
	12 Monitor time to ΔV . Digital event ind	5
	MISSION ELAPSED TIME ind	12
	13 Digital event ind—MIN 00 SEC 00 Initiate +X translation	5
	14 Monitor time to terminate ΔV MISSION ELAPSED TIME ind	12
	ΔV REMAINING ind	7
	15 ΔV REMAINING ind—00000 (Terminate +X translation.)	
	16 ATT DB sw—MAX	8
	17 TVC1 POWER sw—OFF	24
	18 Translation control (2)—LOCKED	
	19 Maneuver S/C—separation attitude	
	20 Confirm attitude—external cues	
	21 Cb's—out (disengaged) A&C ROLL—MN A	25
	A&C ROLL—MN B	
	B&D ROLL—MN B	
	PITCH-2—MN B	
	YAW-2—MN B	
S	22 C/M RCS PRPLNT A&B sw (2)—ON	15
	23 R . . . sw— <i>give pass</i>	16

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Step	Procedure	Panel
S	24 RCS INDICATORS sw—C/M A	12
	25 Confirm C/M RCS—PRESS ind (2) F—between 287 and 308 PSIA OX—between 287 and 308 PSIA	
	26 RCS INDICATORS sw—C/M B	
C	27 Confirm C/M RCS—PRESS ind (2) F—between 287 and 308 PSIA OX—between 287 and 308 PSIA	
	28 Confirm LIMIT CYCLE/OFF sw—OFF	8
	29 FDAI check—self test	2, 4
S	30 ATT /MONITOR/ENTRY sw— <i>ENTRY</i>	8
	31 Monitor time to C/M-S/M separation Digital event ind	5
	MISSION ELAPSED TIME ind	12
	32 Digital event ind—MIN—SEC—C/M- S/M SEP sw (2)—A and B (up)	15
	33 Confirm 0.2°/sec rate damping	4
	34 Maneuver S/C—entry orientation	
	35 Monitor time to 0.05 g—digital event ind	5
	36 Monitor g buildup cue—g ind	1
	37 G buildup sensed	8
	.05G ENTRY sw—.05G ENTRY	
C	38 Initiate 15°/sec CW roll—rotation <i>control</i>	
	39 SCS CHANNEL-B&D ROLL/OFF sw—OFF	
	40 Rotation control—neutral	
	41 Confirm FDAI ind (2) R —15±3°/sec rate P —±2°/sec rate damping Y —±2°/sec rate damping	4
	42 At 35,000 ft, stop roll rate—rotation <i>control</i>	

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Step	Procedure	Panel
C 43	At 25,000 ft, set sw (3) SCS CHANNEL-PITCH/OFF—OFF -YAW/OFF—OFF	4 8
R ..	3 CMD— <i>OFF</i> (momentary)	16
	AGC CLOCK UPDATE—CHECK (CS)	
1	Confirm MSFN AGC clock update	
2	Update automatic UPTTEL sw—ACCEPT UPTTEL ind out UPTTEL sw—BLOCK	14
3	Update manual—record MSFN data ±00XXX—hours ±000XX—min ±0XX.XX—sec	
4	Press DSKY keys—V55 E R1—load hours R2—load min R3—load sec	
5	KEY RLSE—press	
	ARRIVAL TIME AT SPECIFIC LONGITUDE— GROUND TRACK (CS)	
1	DSKY—V65 E	14
2	DSKY ind V—50, <i>V25</i>	
	R1—00012	
3	Enter desired longitude	
4	DSKY flash and display(s) V—06, <i>V34</i>	
	R1—00XXX	

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Step	Procedure	Panel
C	R2—000XX R3—0XX.XX 5 DSKY ENTER—press	14
	LAT & LONG LOCATION AT SPECIFIC TIME—GROUND TRACK (C or S)	
	1 DSKY—V66 E 2 DSKY ind V—50, <i>N25</i>	14
	R1—000XX 3 Press DSKY keys ±hours ±min ±sec 4 DSKY ENTER—press 5 DSKY ind V—06, <i>NXX</i>	
	R1—lat R2—long 6 DSKY—ENTER	
	TIME TO MAXIMUM DECLINATION OF ORBIT (C or S)	
	1 DSKY—V69 E 2 DSKY ind V—XX, <i>NXX</i>	14
	R1—max declination R2—time to max declination 3 DSKY—ENTER	

A1
A2
A3

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Step	Procedure	Panel
ORBIT PARAMETER DISPLAY (C or S)		
1	DSKY—V06 N43 E <i>CK</i>	14
	R1—perigee R2—apogee R3—free-fall time	
IMU GIMBAL ANGLE DISPLAYS (C)		
1	Confirm or set G&C cont(s)—IMU angle display	
2	ATT DB sw—MIN	8
3	DSKY—V16 N20 E <i>CK</i>	14
4	R1—OG ICDU angle R2—IG ICDU angle R3—MG ICDU angle	
5	DSKY key—V34 E <i>CK</i>	
6	PROGRAM—00 If not press DSKY key(s)—V37 E00 E	
7	MODE FINE ALIGN sw—on	101
8	DSKY key—V10 N20 E <i>CK</i>	14
9	R1—OG ICDU angle R2—IG ICDU angle R3—MG ICDU angle	
10	DSKY—V34 E	

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MISSION OPERATIONS

CONTENTS

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MISSION OPERATIONS

Step	Procedure	Panel
	G&N ΔV (C)	
C	1 Perform IMU orientation 2 Align IMU 3 S/C att - <i>01</i> 4 G&N controls nominal settings <i>except</i> G&N/SCS sw—G&N ATT /MONITOR/ENTRY sw— <i>R17</i> SCS CHANNEL-B&D ROLL, PITCH, and YAW sw—on RATE/GYRO-R...	8
	5 DSKY—V37 E41 E (10 min before <i>thrust</i>)	14
	6 DSKY ind—... <i>30, N 25</i>	
	R1—00002	
	7 DSKY—V33 E	
	8 DSKY ind—... <i>06, N 20</i>	
	R1—outer gimbal/ICDU angle	
	9 DSKY—V33 E	
	10 DSKY ind—...	
	R1—TTI	
	R2—velocity to be gained	
	R3—00000	
	11 Event timer—set (value in R1)	8, 5
	12 R2—note and record <i>ΔV</i>	

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Step	Procedure	Panel
C 13	GIMBAL POSITION—set YAW—+6° PITCH—+4°	6
14	ATT. SET ind—set R —0 Y —0 P —32°	
15	FDAI ALIGN—press and hold (32 sec)	6
16	TVC 1 POWER sw—AC1	24
17	ΔV SET sw—press and hold	7

NOTE Hold ΔV set until ΔV REMAINING display reads value received from MSFN in pre-thrusting procedure.

