NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 17

DECEMBER 6 LAUNCH

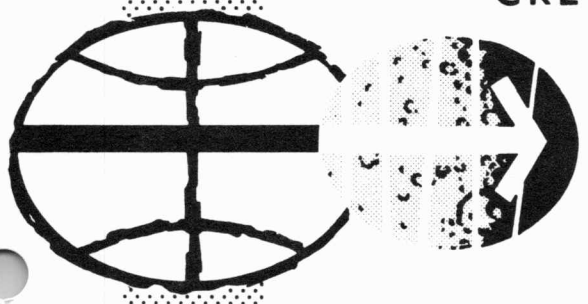
DO NOT DISCARD
THIS COPY BASELINE FOR
ALL LAUNCH DATES

REVISION A

CSM CUE CARDS

PREPARED BY

FLIGHT PLANNING BRANCH
CREW PROCEDURES DIVISION



MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NOVEMBER 2, 1972

APOLLO 17

CSM CUE CARDS

Revision A

NOVEMBER 2, 1972

PREPARED BY: Wesley Jones

W. K. JONES
BOOK MANAGER

APPROVED BY: T W Holloway

JOHN W. O'NEILL, CHIEF
FLIGHT PLANNING BRANCH
CREW PROCEDURES DIVISION

It is requested that any organization having comments, questions, or suggestions concerning this document contact W. K. Jones, TRW Task 81, Building 4, room 265, telephone 483-3953.

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes should be submitted to the Apollo Flight Data File Manager, T. W. Holloway, CG5, Building 4, room 230, telephone 483-4271.

Distribution of this document is controlled by Flight Data File Manager, T. W. Holloway, Flight Planning Branch, Crew Procedures Division.

CSM CUE CARDS

LIST OF EFFECTIVE PAGES

BASIC 9/4/72
CHANGE A 10/13/72
REVISION A 11/2/72

*Current Changes, data
**Format changes to incorporate revised velcro locations based on data from S/C fit check

LIST OF EFFECTIVE PAGES (CONT)

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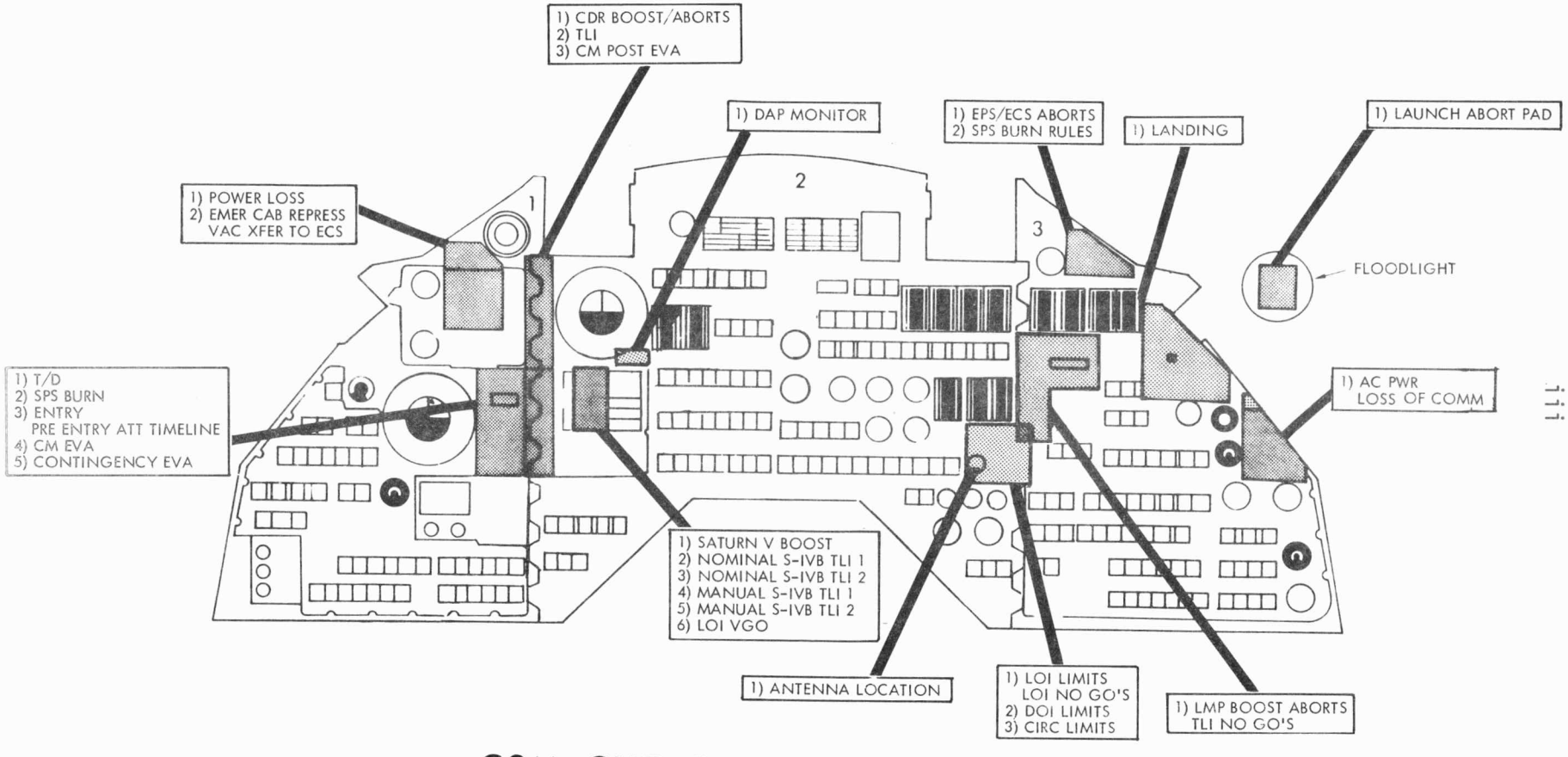


CSM CUE CARD LOCATIONS

9/4/72

L1A

CDR BOOST/ABORTS

DEC 6/7 LAUNCH 9/4/72

EMS - ΔV TO 6999.9 FPS
-3:00 DSKY - VERIFY P02
V75 DO NOT ENTER

00:00 LIFT OFF, MODE 1A
CLOCK RUNNING
P11 AUTO START
00:02 YAW MNVR
00:12 R&P PROG — +4°/sPY ±20°/sR
00:30 ROLL COMPL
00:50 MONIT qα TO
2:00, 100%, 5°ATT ERR
CABIN PRESS DECR
01:01 MODE IB
PRPLNT DUMP - RCS CMD
01:23 MAX Q
01:57 MODE IC
02:00 NO COMM - FEET WET
EDS AUTO - OFF
2 ENG OUT - OFF
LV RATES - OFF
V82 N62
02:19 IECO
02:41 OECO/STAGE/IGN
03:19 TWR JETT, MODE II
α/Pc-Pc
MAN ATT (P)-RT CMD
STEAM/H2O - AUTO
03:22 GUIDE INIT (OECO +41)
ELS/SEP cb's open
05:55 SIVB TO COI
06:00 GMBL MTRS - ON
CK GPI
P-0.58° — +9°/sPY ±20°/sR
Y+1.90°
07:41 IECO
08:11 PU SHIFT
08:36 LEVEL SENSE ARM
09:17 MODE IV
09:20 OECO/STAGE/IGN
10:24 MODE III
11:51 SECO
12:01 INSERT VI_____

THC C/O VI+100_____

L1B

MODE IA (:00 - 1:01)
:00 CCW NEUT *CM/SM SEP*
:14 [ELS AUTO]
ELS LOGIC
TWR-APEX JETT
:16 DROGUES
:18 He DUMP
<3.8K OR 28s & <10K - MAINS

MODE IB (1:01 - 1:57)
:00 CCW NEUT *CM/SM SEP*
:11 CANARDS
:14 [ELS AUTO]
ELS LOGIC, RCS CMD-ON
24K TWR-APEX JETT, DROGUES

MODE IC (1:57 - TWR JETT)
:00 CCW NEUT *CM/SM SEP*
RCS CMD-ON
:11 CANARDS
Ha>32&PLAT GO
TWR JETT
MAN ATT(P)-
RT CMD
0/135/0
BMAG(3)-1/2
EMS-ENT/NORM
.05G LT/SW-ON
MAX LIFT

[<32 or NO GO
*P+5°/SEC *
HI+P, R 90°
*DAMP RATES *
ROLL HDS DN]
30K ELS LOGIC
[ELS AUTO]
24K TWR-APEX
DROGUES

MODES II - III - IV
:00 CCW (4s)
:03 *CSM/LV SEP - PUSH*
*RCS CMD-ON *
:05 NEUT, +X TO :24

II N44(TFF)
TFF>2m: Y 45L
BMAG(3)-1/2
BAT C
[ELS/SEP close]
SM SEP
CM RCS
0/120/0
LM FNL SEP
EMS-ENT/NORM
.05G LT/SW-ON
MAX LIFT

IV N62(VI)
180/356/0
EMS-NORM/IGN
H>70 +6s or
H=200 & +HDOT

III N50(ΔR)
BMAG(3)-1/2
180/194/0
EMS-NORM
BURN ΔR=0
TFF>2m: Y 45L
BAT C
[ELS/SEP close]
SM SEP
CM RCS
0/105/0(FL)
LM FNL SEP
EMS-ENT/NORM
.05G LT/SW-ON
AT .2G
305/105/0(HL)

9/4/72

LOCATION
MDC-2 on left side of FDAI & DSKY

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

L2

9/4/72

L2

SATURN BOOST

DEC 6/7 LAUNCH 11/2/72

DET	θ	VI	$\dot{H}$	H
00:00	90	1341	0	.0
:30	85	1397	286	.6
1	68	1867	786	3.2
1:30	50	3001	1454	8.7
2	35	5000	2160	17.6
2:19	29	6804	2688	25.2
2:30	26	7782	2894	30.2
2:41	23	8966	3130	35.8
3	23	9133	2758	44.8
3:30	24	9664	2274	57.2
4	22	10295	1853	67.4
4:30	20	11024	1464	75.5
5	18	11850	1109	81.9
5:30	15	12776	793	86.5
6	13	13811	518	89.8
6:30	10	14965	290	91.7
7	7	16257	117	92.7
7:30	4	17708	10	93.0
8	6	19127	-29	92.9
8:30	1	20434	-10	92.8
9	358	21795	38	92.9
9:20	355	22777	112	93.1
9:30	355	22861	67	93.3
10	350	23395	-5	93.4
10:30	347	23957	-50	93.3
11	344	24546	-64	93.0
11:30	341	25163	-44	92.7
11:51	341	25599	-6	92.6

