



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 17

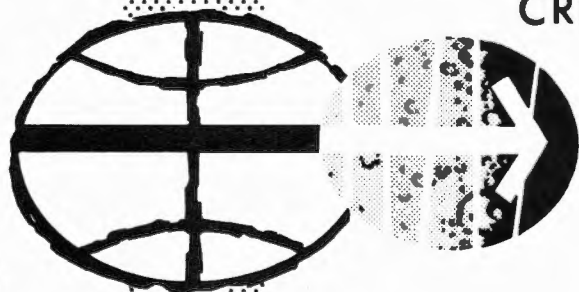
DECEMBER 6 & 7 LAUNCH

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REVISION A
LM CUE CARDS

PREPARED BY

FLIGHT PLANNING BRANCH
CREW PROCEDURES DIVISION



MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NOVEMBER 3, 1972

APOLLO 17

LM CUE CARDS

NOVEMBER 3, 1972

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APOLLO 17

LM CUE CARDS

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~~BASIC 9/14/72~~
REVISION A 11/3/72

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LOS RATE
VS TIME
FROM TPI

5/14/72

LM CUE CARD LOCATIONS

APS BURN
DPS BURN
MISSION
RULES
NO PD1 +
12 ABORTS

ASCENT
MONITOR

RR RANGE

H vs HDOT

CDR BUS
LOSS

FT VS
NM

EVA
CARDS

STOWED
UNLESS NEEDED

DES
ABORTS
&
DPS
ABORT
APS
ABORT

WARNING
LIGHTS
PROCEDURES

DEDA
ADDRESSES

COMM
MODES

CS AC	RCS TCA	CABIN
ASC PRESS	RCS A BBD	SUIT FAN
DES BBD	RCS B BBD	DC BUS
DES QTY	LOC	
RES		

TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY

ASC HI BBD	INVERTER	ED RELAY	EC5
ASC QTY	BATTERY	RCS	O ₂ QTY
ENG GEAR	ENG2 ROD	HEATER	GLYCOL
		C/W PWR	WATER QTY
			(L-80 SCV)

SYSTEM A	ASC QRD	ASC QRD
ASC PWR	ASC PWR	ASC PWR
ASC QRD	ASC QRD	ASC QRD
ASC QRD	ASC QRD	ASC QRD

TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY

TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY

TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY

TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY

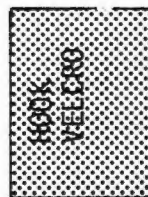
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY

TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY
TEMP	PRESS	QUANTITY

F13

B13

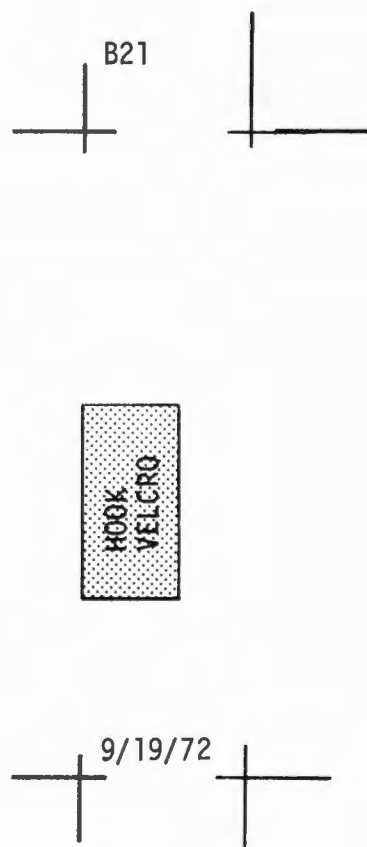
ft	nm
500	= 0.08
1000	= 0.16
1500	= 0.25
2000	= 0.33
2500	= 0.41
3000	= 0.49
3500	= 0.58
4000	= 0.66
4500	= 0.74
5000	= 0.82
5500	= 0.91
6000	= 0.99
6500	= 1.07
7000	= 1.15
7500	= 1.23
8000	= 1.32
8500	= 1.40
9000	= 1.48
9500	= 1.56



9/14/72

9/19/72

F21	
H	HDOT
7000	169
6000	152
5000	132
4000	110
3000	88
2000	63
1000	35
500	17
400	14
300	9
200	5
9/21/72	



F12	
CDR BUS LOST	LMP BUS LOST 9/14/72
AGS, INV 2 SUIT FAN 2 S-BD XMTR/RCVR-PRIM CDR AUDIO CONT-BU ACTIVATE SEC GLY LOOP SEE M8-4, BLOCK 35	INV 1, SUIT FAN 1 LMP AUDIO CONT - BU S-BD PWR AMPL - SEC DN VOICE - BU, BIOMED-OFF S-BD ANT - OMNI SEE M8-3, BLOCK 21

B12	
HOOK VEL ERD 1/2 SHIM	
	9/19/72

F2

RR RANGE VS AGC VOLTS

RANGE VOLTS		N49 LIMITS	
400nm	1.7	2.00nm	.33nm
200nm	2.0	12.0fps	2.0fps
100nm	2.3		
50nm	2.5	TPI	
25nm	2.6	0.80nm	
12.5nm	2.8	5.0 fps	

9/14/72

INS R/RDOT 163/-471

B2

9/19/72

HOOK
VELCRO

HOOK
VELCRO

F11

DEDA ADDRESSES

Vi 433
 HDOT 367(360)
 H 337(223)
 Ha 315
 Hp 403
 Y 211(+S,100FT)
 YDOT 270,263(+S)
 R 317(316)
 RDOT 440(503)
 R VS RDOT 606±0
 574(+)NOT STAGED
 604(-)ON SURFACE
 ACCEL CAL LIM-0.4
 634+77777(MAX ACCEL THRES 1.2)
 534,535,536+0 (ACCEL FACTOR)
 540,541,542+0 (ACCEL BIAS)
 AGS,AUTO,ABORT,400+1,ΔV,ULL

MAX EMER L.O.
 CB'S (11-3,5)-CLOSED
 AGS STATUS - OPERATE
 400+4E (30 SEC)
 342+0
 400+1/AGS-AUTO
 ASC He REG/BATS

SURF S.V.	INS S.V. +1 MIN
340+56905	240+56602
341+0	241+00003
342+0	242+10156
360+0	260-0946.5
361+00029	261+0000.1
362-00139	262+5457.8
	254+0490.5
	414+2

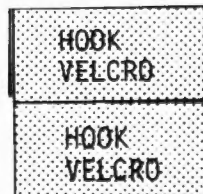
9/14/72

B11

APS LEAK (AGS L/O)

IF TIME PERMITS

V37E47E
 (WAIT FOR DISPLAY)
 V25N07E
 104E
 200E, E
 V82E



9/19/72

F10

S-BAND
ANTENNA ANGLES

9/14/72

B10

DESCENT REFSMAT		ASCENT REFSMAT		9/1
YAW=0°		IGA (PITCH)	YAW=0°	
ANTENNA			ANTENNA	
P	Y		P	Y
23	-48	0	15	-58
14	-41	10	6	-51
6	-35	20	-1	-44
-2	-27	30	-8	-37
-8	-20	40	-14	-30
-15	-14	50	-20	-23
-22	-7	60	-26	-16
-29	0	70	-32	-10
-36	6	80	-39	-5
-44	11	90	-46	1
-52	16	100	-53	5
-61	20	110	-61	9
-71	23	120	-69	12
		130		
		140		
		150		
249	22	160	255	14
239	19	170	247	11
231	15	180	239	8
222	10	190	231	4
215	5	200	224	-1
207	-1	210	217	-6
201	-8	220	211	-12
194	-15	230	204	-18
187	-22	240	198	-25
180	-29	250	192	-32
173	-36	260	186	-39
165	-43	270	179	-46
155	-50	280	171	-53
144	-55	290	162	-60
129	-60	300	149	-66
110	-64	310	130	-72
88	-65	320	102	-75
67	-64	330	69	-74
49	-60	340	44	-70
34	-54	350	27	-64

HOOK
VELCROHOOK
VELCROHOOK
VELCROHOOK
VELCRO

9/19/72

F8

RR PARKING

CB(11) RR(2)-CLOSE

RR MODE-LGC

V41N72E (+TRUN,+SHFT)

N12 R2 00002, PRO

V16N72E

CB(11) RR(2)-OPEN

V44E

DAP DATA LOAD

A 1=STAGED	2=UNSTAGED	3=DOCKED
B 0=RCS A	1=RCS B	2 OR 3=RCS A&B
C 0=FINE	1=NORM	
D 0=0.3°	1=1.0°	2 & 3=5.0°
E 0=0.2°/SEC	1=0.5/SEC	2=2.0°/SEC
		3=10.0°/SEC

DPS

TEMP/PRESS MON
 >30 PSI @ PDI
 HELIUM NOM
 >1000<1150
 PSI PRE PDI

APS

TEMP PRESS MON
 >78 PSI OX
 >114 PSI FU
 50 - 90°F
 ΔT<60°F FOR
 BT<100 SEC
 HELIUM NOM
 PRESS 3125 PSI

RCS

He >1400 PSI
 PRPLNT
 PRESS >100 PSI
 TEMP 40 - 100°F
 FUEL/OXID MANF
 PRESS >100 PSI
 ΔP <80 PSI
 QUAD TEMP >119°F
 (25 MIN TO FIRING)

9/14/72

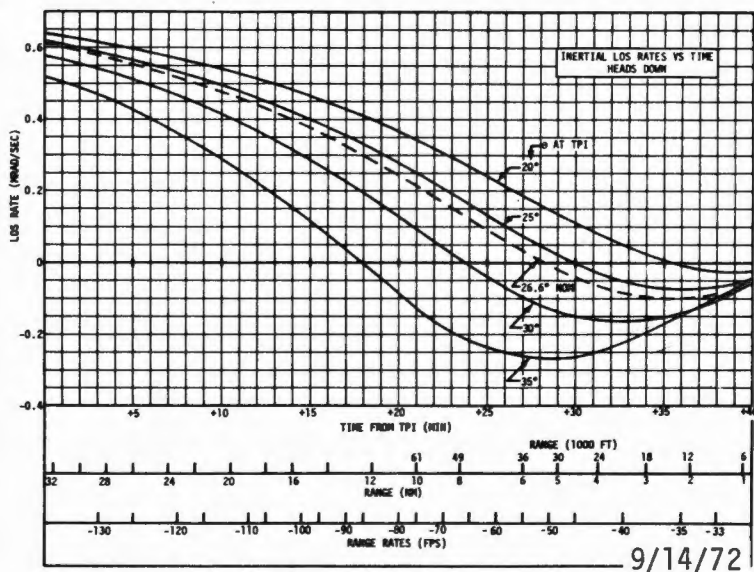
B8

HOOK
 VELCRO

WHS 8/1
 ORC 12A
 HOOK

9/19/72

F3



B3

HOOK
VELCRO

HOOK
VELCRO

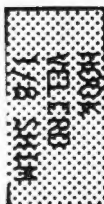
9/19/72

F4

TFI	θ	H	HDOT	OHW
:30	308	1.6	88	40
1:	306	5.0	123	38
1:30	302	9.1	149	36
2:	299	13.9	169	34
2:30	296	19.2	181	32
3:	293	24.7	188	30
3:30	289	30.4	189	27
4:	286	36.0	183	25
4:30	282	41.3	173	22
5:	278	46.3	157	20
5:30	274	50.7	136	17
6:	270	54.4	111	14
6:30	265	57.3	83	11
7:	260	59.3	52	8

9/14/72

B4



9/19/72

F15

LM COMM MODES

COMM BASIC CONFIGURATION	PREP FOR UNDOCKING	LM RELAY WITH VHF RNG	CSM RELAY	LUNAR STAY	PLSS/EVCS WITH LCRU (EVA)	PRIOR TO DOCKING
CB 11 ALL COMM CLOSED						
PNL 8 AUDIO SWITCHES						
S-BD T/R - T/R			OFF			
ICS T/R - T/R						
RELAY ON/OFF - OFF						
MODE - ICS/PTT		VOX			VOX	
AUDIO CONT - NORM						
VHF A - T/R				RCV	OFF	
VHF B - RCV				OFF	OFF	
VOX SENS - MAX INCR						AS REQ
CB 16 ALL COMM CLOSED						
CB 16 TV - OPEN						
PNL 14 UPSQU - AS DES	ENABLE	ENABLE	OFF	OFF*	ENABLE	OFF
PNL 12 UPDATA LNK-OFF						
PNL 12 AUDIO SWITCHES						
S-BD T/R - T/R		RCV	OFF			
ICS T/R - T/R						
RELAY ON/OFF - OFF		ON			ON	
MODE - ICS/PTT		VOX			VOX	
AUDIO CONT - NORM						
VHF A - T/R				RCV		
VHF B - RCV				OFF		
VOX SENS - MAX INCR						AS REQ
PNL 12 COMM SWITCHES						
S-BD MODULATE - PM				FM-PM		
S-BD XMTR/RCVR - SEC						
S-BD PWR AMPL - PRIM				OFF	OFF	
S-BD VOICE - VOICE						
S-BD PCM - PCM						
S-BD RNG - OFF/RESET	RANGE			RANGE	RANGE	RANGE
VHF A XMTR - VOICE		VOICE OR VOICE/RNG	VOICE/ RNG	OFF		VOICE/ RNG
VHF A RCVR - ON		OFF	OFF			OFF
VHF B XMTR - OFF	DATA					
VHF B RCVR - ON				OFF		
SQUELCH VHF A - NORM					N+1 1/2	N+1 1/2
SQUELCH VHF B - NORM					FULL DECR	N+1 1/2
TLM BIOMED - AS REQ	OFF	OFF			OFF	LEFT
TLM PCM - HI	LO			AS SCH	LO	
RECORDER - OFF	ON	AS DES	AS DES	AS SCH		ON
PNL 12 COMM ANTENNAS						
TRACK MODE - AUTO	SLEW			SLEW	SLEW	
PITCH CONT - COMP Δ						
YAW CONT - COMP Δ						
S-BD SEL - SLEW	AFT					
VHF SEL - AFT OR FWD	FWD			AFT	EVA	FWD

* DURING EVA - ENABLE.