18	TVC 2 POWER sw—AC2	24
19	SPS INJECT PREVALVES sw <i>(A/B) - ON</i>	3
20	Five minutes prior to SPS ignition: ATT DB sw—MIN ΔV/OFF sw—ΔV	8
21	Four minutes prior to SPS ignition SPS-GIMBAL MOTORS-PITCH 2 and YAW 2—START/ON	3
22	GIMBAL POSITION— YAW—+6° PITCH—+4°	6
23	SPS-GIMBAL MOTORS-PITCH 1 and YAW 1—START/ON	3
24	SPS-GIMBALS—adjust (use values <i>recorded</i>)	6
25	Translation control—unlock	
26	NORMAL/OFF/DIRECT ON sw— <i>NORM</i>	7
27	Rotation control—unpin	

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2

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Step	Procedure	Panel
C	28 DSKY ind- <i>CH</i> (R3)	14
	29 EVENT timer-00 15	
	30 DSKY ind- <i>CH</i> V-50, <i>N-11</i>	
	31 Digital event timer- <i>CH</i> (at 00 60 perform thrust maneuver)	5
	32 DSKY ind- <i>CH</i> (at SPS ignition) V-16 <i>N-51</i>	
	R1-time to SPS cutoff R2-velocity to gain R3- ΔV measured	
	33 FDAI- <i>CH</i> att rate for MTVC <i>takeover</i> 4	
	34 Maintain +X translation	
	35 DSKY ind- <i>CH</i>	14
	36 SCS CHANNEL-B&D R, <i>CH</i>	8
	37 SPS-GIMBAL MOTORS-set	3
	38 ΔV REMAINING-check (record)	7
	39 SPS propellant quantity-note and (<i>RCO</i>)	20
	40 R2 ind-note and record	14
	41 DSKY ind- <i>CH</i> V-06- <i>N-51</i>	
	R1- <i>CH</i> SPS cutoff R2- ΔV to gain R3-time to free fall	
	42 DSKY-V33 E	
	43 DSKY ind- <i>CH</i> V-16, <i>N-43</i>	
	R1-perigee alt R2-apogee alt R3-time of free fall	

44 DSKY-V33 E

3

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45 DSKY ind- *CH*

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Step	Procedure	Panel
C	44 DSKY—V33-E 45 DSKY ind—	
	SCS VELOCITY CHANGE (CSP)	
C	1 SCS velocity change controls—set	7
CP	2 SPS engine pitch and yaw gimbal angles—	
CS	3 MSFN— (uplink) GMT time of firing ΔV	
	SPS engine gimbal angles Telescope shaft and trunnion Star pair and orientation in field of view	
C	4 AGC/MSFN data—compare 5 IMU orientation, IMU align 6 S/C att for ΔV —orient 7 Offset S/C 5° (each axis) 8 S/C att (precise orientation) 9 S/C att — (docking window)	
	10 Set controls to nominal G&C positions except ATT /MONITOR/ENTRY sw— SCS CHANNEL-B&D R, - ON (U) RATE GYRO-R, - ON (U)	8
S	11 DSKY—V37 E46 E (10 min before burn)	14
	12 Digital event timer—set (00 15)	8, 5

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Step	Procedure	Panel
S	13 GIMBAL POSITION- <i>OK</i>	6
	Pitch—+4° Yaw—+6°	
	14 ATT SET controls—set	
	R ind—0° P ind—32° Y ind—0°	
C	15 FDAI ALIGN sw—press	
	FDAI: R —0° P —32° Y —0°	
	16 TVC 1 P W R sw—AC1	24
	17 ΔV SET sw—set	7
	ΔV REMAINING ind— <i>OK</i>	
	18 TVC 2 P W R sw—AC2	24
	19 SPS-INJECT PRE-VALVES-A&B sw <i>ON</i>	3
	20 ATT DB sw—MIN (<i>1.5 Min</i>)	8
	21 ΔV/OFF sw—ΔV	7
	22 GIMBAL MOTOR CONTROL-PITCH and YAW-BAT A cb's— <i>OK</i>	6
	23 SPS-GIMBAL MOTORS sw—set (<i>burn 64 min</i>)	3
	PITCH 2—START (release to ON) YAW 2—START (release to ON)	
	24 GIMBAL POSITION ind— <i>OK</i> PITCH—+4° YAW—+6°	6
	25 SPS-GIMBAL MOTORS sw—set PITCH 1—START (release to ON) YAW 1—START (release to ON)	3
	26 GIMBAL POSITION-PITCH, YAW controls—adjust	6
	27 Translation control (pri) <i>OK</i>	

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Step	Procedure	Panel
C	28 NORMAL/OFF/DIRECT ON sw — <i>NORM</i>	7
CP	29 Rotation control (2) — unpinned	
C	30 Translation control — +X and DSKY — ENTER (digital event timer — 00 15)	
	31 THRUST ON sw — set (digital event timer <i>00:00</i>)	
	32 FDAI and GIMBAL POSITION ind — <i>CK</i>	
	33 ΔV REMAINING ind —	
	34 NORMAL/OFF/DIRECT ON sw — OFF (if thrusting not terminated)	
	35 At termination of thrust — set SCS CHANNEL-B&D R, <i>FF</i>	8
	SPS-GIMBAL MOTORS sw (4) — OFF	3
	SPS-INJECT PRE-VALVES-A&B sw — <i>OFF</i>	
	NORMAL/OFF/DIRECT ON sw — <i>OFF</i>	7
	TVC 2 P W R sw — OFF	24
	TVC 1 P W R sw — OFF	
	ΔV/OFF sw — OFF	8
CP	36 Rotation controls (2) — pinned	
C	37 Translation control — locked	
	38 SPS-GIMBAL MOTOR CONTROL- PITCH 1 and 2, YAW 1 and 2-BAT A cb's — disengaged	25
	39 SPS propellant quantities — read and <i>recd</i>	20
	40 SPS GAUGING — AC1/AC2 sw — OFF	25
	41 ΔV REMAINING ind — <i>0.1</i>	7
	42 DSKY-REGISTER 3 —	14
S	43 DSKY — V33 E	
	44 DSKY — V64 E	
	45 DSKY displays — <i>V16 A 43</i>	