LOCATION
MDC-2 covering a portion of DSKY lights

LMP BOOST/ABORTS

DEC 6/7 LAUNCH 9/4/72

00:00 IA
00:50 CAB PRESS DECR
01:01 IB
01:57 IC
02:41 OECO/STAGE/IGN
03:19 TWR JETT, II
STM/H2O - AUTO
06:00 ✓GMBL MTRS ON
06:15 OMNI D
(C if AZ>96)
09:17 IV
09:20 OECO/STAGE/IGN
10:24 III
11:51 SECO
12:01 INSERTION

IA <3.8K; MAINS

IB 24K: TWR JETT
Ck LDG PHASE

IC HA>32 & PLAT GO
TWR JETT
MAN ATT P - RT CMD
0/135/0
BMAGS 1/2
EMS - ENT/NORM
.05G .05G on
Max lift

<32 or NO GO
* P rate +5°/s *

Ck LDG PHASE

II BMAGS 1/2
cb MNA&B BAT C
cb ELS/CM-SM SEP
SM SEP
0/120/0
cb LM FNL SEP
LM SEP
EMS - ENT/NORM
.05G .05G on, EMS ROLL
Max lift
Ck LDG PHASE

III BMAGS 1/2
ΔR>0: 180/194/0
(BEF/UP/HORIZ)
✓SCS TVC P&Y - AUTO
EMS - NORM
ΔV THRUST A - NORM
2:05 DIR ULL & THRUST ON
Burn ΔR = 0
ΔV THRUST (2) - OFF
cb MNA & B BAT C

SM SEP
0/105/0
(BEF/DN/Full lift)
cb ELS/CM - SM SEP
cb LM FNL SEP
LM SEP
EMS - ENT/NORM
.05G .05G on, EMS ROLL
.2G 305/105/0, Half lift
Ck LDG PHASE

CUT OUT
THIS PART

IV BMAGS 1/2
180/356/0
FIXED ATT:
(SEF/DN/HORIZ)
✓SCS TVC P&Y - AUTO
EMS - NORM
ΔV THRUST A - NORM
FIXED ATT:
(IGN @ +2:05)

<1:30 DIR ULL & THRUST ON
Fly HDOT = 0
HP >70 +6s BT
or HA = 200 & +HDOT
TFF<1+40: OFF
HP Stop: OFF
ΔV THRUST (2) - OFF

CUT OUT
THIS PART

LOCATION
MDC-3 covering
SPS INJ vlvs

TLI NO GO'S

11/2/72

LOSS OF:

ECS: CABIN FIRE or SMOKE
02 MANF (Leak)
(2) MAIN REG
PRIM COOLANT LOOP

HOOK VELCRO

CRY: 02 or H2 TANK
EPS: (2) FUEL CELL
ENTRY BAT
MN BUS
BAT BUS
AC BUS
BAT RELAY BUS
(2) INV

PRIM RAD
GLYCOL (Leak)
HUMIDITY HIGH
(2) SUIT COMP
SUIT CIR
(3) OB DUMP

HOOK VELCRO

ϕA AC1 or 2
SEC: SMJC (Activated)
SEQ SYSTEM
G&N: AUTO ATT (1) Axis
RATE DAMP (1) Axis
DIR RCS (1) Axis
(2) BMAG R, P or Y
(2) FDAI
THC

G&N: (2) RHC
CMC

HOOK VELCRO

ISS
(2) TVC SERVO LOOP
(2) DSKY
SPS: FU or OX TANK (Leak)
(2) GN2 TANK (Leak)
(2) BALL VLV BANK
(2) FEEDLINE T <40F
FU/OX ΔP >20
He TANK (Leak)

HOOK VELCRO

RCS: SM He TANK (Leak)
Leak below ISOL VLV
(2) PKG T <55 F
(2) P or Y THRUSTER
(3) R THRUSTER
(2) CM He TANK (Leak) & BLOWDOWN (ARMED <1250)
CM MANF (Leak)

HOOK VELCRO

CSM CUE CARDS

1-6

LOCATION
On floodlight

L4

HOOK
VELCRO

HOOK
VELCRO

L4

9/4/72

MODES
II III IV AK

LAUNCH ABORT PAD

9/4/72

II III IV AK		
√√√*	TIG SECO + 2:05	
	EMS ΔV	6 9 9 9 9
*√√√	ΔV — FOR HP >70	
	CUTOFF	
√√√	BT	
√√√	P (IGN)	
√√	GET 300K	
√√	P (.05G)	
√√	GET DRO	

*TIG AT APOGEE
*ΔV FOR 3350 NM SPLASH

L5

EPS/ECS ABORTS

9/4/72

EPS ABORTS
UNCONTROLLED MAIN BUS SHORT
LOSS OF ALL SM PWR SOURCES & 1 BAT
LOSS OF BOTH AC BUSES DURING I & II

CUT OUT
THIS PART

LOSS 2 OR 3 FC
- ATTEMPT RECONNECT
- EDS AUTO - OFF
- USE BAT C & AUX

MN BUS SHORT >25a
- EDS AUTO - OFF
- USE BAT C, INV 3
- PWR DN SHORTED BUS

LOSS 1 AC BUS OR INV
- USE INV 3

LOSS 1 OR 2 BATS
- EDS AUTO - OFF
- USE BAT C
- cb BAT BUS/MN BUS - OPEN

BAT BUS SHORT >22a
- EDS AUTO - OFF
- cb BAT BUS/MN BUS - OPEN
- cb BAT C/MN BUS - CLOSE

IF SEP REQ: AUTO RCS
- TVC GMBL DRIVE - 2
- SPS GMBL MTR P2 & Y2 - START
- SPS GMBL CNTL cb (4) - OPEN

LOSS BAT RELAY BUS
- NO ACTION

ECS ABORTS
LOSS OF CABIN & SUIT PRESS
CABIN PRESS & SUIT O2
NOT SUFFICIENT

L5

10/13/72

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

LOCATION
MDC-3 adj to
VHF antenna sel

L6

AC PWR

9/4/72

AC BUS LIGHT
+
MN BUS UNDER-VOLT
+
BUS OVERLOAD

CUT OUT THIS PART

AFFECTED AC BUS - OFF
WITHIN 5s (AC BUS SHORT)

MN BUS LOSS
BRING ON INV 3
RECONFIGURE FC's

HOOK VELCRO

AC USERS
SUIT COMP, GLY PUMP, TELECOM,
FC PUMPS, G&N PWR, S-BD XPND/PWR AMP,
RAD FLOW CONT

ELECTRICAL POWER USERS
O2 HTRS, GMBL MTRS, RAD HTRS, SM RCS HTRS,
POT H2O HTR, H2 HTRS, CABIN FANS, SPS LINE HTR,
LIGHTS, TAPE RCDR, GLY/EVAP STM PRESS,
H2O FLOW CONT, TEMP IN CONT, CMC TO STBY, G&N PWR DOWN,
SEC LOOP, ECS RAD CONT/HTR cb's, SCE PWR, VHF, HGA PWR,
ONE INVERTER OPERATION, INSTRU ESS MNA & B cb's,
CRYO FANS, SPS GAUGING SWITCH, TVC GIMBAL DR (P&Y) -1,
BMAG 2-OFF, C/W NORMAL - ACK

LOCATION
MDC-3 on right side
of DC AMP & VOLT ind

LOSS OF COMM

9/4/72

A. Verify comm
   Awake Configuration
B. UP TLM CMD - RESET
   Verify All cbs Pnl 225
   closed

HOOK VELCRO

C. Attempt reacquisition with HGA if signal strength <60%.
D. Select omni desired if unable to acquire with HGA.
E. Verify AUDIO CTR & Personal COMM EQUIP Operation
F. If still no comm, XPNDR & PWR AMP - SEC

HOOK VELCRO

G. Wait 90 sec.
   If still no comm, PMP PWR-AUX.
H. If still no comm, S-BD AUX TAPE-DN VOICE BU
I. Request ground transmit CREW ALERT

When CREW ALERT ON, UP TLM - UP VOICE BU

HOOK VELCRO

(Wait 3 min for MSFN reconfig.)

J. Go to T/C MALF.

LANDING

11/2/72

90K (06:02) Watch
STM peg 0:00
50K CAB PRESS B/E 0:52
SECS PYRO (2) - ARM
40K CM UNSTABLE:
RCS CMD - OFF
* 40K APEX *
* +2s DROGUES*
30K ELS LOGIC/AUTO
Start DAC
24K RCS-APEX-DROGUES 1:37
RCS CMD - OFF
*APEX *
* +2s DROGUES*
DROGUES FAIL:
*ELS - MAN *
*Stab DIR RCS *
*5K MAINS *
*ELS AUTO *
CUT OUT
PRESS incr
17K No INCREASE
CAB PRESS - DUMP
CM RCS PRPLNT (2) - OFF
10K cab 10 psi, MAINS

RRT							
.05G	Start DAC						
Vcirc							
BBO							
CUT OUT THIS PART	EBO Stop DAC-T8						
	DRO						
	MAINS						

CUT OUT
THIS PART

SURGE TK
02 - OFF
REPRESS PKG -
OFF
VHF ANT - RECY
VHF AM A - SIMPLEX
VHF BCN - ON
CAB PRESS (RH) - DUMP
Stow DAC
STRUT LOCKS (4) - UNLOCK

If NITE LANDING
cb FLOAT BAG 3 - close
PL BCN LT - LO

cb FLT/PL BUS BAT (3) - close
cb FLT/PL BUS MNA & B (2) - open
cb BAT RELAY BUS (2) - open

ELS LOGIC/AUTO verify
FLOODS - PL
800 CAB PRESS REL (2) - CLOSE
MN BUS TIE (2) - OFF

POST LANDING
cb MN REL PYRO (2) - close
MAIN RELEASE - on (up)
SECS PYRO (2) - SAFE
SECS LOGIC (2) - OFF
cb PL VENT - close
cb FLOAT BAG (3) - close
cb UPRIGHT SYS (2) - close

STAB II Inverted:
VHF A,B & BCN off
FLOAT BAGS - FILL
Upright +2m & OFF

STAB I Wait 10m:
FLOAT BAGS - FILL
+7m then OFF

LOCATION
MDC-3 on right side
of FC Module Temp mtr


HOOK
VELCRO


HOOK
VELCRO


HOOK
VELCRO


HOOK
VELCRO

P1A

TLI 10/13/72

DEC 6 LAUNCH

SIVB SEP

1. MAN ATT (3) - RATE CMD
   THC PWR - ON
   RHC PWR - NORM/DIRECT
   RCS CMD - ON
   S/C CONT - SCS
   LV XLUNAR - SAFE
2. cb SECS ARM (2) - CLOSE
   SECS LOGIC (2) - ON
   SECS PYRO (2) - ARM
3. THC +X & HOLD (5 sec)
   CSM/LV SEP - PUSH
4. OR - THC CCW (HOLD 5 sec)

O>F:ΔP>36
F>O:ΔP>26
OX:P>50

TLI

EMS ΔV TEST, SET ΔV
cb DIRECT ULL (2) - CLOSE
UP TL - BLK
EDS PWR - ON
PYRO ARM (2) - ON
THC, RHC
SC CONT - SCS
LV IND - SIVB
LV GUID - IU
XLUNAR - INJECT
SET DET : 51:00

