

JUG ENTRY LM PREP 4/17/70
23800

MODIFIED 30 MIN
ACTIVATION PROCEDURES
ALREADY READ TO

CREW



J. Holloway

4/17/70
23800

MASTER

ELP-1

17:15

17:00

21:50

23:00

FT-6:00

PWR UP AGS

BAT 5 ~~ON~~ NORM FEED - ON
USE MODIFIED LM DPS/RCS 30-MIN ACTIVATION CHECKLIST
EXCEPT CHGE PG 28 STEP 2 TO VOICE & RANGE
AS FOLLOWS:

EI-5:00

~~MCC 7~~ MCC 7, If Req

~~FT-6:00~~

LM PRE-ENTRY PROCEDURE

MANEUVER TO SM SEP ATTITUDE
CONFIGURE FOR CSM HOT FIRE
DEADBAND - MAX
ATT CONTROL: (3) PULSE
PERFORM CSM HOT FIRE
~~CONFIGURE FOR MANEUVER BACK TO~~ SM SEP ATT
ATT CONTROL - P, R PULSE
- YAW - MODE CONTROL

EI-4:30

~~MANEUVER TO CSM ATT~~
CONFIGURE FOR CM/SM SEP
BAL COUPLE - ON
AGS 404+0, 405+0, 406+0, 470R
TRANSLATE +X .5FPS
CM/SM SEP
~~TRANS - X .5FPS & NULL 470 TO ZERO~~ AFTER SEP
ATT CONT (3) - PULSE
PITCH TO ACQUIRE SM FOR PHOTOS (USE ACA FOR CONTROL)

EI-3:00

MANEUVER AND ATT HOLD FOR CSM P51 & P52
~~MANEUVER FOR CSM JETT~~ PLATFORM RELEASE
MCCN VIEW ATT UNTIL CM

EI-2:30

POWER REMOVAL FROM CM/LM UMBILICAL

- NEED HBR AND should have it

ASSUMES ALL DESCENT BATTERIES ON-LINE AND ASCENT BATTERIES 5&6 ON NORMAL FEED

CB-LM PWR-1 MNB - OPEN
CB-LM PWR-2 MNB - OPEN
~~CB EPS SENSOR SIGNAL MAIN B - OPEN~~

Should with LMP

could be eliminated if needed CSM

LM

CB (11&16) EPS: CROSS TIE BAL LOADS - CLOSE
CB(16) EPS: BAT FEED TIE (2) - OPEN
BAT 1 HV - OFF/RESET
~~BAT 5 OFF/RESET~~ ^{NORM FEED} BAT 5 - OFF/RESET
BAT 2 LV - OFF/RESET THEN ON (WAIT ~~5~~ FOR MSFN GO)
BAT 2 HV - OFF/RESET THEN ON
BAT 1 HV - ON
~~BAT 5 NORM FEED ON~~ BAT 5 NORM FEED - ON
CB(16) EPS: BAT FEED TIE (2) - CLOSE
LMP XFER TO CM

CB(16) EPS: ASC ECA CONT - CLOSE

CB(16) EPS: ASC ECA CONT - OPEN

L

1:45

MANEUVER TO CM/LM JETT ATT

after this point power is off umbilical and it could be disconnected at crew opt

ELP-2
21830

AT-1835 CONFIGURE FOR JETTISON

VERIFY ~~CM~~ FREE
COMM

S-BAND ~~PM~~, PRIM, PRIM, OFF, PCM, RANGE, OFF, HI

SELECT ~~OMNI~~

ECS

FWD DUMP VLV - CLOSE

~~SUIT CIRCUIT RELIEF - AUTO~~

~~CABIN GAS RETURN - EGRESS~~

~~SUIT GAS DIVERTER - EGRESS~~

~~SUIT ISOL VALVS (2) - DISCONNECT~~

~~PRESS REGS A & B - CLOSE~~

~~CABIN REPRESS VALVE - CLOSE~~

~~SUIT FAN - OFF~~

~~CB(16) ECS CABIN REPRESS - OPEN~~

OVHD DUMP VLV - ~~OPEN~~ CLOSED

Close Descent O₂ Valve

*this prevents possible
Cabin over pressure.*

~~VERIFY GSM FREE~~

~~ATT CONTROL (3) - MODE CONTROL~~ (d/b max)