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Step Procedure Panel

S

R1—altitude
R2—altitude
R3—time of free fall

46 DSKY—V33 E

47 DSKY displays—check *V06, N39*

R1—T-perigee-hrs
R2—T-perigee-min
R3—T-perigee-secs

C

48 Flight log—record

S

49 DSKY—V34 E

50 DSKY—PROGRAM-00

MTVC—FDAI ATTITUDE REFERENCE (CSP)

NOTE MTVC-FDAI cont—set

C

1 Set controls to nominal G&C *positions except 8*

G&N/SCS sw—G&N

ATT /MONITOR/ENTRY sw—*ATT*

SCS CHANNEL-B&D R. *... - on (up)*

RATE GYRO-R. *... MHL*

CP

2 SPS pitch-yaw gimbal trim—check

6

C

3 MSFN—check (uplink)

GMT of firing

ΔV

Attitude *R* *P* *Y*

SPS engine *gimbal angles*

Pitch

Yaw

7

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Step	Procedure	Panel
S	4 AGC/MSFN-data—compare	
CS	5 S/C-ΔV attitude—orient	
C	6 S/C attitude, external reference— <i>CK</i>	
	7 DSKY—V37 E 41E	14
	8 DSKY displays— <i>V 50, N 25</i>	
	9 DSKY—V33 E	
	10 DSKY displays— <i>V 16, N 20</i>	
	11 DSKY—V33 E	
	12 DSKY displays— <i>V 16, N 57</i>	
	13 Digital event timer—set	
	14 DSKY displays— R1—ΔV magnitude	
	15 GIMBAL POSITION-PITCH, YAW controls—adjust	6
	16 ATT SET control—adjust	
	17 FDAI ALIGN sw—press FDAI: R -0° P -32° Y -0°	
	18 TVC 1 POWER sw—AC1	24
	19 ΔV REMAINING—set	7
	20 TVC 2 POWER sw—AC2	24
	21 SPS-INJECT PRE-VALVES-A, B sw— <i>ON</i>	3
	22 ATT DB sw—MIN	8
	23 ΔV/OFF sw—ΔV	7
	24 SPS-GIMBAL MOTOR CONTROL- PITCH, YAW-BAT A cb's—	25

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Step	Procedure	Panel
C	25 SPS-GIMBAL MOTORS-PITCH 2, YAW 2 sw—START (then ON)	3
	26 GIMBAL POSITION ind—check Pitch—+4° Yaw—+6°	6
	27 SPS-GIMBAL MOTORS sw—set PITCH 1—START (release to ON) YAW 1—START (release to ON)	3
	28 GIMBAL POSITION-PITCH, YAW controls—adjust and confirm	6
	29 Translation control (prime)— <i>ARMED</i>	
	30 NORMAL/OFF/DIRECT ON sw— <i>NORM</i>	7
CP	31 Rotation control (2)—unpinned	
C	32 Translation control—+X (digital event timer—00 15)	
	33 DSKY display—check (T-5 sec) <i>V.50, N.11</i>	14
	34 Translation control—CW to detent <i>MTVC</i>	
	DSKY-ENTER—press (digital event timer—00 00)	
	35 Ullage maneuver—terminate (1 sec after engine ignition)	
	36 DSKY displays—check <i>V.16, N.16</i>	
	R1— to engine cutoff R2— to be gained R3—accumulated ullage	
	37 Rotation control—maintain attitude	
S	38 Automatic thrust termination— <i>TRONIC</i>	

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Step	Procedure	Panel
C	39 At termination of thrust—set Translation control—neutral and <i>locked</i>	○
	SCS CHANNEL-B&D ROLL/OFF, PITCH, YAW sw (3)—OFF	8
	SPS-GIMBAL MOTORS sw (4)—OFF	3
	SPS-INJECT PRE-VALVES-A, B <i>sw-OFF</i>	
	NORMAL/OFF/DIRECT ON sw— <i>OFF</i>	7
	TVC 2 P W R sw—OFF	24
	TVC 1 P W R sw—OFF	
	Rotation control—pinned	○
	ΔV /OFF sw—OFF	8
	SPS GAUGING sw—OFF	25
	40 GIMBAL MOTOR CONTROL-PITCH & YAW BAT A cb's (2)— <i>OFF</i>	
	41 Read and record SPS propellant quantities	
	42 ΔV REMAINING ind—determine magnitude of ΔV	7
S	43 DSKY-REGISTER 3—check ΔV accomplished	14
	44 DSKY—V33 E	○
	45 Press DSKY keys V64 E	
	46 DSKY displays—check <i>V16, N43</i>	
	R1—perigee altitude	
	R2—apogee altitude	
	R3—free fall time	
	47 DSKY—V33 E	
	48 DSKY displays—check <i>V06, N34</i>	○
	R1—T-perigee-hrs	

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Step	Procedure	Panel
S	R2—T-perigee-min R3—T-perigee-secs	
C	49 Flight log—record	
S	50 DSKY—V34 E	
S	51 DSKY—PROGRAM—00	

PRETHRUST—ORBIT CHANGE & SPS
MINIMUM IMPULSE (CS)

C or S	1 DSKY—set V37 E31 E—orbit change V37 E33 E—SPS minimum impulse	14
	2 DSKY displays—check <i>V00, N34</i>	

R1—TIG hours
R2—TIG min
R3—TIG sec
3 DSKY/MSFN data—compare

NOTE If data correct, proceed to step 5. If data not correct, proceed to step 4.