9/27/72

B15

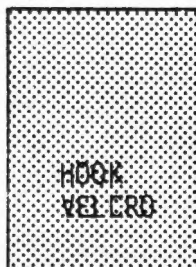
9/19/72

LOSS OF COMM (PDI)

- 1 VERIFY STANDARD COMM CONFIG
- 2 S-BD SIG STR LOW (<3.0)-REACQ WITH STEERABLE
- 3 STILL NO COMM(SIG STR LOW<3.0)-SELECT BEST OMNI
- 4 STILL NO COMM
DN VOICE BU, BIOMED - OFF (HOT MIKE)
- 5 STILL NO COMM
S-BD: XMTR/RCVR-PRIM,PWR AMPL-SEC
- 6 60 SEC, STILL NO COMM
VOICE and FM
- 7 60 SEC, STILL NO COMM
CSM RELAY

PM

S-BD AUDIO (BOTH) - OFF
 NOTIFY CSM TO
 CONFIG FOR
 RELAY



LM	STER ANT	
COORD	PITCH	YAW
+X	90	-45
-X		
+Y	90	45
-Y		
+Z	0	0
-Z	180	0

(EVA)

LOSS OF COMM VIA LM

- 1 CK COMM CBs
- 2 SELECT ALT
S-BD XMTR/RCVR
- 3 IF SIG STR <3.9,
REALIGN STEERABLE ANT
- 4 IF SIG STR <3.9, SELECT
FWD OMNI, TRACK MODE-OFF,
PWR AMPL-PRIM
- 5 CONFIG FOR CDR RELAY:
AUDIO (LMP) AUDIO (CDR)
RELAY-OFF RELAY-ON
VHF A-OFF VHF A-T/R
VHF B-OFF VHF B-RCV
IF COMM OK, PLSS MODE-AR
- 6 CONFIG LM TO B/U EVA MODE
XMTR A-OFF, XMTR B-VOICE,
AUDIO (CDR),
VHF A-RCV, VHF B-T/R
PLSS MODE-A(CDR), B(LMP)
- 7 S-BD - DN VOICE BU
- 8 UPDATA LINK-VOICE BU
- 9 VHF ANT-AFT

LOSS OF CSM-LM VHF COMM

- 1 ✓CB'S/SWITCHES
- 2 ✓SQUELCH A
VHF A XMTR-VOICE
VHF B XMTR-VOICE
VHF B-T/R (BOTH)
- 3 ✓SQUELCH A/B
VHF B XMTR-OFF
VHF A-RCV (BOTH)
- 4 VOX MODE
✓VOX SETTINGS
✓HEADSETS/UMBILICALS
- 5 YAW 180°
CHANGE ANTENNA

F9

T-0 LAUNCH
DPS PRE PRESS RNG

	FUEL	OXID
TEMP	50-75	50-75
PRESS	48-140	36-200

HOOK
VELCRO

SHe PRESS RNG
TIME PRESS

LOI	1110-1310
ABORT	
DPS PRESS	1220-1420

11/8/72

B9

T+24 LAUNCH

DPS PRE PRESS RNG

	FUEL	OXID
TEMP	50-75	50-75
PRESS	48-140	36-200

HOOK
VELCRO

SHe PRESS RNG
TIME PRESS

LOI	1130-1336
ABORT	
DPS PRESS	1316-1506

11/8/72

F5

DPS BURN

CB(11) DECA GMBL AC - CLOSED
CB(16) DISP/ENG OVRD LOGIC - CLOSED
CB(11&16) STAB/CONT (ALL) - CLOSED
EXCEPT CB(11) AEA - OPEN

RATE SCALE **PDI** - 25°/SEC

THR CONT - MAN/CDR
- **PDI** AUTO/CDR

ATT/TRANSL - 4 JETS
BAL CPL - ON
ENG GMBL - ENABLE
DES ENG CMD OVRD - OFF
ABORT/ABORT STAGE - RESET
DEADBAND - MIN
ATT CONT(3) - MODE CONT

MODE CONT **PDI** PGNS - AUTO
AGS - AUTO

STOP PB (2) - RESET
TTCA (2) - THROT/Min **PDI** LMP TTCA - SOFT STOP

FOR PDI GO TO TIMELINE BOOK

-2:00 400+1

MASTER ARM - ON (1st BURN)

- :30 ENG ARM - DES

FOR AGS BURN ABORT PB - PUSH (T=0 FOR AGS)

-:07.5 ULLAGE (MANUAL FOR AGS)

- :05 PRO

+ :01 DES He REG (1) - OPEN (if previously closed)

TFC-10 DES He REG (2) - CLOSE (<86%)

$\Delta V=0$ STOP PB - PUSH

ENG ARM - OFF

ABORT PB - RESET

9/14/72

B5

APS BURN

CB(16)
DISP/ENG OVRD LOGIC - CLOSED
CB(11&16)
STAB/CONT (ALL) - CLOSED
EXCEPT
CB(11) AEA AND DECA PWR AND
CB(16) DES ENG OVRD - OPEN
RATE SCALE - 25°/SEC
ATT/TRANSL - 4 JETS
BAL CPL - ON
DEAD BAND - MIN
ABORT/ABORT STAGE - RESET
ATT CONT(3) - MODE CONT

ASCENT MODE CONT - PGNS - AUTO AGS - ATT HOLD

STOP PB (2) - RESET
TTCA (2) JETS

-2:00 400+1
AGS/PGNS
MASTER ARM - ON

RCS STAGE -:14 MANUAL ULLAGE -:10 STAGE-FIRE
--

-:10 ABORT STAGE PB - PUSH(T=0 FOR AGS)
ENG ARM - ASC

-:05 PRO

:00 ENG ON
+:01 ENG START - PUSH

ASCENT MODE CONT - AGS - AUTO

200 fps ENG ARM - OFF
0 fps ABORT STAGE - RESET
STOP PB - PUSH

(10/27/72)

AGS DISCRETE MALFUNCTION PROCEDURES

9/14/72

DISCRETE (533R)	FAILURE	EFFECTS	DESCENT/ABORT PROCEDURES	ASCENT/ABORT STAGE PROCEDURES
DPS ON B=2,3,6,7	OFF	.LOSS OF FOLLOW-UP DPS ENG ON .FOLLOW-UP ENG OFF ALWAYS ISSUED	.MASTER ARM - ON .START PB - PUSH .MASTER ARM - OFF	-----
	ON	.FOLLOW-UP ENG ON ALWAYS ISSUED	.DELAY ARMING WITH ENG ARM SW UNTIL TIG	.DELAY ARMING WITH ENG ARM SW UNTIL TIG
APS ON B=1,3,5,7	OFF	.LOSS OF FOLLOW-UP APS ENG ON .FOLLOW-UP ENG OFF ALWAYS ISSUED	-----	Δ 604+00000E AT TIG .UNABLE TO UPDATE H/HDOT, PERFORM MANUAL ASCENT
	ON	.LUNAR SURFACE FLAG IS RESET AT TIME OF FAILURE .FOLLOW-UP ENG ON ALWAYS ISSUED	.DELAY ARMING WITH ENG ARM SW UNTIL TIG	IF ON SURFACE: Δ 604-00000E Δ CHECK STATE VECTORS Δ 604+00000E AT TIG .DELAY ARMING WITH ENG ARM SW UNTIL TIG
AUTO B=4,5,6,7	OFF	.LOSS OF AUTO ATT CONT .LOSS OF AUTO ENG CONT .LOSS OF AUTO ATT ERR NEEDLES	.PERFORM MANUAL ASCENT .MANUAL STOP REQUIRED	.PERFORM MANUAL ASCENT .MANUAL START/STOP REQUIRED
	ON	.LOSS OF ATT HOLD CONT (UNLESS 400→0)	.TO LAND: 400+00000E .IF FAILURE DUE TO MODE CONT SW - MAY POSSIBLY HAVE TO OVERRIDE AEA WITH ACA, THEN 575+00000E IN ORDER TO ESTABLISH NEW ATT .TO ABORT: 400+10000E	-----

Δ TO BE PERFORMED IN PGNS GUIDANCE AS WELL AS IN AGS, OTHER PROCEDURES
TO BE USED ONLY IF IN AGS GUIDANCE.

9/14/72

AGS DISCRETE MALFUNCTION PROCEDURES (CONT)

DISCRETE (533R)	FAILURE	EFFECTS	DESCENT/ABORT PROCEDURES	ASCENT/ABORT STAGE PROCEDURES
ABORT STAGE C=2,3,6,7	OFF	.LOSS OF AUTO ENG CONT WITH ABORT STAGE PB .ABORT PB PROVIDES AUTO OFF AND SELECTS ABORT TARGETING	-----	.MANUAL START REQUIRED .SET ABORT PB AFTER TIG FOR AUTO OFF .IF FAILURE DUE TO ABORT STAGE PB TOTAL FAILURE, MUST USE ENG ARM SW IN ADDITION TO ABORT PB
	ON	.ABORT TARGETING IS SELECTED EARLY	.IF FAILURE OCCURS BEFORE PDI+10:20 AND ABORT OCCURS AFTER PDI+10:20 STAND BY FOR TWEAK	.ARM APS AT TIG
ABORT C=4,5,6,7	OFF	.LOSS OF AUTO DES ENG CONT .ABORT TARGETING DOES NOT GET SELECTED UNTIL ABORT STAGE PB IS SET, POSSIBLE OFF-NOMINAL IN- SERCTIONS FOR LATE ABORTS	.IN CASE OF AN ABORT, START PB - PUSH	.MANUAL STOP REQUIRED CONFIRM 224 & 662 WITH MSFN
	ON	.ABORT TARGETING IS SELECTED EARLY	.IF FAILURE OCCURS BEFORE PDI+10:20 AND ABORT OCCURS AFTER PDI+10:20 STAND BY FOR TWEAK	.ARM APS AT TIG
*FOLLOWUP/ **OUT OF DETENT A=1,3,5,7	OFF	.**LOSS OF NORMAL ATT HOLD CONT MODE .AUTO ATT ENG CONT NORMAL	.TO LAND: MODE CONT-ATT HOLD .**OVERRIDE AEA WITH ACA 575+00000E TO ESTABLISH NEW ATT .TO ABORT: MODE CONT- AUTO	-----
	ON	.LOSS OF NORMAL ATT HOLD CONT MODE .RATE COMMAND ONLY AUTO ATT CONT-NORMAL . *LOSS OF AUTO ENG CONT	.TO LAND: MODE CONT-ATT HOLD (NO ATT ERR ISSUED) .TO ABORT: MODE CONT- AUTO . *MANUAL STOP REQUIRED	. *MANUAL START/STOP REQUIRED

DPS ABORT/INSERTION

✓GUID SW

ABORT PB - PUSH

PGNS - ATT HOLD

THROTTLE - UP

V22N46EE **NO P70, V37E 70E**

MODE CONT(2)-AUTO

MODE SEL-AGS

✓ABORT TIME

✓INS DATA

YAW RT 30°

623+1

200fps DES ENG CMD OVRD-OFF
(UNLESS CDR BUS LOSS)TFC-10 DES He REG (2) - Close (<86%)
STANDBY TO COPY GET

0fps STOP PB - PUSH

410+5 TRIM

GET

MODE CONT-ATT HOLD

ENG ARM-OFF

ABORT-RESET

STOP PB-RESET

 ΔV 404,5,6=0 470RABORT RULES

1 ATT & RATE LIMITS

DPS >5° SEC

APS >10° SEC

2 DPS SHUTDOWN

<30 fps - STAGE & RCS

>30 fps - ABORT STAGE

3 APS UNDER BURN

PGNS

<400 NULL

RESIDUALS

>400 A/H BURN

Ha, Hp, HDOT

4 INSERTION

WITH VOICE-GROUND RECOMMENDS TRIM SOURCE AT TGO ~ 1 MIN

TRIM X AXIS ONLY TO <2fps AND STANDBY FOR TWEAK

AT INSERTION +3 MINUTES(10° OHW OR 257° FDAI)

5 NO VOICE

AGS & PGNS <10fps TRIM ACTIVE SYSTEM

AGS & PGNS >10fps TRIM SYSTEM THAT AGREES WITH RR

APS ABORT/INSERTION

✓GUID SW

ABORT STAGE PB-PUSH

PGNS-ATT HOLD

V22N46EE **NO P71, V37E 71E**

MODE CONT(2)-AUTO

ENG ARM-ASC

START PB-PUSH

MODE SEL-AGS

ASC FEED(2)-OPEN (UNLESS
MAIN SOV-CLOSE BUS LOSS)

✓ABORT TIME

✓INS DATA

YAW RT 30°

623+1

CABIN REPRESS-CLOSE

DES O2-CLOSE, #1 ASC O2-OPEN

PRESS REGS A&B-EGRESS

SUIT GAS DIV-EGRESS

CABIN GAS RETURN-EGRESS

H2O SEL-ASC

DES H2O-CLOSE, ASC H2O-OPEN

PROP TEMP/PRESS-ASC

He MON-ASC

THROTTLE/JETS-JET

500fps MAIN SOV-OPEN

ASC FEED(2)-CLOSE

200fps ENG ARM-OFF (UNLESS BUS LOSS)

STANDBY TO COPY GET

0fps ABORT STAGE-RESET

STOP PB-PUSH

410+5 TRIM

GET

MODE CONT-ATT HOLD

 ΔV 404,5,6=0 470R

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STAGING

ASC BATT (2)-ON(PRECONDITION)
 DES BATTS-OFF
 MODE CONT (2)-ATT HOLD
 CB (16) ASC ECA CONT-CLOSE
 DEADFACE
 CB (16) ASC ECA CONT-OPEN
 ✓GUID SW (IF PGNS: DAP 11002, V77)
 ATT CONT (3)-MODE CONT
 BAL CPL-ON
 DEAD BAND-MIN
 P47, 404,5,6=0 470R
 HELIUM MON-✓ ASC PRESS
 MASTER ARM-ON
 ASC He SEL-BOTH
 ✓CB ED LOGIC PWR (2)-CLOSED
 He PRESS ASC-FIRE
 STOP PB-PUSH
 -X TRANS 2 fps
 STAGE-FIRE
 +X TRANS 2 fps
 CB(11&16) ED LOGIC PWR (2)-OPEN
 CABIN REPRESS-CLOSE
 DES 02-CLOSE, #1 ASC 02-OPEN
 H2O SEL-ASC
 DES H2O-CLOSE, ASC H2O-OPEN
 PRESS REG A&B-EGRESS
 SUIT GAS DIV-EGRESS
 CABIN GAS RETURN-EGRESS
 ATT/TRANSL-2 JETS
 P00
 STOP PB-RESET
 ✓GUID SW