VERIFY XFER LIST

IVT TO CM, CLOSE HATCH

Front

Color

ELP-3

24

READ UP 100:01:00

30-MIN ACTIVATION

~~SVT TO LM~~

Basic Date 1/6/70
Changed

- 1 ~~GSM Mavr To/Burn Attitude~~
~~Activate CABIN DUMP VALVE & Open Hatch~~
~~Carry COM Carrier & C/W Connector to LM~~
- 2 ~~FLOOD LIGHT - A11~~
~~DES O2 - OPEN~~
~~DES H2O - OPEN~~
~~CABIN REPRESS - AUTO~~
~~CB(16) ECS: CABIN REPRESS - CLOSE~~
~~SUIT GAS DIVERTER - CABIN~~
- 3 ~~GSM Transfer To LM PWR~~
~~(Flood Lts Blink, C/W PWR Caution Lt-On)~~
~~CB(11) EPS: XLUNAR BUS TIE - CLOSE~~
~~HEATERS: RCS SYS A/B-1 QUAD 4,3,2,1 (4) - CLOSE~~
~~CB(16) EPS: XLUNAR BUS TIE - CLOSE~~
~~HEATERS: RCS SYS A/B-2 QUAD 1,2,3,4 (4) - CLOSE~~
- 4 ~~RCS SYS A/B-2: QUADS (4) - AUTO~~
~~VERIFY AGS STATUS SW-OFF~~

EPS ACTIVATION

- 1 LTG: ANUN/NUM - BRIGHT
- 2 ~~CB(11) INST: SIG CONDR 1 - CLOSE~~
~~EPS: DES ECA CONT - CLOSE~~
~~CB(16) INST: SIG SENSOR - CLOSE~~
~~PGM/TE - CLOSE~~
~~SIG CONDR 2 - CLOSE~~
PERFORM → EPS: DISP - CLOSE
~~DES ECA CONT - CLOSE~~

LM-7

30-MIN ACTIVATION

ELP-4

3

Verify BAT 1,2,3,4 - tb-L0
 DES BATS - tb-gray
 BATS 5&6 NORMAL & BACKUP(4)-tb-bp
 Check BAT and BUS Voltages

When BUS Volts <27V, select High Voltage Taps
 CB(16) EPS: GROSS TIE BAL LOADS - OPEN
 BAT 1 HI VOLTAGE-OFF/RESET Then ON
 Repeat for BATS 2,3,4

4 CB(11) AC BUS B&A: BUS TIE INV 2&1(4) - CLOSE
 : AC BUS VOLT - CLOSE
 EPS: INV 1 - CLOSE
~~CB(16) EPS: INV 2 - CLOSE~~

5 INV-1, Verify Voltage In Green Band

PRIMARY GLYCOL LOOP ACT

1 CB(16) ECS: DISP - CLOSE (*CREW OPTION*)
~~CB(11) ECS: GLYCOL PUMP AUTO TRNFR - CLOSE~~
~~: GLYCOL PUMP 1 - CLOSE~~
~~: GLYCOL PUMP AUTO TRNFR - OPEN~~
 GLYCOL - PUMP 1
 CB(11) ECS: GLYCOL PUMP 2 - CLOSE

2 ~~PRIM EVAP FLOW No. 1 - OPEN~~

3 Close CB's Per 30-MIN ACTIVATION Chart

Basic Date 1/6/70
 Changed 2/13/70

30-MIN ACTIVATION

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ELP-5

O - OPEN
X - CLOSED

Basic Date 1/6/70
Changed 3/10/70

LM-7

30-MIN ACTIVATION

AC BUS B												AC BUS A											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC BUS A												AC BUS A											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FLIGHT DISPLAYS												AC BUS A											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEATERS												STATUS/CONF											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEATERS ACS SYS A/B 1												COMMA											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEATERS ACS SYS A/B 2												COMMA											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2 A's

4 A's

7 A's

4 A's

10

Basic Date _____
Changed _____

4 CB(16) INST: CWEA - Open Then Close

WARN
ASC PRESS
~~RCS-A-REG~~
~~RCS-B-REG~~

VHF/S-BD ACTIVATION AND CHECKOUT

~~1~~ ~~CSM Configure For VHF Simplex A~~
~~VHF A: XMTR VOICE~~
~~RCVR ON~~
AUDIO (BOTH): S-BAND T/R T/R.
~~ICS T/R T/R~~
~~VHF A T/R~~

2 COMM: S-BD-PM, PRIM, PRIM, ~~DN~~ VOICE ~~BD~~,
PCM, ~~OFF~~ ~~SET~~, OFF, HI
S-BD ANT-As Required *RANGE*

~~3~~ ~~LMP Perform Comm Check With CSM~~

PGNS TURN - ON

1 NO ATT Lt - Off
V96E

V25N07E
1257E
252E
E

2 Set EVENT TIMER

~~DAP SET/GIMBAL DRIVE~~

~~1~~ ~~MODE CONT: PGNS - AUTO~~
~~GUID CONT: PGNS~~
~~TTCA (CDR) - THROTTLE (MIN)~~

2 V48E

N46 31021 32021

PRO

N47 + _____ (33731)
+ _____ (From MSFN or CSM)