4 DSKY—V25 N34 E
R1—load TIG hours
R2—load TIG min
R3—load TIG sec
DSKY—ENTER
5 DSKY—V33 E
6 DSKY displays—check *V10, N34*

R1—lat
R2—long
R3—altitude

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Step	Procedure	Panel
C or S	7 DSKY/MSFN data—compare NOTE If data correct, proceed to step 9. If data not correct, proceed to step 8.	○
	8 DSKY—V25 N44 E R1—load lat R2—load long R3—load altitude DSKY—ENTER NOTE Proceed to step 10.	○
	9 DSKY—V33 E 10 DSKY displays—check <i>V06, N35</i>	
	R1—orbit period hours R2—orbit period min R3—orbit period sec	
	11 DSKY/MSFN data—compare NOTE If data correct, proceed to step 13. If data not correct, proceed to step 12.	○
	12 DSKY—V25 N35 E R1—load orbit period hours R2—load orbit period min R3—load orbit period sec DSKY—ENTER	
	13 DSKY—V33 E 14 DSKY displays—check <i>V06, N70</i>	○

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Step	Procedure	Panel
C or S	R1—pitch trim angle R2—yaw trim angle R3— ΔV tailoff 15 DSKY/MSFN data—compare	
	NOTE If data correct, proceed to step 17. If data not correct, proceed to step 16.	
	16 DSKY—V25 N70 E R1—load pitch trim angle R2—load yaw trim angle R3—load ΔV tailoff DSKY—ENTER	
	17 DSKY—V33 E	
	18 SPS minimum impulse (P33), step 19 Orbit change (P31), step 23	
	19 DSKY displays—check <i>V06 N35</i>	
	R1— ΔT burn hours R2— ΔT burn min R3— ΔT burn sec	
	20 DSKY/MSFN data—compare	
	NOTE If data correct, proceed to step 22. If data not correct, proceed to step 21.	
	21 DSKY—V25 N35 E R1—load ΔT burn hours R2—load ΔT burn min R3—load ΔT burn sec DSKY—ENTER	
	22 DSKY—V33 E	

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Step	Procedure	Panel
C or S	23 MSFN—report	
	NOTE Report to MSFN immediately if data of steps 2, 6, 10, 14 or 19 is incorrect after an AGC update by MSFN uplink.	○
	24 DSKY displays—check <i>V36, N45</i>	
	R1—perigee altitude	
	R2—apogee altitude	
	R3— ΔV required	○
	25 DSKY/MSFN data—compare	
	NOTE If data is correct, proceed to step 26. If data is not correct, proceed per MSFN.	
	26 DSKY—V33 E	
	27 DSKY displays—check <i>V36, N35</i>	
	R1—TTI hours	
	R2—TTI min	
	R3—TTI sec	○
C	28 TO EVENT clock and digital event timer—set	99
C or	29 DSKY—V33 E	14
S	30 DSKY displays—check <i>V36, N14</i>	
	R1— ΔV countersetting	
	31 ΔV countersetting value—record	7
	32 DSKY—V33 E	14

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(14Y)

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Step	Procedure	Panel
C or S	33 DSKY displays—check V50, V47 R1—00051 34 DSKY—V57 E00 E 35 DSKY-PROGRAM—00 & MODE-FINE ALIGN sw—illuminates	101

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DEORBIT & ENTRY CHECKLIST

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Changed 17 June 1966

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DEORBIT & ENTRY CHECKLIST

Step	Procedure	Panel
	DEORBIT & PRE-ENTRY PREPARATION— CHECK	
	DEORBIT PRE-THRUSTING PROCEDURES (C)	
C	1 DSKY—V37E 32E, PROG 32 2 DSKY ind—check V06, N44, 3 DSKY ind—compare MSFN Agree—DSKY V33E Disagree—DSKY V24 N44E R1—load desired lat R2—load desired long 4 DSKY ind—check V06, N12, R1- ΔV allow 5 DSKY—compare MSFN Agree—DSKY V33E Disagree—DSKY V21 N12E REG 1—load ΔV allow 6 DSKY ind—check V06, N70, R1-pitch trim R2-yaw trim R3- ΔV tailoff 7 DSKY—compare MSFN Agree—DSKY V33E Disagree—DSKY V25 N70E REG 1—load desired pitch trim REG 2—load desired yaw trim REG 3—load ΔV tailoff 8 DSKY ind—check V06, N34, R1-TIG hr, R2-TIG min, R3-TIG sec	14

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Step	Procedure	Panel
C	9 DSKY—compare MSFN Agree—DSKY V33E Disagree—DSKY V25 N34E REG 1—load TIG hr REG 2—load TIG min REG 3—load TIG sec	○
	10 DSKY ind—check V06, N34, R1-TIG hr R2-TIG min R3-TIG sec	
	11 DSKY date—confirm MSFN or record	
	12 DSKY—V33E	○
	13 DSKY ind—check V06, N47, R1-flight path angle, <i>distance</i>	
	14 DSKY—confirm MSFN or refer recorded data Steps 10 and 13 agree—DSKY V33E Steps 10 and 13 disagree—MSFN for data, or record errors and DSKY-V33E	
	15 DSKY ind—check V06, N35, R1-TTI hr R2-TTI min R3-TTI sec	○
	16 TO EVENT clock and digital timer—DSKY ind step 15	99, 5
	17 DSKY—V33E	14
	18 DSKY ind—check V06, N14, R1-ΔV counter	
	19 DSKY ind—record and compare MSFN	
	20 DSKY—V33E	
	21 DSKY ind—check V50, N07, R1-00051	○
	22 DSKY—V37E 00E	