DPS ABORT/APS INSERTION

✓GUID SW
 ABORT PB - PUSH
 PGNS - ATT HOLD
 THROTTLE - UP
 V22N46EE NO P70, V37E 70E
 MODE CONT(2)-AUTO
 MODE SEL-AGS
 ✓ABORT TIME
 ✓INS DATA
 YAW RT 30°
 623+1
 BURN DPS TO DEPLETION
 ABORT STAGE PB-PUSH
 ENG ARM-ASC
 START PB-PUSH
 ASC FEED(2)-OPEN (UNLESS
 MAIN SOV-CLOSE BUS LOSS)
 CABIN REPRESS-CLOSE
 DES 02-CLOSE, #1 ASC 02-OPEN
 H2O SEL-ASC
 DES H2O-CLOSE, ASC H2O-OPEN
 PRESS REGS A&B-EGRESS
 SUIT GAS DIVERTER-EGRESS
 CABIN GAS RETURN-EGRESS
 PROP TEMP/PRESS-ASC
 He MON-ASC
 THROTTLE/JET-JETS
 CB(11) RR(2)-CLOSED
 500fps MAIN SOV-OPEN
 ASC FEED (2)-CLOSE
 200fps ENG ARM-OFF (UNLESS BUS LOSS)
 STANDBY TO COPY GET
 0fps ABORT STAGE-RESET
 STOP PB-PUSH
 410+5 TRIM
 GET
 MODE CONT-ATT HOLD
 ΔV 404,5,6=0 470R

9/21/72

F1

DPS/APS
ALL PITCH RATES 5°/SEC

1:00	260/0	4:30	0/LV	8:00	0/LV
2:24	SD(FDAI)	4:44	300/36	8:14	300/36
2:36	SD(OHW)	6:26	270/5	10:16	270/15
		7:32	250/0	14:30	250/0
		8:19	SD	14:43	SD
1:30	0/0	5:00	0/LV	8:30	0/LV
1:44	300/0	5:14	300/36	8:44	300/36
2:30	260/0	6:58	270/5	11:12	270/15
3:20	SD	8:20	250/0	15:18	250/0
		9:03	SD	15:31	SD
2:00	0/LV	5:30	0/LV	9:00	0/LV
2:14	300/36	5:44	300/36	9:14	300/36
3:00	300/0	7:34	270/10	12:10	270/16
3:18	260/0	9:04	250/0	16:04	250/0
4:16	SD	9:46	SD	16:18	SD
2:30	0/LV	6:00	0/LV	9:30	0/LV
2:44	300/36	6:14	300/36	9:44	300/36
3:46	300/0	8:04	270/11	12:56	270/16
4:02	260/0	9:50	250/0	16:44	250/0
5:12	SD	10:39	SD	16:58	SD
3:00	0/LV	6:30	0/LV	10:00	0/LV
3:14	300/36	6:44	300/36	10:14	300/36
4:34	270/0	8/34	270/11	13:16	270/16
5:10	250/0	11:04	250/0	17:32	SD
5:57	SD(FDAI)	11:47	SD		
6:06	SD(OHW)				
3:30	0/LV	7:00	0/LV	10:30	0/LV
3:44	300/36	7:14	300/36	10:44	300/36
5:24	270/0	9:06	270/14	13:48	270/16
5:54	250/0	12:26	250/0	18:05	SD
6:50	SD(FDAI)	12:53	SD		
7:02	SD(OHW)				
4:00	0/LV	7:30	0/LV	11:00	*
4:14	300/36	7:44	300/36		USE
5:56	270/0	9:38	270/14		MANUAL
6:38	250/0	13:38	250/0		ASCENT
7:34	SD(FDAI)	13:53	SD		ANGLES
7:40	SD(OHW)				

*ESTABLISH POSITIVE HDOT, THEN ABORT
STAGE TO USE MANUAL ASCENT ANGLES

9/27/72

B1

APS
ALL PITCH RATES 5°/SEC

1:00	260/0	4:30	0/LV	8:00	0/LV
2:18	SD(FDAI)	5:10	300/36	8:40	300/36
2:36	SD(OHW)	6:22	270/10	12:06	270/14
		8:26	250/0	14:26	250/0
		8:51	SD	15:05	SD
1:30	0/LV	5:00	0/LV	8:30	0/LV
2:10	260/0	5:40	300/36	9:10	300/36
3:32	SD(FDAI)	7:08	270/10	13:00	270/14
3:52	SD(OHW)	9:20	250/0	15:02	250/0
		9:46	SD	15:50	SD
2:00	0/LV	5:30	0/LV	9:00	0/LV
2:40	300/0	6:10	300/36	9:40	300/36
3:10	260/0	7:54	270/12	13:54	270/14
4:24	SD(FDAI)	10:14	250/0	15:34	250/0
4:34	SD(OHW)	10:42	SD	16:31	SD
2:30	0/LV	6:00	0/LV	9:30	0/LV
3:10	300/0	6:40	300/36	10:10	300/36
4:00	250/0	8:44	270/14	14:30	270/14
5:18	SD	11:08	250/0	16:12	250/0
		11:37	SD	17:07	SD
3:00	0/LV	6:30	0/LV	10:00	0/LV
3:40	300/36	7:10	300/36	10:40	300/36
4:22	270/0	9:34	270/14	14:30	270/14
5:28	250/0	12:02	250/0	17:00	250/0
6:09	SD	12:33	SD	17:37	SD
3:30	0/LV	7:00	0/LV	10:30	0/LV
4:10	300/36	7:40	300/36	11:10	300/36
5:00	270/5	10:24	270/14	14:48	270/14
6:30	250/0	12:56	250/0	17:50	250/0
7:02	SD	13:28	SD	18:09	SD
4:00	0/LV	7:30	0/LV	11:00	*
4:40	300/36	8:10	300/36		USE
5:40	270/5	11:12	270/14		MANUAL
7:28	250/0	13:48	250/0		ASCENT
7:56	SD	14:19	SD		ANGLES

*ESTABLISH POSITIVE HDOT, THEN ABORT
STAGE TO USE MANUAL ASCENT ANGLES

9/27/72

F14

NO PDI +12 DPS ABORT

✓ENG ARM-OFF, CMD OVRD-OFF,
 LR-OFF, MASTER ARM-OFF,
 ASC BATTS-OFF, P00,
 STOP PB-RESET
 MODE CONT (BOTH)-ATT HOLD
 MNVR TO FDAI (0,272,0)
 VHF ANT-AFT, AFT OMNI
 P30, LOAD PAD, RESET DET, P00

V47	414+1		
V83	317R	440R	277R
400	+ 3		

616 + 00004
 410 + 5, 373 + TIG
 LOAD 450, 451, 452
 370R, 310R, 400 + 1, 500R

P40
 N18 R, P, Y (0,272,0)
 ✓GUID SW
 MODE CONT (BOTH) - AUTO, PRO
 THR CONT-MAN/CDR/MIN
 ✓DPS BURN CARD
 ENTR (ENTR ON 203)
 N40

-2:00 MASTER ARM-ON
 -0:30 ENG ARM-DES
 -0:10 ABORT PB-PUSH
 -0:07.5 ULLAGE (MANUAL FOR AGS)
 -0:05 PRO
 0:00 AIM
 +0:05 MASTER ARM-OFF
 +0:26 THROTTLE UP (MAN)-40%
 VGX=0 STOP PB-PUSH, THR/JETS-THR
 PRO, NULL RESIDUALS
 PRO, P00
 ENG ARM-OFF,
 PRPLNT QTY MON-OFF
 ABORT PB-RESET,
 ENG STOP PB-RESET
 V82, 403R, 315R

MINI FOOTBALLRR

BORESIGHT
 (LM/CSM ALWAYS AT 0° ROLL)
 MANUAL RR LOCK ON
 V83 SET ORDEAL (35NM)
 RR MODE - AUTO TRACK
 V63 N25 (R1 = 201)
 RR MODE - LGC
 PRO
 RR MODE - AUTO TRACK
 XPTR SCALE - LO MULT
 (2 MRD/SEC, + TOP)
 SET DET COUNTING DOWN TO
 DESIRED RNDZ TIME

WITHOUT RR

BORESIGHT
 (LM/CSM ALWAYS AT 0° ROLL)
 SET UP VHF RANGING
 V48, 1(2)2002 (ONLY IF ACTIVE)
 TIME DRIFT FOR 2 MIN IN COAS
 (+ = TGT DRIFTING UP)
 V83 SET ORDEAL (35NM)
 SET DET COUNTING DOWN TO
 DESIRED RNDZ TIME

LM ACTIVE VEHICLE

P47
 BURN UP/DOWN
 (UNTIL HORZ XPTR = η DOTI REQ)
 BURN LEFT/RIGHT
 (CSM BURN OPPOSITE
 FOR VERT XPTR)
 BURN FORE/AFT
 (UNTIL RDOT = RDOT REQ)

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B14

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NO PDI + 12 APS ABORT

✓ ENG ARM - OFF, CMD OVRD - OFF, LR - OFF
MASTER ARM - OFF, ASC BATTS - ON, PRPLNT QTY MON - OFF
POO, STOP PB - RESET, TTCA (BOTH) - JETS
MODE CONT (BOTH) - ATT HOLD, MNVR TO FDAI (0,272,0)

VHF ANT - AFT, AFT OMNI

P30, LOAD PAD, RESET DET, POO

V47	414+1	400+3	V83	317R	440R	277R
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616+00007
410+5, 373+TIG
LOAD 450, 451, 452
370R, 310R, 400+1, 500R

P42 (PRO ON 1706)
N18 R, P, Y (0,272,0)
✓ GUID SW, MODE CONT (BOTH) - AUTO, PRO

HELIUM MON - ASC, PRPLNT TEMP/PRESS MON - ASC
ASC HE SEL - BOTH, MASTER ARM - ON
ASC HE PRESS - FIRE, ASC HE REGS 1, 2 - OPEN

BATT 1, 3 - OFF, BATT 2, 4 - OFF
CB(16) EPS: ASC ECA CONT - CLOSE, DES BAT - DEADFACE
SELECT ASC H2O TANK
DES 02-CLOSE, ASC 1 02-OPEN, DES H2O-CLOSE, ASC H2O-OPEN

✓ APS BURN CARD
ENTR, N40

-0:14 MANUAL ULLAGE
-0:10 STAGE FIRE, ABORT STAGE - PUSH, ENG ARM - ASC
-0:05 PRO
0:00 AIM
VGX=0 ABORT STAGE - RESET, STOP PB - PUSH
PRO, NULL RESIDUALS
PRO, POO
ENG ARM - OFF, ENG STOP - RESET, V82, 403R, 315R

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ALARM CODES (PDI)

CODES	DEFINITION	ACTION
00214	LGC USING IMU WHEN POWER TURNED OFF	GUID CONT - AGS
00402 (4 TIMES)	DAP STEERING LOST	GUID CONT - AGS
00511	NEITHER OR BOTH LR ANT POSITION DISCRETES PRESENT	LDG ANT - HOVER, NO ΔH (N63) UPDATE (10 SEC): LDG ANT - DES
01107	PHASE TABLE DISCREPANCE	GUID CONT-AGS (LAND MANUALLY IF DESIRED)
RECURRING 01406	TGO COMP FAIL (P63 & P64)	NO GUIDANCE, SWITCH TO P66 OR SWITCH TO AGS
RECURRING 01410	DES GUIDANCE EQUATIONS OVERFLOW (P63, P64 & P66)	NO GUIDANCE, SWITCH TO P66 OR SWITCH TO AGS
01412	NON CONVERGING P63 TIG	MSFN UPLINK NEW S.V. & TARGET
01466	INSUFFICIENT THROTTLE SERVICING (P66)	IF RECURS, MAN THR & ATT HOLD (or AGS)
01703	TIG SLIPPED DUE TO INTEGRATION	SLIP PDI ONE REV
2XXXX	ALL POOD00'S (EXCEPT 21406)	GUID CONT - AGS
21406	BAD RETURN FROM TIME TO TGT RTN (P63)	MSFN UPLINK NEW S.V. & RECALL P63
RECURRING 3XXXX	ALL SOFTWARE RESTARTS (BAILOUT)	CONTINUE-INSURE NO UNSAFE CONDITION DEVELOPS
N49	RMAX VMAX $>.3nm$; 2.0fps	A) PRE STEADY STATE LIMITS $>2.0nm$ OR 12.0fps PRIOR TO DIR ASC TPI/CSI OR $>.8nm$ OR 5.0fps AFTER DIR ASC TPI/CSI IF $<$ LIMITS-PRO. IF $>$ LIMITS-REJECT, IF IT REPEATS-PRO B) IF AFTER STEADY STATE (OCCURS AFTER 5 MARKS) 1) REJECT, 2) IF IT REPEATS-PRO
F97N63	LGC THINKS ENG FAILED	PRO TO SET ΔV MON. DO NOT ENTER BECAUSE IT WILL SLIP TIG IF RECURRING, NO GUIDANCE

10/5/72

MISSION RULES NO-GO'S

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	PRE PDI	PDI TO PDI +6+10	PDI +6+10 TO HI GATE	HI GATE TO TD
EPS	ONE DC BUS	ABORT	ABORT	ABORT
	ONE DESCENT FEEDER SHORTED	ABORT	ABORT	ABORT
	ONE ASCENT FEEDER SHORTED	ABORT	ABORT	ABORT
	4 DESCENT BATS	ABORT	ABORT	GO
	ONE ASCENT BAT	ABORT	ABORT	GO
	BOTH INVERTERS	ABORT	ABORT	GO
	AC BUS A AND B	ABORT	ABORT	GO
ED	ONE PYRO SYSTEM ARMED	ABORT	ABORT	ABORT
	ONE PYRO SYSTEM UNABLE TO ARM	ABORT	GO	GO
	ONE STAGING RELAY CLOSED	ABORT	ABORT	ABORT
	ONE PYRO SYSTEM BATTERY	ABORT	GO	GO
ECS	CABIN PRESS <4.0	ABORT	ABORT	GO
	SUIT LEAK	ABORT	ABORT	ABORT
	BOTH SUIT FANS	ABORT	ABORT	GO
	BOTH DEMAND REGS	ABORT	ABORT	GO
	BOTH H2O SEPS	ABORT	ABORT	GO
	BOTH DESCENT O2 TANKS	ABORT	ABORT	GO
	BOTH ASC O2 TANKS	ABORT	ABORT	GO
	PRI COOLANT LOOP	ABORT	ABORT	GO
	PRI AND SEC H2O FEED	ABORT	ABORT	GO
	BOTH DESCENT H2O TANKS	ABORT	ABORT	GO
	BOTH ASC H2O TANKS	ABORT	ABORT	GO
G&C	PGNS GUID STEER	ABORT	ABORT	GO
	3 AXIS ATT CONT			
	PGNS RATE CMD & PGNS AUTO	ABORT	ABORT	OPTION
	AGS RATE CMD	ABORT	ABORT	OPTION
	2 ACA	ABORT	ABORT	OPTION
	AUTO +X & AUTO DPS IGNITION	GO	GO	GO
	2 FDAI-ATT/RATE/ERR	OPTION	OPTION	OPTION
	LR	ABORT	ABORT	GO
	REDNT APS ON	ABORT	GO	GO
	P & R GDA TRIM (IMPING CONST VIOL)	ABORT	ABORT	ABORT
	MANUAL THROTTLE (2 TTCA) & AUTO THROT	ABORT	ABORT	ABORT
DPS	PROP LEAK (ΔQ FU/OX > 10%)	ABORT	ABORT	ABORT
	FU OR OX INLET/ULLAGE < 160	ABORT	ABORT	ABORT
	BINGO/2%			ABORT
APS	PROP LEAK	ABORT	ABORT	ABORT
	FU/OX INLET PRESS < 62, > 220	ABORT	ABORT	ABORT
	APS HE 1 OR 2 DECREASING	ABORT	ABORT	ABORT
RCS	HE/PROP LEAK			
	PROP LEAK (DOWNSTREAM OF MAIN)	ABORT	ABORT	GO
	FU/OX MNFLD A OR B PRESS < 100	ABORT	ABORT	GO