*LV GUID LT - ON
*LV GUID - CMC
*RHC DIR (2) - OFF
*V16N20
*MNVR to R2 ALIGN

P1B

10/13/72

TB6 (TIG -9:38)
SII SEP LT, UPLK - ON
-9:00 SII SEP LT OUT
START DET UP
(TB6 1 REV IF SAFE)
51:04 (SAFE DELAY TIL 58:36)
51:05 REPRESS START
54:00 ORDEAL 300/LUNAR
56:00 ORDEAL θ = 17°
*ORDEAL θ = 0 (N20)
*R2 ALIGN = [ ] 278°
[ ] (57:10) ORDEAL - OPR
θ = 12°
*R2 IGN [ ] 271.5°
58:15 AVG G (MNVR)
58:20 TVC SERVO 1 - AC1/MNA
EMS - NORMAL
58:36 SII SEP LT - ON
(TB6 1 REV IF SAFE)
58:38 SIVB ULLAGE
59:42 SII SEP LT - OFF
(INHIBIT: STG TIL :12)
59:52 FUEL LEAD
59:55 ORDEAL θ = 6°
*ORDEAL θ = 0
*R2 IGN = [ ] 271.5°
ULLAGE OFF
59:59 LV ENG 1 LT - ON
*P = 0, Y = [ ] 00°

00:00 TIG [ ]
VI [ ] BT [ ]
00:02 LV ENG 1 LT - OFF
00:05 ORB RT OFF - IGN ON
01:32 PU SHIFT
05:46 SIVB ECO, TB7
05:56 LV ENG 1 LT - OFF +10
08:26 SIVB MNVR ORB RT (.3)

MONITOR

10°/s: BMAG 1 - STG C/O
45° P or Y: STG C/O
20°/s R
SIVB GUID LT: CONT - CMC,
GUID CMC, V46 STG C/O
NO ECO @ TFC = 0 + 1 sec or
ΔtB + 1 sec or EMS -150:
THC - CCW, NEUT in 1 sec

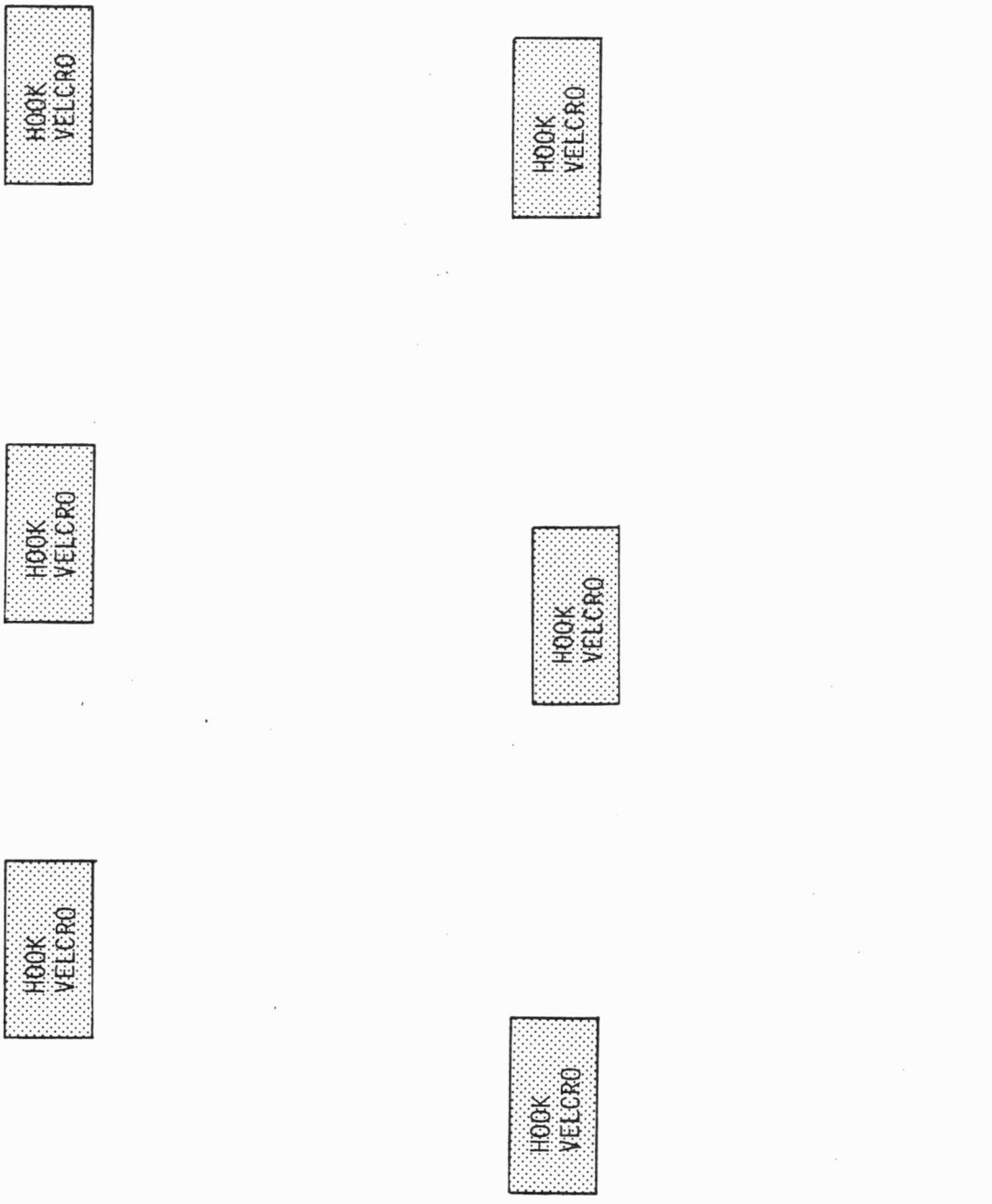
LOCATION
MDC-2 on left side
of FDAI & DSKY

P1B

10/13/72

P1A

10/13/72



P2

HOOK VELCRO | HOOK SHIM - CONTINUOUS STRIP OF 4 PLY VELCRO | HOOK VELCRO

HOOK VELCRO | HOOK SHIM - CONTINUOUS STRIP OF 4 PLY VELCRO | HOOK VELCRO

LOCATION
MDC-2 covering a portion of DSKY lights

P3

P2

9/4/72

NOMINAL SIVB TLI 1

DEC 6 LAUNCH 9/4/72

DET	θ	Ψ	VI	$\dot{H}$	H
0:00	278	0.	25603	-4	97
:30	271	358.8	26155	-11	97
1	270	359.2	26764	15	97
1:30	269	359.3	27400	94	97
2	268	359.5	28157	234	98
2:30	267	359.6	28961	453	100
3	266	359.7	29810	757	103
3:30	264	359.8	30705	1156	107
4	263	359.9	31654	1658	114
4:30	262	0.	32665	2270	124
5	260	0.1	33748	2997	137
5:30	256	0.1	34920	3824	154
5:46	256	0.1	35575	4306	164

9/4/72

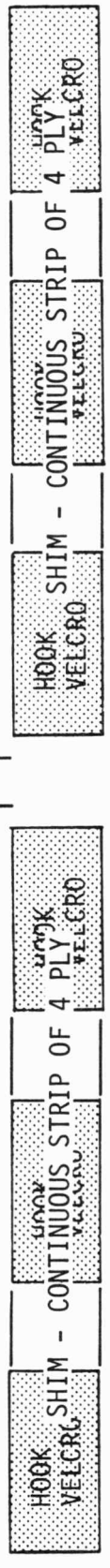
MANUAL SIVB TLI 1

DEC 6 LAUNCH 9/4/72

DET	θ	Ψ	VI	$\dot{H}$	H
0:00	271.5	0	25603	-4	97
:30	270.4	0	26155	-11	97
1	269.4	0	26764	15	97
1:30	268.3	0	27400	94	97
2	267.2	0	28157	234	98
2:30	266.1	0	28961	453	100
3	265.0	0	29810	757	103
3:30	264.0	0	30705	1156	107
4	263.0	0	31654	1658	114
4:30	261.9	0	32665	2270	124
5	260.8	0	33748	2997	137
5:30	259.7	0	34920	3824	154
5:46	259.1	0	35575	4306	164

P3

P4



LOCATION
MDC-2 covering a portion of DSKY lights

P5

P4

9/4/72

NOMINAL SIVB TLI 2

DEC 6 LAUNCH 9/4/72

DET	θ	Ψ	VI	Ḣ	H
0:00	277	0.1	25598	-5	99
:30	271	356.3	26222	-11	99
1	269	357.7	26928	26	99
1:30	268	359.0	27670	129	99
2	267	0.2	28451	306	100
2:30	266	1.4	29272	565	102
3	265	2.5	30137	915	106
3:30	264	3.6	31051	1364	111
4	263	4.7	32023	1920	119
4:30	261	5.8	33057	2590	130
5	259	6.8	34165	3374	145
5:30	256	7.4	35365	4252	164
5:35	256	7.4	35564	4404	167

9/4/72

MANUAL SIVB TLI 2

DEC 6 LAUNCH 9/4/72

DET	θ	Ψ	VI	Ḣ	H
0:00	271.0	3	25598	-5	99
:30	269.9	3	26222	-11	99
1	268.8	3	26928	26	99
1:30	267.8	3	27670	129	99
2	266.7	3	28451	306	100
2:30	265.6	3	29272	565	102
3	264.6	3	30137	915	106
3:30	263.5	3	31051	1364	111
4	262.4	3	32023	1920	119
4:30	261.4	3	33057	2590	130
5	260.3	3	34165	3374	145
5:30	259.2	3	35365	4252	164
5:35	259.1	3	35564	4404	167

P5

T&D 9/4/72

SIVB Mnvr to SEP ATT: TB7 +15 min

_____:_____:_____SIVB MNVR

_____:_____:_____SEP

_____/_____/_____RPY SEP ATT

_____/_____/_____RPY EXTR ATT

DIR O2, CAB PRESS ~5.7
cb DOCK PROBE (2) - close

CUT OUT
THIS PART

COAS PWR - on
RCS DAP 11103/01111
V46E OMNI C
N17 (SEP) & N22 (EXTR)
V63E (SIVB mnvr)
PROBE EXTD/REL - RETRACT
SM RCS tb(8) - gray
AUTO RCS SEL (16) - MNA/MNB
EMS NULL BIAS CK, -100/ΔV
FDAI - 5/1
MAN ATT (3) - RATE CMD
LIMIT CYCLE - OFF
ATT DB - MIN, RATE - LOW
THC PWR - on (up)
RHC NORM (2) - AC/DC
RHC DIR (2) - MNA/MNB
ATT SET 0/180/0
Set up TV
CMC MODE - FREE
SC CONT - CMC
BMAG (3) - RATE 2
cb RCS LOGIC(2) - open
TVC SERVO PWR #1 - AC1/MNA
Set DET 59:30
FC REAC vlv - LATCH
V49E F 06 22 (EXTR)
THC & RHC - ARMED
cb SECS LOGIC (2) - close
cb SECS ARM (2) - close
SECS LOGIC (2) - on (up)