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Step	Procedure	Panel
C	23 DSKY PROG—00	
	24 MODE-FINE ALIGN sw-lt—on	101
	S/C & CREW PREPARATION—CHECK (CSP)	
S	25 Suit circuit return valve—close	135
	26 GLYCOL PRESSURE RELIEF BYPASS valves (2)—ON	133
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CP	28 ECS—prepare	
	O ₂ PRESS IND sw—SURGE TANK	13
	TANK PRESSURE-1-O ₂ ind—900±25	
	OXYGEN-ENTRY valve—FILL	131
	TANK PRESSURE-1-O ₂ ind—900±25	13
	OXYGEN-ENTRY valve—ON	131
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	GLYCOL TO RAD valve—CLOSE	
	CABIN PRESSURE RELIEF controls (2)—BOOST ENTRY	
CSP	29 Crewmen—suited	
	30 Couches—96°	
	31 Couch restraints—adjust	
CS	32 AGC—update	14
P	33 MAIN BUS TIE sw (2)—BAT A & C, BAT B & C	22
	34 ECS—periodic verify	
C	35 C/M PROP JETT-LOGIC sw—2051C	8
S	36 C/M RCS—monitor check	12
C	37 MSFN contact—second pre-thrust procedure	

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Step	Procedure	Panel
C/M RCS ENGINE PRE-HEATING (S)		
S	38 FUNCTION SELECT sw—B	96
	39 TEST SELECT sw—1, 2, 3, 4, 11, 12	
	DC VOLTS ind—record	
	40 TEST SELECT sw—lowest ind <i>step 39</i>	
41 C/M RCS HTRS/OFF sw—C/M <i>RCS HTRS</i>		
42 DC VOLTS ind—1.7 to 1.8		
	C/M RCS HTRS/OFF sw—OFF	
G&N ΔV CHANGE—CHECK		
ΔV PREPARATION (CS)		
C	43 IMU orient determine—perform	
	44 IMU align—perform	
	45 S/C att—window	
	46 12 min to thrust—all <i>except</i>	
	G&N/SCS sw—G&N	8
	ATT /MONITOR/ENTRY sw—ATT	
	SCS CHANNEL—B&D R, V	
	RATE GYRO-R, V	
47	10 min to thrust—DSKY V37E 42E	14
48	DSKY ind—check V50, N25, R1-00002	
49	DSKY—V33E	
50	DSKY ind—check V16, N20, R1-outer gim/ICDU angle,	

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Step	Procedure	Panel
C	51 DSKY—V33E	
	52 DSKY ind—check V16, N51, R1-TTI, R2-V to gain, R3-00000	
	53 Digital timer—R1 ind	5
	54 R2 ind—record	
	55 GIMBAL POSITION controls (2)— YAW +6°, PITCH +4°	6
	56 ATT SET ind— ROLL X° , PITCH X° , YAW X°	
	57 FDAI ALIGN pushbutton—press <i>32 sec.</i>	
	58 TVC 1 POWER sw—AC1	24
	59 ΔV SET sw—press (till ind same as MSFN pre-thrust)	7
	60 TVC 2 POWER sw—AC2	24
	61 SPS-INJECT PRE VALVES-A and B sw (2)—ON	3
	62 5 min to . . . ATT .DB sw—MIN ΔV/OFF sw—ΔV	8
	63 4 min to ign-PITCH GIMBAL MOTORS-PITCH 2 and YAW 2 sw (2)—START, then ON	3
	64 GIMBAL POSITION ind— <i>PITCH +4°</i>	6
	65 SPS-GIMBAL MOTORS-PITCH 1 and YAW 1 sw (2)—START, then <i>ON</i>	3
	66 SPS gimbals—fine adjust	6
	67 Trans control—unlock	
	68 NORMAL/OFF/DIRECT ON sw— <i>NORM</i>	8
	69 Rotation control—unpin	
	70 25 sec to ign—DSKY R3 enabled <i>for ΔV</i>	14

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Step	Procedure	Panel
C	71 Digital timer at MIN 00, SEC 15— +X trans	5
	72 5 sec to ign-DSKY ind— V50, <i>N11</i> R1 same as <i>step 52</i> R3	14
ΔV OPERATIONS (CSP)		
CSP	73 Digital timer—MIN 00, SEC 00 ENTER key—press THRUST ON sw-lt—on SPS thrust—sense	5 14 7
C	74 At eng ign-DSKY ind— V16, <i>N51</i> R1-time to eng CO, R2-V to <i>gain</i> R3-V measured	14
	75 During firing—ready for manual takeover	
	76 1 sec after ign—maintain +X <i>trans</i>	
	77 DSKY ind— V16, N52, R1-time to eng CO, R2-V to gain, R3-time to fall	
S	78 During firing DSKY ind—check, R1-time to <i>02800</i> R2-V to tailoff	
C	ΔV REMAINING ind—check tailoff THRUST ON sw-lt—out NORMAL/OFF/DIRECT ON sw— <i>OFF</i> (if eng still fires)	7
POST ΔV OPERATIONS (CS)		
C	79 SCS CHANNEL-B&D R,	8
	80 SPS-GIMBAL MOTORS-PITCH 1 and 2, YAW 1 and 2 sw (4)—OFF	3

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Step	Procedure	Panel
C	81 SPS-INJECT PRE VALVES A and B sw (2)—OFF	
	82 NORMAL/OFF/DIRECT ON sw— <i>OFF</i>	7
	83 TVC 2 PWR sw—OFF	24
	84 TVC 1 PWR sw—OFF	
	85 ΔV/OFF sw—OFF	8
	86 Rotation control—pin	
	87 Trans control—LOCKED	
	88 GIMBAL MOTOR CONTROL-PITCH 1 & 2, YAW 1 & 2-BAT A & B cb's (4)—	25
	89 SPS GAUGING sw—OFF	
	90 ΔV REMAINING ind—record ΔV	7
S	91 SPS prop qty remain—record	20
C	92 R2 ind—record ΔV	14
	93 DSKY ind—check V06, N52, R1-time to eng CO, R2-V to <i>gain</i> R3-time to fall	
	94 DSKY—V33E	
	95 DSKY ind—check V16, N64, R1-splash lat: <i>long</i> R2-splash <i>long</i> R3-time to fall	
	96 DSKY—V33E	
	97 DSKY ind—check V50, N07, R1-00061	
	98 DSKY—V37E 61E	
C/M-S/M SEPARATION & ENTRY—CHECK		
C/M-S/M SEPARATION PROCEDURES (CSP)		
P	99 Fuel cells—deactivate F C -1, 2, 3, -MAIN <i>W/US (3) OFF</i>	18