PDI - 30 MINUTES TO TD

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LIGHT	MEANING	IMMEDIATE ACTION (POSSIBLE OPERATIONAL IMPLICATIONS)	
DC BUS BATTERY ~11 C&W LIGHTS	CDR BUS FAILURE	(DPS TO 100% AND GDA LOCKED) GUID CONT - AGS, SUIT FAN-2, CDR AUTO CONT-BU, S-BD-XMTR/RCVR & PWR AMPL - PRIM, INV 2, ACT SEC GLYCOL. <u>TO START DPS: ENG ARM - DES; DES ENG CMD OVRD-ON (2ND BURN ONLY); (M8-3)</u> <u>TO STOP DPS: DES ENG CMD OVRD-OFF, ENG ARM-OFF.</u>	RECONFIG IF TIME PERMITS: CB16(11) ASC ECA CONT-CL; CDR(LMP) BAT (S)-OFF/RESET; CB11(16) BAT FEED TIE (2)-OPN; [BAT 6(5) BACKUP FEED-ON]. IF FEED FAULT LT OFF-BUS SHORT; CB16(11) ASC ECA CONT-OPN; IF ON-DES BATS-DEADFACE; IF FEED FAULT LT OFF-ALL DES BATS-OFF; CB11(16)-BAT FEED TIE (2)-CL; BAT 6(5) BACKUP FEED-OFF; BAT 6(5) NORMAL FEED-ON; IF FEED FAULT LT ON-DES BATS-CONNECT; <u>RESTORE BUS.</u>
DC BUS BATTERY ~6 C&W LIGHTS	LMP BUS FAILURE	(DPS TO 100% AND GDA LOCKED) GUID CONT - PGNS, SUIT FAN - 1, LMP AUDIO CONT - BU, S-BD-XMTR/RCVR & PWR AMPL - SEC, INV 1; <u>TO START DPS: ENG ARM - DES; ENG START - PUSH;</u> <u>TO STOP DPS: ENG STOP - PUSH; ENG ARM - OFF (M8-3)</u>	
BATTERY	BAT OVERTEMP REV CURRENT >10A OVERCURRENT	CHECK ALL BATS VOLTS, AMPS & TB's. IF VOLTS, AMPS OK: FAULTY BAT-OFF THEN ON; IF VOLTS, AMPS NOT OK; FAULTY BAT - OFF. (M8-8)	LOSS OF ASC BAT 5(6) (REVERSE CURRENT ONLY) CB(11) DES ECA-OPEN. IF STAGING REQD OR IF PAST HI GATE, CB(16) BUS CROSSTIE-CLOSE. IF ABT STG REQD, CB(16) DES ECA -OPEN. IF TIME PERMITS, BAT 6(5) BU FEED-ON, DES BATS OFF AT 5 SEC INTERVALS.
INVERTER	AC VOLTS <112 398>FREQ>402	CHECK AC VOLTS & FREQ. SWITCH TO INV-2. BUS A&B BUS TIE INV 1 (2)-OPEN (INV 1 FEED SHORT). BUS B: BUS TIE INV 2 - OPEN (BUS B SHORT). BUS A&B: BUS TIE INV 1 (2) - CLOSE; SELECT INV 1. BUS A: BUS TIE INV 2 - OPEN (INV 2 FEEDER SHORT). BUS A: BUS TIE INV 1 - OPEN (BUS A SHORT, LT STAYS ON; CLOSE BUS B: BUS TIE INV 2 BEFORE SELECTING INV 2). (M8-10)	CYCLE DECA GMBL CB FOR LOSS OF INV 1/AC BUS A: MASTER ARM-ON ENGINE START-PUSH MASTER ARM-OFF.
ED RELAY & (ONE/BTH) STG SEQ RELAY LIGHTS ON	ED RELAYS K1 TO K6 CLOSE WITH MASTER ARM OFF	<u>BEFORE PDI: DO NOT SET MASTER ARM-ON, STAGE RELAY-RESET; IF LT STILL ON, ASC He SEL-TANK 1, ASC He PRESS-FIRE. IF APS PRESS, ABORT; IF NOT (NEXT STEP MAY STAGE VEHICLE) MASTER ARM-ON; IF NO STAGE, GO NORMAL PROCEDURES.</u> <u>AFTER PDI: DO NOT SET MASTER ARM - ON; STAGE RELAY-RESET; IF STAGE SEQ RELAY LT STILL ON: ASC He PRESS - FIRE, IF APS PRESSURIZES, ABORT (M11-3)</u>	AFTER LANDING- BAD SYSTEM/LOGIC PWR CB-OPEN.
STAGE SEQ RELAY LT OFF AT PDI	POSSIBLE RELAY FAIL	LAMP TEST. <u>AT PDI: MASTER ARM-OFF, OPEN LOGIC PWR CB ON SYSTEM WHICH HAD SEQ LT-ON, MASTER ARM - ON. AT IGNITION MONITOR DPS SHe AND FUEL/OXID PRESS. SHe TANK INOPERATIVE: STOP PB - PUSH, ENG ARM - OFF. SHe TANK OK: MASTER ARM - OFF, LOGIC PWR CB - CLOSE, ASC He PRESS - FIRE, IF APS PRESSURIZES, ABORT.</u> (M11-4)	
DES REG	220>He PRESS>260	DES He REG 1 - CLOSE, DES He REG 2 - OPEN, MONITOR TEMP/PRESS, MAINTAIN FUEL/OXID>160.(M5-3)	
ENG GMBL	GMBL CMD/RESP FAIL	ENG GMBL - OFF. IF LIGHT STILL ON: CWEA FAIL. IF LT OFF: WAIT FOR MSFN TEST. (M4-7)	
CES DC	ATCA DC OUT OF TOLERANCE	CMD THRUST 10%: DECA GMBL-OPN: SEL MAN THROT, IF THROT NORM CLOSE DECA CB UNTIL THROT DOWN. <u>IF COMMANDED THRUST NORM: GYRO TEST POS RT; IF LT ON-CWEA FAIL; IF LT OFF-CYCLE CWEA CB. IF LT STAYS OFF-TRANSIENT. LT ON-EVAL AGS CONT; IF FAIL CDR BUS CRIT</u> (M4-9)	
NO AUTO START	RELAY DRIVER FAILURE	ENG START - PUSH. AFTER THROTTLE UP: MODE CONT (AGS)-ATT HOLD. GUID CONT-AGS. MSFN WILL DETERMINE AGS APS REDUNDANCY. <u>FOR LOSS OF AUTO-CDR BUS CRITICAL FOR APS BURNS.</u>	

APS/STAGED COAST

10/13/72

LIGHT	MEANING	IMMEDIATE ACTION (POSSIBLE OPERATIONAL IMPLICATIONS)	
DC BUS BATTERY ~11 C&W LIGHTS	CDR BUS FAILURE	GUID CONT - AGS; SUIT FAN - 2; CDR AUDIO CONT - BU; S-BD XMTR/RCVR & PWR AMPL - PRIM; INV - 2; ACTIVATE SEC GLYCOL LOOP. (M8-7)	RECONFIGURE IF TIME PERMITS: CB 16 (11) ASC ECA CONT - CLOSE, CB 11 (16) BAT FEED TIE (2) - OPEN; IF FEEDER FAULT LT ON, BAT 6(5) BU FEED - ON. RESTORE BUS, IF FEEDER FAULT LT OFF- BAT 6 (5) NORM FEED - OFF/ON. IF TB GRAY - BUS SHORT. IF TB BP - BAT 5 & 6 BU FEED-ON; BAT 5 & 6 NORM FEED - OFF; CCB11(16) BAT FEED TIE (2) - CLOSE. IF NO SWITCH ACTION - RESTORE BUS.
DC BUS BATTERY ~6 C&W LIGHTS	LMP BUS FAILURE	GUID CONT - PGNS; SUIT FAN - 1; LMP AUDIO CONT - BU; PWR AMPL - SEC; INV - 1. (M8-7)	
		TO START APS: ENG ARM - ASC; ABT STG-PUSH; AGS AUTO ON TO STOP APS: AGS AUTO OFF; ENG STOP-PUSH; ABT STG-RESET; ENG ARM-OFF	
BATTERY	BAT OVERTEMP REV CURRENT >10A	CHECK BAT 5,6 VOLTS, AMPS & TB'S IF VOLTS, AMPS NOT OK: CB (11 & 16) CROSS TIE BUS - CLOSE. FAULTY BAT: NORMAL FEED - OFF, GOOD BAT: BACKUP FEED - ON. (M8-8)	
INVERTER	AC VOLTS <112 398>FREQ>402	CHECK AC VOLTS & FREQ. VERIFY CB (11) INV 1 - CLOSE, SWITCH TO INV 1. BUS A&B BUS TIE INV 2 (2) - OPEN (INV 2 FEED SHORT). BUS B: BUS TIE INV 1 - OPEN (BUS B SHORT) BUS A&B: BUS TIE INV 2 (2) - CLOSE. SELECT INV 2. BUS A: BUS TIE INV 1 - OPEN (INV 1 FEEDER SHORT). BUS A: BUS TIE INV 2 - OPEN (BUS A SHORT, LT STAYS ON; CLOSE BUS B: BUS TIE INV 1 BEFORE SELECTING INV 1). (M8-10)	
ONE STAGE SEQ RELAY LT. OFF AT ASCENT	MASTER ARM SW FAILURE OR ED RELAY FAILURE	LAMP TEST. MASTER ARM-OFF, THEN ON. CB(11 & 16) ABORT STAGE-OPEN. ABORT STAGE-PUSH. IF BOTH LIGHTS ON: ABORT STAGE - RESET, CB (11 & 16) ABORT STAGE - CLOSE, CONTINUE NORMAL L/O. IF ONE LIGHT STILL OFF: STAGE - FIRE, ABORT STAGE - RESET, CB (11 & 16) ABORT STAGE - CLOSE, GROUND CONFIRM STAGING. (M11-3)	
ASC PRESS	EITHER He PRESS <2775psi (Before Staging)	IF APS NOT PRESSURIZED - CONSULT MSFN, GO TO MAL PROC APS - 1 (M6-3) IF APS PRESSURIZED - CLOSE ASC He REG 1 & 2: MONITOR ASC He PRESS; IF BOTH <2775psi AND DECREASING - IMMEDIATE LIFTOFF. MONITOR FUEL/OXID PRESS; IF EITHER DECREASING - IMMEDIATE LIFTOFF.	IF He LEAK, LMP BUS CRITICAL (SOV'S)
ASC HI REG	MANF PRESS>220psi	ASC He REG 1 & 2 CLOSE, WHEN <220psi, OPEN EACH REG SEPARATELY TO VERIFY GOOD REG. (M6-4)	
CES DC	ATCA DC OUT OF TOLERANCE	GUID CONT-PGNS, GYRO TEST-POS RT. IF LT STAYS ON; CWEA FAIL, IF LT OFF-CYCLE CWEA CB; IF LIGHT REAPPEARS: POSSIBLE NO AGS ATTITUDE CONTROL, NO APS AUTO ON/OFF. CDR BUS CRITICAL. (M4-9)	
NO AUTO OR MAN START	RELAY DRIVER FAILURE	NO AUTO START: CDR BUS CRITICAL. NO MANUAL START (NO LIGHT): LMP BUS CRITICAL.	

RCS/COMMON

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RESTORE BUS VIA CROSSTIE		RAPID IMU REALIGN
CDR CB(11) - UTIL LT; ANUN/DK/CMPT; GLY PUMP 1&2; S-BND XMTR/RCVR & PWR AMP; LR; RR; LGC; IMU OPR; INV 1. VHF B XMTR - OPEN	LMP CB(16) - FLOOD; ANUN/ DOCK/CMPT; AEA; ATCA; VHF A XMTR; S-BAND XMTR/RCVR & PWR AMP; INV 2 - OPEN	1) AGS INERTIAL FDAI TO 0°, 0°/XXX°, 0° 2) V41 N20E, E, E/XXE, E 3) V40 N20 at 0°, 0°/XXX°, 0° ON AGS FDAI, WAIT 11 SEC 4) V25N07E, 77E, 10000E, 1E 5) P51E, PRO, POOE 6) PERFORM P52, OPTION 3 (AUTO OPTICS ARE GOOD) NOTE: FOR TEMPORARY LOSS OF CDR'S BUS, UPDATE LGC CLOCK WITH V55 TO COMPLETE RECOVERY
CB(16) CROSSTIE BUS - CLOSE CLOSE ABOVE CB'S AND SYNCHRONIZE CLOCKS.	CB(16) CROSSTIE BUS-CLOSE	