RCS CMD - ON
HBR/RCD/FWD/CMD RESET
SECS PYRO ARM (2) - ARM
GDC ALIGN, EMS MODE - NORM
V62E

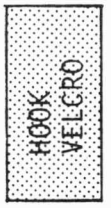
59:30 Start DET
59:50 CMC MODE - AUTO
59:58 Thrust +X & hold

00:00 CSM/LV SEP pb
00:03 THC release ~0.5 fps
Ck SM RCS PRPLNT, He &
FUEL PRESS
Ck O2 TK 3 ISOL vlv
MAN ATT(P) - ACCEL CMD
00:15 Pitch up ~0.5°/sec
When P error needle +:
PRO F 50 18 OMNI B
PRO 06 18
MAN ATT(P) - RATE CMD
F 50 18 Mnvr Compl
ENTR

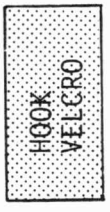
THRUST +X ~4 sec, ~.7 fps
cb DIR ULL (2) - open
RCS DAP 11102/01111
Start TV & DAC
Stab/align CSM
BMAG (3) - 1/2

CAPTURE PROBE tb - bp
*Remains gray: *
*PROBE RETR-PRIM 1 *
*(SEC 1)in that sys *
CMC MODE - FREE
Damp ~10 sec
Align P&Y with THC <3°
PROBE RETR - PRIM 1 (2 alt)
SECS PYRO ARM (2) - SAFE
SECS LOGIC (2) - OFF
EDS PWR - OFF
cb EDS (3) - open
PROBE EXTD/REL - OFF
PROBE RETR (2) - OFF
cb DOCK PROBE - open
TAPE RCDR - off (ctr)
PCM BIT RATE - LOW
DAC & TV - off (ctr)

LOCATION
MDC-1 covering ABORT
and LV light panel


HOOK
VELCRO


HOOK
VELCRO


HOOK
VELCRO


HOOK
VELCRO

SPS BURN

10/13/72

EMS ΔV CK, Set ΔV, EMS FUNC - ΔV
Ck SIM BAY
BMAG (3) - RATE 2
AUTO RCS SELECT - as req
LOAD DAP
Set DET, SC CONT - CMC/AUTO
MNVR to PAD BURN ATT
BORESIGHT & SXT STAR CHECK, V41 N91E
P40 to F 50 18, GDC ALIGN

GMBL TRIM

P _____

Y _____

HOOK VELCRO

CUT OUT THIS PART

cb STAB CONT (Pnl 8) & SPS(12) - close
MAN ATT (3) - RATE CMD
ATT DB - MIN, RATE - LOW
SCS TVC (2) - RATE CMD
ΔVCG - LM/CSM or CSM
TVC GMBL DR P & Y - AUTO

HOOK VELCRO

54:00 *MN BUS TIE (2) - on.
(-06:00) *TAPE RCDR - HBR/RCD/FWD/CMD RESET
SPS He vlvs (2) - AUTO ✓, Ck N2A & N2B
*TVC SERVO PWR 1 - AC1/MNA, 2 - AC2/MNB
RHC PWR NORM (2) AC, DIRECT (2) - OFF
*BMAG (3) - 1/2
SC CONT - SCS, RHC 2 - ARMED
55:00 PRIMARY TVC CHECK
(-05:00) *GMBL MOT P1 & Y1 - START
Verify trim control & set, Verify MTVC
SCS: SCS TVC (2) - AUTO
SC CONT - CMC(SCS), THC - CW, Verify NO MTVC
SEC TVC CHECK
*GMBL MOT P2 & Y2 - START
Set GPI trim, Verify MTVC
THC neutral, Verify NO MTVC
Verify GPI returns to 0,0 (CMC) or trim (SCS)
RHC PWR NORM(2)-AC/DC
DIRECT (2) - MNA/MNB
(TRIM) BMAG (3) - RATE 2
PRO
BMAG (3) - 1/2
ENTR

HOOK VELCRO

HOOK VELCRO

LOCATION
MDC-1 covering ABORT and LV light panel

SPS BURN CONTD

10/13/72

*F 50 25 GMBL TEST OPTION
(ACCEPT) PRO
06 40 FDAI SCALE - 5/1
RATE - HIGH (IF SCS: After IGN), Update DET

59:00 *EMS - NORM, THC PWR - ON
(-01:00) *ΔV THRUST A(B) - NORM, THC & RHC (2) - ARMED
59:30 *Ck PIPA BIAS <2 fps for 5 sec
(-00:30)
59:XX *ULLAGE _____
(-00:XX)

HOOK VELCRO

F 99 40 (-00:05) ENG ON ENABLE REQUEST

00:00 IGN, If SCS: THRUST PB - PUSH
00:03 BT >10 sec: ΔV THRUST B(A) - NORMAL
00:XX ECO
F 16 40 ΔV THRUST (2) - OFF
GMBL MOT (4) - OFF
TVC SERVO PWR 1 & 2 - OFF
F 16 85 Null residuals
RHC & THC - LOCKED
THC PWR - OFF, RHC PWR DIRECT (2) - OFF
cb DIRECT ULLAGE (2) - open, cb SPS P1 & Y1 - open
Record ΔV counter & residuals
EMS FUNC - OFF, MODE - STBY
PRO (MINKEY: To Seq 3X.2), ATT DB - MAX
BMAGS (3) - RATE 2, MN BUS TIE (2) - OFF
PCM BIT RATE - LOW, Ck SIM BAY

HOOK VELCRO

HOOK VELCRO

THRUST FAIL ROUTINE					
EXIT	9740	E	0640	9940	E 1685
RECYCLE	9740	E	0640	9940	P 0640
ERR NEEDLES	9740	P	0640		

G&N Reignition
F 97 40
ENTR
F 99 40
ΔV THRUST
✓GMBL TRIM
ULLAGE
PRO for IGN

HOOK VELCRO

SCS Reignition
Check ATT
BMAGS
TVC (2) - AUTO
SC CONT - SCS
EMS - ΔV/NORM
ΔV THRUST
ULLAGE & THRUST

K2

SPS BURN RULES

9/4/72

CUT OUT
THIS PART

FU/OX TEMP >40 (45-75°F)
FU/OX PRESS >115* (170-195 psi)
FU/OX ΔP <20 psi
Pc >70* (95-105 psi)
N2 A&B >400 (2900 psi max)

*TIGHT:
>160 & >80

BURN: Start watch, INJ VLVS (4) - OPEN
He VLV tb (2) - gray, PUGS - balanced

SPS PRESS lt
Continue critical burn
FU/OX LO: He VLV (2) - ON, FU/OX HI: He VLV (2) - OFF
HI ΔP: He VLV(2) - ON, If persists - OFF till Pc <70*

EARLY SHUTDOWN
He VLV (2) - ON
cb PILOT VLV (2) - close ✓
cb He VLV (2) - close ✓
cb EPS GP 3 & 5 - close ✓
ΔV THRUST (2) - NORM

NO SHUTDOWN
ΔV THRUST (2) - OFF
THC - CW
THRUST DIR ON - OFF
cb PILOT VLV (2) - open
cb EPS GP 5 - open

K2

10/13/72

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

LOCATION
MDC-3 on left side
of VHF ANTENNA Sel sw

LOI LIMITS

DEC 6 LAUNCH

11/2/72

VGO	BT	VM	MODE	ABORT LIMITS	CALL OUT MODES AND LIMITS
2980	00	0	I DPS @ 2hr	TIGHT	EARLY CUTOFF
2797	0+28	183		TK <160 & LO Pc ΔP >20 & LO Pc Pc <80 or DECR >10 & LO ΔV	OUT OF LIMITS: NO RESTART LIMITS GOOD: RESTART
2632	0+53	348	I DPS @ 30m		
2367	1+31	613	I DPS @ 30m +APS @ 2.5hr	LOOSE	EARLY CUTOFF
2147	2+03	833	II DPS @ 2hr +DPS @ PC +APS @ PC+2hr	TK <115 & LO Pc Pc <70 & other cues	OUT OF LIMITS: NO RESTART LIMITS GOOD: RESTART
1780	2+54	1200	II DPS @ 2hr +DPS @ PC	BALL VLV FAIL, SHUTDOWN GOOD BANK 10 sec PRIOR to NOM C/O	
1437	3+40	1543	III DPS @ PC	RESIDUALS: NO TRIM	
1050	4+30	1930	III DPS @ PC	TIGHT	MAX IGN DELAY: 3+40
0	ECO 6+35	2980	III DPS @ PC +APS @ 2hr	C/O: BT+10 Sec, IGN DELAYED: 1:20-2+00: BT+5, >2+00: BT	

LOCATION
MDC-2 covering
CABIN TEMP AUTO tw

LOI NO GO'S 11/2/72

LOSS OF:

ECS: CABIN
FIRE or SMOKE
O2 MANF (Leak)
(2) MAIN REG
PRIM COOLANT
PRIM RAD
GLYCOL (Leak)
HUMIDITY HIGH
(2) SUIT COMP & VAC CLNR
SUIT CIR
(3) OB DUMPS

4 PLY SHIM VELCRO

CRY: O2 or H2 TANK

EPS: (2) FUEL CELL
ENTRY BAT
MAIN BUS
BAT BUS
AC BUS
BAT RELAY BUS
(2) INV
ϕA AC1 or 2
(4) DOCK LATCH

HOOK VELCRO

SEQ: SMJC ACTVD or SEQ SYS

G&N: AUTO ATT (1) Axis
RATE DAMP (1) Axis
DIR RCS (1) Axis
(2) BMAG R, P or Y
(2) FDAI
(2) RHC
CMC & DPS
ISS
O-DAC & DPS
(2) TVC SERVO LOOP
or (1) & DPS
(2) DSKY & DPS

HOOK VELCRO

SPS: FU or OX TANK (Leak)
(2) GN2 TANK (Leak)
or (1) & DPS
(2) BALL VLV BANK
or (1) & DPS
FEEDLINE T <40F
FU/OX ΔP >20
Pc <70
FLG T >480F
He TANK (Leak)

RCS: (2) SM He TANK (Leak)
(2) Leak below ISO VLV
(2) PKG T <55F
(2) P or Y THRUSTER
(2) R THRUSTER
(2) CM He TANK (Leak)
& BLOWDOWN (ARMED <1250)
CM MANF (Leak)