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Step	Procedure	Panel
P	F C -1, 2, 3, -MAIN <i>BYS - F</i> sw (3) - OFF	
	F C -1, 2, 3, -REACTANTS sw (3) - OFF	
	F C PUMP -1, 2, 3 sw (3) - OFF	
S	100 CAUT/WARN-MODE sw - C/M	11
C	101 PROG 61 - check	14
	102 DSKY ind - check V16, N53, R1 - G max, R2 - time to fall	
	103 DSKY - V33E	
	104 LIMIT CYCLE/OFF sw - OFF	8
	105 DSKY ind - check V06, N17, R1 - outer gim/ICDU angle, R2 - inner gim/ICDU angle, R3 - middle gim/ICDU angle	14
	106 DSKY - V33E	
	107 FDAI att ball - check 4°/sec to 60° neg pitch, yaw -0, roll to 180°	4
	108 C/M RCS PRPLNT-A and B sw (2) - ON	15
	109 REACTION CONTROL SYS - C/M PRESS sw - C/M PRESS	16
	110 RCS INDICATORS sw - C/M A	12
	111 C/M RCS - PRESS - F & OX ind (2) - 287 to 308	
	112 RCS INDICATORS sw - C/M B	
	113 C/M RCS - PRESS - F & OX ind (2) - 287 to 308	
	114 PROG - change 61 to 62	14
	115 LIMIT CYCLE/OFF sw - LIMIT <i>CYCLE</i>	8
	116 DSKY ind - check V50, N25, R1 - 00004	14
	117 G&N/SCS sw - SCS	8
	118 DSKY - E	14

R1
R2
R = +150°
P = -60°
Y = 0

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Step	Procedure	Panel
C	119 DSKY ind—ignore V50, N25, R1-00003	14
	120 FDAI ALIGN pushbutton—press (10 sec)	6
	121 FCSM-AUTO/OVERRIDE sw— OVERRIDE	2
	122 FCSM-ON/OFF/RESET sw—OFF	
	123 SCS-A&C ROLL-MN A & B, B&D-MN B, PITCH-MN B, YAW-MN B cb's (5)—	25
	124 ATT SET controls—position ROLL-0, PITCH-152, YAW-0	6
	125 DIRECT RCS/OFF sw—DIRECT RCS	8
	126 G&N/SCS sw—G&N	
	127 FDAI att error ind—check ATT /MONITOR/ENTRY sw— MINITOR 8	4
	FDAI attitude error ind—null ATT /MONITOR/ENTRY sw— ENTRY 8	4
	128 DSKY—V33E	14
	129 DSKY ind—check V50, N25, R1-00041 (ignore till sep)	
	130 LIMIT CYCLE/OFF sw—OFF	8
S	131 FLIGHT QUAL RCDR sw— RECORD	19
P	132 MASTER EVENT SEQ CONT cb's (4)—	22
C	133 MESC-LOGIC ARM/OFF sw (2)— LOGIC ARM	25
	134 MASTER EVENT SEQ CONT- PYRO ARM/SAFE sw (2)—PYRO ARM	24
	135 FDAI att rate ind—check FDAI-SELF TEST sw— SELF TEST	4 2

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Step	Procedure	Panel
C	FDAI att rate ind—deflect	4
	FDAI-SELF TEST/OFF sw—OFF	2
C/M-S/M SEPARATION (CP)		
C	136 C/M-S/M SEP-A & B sw (2)—on	15
	137 REACTION CONTROL SYS-TRANS sw—C/M	16
	138 C/M-S/M separation—check and rate dampen	
	139 DSKY—E	14
	140 DSKY ind—check V06, N17, R1-outer gim/ICDU angle, R2-inner gim/ICDU angle, R3-middle gim/ICDU angle	
	141 DSKY—V33E	
	142 FDAI att ball—check 4°/sec to 152° pos pitch, roll-0, yaw-0	4
	143 PROG—change 62 to 63	14
P	144 Entry att—visual check	
C	145 DSKY ind—check V16, N54, R1-bank angle, R2-g's, R3- altitude	
	146 Attitude hold—check	
	147 FDAI ALIGN pushbutton—press (10 sec.)	6

R
C
P+152°
Y 0

R1
R2
R3

G&N MANUAL ENTRY (C)

C	148 DSKY ind—change PROG-63 to 64, R2-00000 to 00001	14
	149 .05 G ENTRY/OFF sw—.05 G <i>ENTRY</i>	8
	150 Trans control—CW to stop	

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Step	Procedure	Panel
C	151 Rotation control—lift vector to null FDAI roll att error ind	
	152 Rate damping—check FDAI pitch and yaw $\pm 2^\circ$ /sec	4
	153 DSKY ind—change PROG-64 to 67, R2-00001 to 00002	14
	154 C/M RCS-PRESS-F & OX ind (2)—no sys B prop loss	12
	155 DSKY ind—check till R3-00140	14
	156 Rotation control—release	
	157 ELS-BAT A & B cb's (2)—	25
	158 LOCK/UNLOCK control—UNLOCK	5
	159 ELS-LOGIC/OFF sw—LOGIC	8
ELS OPERATION (CSP)		
C	160 C/M status—check MSFN	
	161 C/M stability—report Stable—manual control Unstable—backup procedure REACTION CONTROL SYS-CMD sw-OFF	16
	APEX COVER JETT sw—press (below 45 K ft)	5
	DROGUE DEPLOY sw—press (2 sec after apex jett)	
P	162 VHF/FM sw—OFF	20
	163 C-BAND sw—OFF	
	164 XPONDER/OFF/XPONDER PWR AMPL sw—OFF	
	165 DSKY ind—check till R3-00040	14
	166 SCS CHANNEL-B&D R, P, -OFF	8
	167 Apex jett—report Jett—auto Jett—backup mode	