LIGHT	MEANING	IMMEDIATE ACTION (POSSIBLE OPERATIONAL IMPLICATIONS)	
RCS TCA WITH QUAD FLAG	ONE OR MORE THRUSTERS FAIL OFF, COLLINEAR THRUSTERS FIRING SIMULTANEOUSLY	ULLAGE: Disable 1st Flag. If 2nd Flag (V-UP), OPEN CB; Disable Flag. Enable 1st Flag. POWERED FLIGHT: If JET ON; CB QUAD TCA - OPEN DETERMINE CRITICAL QUAD (DO NOT DISABLE CRITICAL QUAD UNLESS V-JET AVAILABLE*). BUS WITH GOOD SYSTEM CRITICAL. (M7-4)	*H-JET ON: ENABLE FOR CRITICAL V-JET FAIL AND DISABLE CRITICAL JET V-JET ON: ENABLE FOR CRITICAL V-JET FAIL OFF V-JET OFF: SELECT DIRECT (P, R) FOR CRITICAL V-JET FAIL OFF
ABNORMAL THRUSTERS W/O RCS TCA, QD FL	POSSIBLE SWITCH FAILURE ON SECONDARY COILS, ACA, OR TTCA	ACA 4-JET (2) - DISABLE (FOR PDI: ISOLATE BY TIG + 15 SEC OR THROTTLE UP MANUALLY) TTCA/TRANS (2) - DISABLE ACA PROP (2) - DISABLE	(M7-4)
RCS A REG RCS B REG	165psi>REG PRESS >218psi	Monitor MANF PRESS, When <100psi: Bad System MAIN SOV - CLOSE CRSFD - OPEN	(M7-4)
RCS	A OR B He Press <1700psi	Monitor He PRESS & QTY. CB(11 or 16) QUAD TCA(4)-OPEN. Affected Sys: LGC THR CMDS (4)-DISABLE, MAIN SOV-CLOSE. Monitor MANF PRESS. CDR BUS CRITICAL if Pn1 16 QUAD TCA CB OPEN. Go to Mal Proc RCS 1.	(M7-3)
LGC	LGC Power, Scaler, or Counter Fail	MODE CONT (AGS)-ATT HOLD;GUID CONT-AGS. IF LT ON-CWEA FAIL. IF RESTART LT ON; LGC FAIL. CB(11).AEA-CLOSE. LMP BUS CRITICAL. IF RESTART LT OFF; EVAL PGNS.	(M2-4)
ISS	IMU, ICDU or PIPA (Thrusting) FAIL	MODE CONT (AGS) - ATT HOLD; GUID CONT - AGS. IF LT ON - CWEA FAIL. IF PROG LT NOT ON CWEA Fail. CB(11) AEA - CLOSE. LMP BUS CRITICAL.	(M2-3)
CES AC	ATCA AC Out of Tolerance	GUID CONT - PGNS, GYRO TEST - POS RT. IF Light Stays ON - CWEA Fail. IF Light OFF; Check rate needles - NO RESPONSE: Loss of AGS Control and AGS FDAI Error Needles, RR Usable in LGC Mode Only. If Rate Needles VALID- CYCLE CWEA CB: IF LIGHT REAPPEARS; Possible Loss of AGS Control, DO NOT REMOVE ATCA CB PWR. CDR BUS CRITICAL FOR AGS CONTROL LOSS.	(M4-9)
AGS	AGS Power Supply Out of Tolerance, AGS Heater Failed ON, AGS Self Test FAILED, ASA FREQ OUT OF TOLERANCE	MODE CONT (AGS) - ATT HOLD; GUID CONT - PGNS. Cycle 02/H20 Qty Mon Sw: If Light OFF - Perform 412R. If Light ON - CWEA CB OPEN: If Light Stays ON - CWEA Failure. If Light OFF: CLOSE CWEA CB; If Light Stays OFF - PWR Transient. If Light ON: Evaluate AGS Control & Steering. CES Rate Cmd OK.	(M3-3)

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CONTINGENCY EVT (2 OPS)

PREP FOR EGRESS

Doff IV Gloves, Stow Under Netting Behind LMP
 Doff Helmets, Verify Feedport Cover Installed
 Apply Antifog (EMU kit, purse)
 Stow Helmets On Ceiling
 Verify Wristwatch Donned
 FWD Hatch Handle - UNLOCK
 Verify With CMP That Tunl Is Depressed

Verify - PGA Zipper Locked
 Stow COAS On Fwd Window Mount
 Stow DEDA & DSKY Desk, Loose Items
 LM 02 hoses to inboard connectors

EQUIPMENT PREP (OPTIONAL)

Place items in PGA pockets
 Snap one end of 2 bungees together
 Attach end to BSLSS tiedown, route over horiz bar in recharge station and snap to lower snap on LH eng cover
 Place items in transfer container
 Stow behind bungee

OPS DONNING

Stow PGA Gas Connector Plugs & LCG Plugs in PGA pocket
 Unstow OPS Straps & Purge Valves (LHSSC)
 Purge VLVs - Hi
 Don Purge Valves (Outboard Red)
 Don OPS Straps (Break Stitches 2 Places, Remove Keeper, Extend To Max Length, Route Thru PGA LH D-RING With Adjustable Strap On RH Side)

LMP 1st - Unstow OPS & Checkout * * * *
 Verify OPS Reg Decays To 2.5 PSI (~3Min)
 Unstow OPS 02 Gas Hose
 Do not don OPS over 02 or H2O hoses
 Secure OPS To OPS Straps
 (Do Not Twist Strap)
 Connect OPS Hose To PGA (Outboard Blue)
 Fix OPS Flaps To Expose Press Gage
 CDR Repeat OPS DONNING * * * *

CB(11) ECS: CABIN FAN - Open (VERIFY)

Unstow Lifeline/Tethers - RHSSC
 Verify Small Hooks Attached to Lifeline
 Attach Waist Tether Hooks To PGA
 (Connect To LMP RH Side, Route In Front of LMP & Behind CDR & Connect To CDR LH Side, Verify Hooks Locked)
 Secure Tool B (aft RHSSC) to CDR tether if required
 Verify LM 02 Hoses - R/R, B/B

PGA Diverter Valves - Vertical
 Don Helmets
 Don LEVA's, Verify Helmet Aligned

CK Conn - Hel, 02, Comm, Purge VLVs
 Verify LM Restraints Removed
 Don EV Gloves, Verify Locked

SUIT INTEGRITY CHECK

SUIT GAS DIVERTER - PULL-EGRESS
 CABIN GAS RETURN - EGRESS
 SUIT CIRCUIT RELIEF - CLOSE

PRESS REG A - EGRESS
 PRESS REG B - DIRECT 02
 Monitor CUFF GAGE 3.7-4.0 PSIG Then
 PRESS REG B - EGRESS (Cuff Gage Decay <.3 Psig in 1 Min)
 Verify Purge Valves Accessible

SUIT CIRCUIT RELIEF - AUTO (SUIT CKT PRESS DECAYS TO 4.8 PSIA)
 Confirm CSM Side Hatch Open And
 CMP Go For LM Depress

LCG - COLD, As REQ'D
 CB(16) ECS: LCG Pump - Open
 Disconnect LM H2O Hoses
 Inspect EMU

Unstow transfer items and connect to lifeline hook, lock

CABIN DEPRESS

CB(16) ECS: CABIN REPRESS-OPEN
 CABIN REPRESS VLV - CLOSE (VERIFY)
 Fwd Dump Valve - OPEN Then AUTO
 At 3.5 Psia
 Verify LM Suit circuit lockup at 4.3 psia And Decaying Slowly
 Fwd Dump Valve - OPEN
 Monitor Cabin Press To 0 Psia
 Verify LM Suit Press 3.6-4.3 Psia

HATCH OPENING

Open Hatch

VERIFY/PERFORM:

CB(11) STAB/CONT: ATCA (PGNS) - OPEN
 (If docked)

CB(16) STAB/CONT: ATCA (AGS) - OPEN
 AELD - OPEN
 ATT DIR CONT- OPEN
 AELD - OPEN

If undocked:

Verify CB(11) ATCA (PGNS) - Closed
 V48E, N46 12021, PRO,
 Load LM Wt, PRO
 Disable jets 1U, 1D, 1F, 4U, 4D, 4F
 V25N07E, 1257E, 303E, 1E
 V25N07E, 1260E, 6E, 1E
 V01N01E, 1257E, Ver 00303,
 ENTR, 1260E, Ver 00006
 V48E, PRO, PRO
 TTCA/TRANSL (2) - DISABLE
 ACA PROP (2) - DISABLE

Turn Card Over, Review Xfer Method



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EVT (DOCKED)

EVT (UNDOCKED, STABLE)

EVT (UNDOCKED, UNSTABLE)

CDR Egress Feet First and Transfer To
CSM, LMP Tend Lifeline

CDR Ingress CSM Head First, Face Toward
MDC, and Move To LEB
Retrieve C 02 Hoses and Comm Umbilical

CMP Connect C Comm Umbilical To CDR

CDR Configure Audio Panel As Desired
(Vac transfer to ECS if necessary,
CMP cue card)

CDR Secure Position In LEB & Tend
Lifeline For LMP

LMP Egress Feet First and Transfer
to CSM, Remove transfer bag

LMP Ingress CSM Feet First, Face Toward
MDC, and Assume Position In Center
Couch Area

CDR Connect R Electrical Umbilical
to LMP

CMP Close Hatch

CONTINUE WITH VACUUM
DISCONNECT AND EGRESS

CSM Maneuver Apex to LM Forward Hatch

CDR, Then LMP, Egress Feet First, Move
Along Handrails to CSM
LMP Tend Lifeline

CDR Ingress CSM, Head First, Face
Toward MDC, And Move To LEB
Retrieve C 02 Hoses And Comm Umbilical

CMP Connect C Comm Umbilical To CDR

CDR Configure Audio Panel As Desired
Secure Position In LEB And Tend
Lifeline For LMP

LMP move to CM hatch, remove transfer
bag, push inside

LMP Ingress CSM Feet First, Face Toward
MDC, and Assume Position In Center
Couch Area

CDR Connect R Electrical Umbilical
To LMP

CMP Close Hatch

CONTINUE WITH PROCEDURE BELOW

LEVA - Lower As Required

OPS 02 - On

SUIT ISOL VALVES (Both) - SUIT DISC
Purge Valves - OPEN (Give Mark To CMP
For T+25 Min On OPS)

Verify 02 Flow & PGA Press 3.4-4.0 Psig

Disconnect LM 02 Hoses

Disconnect LM Comm Umbilical
Verify clear of LM hoses

CDR Transfer To CSM LEB (LMP Manage
Lifeline)

LMP Transfer To CSM Center Couch Area
(CDR Manage Lifeline)

CSM Maneuver to LM

CDR Egress Feet First, Move to EVA
Handrail Clear of Hatch
LMP Tend Lifeline

LMP Egress, Move Up EVA Handrail

CDR and LMP Push Away from LM at
Same Time (Give Signal, Pull In, Push
Off)

CSM Maneuver Apex to CDR and LMP

CDR and LMP Use CSM Handholds to Move
To Side Hatch

CDR Ingress CSM, Head First, Face
Toward MDC, And Move To LEB
Retrieve C 02 Hoses And Comm Umbilical

CMP Connect C Comm Umbilical To CDR

CDR Configure Audio Panel As Desired
Secure Position in LEB And Tend
Lifeline For LMP

LMP Ingress CSM Feet First, Face Toward
MDC, and Assume Position In Center
Couch Area

CDR Connect R Electrical Umbilical
To LMP

CMP Close Hatch

CONTINUE WITH VACUUM
DISCONNECT AND EGRESS

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ONE MAN EVA

CABIN PREP-Perform EVA 1,2 Or 3 As Req'd

EQPT PREP-Perform EVA 1,2 Or 3 As Req'd

PLSS DONNING-Perform EVA 1,2 Or 3 As Req'd

Position Post EVA 1, 2 Or 3 Cue Card
For Post EVANON EVA CREWMAN-Connected To LM 02,
Comm, & H2O
Gas Connector Plugs In PGA
PGA Diverter Vlv - HorizontalEVA CREWMAN: PGA Diverter Vlv -
Vertical

PLSS COMM CHECK

IVA
PNLVerify Powerdown CB Configuration
(White Dots Out)
Verify LM EVA Antenna Deployed
Verify Voice Comm With Hou

Audio (Non EVA Crewman)

S-BAND - T/R

ICS - T/R

RELAY - OFF

MODE - VOX

VOX SENS - MAX

VHF A - RCV

B - T/R

Audio (EVA Crewman)

S-BAND - T/R

ICS - T/R

RELAY - ON

MODE - VOX

VOX SENS - MAX

VHF A - RCV

B - T/R

H COMM:

O VHF A XMTR - OFF

U A RCVR - ON

& B XMTR - VOICE

B RCVR - ON

E TLM BIOMED - NON EVA CREWMAN

V SQUELCH VHF A&B -

A Noise Thres + 1 1/2

RECORDER - ON

VHF Antenna - EVA

AUDIO CB - Open

EVA Crewman Connect to PLSS Comm

H AUDIO CB - Close

O RCU PTT - MAIN (Rt), Verify

EVA PLSS Mode-B, Blade-CCW

PNL (Tone-On, Vent Flag-P,
Press Flag-0, 02 Mom)

H PLSS 02 Press Gage >85%

O Comm Check With Each Other & Hou

& **NOTE:** Unstow PLSS Antenna If It
Transmits Garbled And/Or Loses TM
Restow Before Egress

E Audio (CDR & LMP)

V VHF A - T/R

& VHF B - RCV

H COMM:

O VHF A XMTR - VOICE

U VHF B XMTR - OFF

PLSS Mode - A, Wheel-CCW (Tone-On)

H Perform Comm Check With Each Other &
Comm & TM Check With Hou

EVA Read PLSS 02 Qty To Hou

FINAL SYSTEMS PREP

I CB(16) ECS: LCG PUMP - Close

V LCG - Cold, As Req'd

A CB(16) ECS: CABIN REPRESS - Close (Ver)
SUIT FLOW CONT- Open

SUIT GAS DIVERTER - PULL-EGRESS(Verify)

CABIN GAS RETURN - EGRESS (Verify)

SUIT CIRCUIT RELIEF - AUTO (Verify)

OPS CONNECT

SUIT ISOL - ACT OVRD (SUIT DISC)

Discon LM 02 Hoses, Secure About PGA

Connect OPS 02 Hose To PGA B/B

Retrieve Purge Valve (Purse) -

Verify Closed, Lock Pin In & LO

Install Purge Valve In PGA R/R

Drink

DES H2O VLV - CLOSE

HELMET/GLOVE DONNING

Position Mikes (Both)

PLSS FAN - ON, Rt (Vent Flag - Clear)

Don Helmets, Check Drink Bag Position

Don LEVA And Lower Protective Visor

EVA Crewman: Stow LM 02 & Comm



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ONE MAN EVA

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Verify EVA Crewman in CDR's Station

Verify The Following (Both):

Helmet & Visor (2) - Aligned & Adjusted
O2 Connectors (7) - Locked
Purge Valve (1) - Locked
H2O Connectors (1) - Locked
Comm Connectors (2) - Locked

Don EV Gloves & Verify:

Wrist Locks (4) - Locked
Glove Straps (4) - Adjusted

Cover Wrist Rings

NOTE: If PGA Biting, PLSS O2 - ON/OFF

LCG - COLD, As Req'd
Disconnect LM H2O Hose
Connect PLSS H2O Hose, Verify Locked

PLSS DIVERter - MIN (Verify)
PLSS PUMP - ON (Rt)

PRESSURE INTEGRITY CHECK

(Non EVA Crewman)

NOTE: LM Suit Circuit Shall Not Be Maintained At Elevated Press >5 min

SUIT GAS DIVERter - PULL-EGRESS (Verify)
CABIN GAS RETURN - EGRESS (Verify)
SUIT CIRCUIT RELIEF - CLOSE

PRESS REG A - EGRESS
PRESS REG B - DIRECT O2
Monitor Cuff Gage To 3.7 - 4.0 Psig
Then PRESS REG B - EGRESS (Cuff Gage Decay <.3 Psig In 1 min)