ENTRY

11/2/72

43:00(17:00) P62
HRZN CK:(31.7±5)P____±5°
SCS, YAW LEFT (315°),
BMAGS - ATT 1/RATE 2

45:00(15:00) SEP (Y=315°)
MIN IMP/RATE 2, YAW TO 0

FDAI - 5/5 PITCH TO .05G ATT (152)

R_____P_____Y_____

.05G FILTER
- down ✓

CUT OUT
THIS PART

____:____ MOONSET GET__:__:____

59:00(-1:00) PITCH NEEDLE OFF PEG, CK DET

00:00 RRT_____:_____:_____

____:____ .05G

+3 NO .05G LT & P64 RUNNG EMS - BU/VHF RNG
+5 NO .05G LT & NO P64 CK CLOCK
+5 .05G LT ON & NO P64 FLY EMS
CMC GO/RT CMD/SC CONT-CMC
NO DAP/RT CMD/FLY BETA
NO CMC/RT CMD/FLY EMS
1.5G LIFTUP

G MAX SYS OFF >1G-NO GO

5.5G NO ROLL RVS SCS-EMS

____:____ V CIRC

*DL_____ _____ *VL_____

____:____ DROG GET ____:____:____

P63
06 64 .0G. VI., RTG.0
V16 63 RTG.0, VIO.,
TFE (MON)
KREL -5:28(55:00)
59:00 PITCH NEEDLE OFF PEG
06 64 RTGO → EMS

.05G CMC RET.05G±5
↓ (EMS .05G+3:MAN)
P64 .05:(L DN: CMC CMD,
PAD, NO COMM)
06 74 BE.TA, VI., .0G
1.5 L UP IF SHALLOW

MAX ____ ±1G. METER
(EMS)
>6.5 >90° ROLL (EMS)

DO _____ MODULATE

P65 IF 26 < VL < 18
16 69 BE.TA

.DL _____/____ (EMS)

PRO VL. _____/____ (EMS)
06 74 BE.TA, VI., .0G
V16 64 .0G, VI., RTG.0(EMS)
N68 BETA, VI, HDOT

P66 <.2G KREL
06 22 RPY HRZN 31.7±12°
<.05G ATT HOLD L UP,
✓ N22
EXIT P66
V16 68 BE.TA, VI., HDOT.
NEG (IF +:EMS)

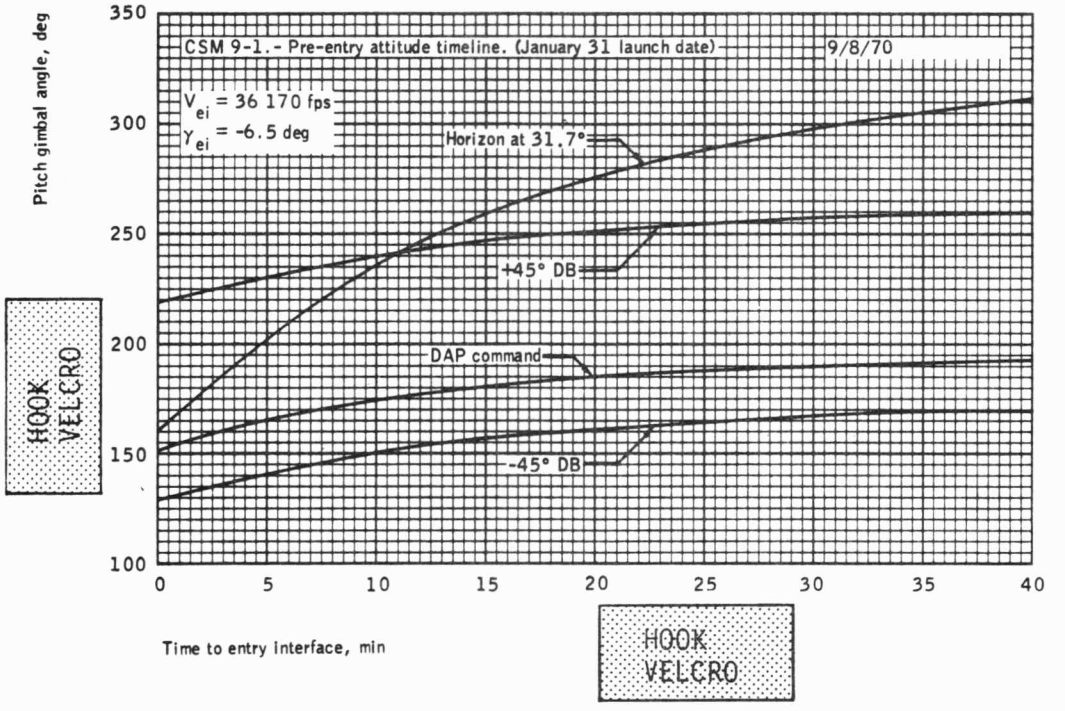
P67 .2G
06 66 BE.TA, XER.R, DNER.R
V16 64 .0G, VI., RTG.0(MON)
3400:STEAM PRESS
1900:N67
1700:50K
16 67 RTG.0, L.AT, LO.NG

LOCATION
MDC-1 covering ABORT
and LV light panel

HOOK VELCRO

HOOK VELCRO

PRE-ENTRY ATTITUDE TIMELINE



HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

P61

06 61 L.AT _____

LO.NG _____

LIFTUP -00001

PRO (41:30)

06 60 GM.AX _____, V400K,

γ EI_____

PRO (EMS)

16 63 RTG.0_____(_____)

VIO. _____(_____)

PRO DET=60-TFE+RET.05G

RET.05G_____

P62

50 25 00041 SEP

PRO ACTIV ENTRY DAP

(ATT HOLD)

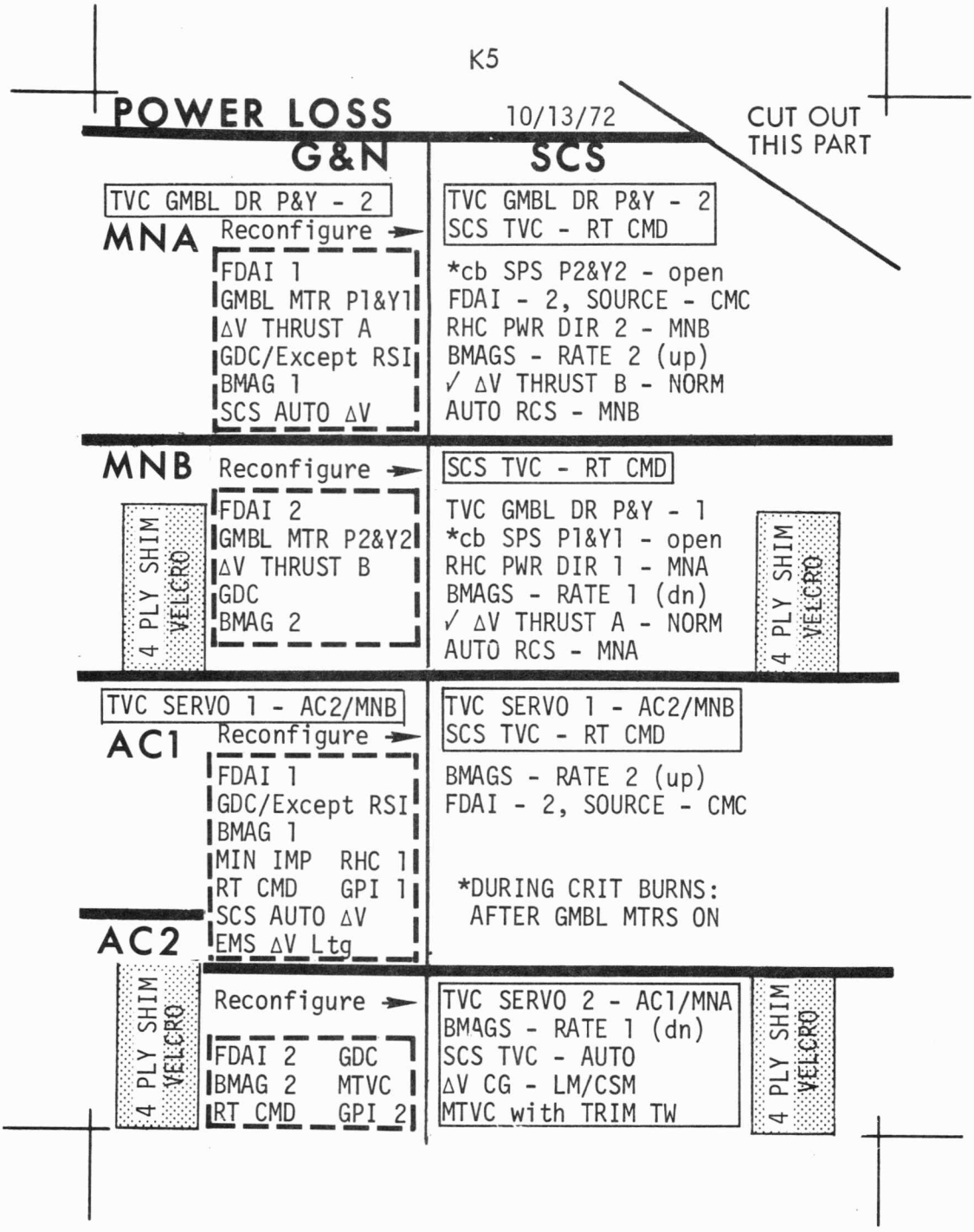
06 61 L.AT, LO.NG,

HDS UP(DN): +(-)

PRO (CMC GUIDANCE)

06 22 (X AXIS >45° OF VEL)

ENTRY CONTINUED



LOCATION
MDC-1 covering EMS scroll ind

K5

BRAKING GATES

10/13/72

R(nm)	$\dot{R}$(fps)	RETICLE ANGLE(deg)	R(ft)
1.50	45	.08	9000
1.00	30	.13	6000
.50	20	.26	3000
.25	10	.54	1500
.08	5	1.60	500
.05		2.70	300
.03		4.00	200
.02		8.50	100