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Step	Procedure	Panel
	REACTION CONTROL SYS-CMD <i>sw - OFF</i>	16
	APEX COVER JETT sw—press	5
168	Drogue deploy—report	
	Deploy—auto	
	Deploy—backup mode	
	DROGUE DEPLOY sw—press	
169	Drogue release-main pilot deploy— <i>report</i>	
	Release-deploy—auto	
	Release-deploy—backup mode	
	MAIN DEPLOY sw—press	
170	CABIN PRESSURE RELIEF controls (2)—CLOSE	131
171	C/M PROP JETT-LOGIC <i>sw - LOGIC</i>	8
172	Mains disreef—report	
173	DIGITAL EVENT TIMER-RESET/ UP/DOWN sw—RESET (then UP)	
174	C/M PROP JETT-DUMP <i>sw - DUMP</i>	
CS	Backup mode—rotation control	
C	175 COUCH sw—UNLOCK (check)	
S	Backup-mode—pull pins (4)	
P	176 RECOVERY-VHF BCN sw—ON	20
	177 VHF ANTENNA sw—RECOVERY	
C	178 Digital timer—MIN 03-SEC 40	5
	C/M PROP JETT-PURGE sw— <i>PURGE</i>	8
CS	Backup mode-C/M RCS He DUMP sw—DUMP (use rotation control)	26
C	179 CABIN PRESSURE RELIEF controls (2)—BOOST ENTRY	131
	180 C/M status—report	
S	181 C/M RCS-PRESS-He ind (2)—zero	12

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Step	Procedure	Panel
C	182 C/M PROP JETT-LOGIC sw - OFF	8
S	183 C/M RCS PRPLNT-A and B sw (B) - OFF	15
CSP	184 Couches—96°	
	185 Unnecessary pwr sw—off	

TOUCHDOWN

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POSTLANDING CHECKLISTS

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POST
LANDING

POSTLANDING CHECKLISTS

Step	Procedure	Panel
TOUCHDOWN & STABILIZATION (CP)		
<i>spell</i> C	1 MAIN CHUTE RELEASE sw— up (mementary)	16
	2 CABIN PRESSURE RELIEF valve (2)—CLOSE	131
P	3 POST LDG-BAT BUS A, B, & BAT C cb's—closed	151
C	4 If C/M not floating upright, set POSTLANDING FLOAT BAG 1-PL BUS cb—closed VENT FAN-PL BUS-FLOAT BAG 2 cb—closed FLOAT BAG-1 sw—FILL In 5 minutes FLOAT BAG-2 sw— <i>FILL</i> FLOAT BAG-1 sw—off (center) In 5 minutes FLOAT BAG-2 sw— <i>off (center)</i>	25
P	5 Backup: FLOAT BAG-3 sw—FILL MAIN BUS TIE sw (2)—OFF	22
POST-STABILIZATION & VENTILATION (C)		
C	6 PLV duct lanyard—pull and secure 7 POST LANDING-VENT FAN sw— <i>HI</i>	25
	8 POST LDG BEACON LIGHTS sw— on (if at night)	26
	9 POST LANDING-ANTENNA A and B sw (2)—DEPLOY	25
	10 MESC-LOGIC ARM sw (2)—OFF	
	11 MASTER EVENT SEQ CONT- PYRO ARM sw (2)—SAFE	24

How C/B's are closed, in other lists they are IN.

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Step	Procedure	Panel
TRACKING & COMMUNICATIONS (CSP)		
P	12 RECOVERY-HF sw—ON	20
CSP	13 HF sw—TR (up)	26, 13, 23
P	14 RECOVERY-HF mode sw—SSB (voice) or BCN (tracking) or <i>HF (voice)</i>	20

OPENING SIDE HATCHES (S)

- | | | |
|---|---------------------------------------------------------|--|
| S | 15 Set wrench for CCW operation | |
| | 16 Insert wrench into inner hatch cover
sealed drive | |
| | 17 Turn wrench— 360° CCW | |
| | 18 Lower inner hatch against ZZ-axis <i>struts</i> | |
| | 19 Pull outer hatch cover lanyard <i>handle</i> | |

Backup: Reset ratchet & turn latch
drive shaft CW.

EMERGENCY & ABORTS

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1 MINUTE-55 SECONDS TO 3 MINUTES	5

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EMERG (123)
ABORT

EMERGENCY PROCEDURES

Step	Procedure	Panel
	FIRE IN C/M (CNS)	
C	1 PGA suits—don	
	2 DIRECT O ₂ valve—OPEN	
	3 EMERG CABIN PRESSURE valve— <i>OFF</i>	
	4 CABIN REPRESS valve—closed	
	5 CABIN PRESSURE RELIEF valve— <i>DUMP</i>	
	Result: PRESS CABIN ind—zero	
	CONTAMINATION IN C/M	
C	1 PGS suits—don	
	2 Contamination— isolate (C/M or suit)	
	3 DIRECT O ₂ valve—OPEN	
	Result: Contamination elimination	
	NOTE Determine necessity for dumping cabin pressure.	
C	1 Cabin pressure dump—unnecessary	
	Suit circuit valve—C (close)	
	DIRECT O ₂ valve—close	
	Vent line—cap	
	PRESS-CABIN ind—4.8 to 5.2 psia	
	PRESS-SUIT ind—4.7 to 5.3 psia	
	2 Cabin pressure—dump	
	Suit circuit valve—C (close)	
	DIRECT O ₂ valve—close	
	EMERG CABIN PRESSURE valve— <i>OFF</i>	
	CABIN REPRESS valve—close	

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Step	Procedure	Panel
C	CABIN PRESSURE RELIEF valve—dump PRESS-CABIN ind—zero press (allow <i>2 min</i>)	○
	CONTAMINATION IN C/M—MSFN (UPLINK)	
	NOTE Refer to Mission Rules.	
	CABIN DECOMPRESSION	
C	1 PGA suits—con EMERC CABIN PRESSURE valve— <i>OFF</i> CABIN REPRESS valve—close	○
		○
		○