SUIT CIRCUIT RELIEF - AUTO (Suit Ckt Press Decays To 4.8 Psia)

(EVA Crewman)

PLSS O2 - ON (Tone-On, O2 Flag-0)
Press Flag Clear (3.1-3.4 Psid)
Cuff Gage 3.7-4.0 Psig
O2 Flag Clear

PLSS O2 - OFF (Monitor Cuff Gage For 1 Min, Report Decay)
PLSS O2 - ON (Cuff Gage 3.7-4.0 Psig, Tone & O2 Flag May Come On)
Verify O2 Flag Clear

CABIN DEPRESS

Confirm Go For Depress From Hou
CB(16)ECS: CABIN REPRESS - Open
CABIN REPRESS VLV - Close

Ovhd Or Fwd Dump Valve - OPEN Then AUTO
At 3.5 Psia (Verify EVA Crewman Cuff Gage Does Not Drop Below 4.6 Psig)
Verify:
Cabin At 3.5 Psia
LM Suit Circuit Lockup At 4.3 Psia & Decaying
PLSS/OPS/PGA > 4.6 Psig & Decaying

Start Wrist Watch :00

Ovhd Or Fwd Dump Valve - OPEN
Verify:
Tone-On & H2O Flag - A (1.2-1.7 Psia)
LM Suit Circuit 3.6 To 4.3 Psia & Decaying
PLSS/OPS/PGA > 4.6 Psig & Decaying

Partially Open Fwd hatch

FINAL PREP FOR EGRESS :03

PLSS FEEDWATER - OPEN (H2O Flag - Clear In About 4 Min)

Fwd Hatch - Open

Rest Until Cooling Sufficient

Verify:

PLSS/OPS/PGA 3.7 To 4.6 Psig
CWEA Status:

Caution
PREAMPS

Lower EV Visor As Req'd
Release PLSS Antenna :10

POST ONE-MAN EVA

Perform POST EVA 1,2 Or 3 As Applicable

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115:15 EQUIPMENT PREP EVA 1 (25 Min)

Empty UCTA's (WMS Valve), Install Cap
HTR CONT: URINE LINE - OFF
CB(11) HTR: URINE LINE - Open
Check PGA Zippers, Verify Lock - Lock
Stow PGA Gas Conn Plugs In Purse
Empty PGA Pockets Into Purse
PGA Relief Valve Cap In Pkt

CDR Move To Aft Cabin Area

Unstow CDR Boots, Purge Valve And
Donning Lanyard To Purse
CDR Don Boots
Unstow CDR OPS

Remove Pallet, Stow In Jett Bag
Perform OPS Check, Restow OPS

LMP Move To Aft Cabin Area
Unstow LMP Boots, Purge Valve To Purse
Stow IV Gloves In Bot Boot Comp
LMP Don Boots

Unstow LMP OPS
Remove Pallet, Stow In Jett Bag
Perform OPS Check

Stow LMP OPS On Eng Cover Install ISS

**Apply Antifog (LEVA Bags), Wipe Dry
With Tissue (LHSSC)**

Stow EMU Maintenance Kits In Purse
Stow LEVA's, Helmets & EV Gloves
(Attach Watch & Mirror) On ISS
Stow LEVA Bags Under SRC Compt
Stow BRA

Move CDR's OPS To Front Of Eng Cover
Stow ETB On Aft Eng Cover
Tie Jett Bag, Stow On Aft Engine Cover

Fwd Hatch Handle - UNLOCK

EVA 1 PREP

115:40 PLSS DONNING (26 Min)

```
* * * * LMP 1st: * * * *
Set PLSS On Mid-Step
Verify OPS Reg Decay
Unstow 02 Nozzle & Antenna Lead
Secure Flaps
```

Attach OPS To PLSS
Connect OPS Antenna Lead To PLSS
Verify Sublimator Exhausts Clear

Unstow PLSS Straps & Hoses
Remove Elect Dust Cap, Stow In Purse
Verify AUX H2O, DIVERTER, O2 &
PRIM H2O-OFF
Connect Battery Cable

Verify The Following Locked:
 PLSS Battery Connection
 OPS Antenna Lead To PLSS
 OPS To PLSS

Don PLSS/OPS, Lift PLSS Hoses Above Lower Straps

Connect PLSS 02 Hoses To PGA
Verify AUX H2O, DIVERTER, 02 &
PRIM H2O-OFF

Connect RCU To PGA & Upper Straps
Verify RCU Controls:
PUMP, FAN - OFF (Left) MODE SEL-0
Connect RCU To PLSS

Unstow OPS 02 Hose & Actuator, Route
Hose Behind PGA
Connect Actuator To RCU

CDR Repeat PLSS DONNING * * * *

116:06 PLSS COMM CHECK (8 Min)

Verify Powerdown CB Configuration
(White Dots Out)
Verify Voice Comm With Hou

Audio (LMP)
S-BAND - T/R
ICS - T/R
RELAY - ON
MODE - VOX
VOX SENS-MAX
VHF A - T/R
B - RCV

COMM:
VHF A XMTR - VOICE
A RCVR - ON
B XMTR - OFF
B RCVR - ON
TLM BIOMED - OFF
SQUELCH VHF A&B -
Noise Thres + 1 1/2
RECORDER - ON
VHF Antenna - EVA
UPLINK SQUELCH - ENABLE

Audio (CDR)
S-BAND - T/R
ICS - T/R
RELAY - OFF
MODE - VOX
VOX SENS-MAX
VHF A - T/R
B - RCV

_CB(16) COMM: SE AUDIO - Open
LMP Connect To PLSS Comm

H
O
U

H O U & C D R	C D R
---------------------------------	-------------

H CB(16) CDR SE AUDIO - Close
 O PLSS PTT (LMP) - MAIN (Rt), Verify
 U PLSS Mode(LMP) - A, Wheel-CCW
 (Tone-On, Vent Flag - P,
 H Press Flag - 0, 02 Mom)
 O PLSS 02 Press Gage > 85%
 U LMP Comm Check With CDR And Hou
 & **NOTE:** Unstow PLSS Antenna If It
 L Transmits Garbled And/Or Loses TM
 M Restow Before Egress
 P
 CB(11) COMM: CDR AUDIO - Open
 CDR Connect To PLSS Comm
 CB(11) COMM: CDR AUDIO - Close
 Audio (CDR)
 VHF A - OFF
 VHF B - OFF
 PLSS PTT (CDR) - MAIN (Rt), Verify
 PLSS Mode(CDR) - B, Blade-CCW
 (Tone-On, Vent Flag - P,
 Press Flag - 0, 02 Mom)
 PLSS 02 Press Gage > 85%
 L **NOTE:** Crewman In Mode B Cannot
 M Hear Hou
 P LMP Comm Check With CDR And Hou
 PLSS Mode(LMP)-B, Blade-CCW(Tone-On)
 PLSS Mode(CDR)-A, Wheel-CCW(Tone-On)
 CDR Comm Check With LMP And Hou
 H PLSS Mode (Both) - AR (Tone-On)
 O **NOTE:** (AR) Wheel-Hou, Blade-EVA
 U & Perform Comm & TM Check With Hou &
 L Comm Check With Each Other
 M Read PLSS 02 Qty to Hou
 P SQUELCH VHF B (LMP) - FULL DECREASE

116:14 FINAL SYSTEMS (1 Min)
 CB(16) ECS: LCG PUMP - Close
 LCG - Cold, As Req'd
 CB(16) ECS: CABIN REPRESS - Close (Ver)
 SUIT FAN ΔP - Open
 SUIT FAN 2 - Open
 SUIT FAN Sel - 2
 Verify ECS Caution & H2O SEP Comp
 Lts - On (~ 1 Min)
 SUIT GAS DIVERter - PULL-EGRESS(Verify)
 CABIN GAS RETURN - EGRESS (Verify)
 SUIT CIRCUIT RELIEF - AUTO (Verify)
 116:15 OPS CONNECT (6 Min)
 # # # # LMP 1st: # # # #
 SUIT ISOL - ACT OVRD (SUIT DISC)
 Discon LM 02 Hoses, Secure About PGA
 Connect OPS 02 Hose To PGA B/B
 Retrieve Purge Valve (Purse)-
 Verify Closed, Lock Pin In & LO
 Install Purge Valve In PGA R/R
 PGA Diverter Valve - Vertical
 CDR Repeat OPS CONNECT # # # #
 Drink
 DES H2O Vlv - CLOSE

116:21 HELMET/GLOVE DONNING (12 Min)
 Position Mikes (Both)
 PLSS FAN - ON, Rt (Vent Flag - Clear)
 Don Helmets, Check Drink Bag Position
 Don LEVA's And Lower Protective Visor
 Secure Tool Harness Self Doff Straps
 To LEVA's
 Stow LM 02 & Comm(CDRs To ECS Handhold)
 Verify The Following:
 Helmet & Visor (1) - Aligned &
 Adjusted
 02 Connectors (3) - Locked
 Purge Valves (1) - Locked
 Comm Connectors (1) - Locked
 PGA Diverter Vlv(1) - Vertical
 Verify EVA CB Configuration
 (White Dots Out + EVA Decals)



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EVA 1

Don EV Gloves & Verify:
 Wrist Locks (4) - Locked
 Glove Straps (4) - Adjusted
 Cover Wrist Rings

NOTE: If PGA Biting, PLSS 02 - ON/OFF

LCG-Cold, As Req'd
 CB(16) ECS: LCG PUMP - Open
 Disconnect LM H2O Hose
 Connect PLSS H2O Hose, Verify Locked

PLSS DIVERter - MIN (Verify)
 PLSS PUMP - ON (Rt)

PRESS REG A & B - EGRESS

116:33 PRESSURE INTEGRITY CHECK (4 Min)

PLSS 02 - ON (Tone-On, 02 Flag-0)
 Press Flag Clear (3.1-3.4 Psid)
 Cuff Gage 3.7-4.0 Psig
 02 Flag Clear

PLSS 02 - OFF (Monitor Cuff Gage For
 1 Min, Report Decay)
 PLSS 02 - ON (Cuff Gage 3.7-4.0 Psig,
 Tone & 02 Flag May Come On)
 Verify 02 Flag Clear

116:37 CABIN DEPRESS (3 Min)

Confirm Go For Depress From Hou
 CB(16)ECS: CABIN REPRESS - Open
 CABIN REPRESS Vlv - CLOSE

Ovhd Or Fwd Dump Vlv - OPEN Then AUTO @
 3.5 Psia (Verify Cuff Gage Does
 Not Drop Below 4.6 Psig)
 Verify:
 Cabin At 3.5 Psia
 LM Suit Circuit Lockup At 4.3 Psia
 PGA > 4.6 Psig & Decaying

116:40 Start Wrist Watch :00

Ovhd Or Fwd Dump Valve - OPEN
 Verify:
 Tone-On & H2O Flag - A (1.2-1.7 Psia)
 PGA > 4.6 Psig & Decaying

Partially Open Fwd Hatch

FINAL PREP FOR EGRESS :03

PLSS PRIM H2O - OPEN (H2O Flag -
 Clear In About 4 Min)

Fwd Hatch - Open

Rest Until Cooling Sufficient

Verify:
 PGA 3.7 To 4.6 Psig
 CWEA Status:
 Caution
~~PREAMPS~~
 ECS

H2O SEP Comp Lt - On

Lower EV Visor As Req'd :10

POST EVA 1

PLSS PRIM H2O - CLOSE
 Fwd Hatch - Close & Lock
 Dump Valves (Both) - AUTO

NOTE: PLSS 02 & PRESS Flags May Come
 On During Repress. If PLSS 02 <10%
 Manually Control Cabin Repress To
 Maintain Positive PGA Pressure.
 (Leave Cabin Repress CB Open For
 Manual Repress)

CABIN REPRESS - AUTO
 CB(16)ECS: CABIN REPRESS - Close
 MASTER ALARM & CABIN Warning Lt - On
 Verify Cabin Press Increasing
 PRESS REG A & B - CABIN

PLSS 02 - OFF @ Cabin > 2.5 Psia

CABIN Warning Lt - Off
 Verify Cabin Press Stable At 4.6-5 Psia
 Use Purge Valve To Depress PGA As Req'd

123:40 POST EVA SYSTEMS CONFIG (15 Min)

Verify EVA CB Configuration
 (White Dots Out + EVA Decals)
 CB(16) ECS: SUIT FAN 2 - Close
 SUIT FAN ΔP- Close
 ECS Caution & H2O SEP Comp Lts - Out

Doff Gloves, Stow On Comm Panel
 Doff Helmets With Visors, Lower Shades,
 Stow In BRA

Verify Saf On Dump Valve
DES H2O Vlv - OPEN
Remove Purge Valve, Stow In Purse
Disconnect OPS 02 Hose

Connect LM 02 Hoses R/B & B/R
PGA Diverter Vlv - Horizontal

SUIT ISOL (Both) - SUIT FLOW
PLSS PUMP - OFF (Left)
PLSS FAN - OFF (Left)

Disconnect PLSS H2O From PGA
Connect LM H2O

PLSS Mode (Both) - 0
AUDIO CB - Open
Connect To LM Comm

AUDIO CB - Close
AUDIO (CDR & LMP)
VHF A - RCV
B - OFF
MODE - ICS/PTT
RELAY - OFF

COMM:
VHF A XMTR - OFF
A RCVR - ON
B XMTR & RCVR - OFF
TLM BIOMED - LEFT
VHF ANTENNA - AFT
UPLINK SQUELCH - OFF

123:55 PLSS 02 RECHARGE (15 Min)

Verify DES 2 02 >56%

* * * * LMP 1st: * * * *

Connect LM 02 To PLSS
HI PLSS 02 FILL - OPEN Then CLOSE
After 4 Min

PLSS Mode - AR (02 QTY ~85%)
PLSS Mode - 0

Disconnect LM 02

CDR Repeat 02 RECHARGE * * * *

Stow LM 02 Supply Hose

124:10 PLSS/OPS DOFFING (30 Min)

Disconnect OPS Actuator From RCU
Disconnect RCU From PGA
PLSS PUMP, FAN - OFF (Left) MODE SEL-0
Disconnect RCU From PLSS, Stow In
LCG Bag (LHMS, CDR's 1st)

Disconnect PLSS 02 Hoses
Doff PLSS/OPS (LMP 1st)
Stow LMP PLSS On Floor
Stow CDR PLSS On Mid-Step

Report OPS Press To Hou
Stow OPS 02 Hose & Actuator

Install Gas Conn Plugs (Purse) In PGA
Install PLSS Elect Dust Cap (Purse)

CAUTION: Insure PLSS LiOH Carts & Batts
Numbered 1 or 2 Replaced with 3 or 4.