PRO *V34E*

~~N48 + _____ (From MSFN or Chart)~~
~~+ _____ (From MSFN or Chart)~~

Basic Date 1/6/70
Changed 3/10/70

Basic Date 1/6/70
Changed _____

LM-7

LM-7

this is really

VERIFY RCS HRS IN AUTO For 15 Min
BAL CPL - OFF
DEADBAND - MIN
ATT CONT, P, R - PULSE, YAW - DIR
MODE CONT (AGS) - ATT HOLD
GUID CONT - AGS 29
Damp Rates, Pitch & Roll with TTCH, YAW with AGS DIR

EL

~~ENG STOP - PUSH
ENG ARM - DES (DES REG Lt-ON)
PRO (ENG GMBL Lt-ON)
MSEN Verify GDA Position~~

~~3 F 50 48
PRO
ENG ARM - OFF (ENG GMBL Lt-OFF)
ENG STOP - Reset~~

AGS ACTIVATION

Verify AGS CB In For 10 min
1 AGS STATUS - STBY (AGS Warn Lt - On)
CB(11) AC BUS B: AGS - CLOSE
CB(16) STAB/CONT: AEA - CLOSE (AGS Warn Lt-Off)
AGS STATUS - OPERATE (AGS Warn Lt - On)
O2/H2O QTY MON - C/W RESET, Then DES
2 412R + 1 SELF TEST SATISFACTORY

Basic Date Changed

~~RCS PRESS~~

~~1 Recycle: SYS A&B ASC FEED 2(2) - CLOSE, tb(4)-bp
: SYS A&B ASC FEED 1(2) - OPEN, tb(4)-bp
: SYS A&B THRUSTER PAIR QUADS-OPEN,
tb(8)-gray
: CRSFD - CLOSE
: MAIN SOV SYS A&B - OPEN
2 Cycle TEMP/PRESS MON
3 MASTER ARM - ON
HE PRESS RCS - FIRE
(RCS A&B REG. Warning Lts - Off)
RECYCLE: SYS A&B ASC FEED 2(2) - CLOSE, tb(4)-bp
: SYS A&B ASC FEED 1(2) - OPEN, tb(4)-bp
: SYS A&B THRUSTER PAIR QUADS-OPEN,
tb(8)-gray
: CRSFD - CLOSE
: MAIN SOV SYS A&B - OPEN~~

Basic Date Changed
1/6/70
3/10/70

LM-7

ELP-1

(Trim front page on solid crop marks; back page on dash crop marks.)

 TEMP/PRESS MON - He (2750-3200 psi) - PRPLNT (40°-100°/178-188 psi) FUEL MANF (175-188) - OXID. MANF (175-188)
--

DPS PRESS

1 ~~PRPLNT QTY MON - DES 1~~
 PROP TEMP/PRESS MON - DES 2
 HELIUM MON - AMB PRESS
 DES HE REG 1 - tb-gray bp
 DES HE REG 2 - tb-bp

~~2 DES PRPLNT ISOL VLV - FIRE
 HE PRESS/DES START - FIRE~~

~~3 PRPLNT TEMP/PRESS MON: DES 2&1
 (50°-90° FUEL, 50°-90° OXID/242-253 psi)
 HELIUM MON: AMB PRESS (200-1110 psi)
 SUPRCRIT PRESS (610-1070 psi)~~

LANDING GEAR DEPLOY	
1	CB(11) LOGIC PWR A - Open LDG GEAR DEPLOY - FIRE, tb-gray
2	CB(11) LOGIC PWR A - Close LDG GEAR DEPLOY - FIRE MASTER ARM - OFF

Basic Date 1/6/70
 Changed 3/10/70

Basic Date _____
 Changed _____

MINVR TO BURN ATT

ELP-10

400 + 5

400 + 0

ATT CONT: P, R - PULSE

: YAW - MODE CONT

MINVR USING TTCA

Crew can control Pitch, Roll w/TTCA

Computer controls Yaw but ACA can
override

When in Attitude - ACA Out of Detent

Set EVNT TMR GROUND TO GIVE

Front

Color _____

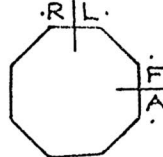
ELP-11

DOCKED DPS BURN (MANUAL)

DOCKED DPS BURN
(MANUAL)

Basic Date 1/6/70
Changed _____

- * DPS BURN TECHNIQUE *
- * If PITCH Error Needle Goes Down, *
- * LMP Thrust AFT (Pull Out On TTCA). *
- * If ROLL Needle Left, CDR Thrust *
- * Right (Push Right On TTCA). *
- * See FDAI Picture Below. *