ABORT—CHECKLIST

Step	Procedure	Panel
	PAD TO +61 SECONDS (C)	
C	1 ABORT (automatic) Backup: Translation control—rotate (CCW)	
	2 EVENT TIMER—check	
	3 LES motor ignites—check	
	4 LOCK control—UNLOCK	
	5 CANARD DEPLOY—press (00:11)	
	6 LES TWR Jett—check (00:14) Backup: ABORT SYSTEM-MODE A &B sw—TWR JET SPS MODE	
	7 Apex cover jettison—check (00:15) Backup: APEX COVER JETT sw—press	
	8 Drogue parachute deploys (00:16) Backup: DROGUE DEPLOY—press	
	9 ALTIMETER—check (00:17) <u>3300 Ft and Below</u> a. MAIN DEPLOY sw—press	
	10 MAIN DEPLOY-AUTO/MAN sw—AUTO <u>3300 Ft and Above</u> a. MAIN DEPLOY-AUTO/MAN sw— <i>MAN</i> b. MAIN DEPLOY sw—press (3300 ft)	
	61-SECONDS TO 1 MINUTE-10 SECONDS (C)	
C	1 ABORT (automatic) Backup: Translation control—rotate (<i>ccw</i>)	
	2 EVENT TIMER—check	
	3 LES motor ignites—check	
	4 Lock control—UNLOCK	
	5 CANARD DEPLOY—press (00:11)	

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Step	Procedure	Panel
C	6 ELS logic armed (+14) Backup: ELS LOGIC sw—LOGIC	
	7 LES TWR Jett—check (+14) Backup: ABORT SYSTEM A&B sw— TWR JET SPS MODE	○
	8 Apex Cover Jett—check (00:15)	
	9 Drogue parachute deploys (00:16) Backup: DROGUE DEPLOY—press	
	10 Main chutes deploy (11,000 to 9000 ft) Backup: MAIN DEPLOY—press	
	11 Main chutes disreef—check	
	12 CABIN PRESSURE RELIEF valves— CLOSE	○
	13 PROP JETT-DUMP/OFF sw—DUMP	
	14 EVENT TIMER—RESET	
	15 COUCH UNLOCK sw—unlock (up)	
	16 Attenuator struts (4)—verify unlocked Backup: Mechanical lock pins—pull	
	17 CM PROP JETT-PURGE sw—PURGE (03:40) Backup: C/M RCS-He DUMP sw— DUMP	
	18 CABIN PRESSURE RELIEF valves (2)— BOOST ENTRY (04:00) 1-MINUTE -10 SECONDS TO 1 MINUTE- 55 SECONDS	○
C	1 ABORT (automatic) Backup: Translation control—rotate (ccw)	
	2 EVENT TIMER—check	
	3 LES motor ignites—check	
	4 Lock control—UNLOCK	
	5 CANARD DEPLOY sw—press (00:11)	○
	6 ELS logic—armed (00:14) Backup: ELS LOGIC sw—LOGIC	

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Step	Procedure	Panel
C	7 C / M RCS-PRESS-F & OX ind—294 Backup: REACTION CONTROL SYS- C / M PRESS sw—up	
	8 LES tower jettison—check (24, 900 to 21, 500 ft) Backup: ABORT SYSTEM-MODE sw (A&B)—TWR JETT SPS MODE	
	9 Apex cover—jettison Backup: APEX COVER JETT sw—press	
	10 Drogue parachute—deploy (twr jett <i>+00:02</i>) Backup: DROGUE DEPLOY sw—press	
	11 Main parachutes—deploy (10, 950 to <i>9100 ft</i>) Backup: MAIN DEPLOY sw—press	
	12 Main parachutes disreef—check	
	13 CABIN PRESSURE RELIEF (2)—CLOSE	
	14 PROP JETT-DUMP/OFF sw—DUMP	
	15 DIGITAL EVENT TIMER—reset	
	16 COUCH UNLOCK sw—unlock (up)	
	17 Attenuation struts—verify unlocked	
	18 CM PROP JETT-PURGE/OFF sw— PURGE (03:40)	
	19 CABIN PRESSURE RELIEF valves (2)— BOOST ENTRY (04:00) 1-MINUTE-55 SECONDS TO 3 MINUTES	
C	1 ABORT (automatic) Backup: Translation control—rotate <i>(SCW)</i>	
	2 EVENT TIMER—check	
	3 LES motor ignites—check	
	4 Lock control—UNLOCK	
	5 CANARD DEPLOY sw—press	

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Step	Procedure	Panel
C	6 ELS—armed Backup: ELS LOGIC sw—LOGIC	○
	7 C/M RCS-PRESS F & OX ind—294 Backup: R..	○
	8 Establish 5°/sec + pitch rate	
	9 ATT /MONITOR/ENTRY sw— <i>ENTRY</i>	
	10 5°/sec + pitch rate—maintain	
	11 LES tower jettison—check (24, 900 to 21, 500 ft) Backup: ABORT SYSTEM-MODE sw (A&B)—TWR JETT SPS MODE	○
	12 Apex cover—jettison Backup: APEX COVER JETT—press	
	13 Drogue parachutes deploy—check (apex jett + 1.6) Backup: DROGUE DEPLOY—press	
	14 Main parachutes deploy—check (10, 950 to 9, 100 ft) Backup: MAIN DEPLOY sw—press	
	15 Main parachutes disreef—check	
	16 CABIN PRESSURE RELIEF valves (2)— <i>CLOSE</i>	○
	17 C/M PROP JETT-DUMP/OFF sw— <i>DUMP</i>	
	18 DIGITAL EVENT TIMER—reset	
	19 COUCH UNLOCK sw—unlock (up)	
	20 Attenuator struts (4)—verify unlocked	
	21 C/M PROP JETT-PURGE/OFF sw—PURGE (03:40)	
	22 CABIN PRESSURE RELIEF valves (2)—BOOST ENTRY (04:00)	○

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PERFORMANCE DATA

CONTENTS

TBD

Refer to section 4 in AOH

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PERF
DATA

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EXPERIMENTS

CONTENTS

TBD

Refer to section 11 in AOH

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EXP

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E&TP

CONTENTS

TBD

Refer to section 12 in AOH

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E&TP