CDR 1st: ###
Change PLSS Batt, Stow In Jett Bag
Connect Cable to Battery
Stow PLSS Hoses & Straps

Disconn PLSS Tool Harness
Change LiOH Cart, Temp<130°, Read Cart
Decal
Stow Used LiOH Carts Inside Canisters
Stow Canisters In Jett Bag
Install PLSS Tool Harness

Disconnect OPS Antenna Lead
Remove OPS & Stow Antenna Lead
Stow CDR OPS On Eng Cover
Stow CDR PLSS In Recharge Station

LMP PLSS To Mid-Step, Repeat Above ###

Stow LMP OPS On Floor Under Dump Vlv
Stow PLSS On Floor Against Hatch

124:40 POST EVA CABIN CONFIG (20 Min)

Unstow Lunar Surface Checklist, 3-3
Stow EVA 1 Prep & Post Card

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137:50 CABIN PREP EVA 2 (10 Min)

Stow All Loose Items Not Req'd For EVA

Report PRD Readings to Hou

Stow Lunar Surface Checklist

138:00 EQUIPMENT PREP EVA 2 (16 Min)

Stow PGA Gas Conn Plugs In Purse
Empty PGA Pockets Into Purse
PGA Relief Valve Cap In Pkt
Verify Watch & Mirror Donned

Unstow CDR OPS
Perform OPS Check (Both)
Stow Both OPS On Floor

Apply Antifog (Purse), Wipe Dry With
Tissue (LHSSC)
Stow EMU Maintenance Kit In Purse
Stow LEVA's & Helmets On ISS
Stow BRA

Stow ETB On RH Eng Cover
Tie Jett Bag, Stow On LH Eng Cover

Fwd Hatch Handle - UNLOCK

EVA 2 PREP

138:16 PLSS DONNING (20 Min)

* * * * LMP 1st: * * * *
Set PLSS On Mid-Step
Verify OPS Reg Decay
Unstow O2 Nozzle & Antenna Lead
Secure Flaps

Attach OPS To PLSS
Connect OPS Antenna Lead To PLSS
Verify Sublimator Exhausts Clear

Unstow PLSS Straps & Hoses
Remove Elect Dust Cap, Stow In Purse
Verify AUX H2O, DIVERTER, O2 &
PRIM H2O - OFF

Verify The Following Locked:
PLSS Battery Connection
OPS Antenna Lead To PLSS
OPS To PLSS

Don PLSS/OPS, Lift PLSS Hoses Above
Lower Straps

Connect PLSS O2 Hoses To PGA
Verify AUX H2O, DIVERTER, O2 &
PRIM H2O - OFF

Connect RCU To PGA & Upper Straps
Verify RCU Controls:
PUMP, FAN - OFF (Left) MODE SEL-0
Connect RCU To PLSS

Unstow OPS O2 Hose & Actuator, Route
Hose Behind PGA
Connect Actuator To RCU

CDR Repeat PLSS DONNING * * * *

138:36 PLSS COMM CHECK (8 Min)

Verify Powerdown CB Configuration
(White Dots Out)

Verify Voice Comm With Hou

Audio (LMP)
S-BAND - T/R
ICS - T/R
RELAY - ON
MODE - VOX
VOX SENS MAX
VHF A - T/R
B - RCV

H COMM:
O VHF A XMTR - VOICE
U A RCVR - ON
& B XMTR - OFF
L B RCVR - ON
M TLM BIOMED - OFF
P SQUELCH VHF A&B -
Noise Thres + 1 1/2
RECORDER - ON
VHF Antenna - EVA
UPLINK SQUELCH - ENABLE

Audio (CDR)
S-BAND - T/R
ICS - T/R
RELAY - OFF
MODE - VOX
VOX SENS - MAX
VHF A - T/R
B - RCV

CB(16) COMM: SE AUDIO - Open
LMP Connect To PLSS Comm

H
O
U
&
C
D
R
C
D
R

H
O
U

H CB(16) COMM: SE AUDIO - Close
 O PLSS PTT (LMP) - MAIN (Rt), Verify
 U PLSS Mode(LMP) - A, Wheel-CCW
 T (Tone-On, Vent Flag - P,
 H Press Flag - O, 02 Mom)
 O PLSS 02 Press Gage > 85%
 U LMP Comm Check With CDR And Hou
 & **NOTE:** Unstow PLSS Antenna If It
 L Transmits Garbled And/Or Loses TM
 M Restow Before Egress
 P
 CB(11) COMM: CDR AUDIO - Open
 CDR Connect To PLSS Comm
 CB(11) COMM: CDR AUDIO - Close
 Audio (CDR)
 VHF A - OFF
 VHF B - OFF
 PLSS PTT (CDR) - MAIN (Rt), Verify
 PLSS Mode(CDR) - B, Blade-CCW
 (Tone-On, Vent Flag - P,
 Press Flag - O, 02 Mom)
 PLSS 02 Press Gage > 85%
NOTE: Crewman In Mode B Cannot
 Hear Hou
 L
 M LMP Comm Check With CDR And Hou
 P
 PLSS Mode(LMP)-B, Blade-CCW(Tone-On)
 PLSS Mode(CDR)-A, Wheel-CCW(Tone-On)
 CDR Comm Check With LMP And Hou
 H PLSS Mode (Both) - AR (Tone-On)
 O
 U **NOTE:** (AR) Wheel-Hou, Blade-EVA
 & Perform Comm & TM Check With Hou &
 L Comm Check With Each Other
 M Read PLSS 02 Qty to Hou
 P
 SQUELCH VHF B (LMP) - Full Decrease

138:44 FINAL SYSTEMS PREP (1 Min)

CB(16) ECS: LCG PUMP - Close
 LCG - Cold, As Req'd
 CB(16) ECS: CABIN REPRESS - Close (Ver)
 SUIT FAN ΔP - Open
 SUIT FAN 2 - Open
 Verify ECS Caution & H2O SEP Comp
 Lts - On (~ 1 Min)

SUIT GAS DIVERter - PULL-EGRESS(Verify)
 CABIN GAS RETURN - EGRESS (Verify)
 SUIT CIRCUIT RELIEF - AUTO (Verify)

138:45 OPS CONNECT (6 Min)

LMP 1st # # # #
 SUIT ISOL - ACT OVRD (SUIT DISC)
 Discon LM 02 Hoses, Secure About PGA

Connect OPS 02 Hose To PGA B/B
 Retrieve Purge Valve (Purse)-
 Verify Closed, Lock Pin In & LO
 Install Purge Valve In PGA R/R
 PGA Diverter Valve - Vertical

CDR Repeat OPS CONNECT # # # #

Drink
 DES H2O VLV - CLOSE

138:51 HELMET/GLOVE DONNING (3 Min)

Position Mikes (Both)
 PLSS FAN - ON, Rt (Vent Flag - Clear)
 Don Helmets With LEVA's, Check Drink
 Bag Position
 Lower LEVA Protective Visor
 Secure Tool Harness Self Doff Straps
 To LEVA's

Stow LM 02 & Comm(CDRs To ECS Handhold

Verify The Following:

Helmet & Visor (1) - Aligned &
 Adjusted
 02 Connectors (3) - Locked
 Purge Valves (1) - Locked

Comm Connectors (1) - Locked
 PGA Diverter Vlv(1) - Vertical

Verify EVA CB Configuration
 (White Dots Out + EVA Decals)



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EVA 2

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EVA 2

Don EV Gloves & Verify:
 Wrist Locks (4) - Locked
 Glove Straps (4) - Adjusted
 Cover Wrist Rings

NOTE: If PGA Biting, PLSS O2 - ON/OFF

LCG-Cold, As Req'd
 CB(16) ECS: LCG PUMP - Open
 Disconnect LM H2O Hose
 Connect PLSS H2O Hose, Verify Locked

PLSS DIVERter - MIN (Verify)
 PLSS PUMP - ON (Rt)

PRESS REG A & B - EGRESS

139:03 PRESSURE INTEGRITY CHECK (4 Min)

PLSS O2 - ON (Tone-On, O2 Flag-0)
 Press Flag Clear (3.1-3.4 Psid)
 Cuff Gage 3.7-4.0 Psig
 O2 Flag Clear

PLSS O2 - OFF (Monitor Cuff Gage For
 1 Min, Report Decay)
 PLSS O2 - ON (Cuff Gage 3.7-4.0 Psig,
 Tone & O2 Flag May Come On)
 Verify O2 Flag Clear

139:07 CABIN DEPRESS (3 Min)

Confirm Go For Depress From Hou
 CB(16)ECS: CABIN REPRESS - Open
 CABIN REPRESS Vlv - CLOSE

Ovhd Or Fwd Dump Vlv - OPEN Then AUTO @
 3.5 Psia (Verify Cuff Gage Does
 Not Drop Below 4.6 Psig)
 Verify:
 Cabin At 3.5 Psia
 LM Suit Circuit Lockup At 4.3 Psia
 PGA > 4.6 Psig & Decaying

139:10 Start Wrist Watch :00

Ovhd Or Fwd Dump Valve - OPEN
 Verify:
 Tone-On & H2O Flag - A (1.2-1.7 Psia)
 PGA > 4.6 Psig & Decaying

Partially Open Fwd Hatch

FINAL PREP FOR EGRESS :03

PLSS PRIM H2O - OPEN (H2O Flag -
 Clear In 2-4 Min)

Fwd Hatch - Open

Rest Until Cooling Sufficient
 Verify:

PGA 3.7 To 4.6 Psig
 CWEA Status:
Caution
PREAMPS
 ECS

H2O SEP Comp Lt - On

Lower EV Visor As Req'd

POST EVA 2

PLSS PRIM H2O - CLOSE
 Fwd Hatch - Close & Lock
 Dump Valves (Both) - AUTO

NOTE: PLSS O2 & PRESS Flags May Come
 On During Repress. If PLSS O2 <10%
 Manually Control Cabin Repress To
 Maintain Positive PGA Pressure.
 (Leave Cabin Repress CB Open For
 Manual Repress)

CABIN REPRESS - AUTO
 CB(16)ECS: CABIN REPRESS - Close
 MASTER ALARM & CABIN Warning Lt - On
 Verify Cabin Press Increasing
 PRESS REG A & B - CABIN

PLSS O2 - OFF @ Cabin > 2.5 Psia

CABIN Warning Lt - Off
 Verify Cabin Press Stable At 4.6-5 Psia
 Use Purge Valve To Depress PGA As Req'd

146:10 POST EVA SYSTEMS CONFIG (15 Min)

Verify EVA CB Configuration
 (White Dots Out + EVA Decals)
 CB(16) ECS: SUIT FAN 2 - Close
 SUIT FAN ΔP- Close
 HTRS: MESA - Open
 ECS Caution & H2O SEP Comp Lts - Out

Doff Gloves, Stow On Comm Panel
 Doff Helmets With Visors, Lower Shades,
 Stow In BRA

:10

Verify Safety On Dump Valve
DES H2O Vlv - OPEN
Remove Purge Valve, Stow In Purse
Disconnect OPS 02 Hose

Connect LM 02 Hoses R/B & B/R
PGA Diverter Vlv - Horizontal

SUIT ISOL (Both) - SUIT FLOW
PLSS PUMP - OFF (Left)
PLSS FAN - OFF (Left)

Disconnect PLSS H2O From PGA
Connect LM H2O

PLSS Mode (Both) - 0
AUDIO CB - Open
Connect To LM Comm

AUDIO CB - Close
AUDIO (CDR & LMP)
VHF A - RCV
B - OFF
MODE - ICS/PTT
RELAY - OFF

COMM:
VHF A XMTR - OFF
A RCVR - ON
B XMTR & RCVR - OFF
TLM BIOMED - RIGHT
VHF ANTENNA - AFT
UPLINK SQUELCH - OFF

146:25 PLSS 02 RECHARGE (15 Min)

Verify DES 2 02 >56%

* * * * LMP 1st: * * * *

Connect LM 02 To PLSS
HI PLSS 02 FILL - OPEN Then CLOSE
After 4 Min

PLSS Mode - AR (02 QTY ~85%)
PLSS Mode - 0

Disconnect LM 02

CDR Repeat 02 RECHARGE * * * *

Stow LM 02 Supply Hose

146:40 PLSS/OPS DOFFING (30 Min)

Disconnect OPS Actuator From RCU
Disconnect RCU From PGA
PLSS PUMP, FAN - OFF (Left) MODE SEL-0.
Disconnect RCU From PLSS, Stow In
LCG Bag (LHMS, CDR's 1st)

Disconnect PLSS 02 Hoses
Doff PLSS/OPS (LMP 1st)
Stow LMP PLSS On Floor
Stow CDR PLSS On Mid-Step

Report OPS Press To Hou
Stow OPS 02 Hose & Actuator

Unstow Jett Bag (LHSSC), Hang From
CDR's LH Handhold
Install Gas Conn Plugs (Purse) In PGA
Install PLSS Elect Dust Cap (Purse)

CAUTION: Insure PLSS LiOH Carts & Batts
Numbered 3 or 4 Replaced with 5 or 6.