LOCATION
K6 MDC-2 above
CABIN TEMP AUTO tw
K7 MDC-2 above DSKY

K6

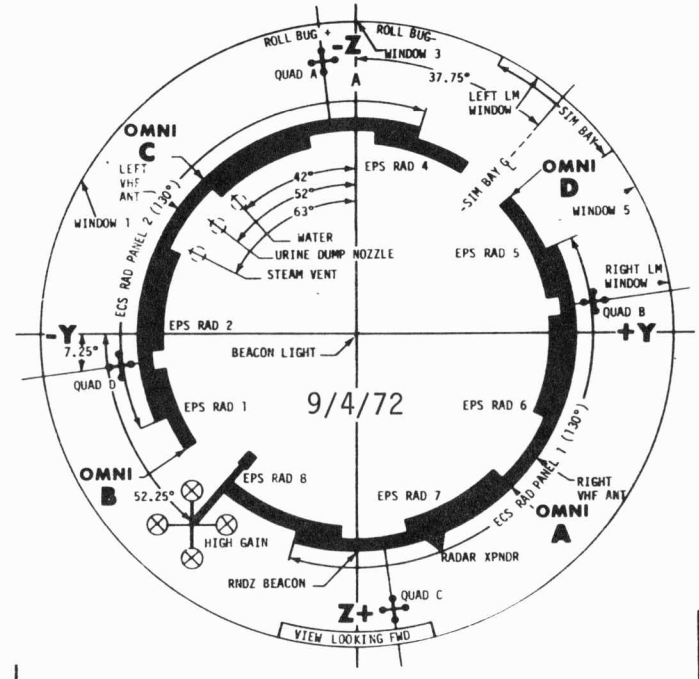
HOOK VELCRO

HOOK VELCRO

9/4/72

HOOK VELCRO

K6



MNVR COMPLETION TIME

1. During auto mnvr
   V4 N1 E, 3316 E
   Record R1 & R2

HOOK VELCRO

2. V24 N25 E
   Load Step 1
   R1 & R2 (octal)

9/4/72

3. V6 N34 E
   (hrs, min, .01 sec)
   MNVR Completion
   time - 1 sec

HOOK VELCRO

HOOK VELCRO

K7

	VEHICLE CONFIG	QUAD A/C FOR $\ddot{X}$	QUAD B/D FOR $\ddot{X}$	ERR DEADBAND	RATE SELECT
R1	0 = No DAP 1 = CSM 2 = CSM & LM 3 = CSM & SIVB 6 = CSM & LM (Ascent Stg only)	0 = Fail A/C 1 = Use A/C	0 = Fail B/D 1 = Use B/D	0 = ±0.5° 1 = ±5.0°	0 = 0.05°/sec 1 = 0.2°/sec 2 = 0.5°/sec 3 = 2.0°/sec
		N78 +90/52.25 +X = 180 -X = 000		9/4/72	
	Roll Quad Select	Quad A	Quad B	Quad C	Quad D
R2	0 = Use B/D 1 = Use A/C	0 = Fail 1 = Use	0 = Fail 1 = Use	0 = Fail 1 = Use	0 = Fail 1 = Use

K7

K8

SIM BASIC CONFIG

9/4/72

PNL 8 AUTO RCS SELECT - OFF
except A1,C2 (or D1,B2) A3,C4,B3,D4

PNL 3 PCM BIT RATE - HIGH
S-BD AUX TV - SCI

PNL 181 SM/AC PWR - ON
LOGIC POWER (2) - DPLY/RETR

PNL 230 MAP CAM ON - STBY
MAP CAM TRACK - RETRACT
LS OPERATE - STBY
LS HF ANTENNA 1&2 - RETR
IMAGE MTN - OFF
LASER ALTM - OFF
RCDR - HTRS
RADAR - OFF
MODE - HF
DATA SYS - ON
IR - ON
PAN CAM SELF TEST - HTRS
PAN CAM STEREO - STEREO
PAN CAM MODE - STBY
PAN CAM PWR - off (ctr)
V/h OVRD - off (ctr)
UV SPECT - ON
Verify map camera retr (tb-gray)

HOOK VELCRO

HOOK VELCRO

PNL 278 MAP CAM/LASER EXP COVERS - CLOSE
IR EXP COVER - CLOSE
UV EXP COVER - CLOSE

PRE-SPS BURN PREP

LASER ALTM - OFF
ANT, CAM & COVERS - RETR
LOGIC PWR (2) - OFF
SM/AC PWR - ON
MAP CAM ON - STBY
IMAGE MTN - OFF
PAN CAM PWR - BOOST

POST-SPS BURN PREP

PAN CAM PWR - OFF
LOGIC PWR (2) - DPLY/RETR

LOCATION

ADJACENT TO PNL 230

HOOK VELCRO

HOOK VELCRO

SIM EXP STATUS CODE

L1	SIM ATT **A**	MAP CAM COVER/POS **B**	LS HF ANT **C**	IR COVER **D**	UV COVER **E**
	+ +X FWD - -X FWD * NON SIM	0 CLOSED 1 OPEN/EXTD 2 OPEN/RETR	0 RETR 1 EXTD	0 CLOSED 1 OPEN	0 CLOSED 1 OPEN
L2	PAN CAM **F**	MAP CAM/ LASER ALTM **G**	LS **H**	IR **I**	UV **J**
	0 OFF/STBY 1 PWR/STBY 2 PWR/OPERATE 3 BOOST/STBY	0 OFF/OFF 1 STBY/OFF 2 ON/ON 3 STBY/ON 4 ON/OFF 5 ON(IMC-OFF) /OFF	0 OFF 1 HF MODE 2 VHF MODE 3 RECV ONLY 4 STBY	0 OFF 1 ON	0 OFF 1 ON

USUAL CONFIGURATIONS

PRE - SPS BURN PREP (*0000) (31000)

SLEEP (±0011) (01011)

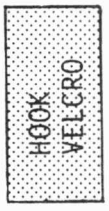
MIN POWER (0000) (00000)

SIM BAY SECURE (0000) or (0001)
(Dumps, Thermal, Thrusters) (01011)

CM EVA

10/13/72

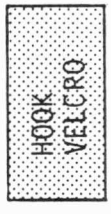
Don helmet, lock
Don wrist tether, ring fwd
Don LEVA, verify alignment
Don comfort gloves



Don one glove, lock
Pnl 603 EVA O2 - OFF
Don other glove, lock
Pnl 603 EVA O2 - ON
Modulate OFF/ON as reqd
to pressurize CMP
Cuff gage 3.7-4.0 psig
Pnl 604 SUIT PRESS ALARM - ON
Verify tone - off
Pnl 10 Adjust CMP Master Vol
if required
LMP Pnl 351 EMER CAB PRESS - OFF

EVA WARNING TONE CHECK
CMP Monitor cuff gage
PURGE VLV - HI (CCW), verify EVA
tone on at 3.1-3.4 psig,
then PURGE VLV - CLOSE
Verify tone - off
PURGE Vlv - lock, HI
CDR install pin
Verify flow & cuff gage reads
3.7-4.0 psig

CMP INTEGRITY CHECK
Pnl 603 EVA STA O2 - OFF
Monitor cuff gage to verify PCV
closes. Monitor press decay for
1 min, verify <0.8 psi



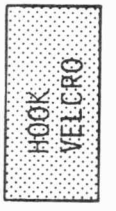
(If suit press decays
0.3 to 0.8, reverify
helmet, wristrings,
outer zipper and all
connectors locked.)

Tone - on (low flow)
Pnl 603 EVA STA O2 - ON
Install guard
Verify PGA press 3.7-4.0 psig
(stable), tone - off
EVA STA press gage 100-500 psi
Verify SRG TK press >750 psia

CABIN DEPRESS
GN2 vlv handle - pull
Gage - min, leave in vent position
Verify helmet & gloves locked
Confirm GO for depress from Hou

NOTE: EVA warning tone may come
on momentarily during depress

Side hatch dump vlv - open
O2 Hi Flow lt may come on before
cabin press reg lock up
Close side hatch dump
vlv at 3.25 psia
O2 FLOW ind <0.5 LB/HR
CDR/LMP verify suit 3.5-4.0 psia
Side hatch dump
vlv - open
Dump cabin to zero



CDR/LMP verify suit
3.5-4.0 psia (stable)
HI O2 Flow lt - off
CMP verify CMP cuff
gage press 3.7-4.0 psig
EVA STA press gage 100-500 psi,
No tone
Pnl 3 S-BD AUX TV - TV
Pnl 9 MODE - INT/PTT

HATCH OPENING
Lock pin release knob - unlock
ind released (white to yellow)
Gear Box sel - unlatch
ACTR handle sel - U
Unstow ACTR handle
Unlock Hatch
ACTR handle SEL-L
Stow ACTR handle
Gear Box sel - latch
CMP/LMP lower inner visors

Open hatch
Verify Hex clears
Hatch full open

LOCATION
MDC-1 covering ABORT
and LV light panel

CM EVA CONTD

EVA OPERATIONS 10/13/72

Egress
Lower outer visors
Verify TV quality
CMP adj aperture if reqd

HOOK VELCRO

DAC: (T8,1/250,3)
6 fps
TV: Zoom 25, Focus 4,
Aperture 22

Install/align TV/DAC pole
Jettison jett bag
Pnl 15 UTILITY PWR - ON
DAC - on, verify DAC operation
Transfer to SIM BAY and
enter foot restraints
LMP tend umb, stop at mark
CMP verify cuff gage 3.7-4.0 psig

Retrieve Lunar Sounder cassette
Remove cover
Attach hook and lock
Rotate handle and remove
cassette
Transfer to hatch
LMP attach LMP tether large hook
to cassette and lock
Remove wrist tether hook
Temp stow cassette on LMP couch
CMP to work sta
Cuff gage 3.7-4.0 psig

Retrieve Pan Camera cassette

HOOK VELCRO

Remove hard and soft
covers
Attach hook and lock
Pull pip pin, squeeze
handle and remove
cassette
Transfer to hatch

LMP attach LMP tether large hook
to cassette and lock
Remove wrist tether hook
Temp stow cassette on LMP couch
CMP to work sta
Cuff gage 3.7-4.0 psig

Rest - inspect SIM BAY
Retrieve Mapping Camera cassette
Remove hard and soft covers
Attach hook and lock
Squeeze handle and rotate
Remove cassette
Transfer to hatch

LMP attach CDR tether large hook
to cassette and lock
Remove wrist tether hook
Temp stow cassette
LMP move to ctr couch area
Pnl 15 UTIL PWR - OFF
Rest at hatch
CMP remove TV/DAC pole, stow
under CDR couch
Ingress
S-BD AUX TV - OFF (ctr)
CDR Pnl 9 MODE - VOX

HOOK VELCRO

HATCH CLOSING
Unstow lanyard
Pull and close hatch
Verify hex clears
Close hatch
Unstow ACTR handle
Lock hatch, verify lock pin
dropped in (white to white)
Stow ACTR handle
ACTR handle sel - N
Gear Box sel - latch, ver

CABIN REPRESS
Rapid repress: Use EVT DECAL
Side hatch dump vlv - close
Pnl 326 REPRESS PKG - OFF
Pnl 601 REPRESS O2 - OPEN,
close @ cabin press 1 psia
Monitor cab gross leak (30 sec)
Pnl 601 REPRESS O2 - OPEN
Monitor REPRESS O2 to zero
Cabin press ~2 psia
Pnl 601 REPRESS O2 vlv - CLOSE

HOOK VELCRO

CMP umb flow to
cab to 3.0 psia
Go to Cue Card
CM POST EVA

CM POST EVA

K10 10/13/72

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

CMP discon OPS O2 hose, hold
(direct into open volume)
OPS O2 - on
Hi O2 Flow lt - on
Monitor cabin press to
5.0 psia
OPS O2 - OFF
Hi O2 Flow lt - off
Pnl 9 MODE - INT/PTT