- ~~* Only Set The PITCH or ROLL ATTITUDE *~~
- ~~* CONTROL Switches To MODE CONT When *~~
- ~~* The Rates & Errors Are Zero And *~~
- ~~* Not Thrusting With TTCA's. Throt- *~~
- ~~* tle Initially At 10%, Then Throt- *~~
- ~~* tle Up When Stabilized, 10% Before *~~
- ~~* Cutoff. *~~

G M B L LOCKED

LM-7

ELP-12

DO THIS

~~V76E~~
 GUID CONT - AGS
 MODE CONT (~~BOTH~~) - ~~AGS~~ ATT HOLD
 ENG STOP (2) - RESET
 ABORT/ABORT STAGE - RESET

DOCKED DPS BURN
(MANUAL)

~~-6:00 MODE CONT, PGNS, ATT HOLD~~

~~V41 N20E, E, E, E~~ *DO THIS*
400 + 5

At burn attitude: *AT BURN ATTS*

~~V40 N20E~~
V40 N20E
~~V25 N07E, 77E, 10000E, 1E~~
~~V01 N01E, 77E (Verify A = 1,3,5,7)~~
~~V37E 51E, PRO, V37E00E~~

~~400 + 0~~

~~At burn attitude~~
400 + 0

Caution: Do NOT go out of detent on ACA again

~~V27E-47E~~
 When CHPTTR ACTY Lt = ON
~~V06 N65 E _____ hrs~~
~~_____ min~~
~~_____ sec~~


~~Load N65 Into N38.~~
~~V25 N38E (_____ hrs) E~~
~~(_____ min) E~~
~~(.01 sec) E~~

404 + 0
 405 + 0
 406 + 0
 470R

Basic Date 1/6/70
 Changed _____

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ELP-13

-4:00 RATE/ERR MON (BOTH) - LDG RDR/CMPTR
 ATT MON (BOTH) - AGS
 RATE SCALE - 5°/SEC
 THR CONT - MAN
 MAN THROT - CDR
 ATT/TRANSL - 4 JET
 BAL CPL - OFF
 ENG GMBL - ~~ON~~ OFF
 DES ENG CMD OVRD - OFF
 DEADBAND - MIN
 ATT CONT: ROLL - PULSE
 PITCH - PULSE
 YAW - MODE CONT 
 MODE CONT (BOTH) - ATT HOLD
~~SPD MON (CDR) - 100 KTS~~
~~SPD MON (LMP) - 100 KTS~~
 TTCA (CDR) - THROT (MIN) ^{JETS (RCS)} _(DPS)
 TTCA (LMP) - JETS

Basic Date 1/6/70
Changed 3/23/70

Basic Date _____
Changed _____

~~1:00 MASTER ARM - ON~~

- :35 ~~100 KTS~~
~~F 10 85 200, 1, 2 (ATT Zero)~~ (100 fps)
ENG ARM - DES

- :10 MANUAL ULLAGE (LMP)

~~1:02 CMC MOD - 100~~

~~ACA - Out of Detent (Yaw) (Zero Error Needles)~~

:00 ENG START (CDR) - PUSH
Ignition

:01 Release ullage

~~1:05 TTCA (CDR) - Throttle Up As Req'd
ATT CONT: PITCH, ROLL - As Req'd~~

~~1:15 MASTER ARM - OFF~~

LM-7

E2P-14

Monitor ΔVX Via N83, 470

~~When PRPLNT QTY = 37%:
DES He REG 1 - CLOSE~~

~~TTCA (CDR) Reduce to 10% when Vgo = 10.0 fps~~
Shut down on Burn Time
~~When ΔVX = Final ΔVX:
ENG STOP - PUSH
ATT CONT: YAW - PULSE~~
Record 4-70
Damp Excessive Rates Via LM Y, Z Translation

~~CSM Resume Attitude Control~~

~~ENG VOSE~~
ENG ARM - OFF
~~PRPLNT QTY MON - OFF~~
ENG STOP - RESET
TTCA (CDR) - JETS

Return TO ENTRY LM PREP EI-500
~~ESTABLISH DTC~~

~~ATT CONT (3) - PULSE~~
~~ROLL WITH TTCA until~~

R 90°
D 0°
Y 0°

When at attitude go out of Detent w/ ACA
ATT CONT: YAW - MODE CONT
When rates are < .05:
ATT CONT: YAW - DIR Pulse
Spin up to .3 %/sec in yaw
MODE CONT: AGO - OFF
PWR Down Per PWR 5
(AS MODIFIED)

Basic Date _____
Changed _____

Basic Date 1/6/70
Changed 3/23/70

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