CDR 1st: # # # #
Change PLSS Batt, Stow In Jett Bag
Connect Cable to Battery
Stow PLSS Hoses & Straps

Disconnect PLSS Tool Harness
Change LiOH Cart, Temp<130°, Read Cart
Decal
Stow Used LiOH Carts Inside Canisters
Stow Canisters In Jett Bag
Install PLSS Tool Harness

Disconnect OPS Antenna Lead
Remove OPS & Stow Antenna Lead
Stow CDR OPS On Floor Under Purse
Stow CDR PLSS In Recharge Station

LMP PLSS To Mid-Step, Repeat Above ####

Stow LMP OPS On Floor Under Dump Vlv
Stow PLSS On Floor Against Hatch

147:10 POST EVA CABIN CONFIG (20 Min)

147:10 BATT MGMT
POWER/TEMP MON - ED/OFF
Check ED Volts A ___, B ___ (To Hou)
TLM PCM - HI
POWER/TEMP MON - LUN
BAT 3 - OFF/RESET; tb - bp
BAT L (CDR) - ON; tb - CDR
BAT 4 - OFF/RESET; tb - bp
POWER/TEMP MON - Check Bus Volts

Unstow Lunar Surface Checklist, 5-4
Stow EVA 2 Prep & Post Card

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161:20 CABIN PREP EVA 3 (10 Min)

Stow All Loose Items Not Req'd For EVA

Report PRD Readings To Hou

Stow Lunar Surface Checklist

161:30 EQUIPMENT PREP EVA 3 (16 Min)

Stow PGA Gas Conn Plugs In Purse
 Empty PGA Pockets Into Purse
 PGA Relief Valve Cap In Pkt
 Verify Watch & Mirror Donned

Perform OPS Check (Both)

Apply Antifog (Purse), Wipe Dry With
 Tissue (LHSSC)

Stow EMU Maintenance Kit In Purse
 Stow LEVA'S & Helmets On ISS
 Stow BRA

Stow ETB on RH Eng Cover
 Tie Jett Bag, Stow On LH Eng Cover

FWD Hatch Handle - UNLOCK

EVA 3 PREP161:46 PLSS DONNING (20 Min)

* * * * LMP 1st: * * * *

Set PLSS On Mid-Step
 Verify OPS Reg Decay
 Unstow O2 Nozzle & Antenna Lead
 Secure Flaps

Attach OPS To PLSS
 Connect OPS Antenna Lead To PLSS
 Verify Sublimator Exhausts Clear

Unstow PLSS Straps & Hoses
 Remove Elect Dust Cap, Stow In Purse
 Verify AUX H2O, DIVERTER, O2 &
 PRIM H2O - OFF

Verify The Following Locked:
 PLSS Battery Connection
 OPS Antenna Lead To PLSS
 OPS To PLSS

Don PLSS/OPS, Lift PLSS Hoses Above
 Lower Strap

Connect PLSS O2 Hoses To PGA
 Verify AUX H2O, DIVERTER, O2 &
 PRIM H2O - OFF

Connect RCU To PGA & Upper Straps
 Verify RCU Controls:
 PUMP, FAN - OFF (Left) MODE SEL - 0
 Connect RCU To PLSS

Unstow OPS O2 Hose & Actuator, Route
 Hose Behind PGA
 Connect Actuator To RCU

CDR Repeat PLSS DONNING * * * *162:06 PLSS COMM CHECK (8 Min)

Verify Powerdown CB Configuration
 (White Dots Out)
 Verify Voice Comm With Hou

Audio (LMP)
 S-BAND - T/R
 ICS - T/R
 RELAY - ON
 MODE - VOX
 VOX SENS - MAX
 VHF A - T/R
 B - RCV

COMM:

H VHF A XMTR - VOICE
 O A RCVR - ON
 U B XMTR - OFF
 & B RCVR - ON
 L TLM BIOMED - OFF
 M SQUELCH VHF A&B -
 P Noise Thres + 1 1/2
 RECORDER - ON
 VHF Antenna - EVA
 UPLINK SQUELCH - ENABLE

Audio (CDR)
 S-BAND - T/R
 ICS - T/R
 RELAY - OFF
 MODE - VOX
 VOX SENS - MAX
 VHF A - T/R
 B - RCV

CB(16) COMM: SE AUDIO - Open
 LMP Connect To PLSS Comm

H
O
U
&
C
D
RC
D
RH
O
U

H CB(16) COMM: SE AUDIO - Close
 O PLSS PTT (LMP) - MAIN (Rt), Verify
 U PLSS Mode(LMP) - A, Wheel-CCW
 (Tone-On, Vent Flag-P,
 Press Flag-0, 02 Mom)
 O PLSS 02 Press Gage >85%
 U LMP Comm Check With CDR And Hou
 &
 L **NOTE:** Unstow PLSS Antenna If It
 M Transmits Garbled And/Or Loses TM
 P Restow Before Egress
 CB(11) COMM: CDR AUDIO - Open
 CDR Connect To PLSS Comm
 CB(11) COMM: CDR AUDIO - Close
 Audio (CDR)
 VHF A - OFF
 VHF B - OFF
 PLSS PTT(CDR) - MAIN (Rt), Verify
 PLSS Mode(CDR) - B, Blade-CCW
 (Tone-On, Vent Flag- P,
 Press Flag-0, 02 Mom)
 PLSS 02 Press Gage >85%
NOTE: Crewman In Mode B Cannot
 Hear Hou
 LMP Comm Check With CDR And Hou
 PLSS Mode(LMP)-B, Blade-CCW(Tone-On)
 PLSS Mode(CDR)-A, Wheel-CCW(Tone-On)
 CDR Comm Check With LMP And HOU
 O PLSS Mode (Both) - AR (Tone-On)
 U **NOTE:** (AR) Wheel-Hou, Blade-EVA
 &
 L Perform Comm & TM Check With Hou &
 M Comm Check With Each Other
 P Read PLSS 02 Qty To Hou
 SQUELCH VHF B (LMP) - Full Decrease

162:14 FINAL SYSTEMS PREP (1 Min)
 CB(16) ECS: LCG PUMP - Close
 LCG - Cold, As Req'd
 CB(16) ECS: CABIN REPRESS - Close (Ver)
 SUIT FAN ΔP - Open
 SUIT FAN 2 - Open
 Verify ECS Caution & H2O SEP Comp
 Lts - On (~1 Min)
 SUIT GAS DIVERter - PULL-EGRESS(Verify)
 CABIN GAS RETURN - EGRESS (Verify)
 SUIT CIRCUIT RELIEF - AUTO (Verify)
 162:15 OPS CONNECT (6 Min)
 # # # # LMP 1st: # # # #
 SUIT ISOL - ACT OVRD (SUIT DISC)
 Discon LM 02 Hoses, Secure About PGA
 Connect OPS 02 Hose To PGA B/B
 Retrieve Purge Valve (Purse) -
 Verify Closed, Lock Pin In & LO
 Install Purge Valve In PGA R/R
 PGA Diverter Valve - Vertical
 CDR Repeat OPS CONNECT # # # #
 Drink
 DES H2O VLV - CLOSE
 162:21 HELMET/GLOVE DORNING (12 Min)
 Position Mikes (Both)
 PLSS FAN - ON, Rt (Vent Flag - Clear)
 Don Helmets With LEVA's, Check Drink
 Bag Position
 Lower LEVA Protective Visor
 Secure Tool Harness Self Doff Straps
 To LEVA's

Stow LM 02 & Comm(CDRs To ECS Hold
 Verify The Following:
 Helmet & Visor (1) - Aligned &
 Adjusted
 02 Connectors (3) - Locked
 Purge Valves (1) - Locked
 Comm Connectors (1) - Locked
 PGA Diverter Vlv(1) - Vertical
 Verify EVA CB Configuration
 (White Dots Out + EVA Decals)
 Don EV Gloves & Verify:
 Wrist Locks (4) - Locked
 Glove Straps (4) - Adjusted
 Cover Wrist Rings
NOTE: If PGA Biting, PLSS 02 - ON/OFF
 LCG-Cold, As Req'd
 CB(16) ECS: LCG PUMP - Open
 Disconnect LM H2O Hose
 Connect PLSS H2O Hose, Verify Locked
 PLSS DIVERter - MIN (Verify)
 PLSS PUMP - ON, Rt
 PRESS REG A & B - EGRESS
 162:33 PRESSURE INTEGRITY CHECK (4 Min)
 PLSS 02 - ON (Tone-On, 02 Flag - 0)
 Press Flag Clear (3.1-3.4 Psid)
 Cuff Gage 3.7-4.0 Psig
 02 Flag Clear
 PLSS 02 - OFF (Monitor Cuff Gage For
 1 Min, Report Decay)
 PLSS 02 - ON (Cuff Gage 3.7-4.0 Psig,
 Tone & 02 Flag May Come On)
 Verify 02 Flag Clear



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EVA 3

162:37 CABIN DEPRESS (3 Min)

Confirm Go For Depress From Hou
CB(16)ECS: CABIN REPRESS - Open
CABIN REPRESS Vlv - CLOSE

Ovhd Or Fwd Dump Vlv - OPEN Then AUTO @
3.5 Psia (Verify Cuff Gage Does
Not Drop Below 4.6 Psig)

Verify:

Cabin At 3.5 Psia
LM Suit Circuit Lockup At 4.3 Psia
PGA > 4.6 Psig & Decaying

162:40 Start Wrist Watch :00

Ovhd Or Fwd Dump Valve - OPEN

Verify:

Tone-On & H2O Flag - A (1.2-1.7 Psia)
PGA > 4.6 Psig & Decaying

Partially Open Fwd Hatch

FINAL PREP FOR EGRESS :03

PLSS PRIM H2O - OPEN (H2O Flag -
Clear In 2-4 Min)

Fwd Hatch - Open

Rest Until Cooling Sufficient

Verify:

PGA 3.7 To 4.6 Psig
CWEA Status:
Caution
PREAMPS
ECS

H2O SEP Comp Lt - On

Lower EV Visor As Req'd

:10

POST EVA 3

PLSS PRIM H2O - CLOSE
Fwd Hatch - Close & Lock
Dump Valves (Both) - AUTO

NOTE: PLSS O2 & PRESS Flags May Come
On During Repress. If PLSS O2 <10%
Manually Control Cabin Repress To
Maintain Positive PGA Pressure.
(Leave Cabin Repress CB Open For
Manual Repress)

CABIN REPRESS - AUTO
CB(16)ECS: CABIN REPRESS - Close
MASTER ALARM & CABIN Warning Lt - On
Verify Cabin Press Increasing
PRESS REG A & B - CABIN

PLSS O2 - OFF @ Cabin > 2.5 Psia

CABIN Warning Lt - Off
Verify Cabin Press Stable At 4.6-5 Psia
Use Purge Valve To Depress PGA As Req'd

169:40 POST EVA SYSTEMS CONFIG (15 Min)

Verify EVA CB Configuration
(White Dots Out + EVA Decals)
CB(16) ECS: SUIT FAN 2 - Close
SUIT FAN ΔP - Close
ECS Caution & H2O SEP Comp Lts - Out

Doff Gloves, Stow On Comm Panel

Verify Safety On Dump Valve
DES H2O VLV - OPEN
Remove Purge Valves, Stow In Purse
Disconnect OPS O2 Hose

Connect LM O2 Hoses R/R & B/B

SUIT ISOL (Both) - SUIT FLOW
PLSS PUMP - OFF (Left)
PLSS FAN - OFF (Left)

Disconnect PLSS H2O From PGA
Connect LM H2O To PGA

PLSS Mode (Both) - 0
AUDIO CB - Open
Connect To LM Comm

AUDIO CB - Close
SQUELCH VHF B (LMP) -
Noise Thres + 1 1/2
AUDIO (CDR & LMP)
VHF A - RCV
B - OFF
MODE - ICS/PTT
RELAY - OFF

COMM:

VHF A XMTR - OFF
A RCVR - ON
B XMTR & RCVR - OFF
TLM BIOMED - LEFT
PCM - HI
VHF ANTENNA - AFT

169:55 PLSS/OPS DOFFING (20 Min)

Disconnect OPS Actuator From RCU's
Disconnect RCU's From PGA
Verify Pump, Fan - OFF (Left) MODE SEL-O
Disconnect RCU From PLSS, Stow On
Eng Cover

Disconnect PLSS O2 Hoses
Doff PLSS/OPS (LMP 1st)
Stow LMP PLSS On Floor
Stow CDR PLSS On Mid-Step
Stow OPS O2 Hose & Actuator

Install Gas Conn Plugs (Purse) In PGA

***** CDR 1st: *****

Disconnect OPS Antenna Lead
Remove OPS & Stow Antenna Lead
Perform OPS Checkout
Report OPS Press To Hou
Stow OPS On Eng Cover

Stow PLSS Hoses & Upper Straps
Remove Lower PLSS Straps, Clip Straps
Together, D-Ring (Name-To-Name)
Remove Yo-Yo, Stow On Eng Cover

Stow Straps In Aft LHSSC
Stow PLSS On Floor

LMP PLSS To Mid-Step, Repeat Above ****

Verify Powerdown CB Configuration
(White Dots Out)

170:15 PREP FOR EQUIP JETT 1 (24 Min)

Stow Return Items In ISA Big Pkt
Unstow Scale (Bot RHSSC)

Weigh BSLSS/Rock Bag (30# Max) &
Collection Bags
Record On 2-2 & Report To Hou

Weigh ISA (19# Max)
Stow Scale In RHSSC
Stow Collection Bags & BSLSS/Rock Bag
Aft Eng Cover

Verify Total DES 02 QTY (Tank 1+2) >31%
Fwd Hatch Handle - UNLOCK

Remove ISS, Wrap & Tie The Following:
Lunar Boots (4)
RCU's (2)
Armrest (1)
Yo-Yo's (2)

Position PLSS's For Jettison, Eng
Cover & Mid-Step

Clean & Lub Wristings As Req'd
PGA Diverter Vlv's - Horizontal

Audio (CDR & LMP)
Mode - VOX
VOX SENS - As Req'd
Comm: RECORDER - ON

Don EV Gloves
Check PGA Connectors

170:39 PRESS INTEGRITY CHECK (4 Min)

NOTE: LM Suit Circuit Shall Not Be
Maintained At Elevated Press >5 Min

SUIT GAS DIVERTER - PULL-EGRESS (Ver)
CABIN GAS RETURN - EGRESS (Verify)
SUIT CIRCUIT RELIEF - CLOSE

PRESS REG A - EGRESS
PRESS REG B - DIRECT 02
Monitor Cuff Gage To 3.7 - 4.0 Psig
Then PRESS REG B - EGRESS (Cuff
Gage Decay <.3 Psig In 1 Min)

SUIT CIRCUIT RELIEF - AUTO (Suit Ckt
Press Decays To 4.8 Psia)

170:43 CABIN DEPRESS FOR JETT (4 Min)

Confirm Go For DEPRESS From Hou
CB(16)ECS: CABIN REPRESS - Open
Ovhd Or Fwd Dump Valve - OPEN Then AUTO
At 3.5 Psia
(Verify Cabin Press 3.5 Psia
& LM Suit Circuit Lockup At
4.3 Psia & Decaying)

Ovhd Or Fwd Dump Vlv - OPEN (Verify LM
Suit Circuit 3.6 To 4.3 Psia)

170:47 HATCH OPENING (4 Min)

Partially Open Fwd Hatch
Ovhd Or Fwd Dump Valve - AUTO

Fwd Hatch - Full Open

Jettison The Following:
PLSS On Mid-Step
PLSS On Eng Cover
ISS

Verify Items Clear Of Ascent Stage

Fwd Hatch - Close & Lock

170:51 CABIN REPRESS (7 Min)

Dump Valves(Both)- AUTO (Verify)
CABIN REPRESS - AUTO (Verify)

CB(16)ECS: CABIN REPRESS - Close
MASTER ALARM & CABIN Warning Lt - On
Verify Cabin Press Increasing
PRESS REG A & B - CABIN

CABIN Warning Lt - Off
Verify Cabin Press Stable At 4.6-5 Psia

Doff Gloves, Stow On Comm Panel
Doff Helmets With Visors, Lower Shades,
Stow In BRA

Verify Safety On Dump Valve

Audio (CDR & LMP):
Mode - ICS/PTT

COMM: UPLINK SQUELCH - OFF
RECORDER - OFF

Unstow Lunar Surface Checklist, 7-5
Stow EVA 3 Prep & Post Card