POST EVA
Pnl 351 EMER CAB PR - BOTH
CDR/LMP doff gloves, helmets
Pnl 380 SUIT CKT
RTN Vlv - open (pull)
Unstow Accessory bag
(CDR TSB, top pkt)
CMP PURGE VLV - HI, pull
pin & activate PURGE VLV
Stow pin in accessory bag
Pnl 603 EVA STA O2 - OFF
Pnl 604 SUIT PR ALARM - OFF
When PGA press zero psid,
CMP pop glove

DO NOT REMOVE GLOVES

Pnl 603 EVA STA O2 - ON
CMP place both gloves in
accessory bag
Remove gloves using wrist
rings only
Doff helmet with LEVA
Pnl 603 EVA STA O2 - OFF
Verify SURGE TK press >400
Pnl 326 REPRESS PKG - FILL

Go to CSM EXP/EVA C/L
page X/3-19

LOCATION
MDC-2 on left side
of FDAI

CM EVA MALF

9/4/72

1 TONE ON

OPS - ON

Tone on:
Pnl 603 press 65-500 (WARNING TONE MALF)
Pnl 603 press not 65-500:
  PURGE VLV - HI
  PCV - CLOSE, SCU - CLOSE
  Pnl 603 press <65: EVA STA O2 - OFF
  (Umb or CM leak or supply blkd)
  Pnl 604 - OFF, Tone off

Tone off:
  Cap PRV, OPS - OFF
  PGA press 3.7-4.0 (PRV failed open)
  PGA press not 3.7-4.0:
    OPS - ON
    (PCV failed open or PGA leak)

2 CUFF GAGE <3.4 & NO TONE

OPS - ON

HOOK VELCRO

PGA press not 3.4-4.0
(Gage failed)
PGA press 3.4-4.0:
(Tone failed)

Pnl 603 press 65-500:
Cap PRV, OPS - OFF
PGA press 3.7-4.0
(PRV failed open)
PGA press not 3.7-4.0:
  OPS - ON
  (PCV failed open or PGA leak)

HOOK VELCRO

Pnl 603 press not 65-500:
PURGE VLV - HI
PCV - CLOSE, SCU - CLOSE
EVA STA O2 - OFF
(Umb or CM leak or PGA inlet blocked)

3 CUFF GAGE >4.0

OPS - ON
PURGE VLV - HI, SCU - CLOSE

PGA press decr (PCV failed closed)
PGA press had been steady:
  PURGE VLV - CLOSE
  SCU - OPEN, OPS - OFF

PGA press still >4.0 (Gage failed)
PURGE VLV - CLOSE
  SCU - OPEN, OPS - OFF

CM EVA MALF CONTD

9/4/72

4 LOSS OF COMM FROM EVA

Verify S-BD MODE VOICE not in RELAY
Pnl 10 VOX SENS - 9
Ck VOLUME tw's
Pnl 10 MODE - INTERCOM/PTT

Voice OK (Pnl 10 VOX failed)

Voice not OK:
Pnl 10 AUDIO CONT - BACKUP
Voice OK:
  Pnl 9 MODE - VOX
  VOX SENS - as reqd
  VOLUME tw's - as reqd
  (CMP AUDIO CTR failed)
Voice not OK: (Personal comp failed)
  Suit press tone may be inoperative

HOOK VELCRO

Hand signals:
1. Two tugs on umb:
   Look at LMP
2. CMP points to ear,
   Thumbs
   up: can hear
   dn: cannot hear
3. Monitor Pnl 603 gage

HOOK VELCRO

5 EVA COOLING INADEQUATE, CUFF GAGE NORMAL

Pnl 603 press low, <100psi:
OPS - ON
SCU - CLOSE, PCV - CLOSE
PURGE VLV - HI
EVA STA O2 - OFF (System leakage)
Pnl 604 - OFF, Tone off

Pnl 603 press high, >500psi:
(Restriction in system)
Monitor PGA press often
OPS - ON
PURGE VLV - HI, as reqd

Pnl 603 press norm, 100-500psi:
(EVA crewman working too hard
  or system leakage)
Monitor PGA press often

CONTINGENCY EVA

A CM PREP 11/2/72

1 Unstow from A8:
   Sect 1 EMU Maint Kit & (2) O2 Interconnects
   Sect 3 Tool kit
   Side A8 (3) MDC Bars

HOOK VELCRO

2 C & R SUIT FLOW - OFF
3 C hoses stowed around CDR X-X foot strut, R hoses on LMP couch
   Intercon C & R O2 hoses
4 Install EVA Stabilizer Strut
5 TSB's installed on L Girth Ring and R & L LEB
6 Verify Tool Kit Jack Screws fully opened inside, snap to LH Girth Ring
7 Stow EMU Maint Kit in CMP TSB, top pkt
8 Hatch counterbalance: Pull Pip Pin & stow in R-6 or disconnect Hex with Tool B
9 Stow MDC Ingress bar
10 Install MDC bars & mtr covers (4 EVA Bag, A2)

B CABIN PREP

1 Depress tunnel, if docked
2 Stow optics & COAS
3 Stow cameras & bkt in TSB

HOOK VELCRO

4 Set up COMM panels
5 Stow helmet shield (PGA bag) in Jett bag
6 Disconnect PGA bag
7 Verify BUSS's covers installed & snapped
8 Stow BUSS's in PGA bag
9 Remove center couch
10 Close/lock marmon clamps
11 Stow under LMP couch, using 2 straps (R5)
12 Remove PGA (PGA bag), place on LMP couch
13 Disconnect PGA bag and stow under LMP couch
14 Stow RHC 1 in F2
15 L & R couch, stow pans, 0°
16 LH X-X Strut: (Connected or disconnected & tie off)
17 Stow in Jett Bag: A9 contents & partition, misc waste
18 Unstow B5 & B6
19 Prep Jett bag, secure draw string, tape

CUT OUT THIS PART

C SYSTEM PREP

1 Pnl 325 CAB PRESS REL vlv (2) - NORM
2 Pnl 326 REPRESS PKG vlv - FILL
3 Pnl 326 SURGE TANK vlv - ON
4 Pnl 351 CAB REPRESS - OFF

HOOK VELCRO

5 Pnl 600 EMERG O2 vlv - CLOSED
6 Pnl 601 REPRESS O2 vlv - CLOSED
7 Pnl 602 REPRESS O2 865-935 psi
8 Pnl 2 CRYO PRESS - SRG/3
9 Pnl 2 SURGE TANK PRESS 865-935
10 Pnl 2 CAB FANS - OFF
11 Ck LM Status, prep for egress
12 Stow loose items

D PLSS/COMM CK (if reqd)

1 LM request:
   VHF AM A - DUPLEX
   VHF AM B - off (ctr, verify)
   VHF RANGING - OFF (verify)
   Pnl 9 VHF AM - T/R
2 Verify comm with 2 PLSS: CDR/EVCS #1, then LMP/EVCS #2
   OR 1 PLSS: EVCS #1 or #2

HOOK VELCRO

E EXT LTS

1 RUN/EVA-on(up)
2 RNDZ/SPOT-off

LOCATION
MDC-1 covering ABORT and LV light panel

CONTINGENCY EVA CONTD

11/2/72

F FINAL CABIN PREP
1 Don PGA
2 L O2 hoses connect RR/BB & locked
3 PGA FLOW DIVR vlv (2) - as reqd
4 Zipper - lock/lock
5 Unstow helmet
6 Feedport cover locked

HOOK VELCRO

7 Apply anti-fog (EMU Kit, CMP TSB, top pkt) dry with tissue
8 Unzip fecal bags (2)
9 Don helmet, gloves & lock
10 Pnl 380 SUIT CKT RET vlv - close (push)
11 Pnl 351 EMERG CAB PRESS - OFF
12 Ck connections: Helmet, gloves O2, comm, feedport
13 Ingress CDR couch

G PRESS INTEGRITY CK
1 Use DECAL - EVT
2 Sel cont mode, mnvr to EVT att
3 Adj mirror to read cab press

H CABIN DEPRESS
1 Use DECAL - EVT

HOOK VELCRO

I HATCH OPENING
1 Use DECAL - EVT

J EVT STATION KEEP
1 Jett Bag, B5 & B6

2 AUTO RCS SEL - undock xfer
Pitch A3 & C4 - OFF
Verify 1/2° DB
3 AUTO RCS SEL - docked xfer
All - OFF
4 Mnvr as reqd for EVT

K EVT
1 Give GO for xfer to OPS & EVT
2 Start DET when purge starts

L CM INGRESS
1 CMP protect RHC
2 CDR Hd 1st face MDC, sit on A9
PURGE vlv - LO
3 Retrieve C O2 hoses
4 CMP connect C elec umb to CDR
5 CDR AUDIO pnl as desired
6 Secure position, aid LMP
7 LMP remove xfer bag, push in CM
8 LMP Ft 1st face MDC, ctr couch
PURGE vlv - LO
9 CM back off from LM
10 CDR connect R elec umb to LMP
11 CMP close hatch
12 PLSS PRIM & AUX Feed water vlvs - close

HOOK VELCRO

M VAC XFER TO CM ECS
1 SUIT FLOW vlv - OFF
2 Remove interconnect

FOR OPS (O2 ON + 25 min):
3 Connect O2 hoses RR/BB
4 PURGE vlv - CLOSE
5 SUIT FLOW vlv - FULL
6 OPS O2 - OFF

FOR PLSS/OPS:
3 Disconnect PURGE vlv, OPS hose
4 Connect O2 hoses RR/BB
5 SUIT FLOW vlv - FULL
6 O2, FAN, PUMP - OFF
Mode Sel - O

N HATCH CLOSING
1 Use DECAL - EVT (X/4-12)

HOOK VELCRO

O CABIN REPRESS
1 Use DECAL - EVT
Go to CSM EXP/EVA C/L X/4-7, 10, 14

K13

EMER CAB REPRESS

9/4/72

A. CMP ON OPS Umb flow OFF
Use EVT Cabin Repress decal, omit steps 3 & 4 (gross cabin leak ck)

B. SURGE TANK Decr Rapidly
HATCH DUMP VLV - CLOSE
OPS 02 - OFF verify
Discon OPS Hose from PGA
OPS 02 - ON
CABIN PRESS ~3 psia
P 302 SUIT FLOW - OFF ver
Remove CMP ECS Intercon
PURGE VLV - OPEN, HI
P 603 EVA STA 02 - OFF
P 604 SUIT PR ALARM - OFF
Discon PCV
When PGA press zero psid, Conn ECS to PGA RR/BB
P 302 SUIT FLOW - PULL
PURGE VLV - CLOSE

P 351 CABIN REPRESS - OPEN
Maintain SRG TK 150 psia
When CABIN PRESS >4.7,
CABIN REPRESS - CLOSE
EMER CABIN PRESS - BOTH

VAC XFER TO ECS

A. CMP ON OPS

P 302 SUIT FLOW - OFF ver
Remove CMP ECS Intercon
Discon PCV
Discon SCU, verify CLOSED
Conn ECS Hoses RR/BB
PURGE VLV - CLOSE
P 302 SUIT FLOW - FULL
Verify flow from ECS
OPS 02 - OFF
Verify cuff gage 3.5-4.0
P 603 EVA STA 02 - OFF
P 604 SUIT PR ALARM - OFF

B. CMP ON EVA UMBILICAL

P 302 SUIT FLOW - OFF ver
Remove CMP ECS Intercon
OPS 02 - OFF verify
Discon PURGE VLV
Discon OPS 02 Hose
Conn ECS Hoses RR/BB
P 302 SUIT FLOW - FULL
EVA STA 02 - OFF
Verify flow from ECS
P 604 SUIT PR ALARM - OFF
PCV - CLOSE
Verify cuff gage 3.5-4.0

LOCATION
MDC-1 covering EMS scroll ind

4 PLY SHIM
VELCRO

4 PLY SHIM
VELCRO

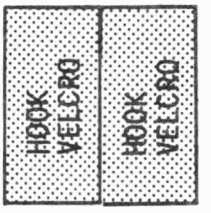
4 PLY SHIM
VELCRO

4 PLY SHIM
VELCRO

PNL 229 cb FUNCTIONS

9/4/72

PNL 229 cb	PNL 8 cb's	LOSS: RECONFIGURE
GRP 1 MNA	SCS PITCH MNA	AUTO RCS PITCH (4) - MNB
	CONTR/AUTO MNA	Sys A Auto RCS Enable
	LOGIC BUS 3/4	
	RCS SM HTRS D	QUAD D Htrs (Att B/U)
	PRPLNT ISOL MNA	B&D He 1&2, B&D PRIM & SEC & CM RCS 1 (ISOL VLVS)
GRP 1 MNB	SCS PITCH MNB	AUTO RCS PITCH (4) - MNA
	CONTR/AUTO MNB	Sys B Auto RCS Enable
	LOGIC BUS 2/3	
	RCS SM HTRS C	QUAD C Htrs (Att B/U)
	PRPLNT ISOL MNB	A&C He 1&2, A&C PRIM & SEC & CM RCS 2.(ISOL VLVS)
GRP 2 MNA	SCS A/C ROLL MNA	AUTO RCS A/C ROLL (4) - MNB
	SYSTEM MNA	FDAI 1, BMAG 1 Err, Uncage, SMRD, Htrs, C&W, GDC P&R Euler: TVC SERVO PWR - AC2/MNB
GRP 2 MNB	SCS A/C ROLL MNB	AUTO RCS A/C ROLL (4) - MNA
	SYSTEM MNB	FDAI 2, BMAG 2 SMRD, Htrs, C&W, Min Imp, GDC Y Euler, GDC Align: TVC SERVO PWR - AC 1/MNA
GRP 3 MNA	SCS YAW MNA	AUTO RCS YAW (4) - MNB
	LOGIC BUS 1/2	
	RCS SM HEATERS B	QUAD B Htrs (Att B/U), SM B&D & CM 1 RCS tb's
GRP 3 MNB	SCS YAW MNB	AUTO RCS YAW (4) - MNA
	LOGIC BUS 1/4	
	ORDEAL MNB	ORDEAL
	RCS SM HEATERS A	QUAD A Htrs (Att B/U), SM A&C & CM 2 RCS tb's
GRP 4 MNA	SCS B/D ROLL MNA	AUTO RCS B/D ROLL (4) - MNB
	EMS MNA	
	DOCK PROBE MNA	Sys A & PRIM RETRACT
	SPS GAUGING MNA	
	He VALVE MNA	Bank A
GRP 4 MNB	SCS B/D ROLL MNB	AUTO RCS B/D ROLL (4) - MNA
	EMS MNB	
	DOCK PROBE MNB	Sys B & SEC RETRACT
	SPS GAUGING MNB	
	He VALVE MNB	Bank B



PNL 229 cb FUNCTIONS CONTD

9/4/72

PNL 229 cb	PNL 8 cb's	LOSS: RECONFIGURE
GRP 5 MNA	SCS DIRECT ULL MNA	1/2 Dir Ull, Y D3/B4
	CONTR/DIR 1 MNA	1/2 RHC 1 DIR in A/B, all in A
	CONTR/DIR 2 MNA	1/2 RHC 2 DIR in A/B
	RCS CM HEATERS 1	CM Eng 11-16 Htrs
	RCS LOGIC MNA	Ring 1 Auto RCS Auto/man Xfer, Prplnt Dump/Purge & redundant SPS Abort Ullage, CM Eng 11-16 Htrs
	SPS PILOT VLVS A	Bank A
GRP 5 MNB	SCS DIRECT ULL MNB	1/2 Dir Ull, P C3/A4
	CONTR/DIR 1 MNB	1/2 RHC 1 DIR in A/B
	CONTR/DIR 2 MNB	1/2 RHC 2 DIR in A/B, all in B
	RCS CM HEATERS 2	CM Eng 21-26 Htrs
	RCS LOGIC MNB	Ring 2 Auto RCS Auto/man Xfer, Prplnt Dump/Purge & redundant SPS Abort Ullage, CM Eng 21-26 Htrs
	SPS PILOT VLVS B	Bank B
BAT BUS A	SPS PITCH 1 BAT A	P1 Gmbl Mtr ON/OFF & over-current xfer to SEC Gmbl Mtr
	YAW 1 BAT A	Y1 Gmbl Mtr ON/OFF & over-current xfer to SEC Gmbl Mtr
	EDS 1 BAT A	LV/SPS ind 1 & 3, one ABORT vote rec'd
	ELS/CM SM SEP BAT A	
	FLOAT BAG 1 BAT A	-Y Float Bag Fill/Vent
	SECS LOGIC A	Ring 1 Auto RCS Auto Xfer
	ARM A	RCS CMD ON/OFF MN A
BAT BUS B	SPS PITCH 2 BAT B	P2 Gmbl Mtr ON/OFF
	YAW 2 BAT B	Y2 Gmbl Mtr ON/OFF
	EDS 3 BAT B	LV/SPS ind 2 & 4, one ABORT vote rec'd
	ELS/CM SM SEP BAT B	
	FLOAT BAG 2 BAT B	+Y Float Bag Fill/Vent
	SECS LOGIC B	Ring 2 Auto RCS Auto Xfer
	ARM B	RCS CMD ON/OFF MN B

K15

K15

9/4/72

LOI VGO 10/13/72

LOI BT	VGO/THRUST 100%	80%
:00	2980	2980
:20	2849	2876
:40	2716	2770
1	2582	2663
1:20	2446	2555
1:40	2308	2446
2	2168	2336
2:20	2026	2224
2:40	1882	2111
3	1736	1997
3:20	1587	1882
3:40	1437	1765
4	1284	1647
4:20	1129	1528
4:40	970	1406
5	809	1282
5:20	644	1157
5:40	477	1030
6	307	902
6:20	135	771
6:35	0	672
6:40		640
7		506
7:20		371
7:40		238
8		98
8:14		0

DEC 6 LAUNCH

LOCATION
MDC-2 covering a
Portion of DSKY lights

DOI 1 LIMITS

11/2/72

ENG LIMITS	RT/ERR FOR TAKEOVER	MAN START	SHUT DOWN	EARLY C/O RESTART	RESIDUALS TRIM GUIDE
TIGHT	10/10 TERM	DELAY	BT	NO	X: to < +/- 1.0 Overburn 2.2-10: P 180, TRIM +X >10: Use SPS
If BALL VLV fails, start on suspect bank. Do not trim Y & Z residuals					

NO GO - LOSS OF:

ECS: CABIN
FIRE or SMOKE
O2 MANF (Leak)
(2) MAIN REG
PRIM COOLANT
PRIM RAD
GLYCOL (Leak)
HUMIDITY HIGH
(2) SUIT COMP
& VAC CLNR
SUIT CIR
(3) OB DUMPS

CRY: O2 or H2 TANK

EPS: (2) FUEL CELL
ENTRY BAT
MAIN BUS
EPS: BAT BUS
AC BUS
BAT RELAY BUS
(2) INV
ϕA AC1 or 2

G&N: AUTO ATT (2) Axis
RATE DAMP (2) Axis
DIR RCS (1) Axis
(2) BMAG P or Y
(2) FDAI
THC
(2) RHC
CMC or ISS
OSS & VHF
O-DAC
TVC SERVO LOOP
(2) DSKY

SPS: FU or OX TK (Leak)
GN2 TANK (Leak)
BALL VLV BANK
FEEDLINT T <40F
FU/OX ΔP >20
Pc <70
FLG T >480F
He TANK (Leak)

RCS: (2) SM He TK (Leak)
Leak below ISO VLV
(2) PKG T <55F
(2) P or Y THRUSTER
(2) R THRUSTER
(2) CM He TK (Leak)
& BLOWDOWN
(ARMED <1250)
CM MANF (Leak)

LOCATION
MDC-2 covering
CABIN TEMP AUTO tw

9/4/72

CIRC LIMITS

11/2/72

ENG LIMITS	RT/ERR FOR TAKEOVER	MAN START	SHUT DOWN	EARLY C/O RESTART	RESIDUALS TRIM GUIDE
TIGHT	10/10 TERM	START	BT+1	VGO >20	ALL <5: to <0.2 ANY >5: NO TRIM +Vgz or -Vgy: Roll L, use -Z
If BALL VLV fails, start on suspect bank.					

NO GO - LOSS OF:

ECS: CABIN
FIRE or SMOKE
PRIM COOLANT
PRIM RAD
GLYCOL (Leak)
HUMIDITY HIGH
(2) SUIT COMP & VAC CLNR
SUIT CIR

CRY: O2 or H2 TANK

EPS: (2) FUEL CELL
ENTRY BAT
MAIN BUS
BAT BUS
AC BUS
BAT RELAY BUS
(2) INV
ϕA AC1 or 2

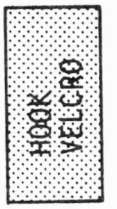
G&N: AUTO ATT (2) Axis
RATE DAMP (2) Axis
DIR RCS (1) Axis
(2) BMAG P or Y
(2) FDAI
THC
(2) RHC
CMC
ISS
OSS & VHF
O-DAC
TVC SERVO LOOP
(2) DSKY

SPS: FU or OX TK (Leak)
GN2 TANK (Leak)
BALL VLV BANK
FEEDLINT T <40F
FU/OX ΔP >20
Pc <70
FLG T >480F
He TANK (Leak)

RCS: (2) SM He TK (Leak)
Leak below ISO VLV
(2) PKG T <55F
(2) P or Y THRUSTER
(2) R THRUSTER
(2) CM He TK (Leak) & BLOWDOWN (ARMED <1250)
CM MANF (Leak)

LOCATION
MDC-2 covering
CABIN TEMP AUTO tw

9/4/72



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