AC PWR

5/10/71

2 94 : 58 P37

AC BUS
LIGHT

+

MN BUS UNDER-
VOLT

+

BUS OVERLOAD

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

MN BUS LOSS

BRING ON INV 3
RECONFIGURE FC's

AC USERS

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

ELECTRICAL POWER USERS

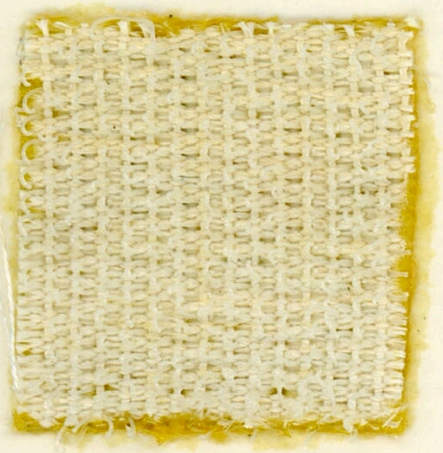
O2 HTRS, GMBL MTRS, RAD HTRS, SM RCS HTRS,
POT H2O HTR, H2 HTRS, CABIN FANS, SPS LINE HTR,
LIGHTS, TAPE RCDR, GLY/EVAP STM PRESS,
H2O FLOW CONT, TEMP IN CONT, CMC TO STBY, G&N PWR DOWN,
SEC LOOP, ECS RAD CONT/HTR cb's, SCE PWR, VHF, HGA PWR,
ONE INVERTER OPERATION, INSTRU ESS MNA & B cb's,
CRYO FANS,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

LOSS OF COMM

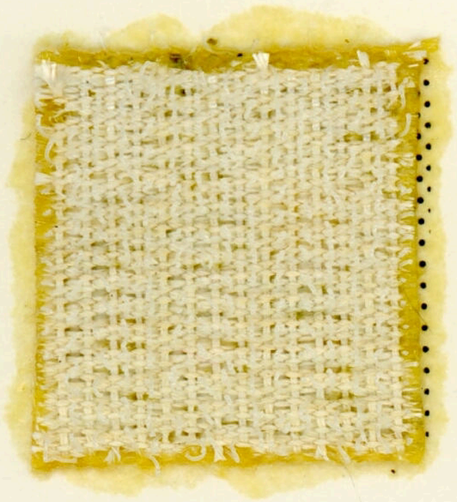
7/1/71

A. Verify comm
   Awake Configuration
B. UP TLM CMD - RESET

   Verify
   All cbs
   Pnl 225
   closed



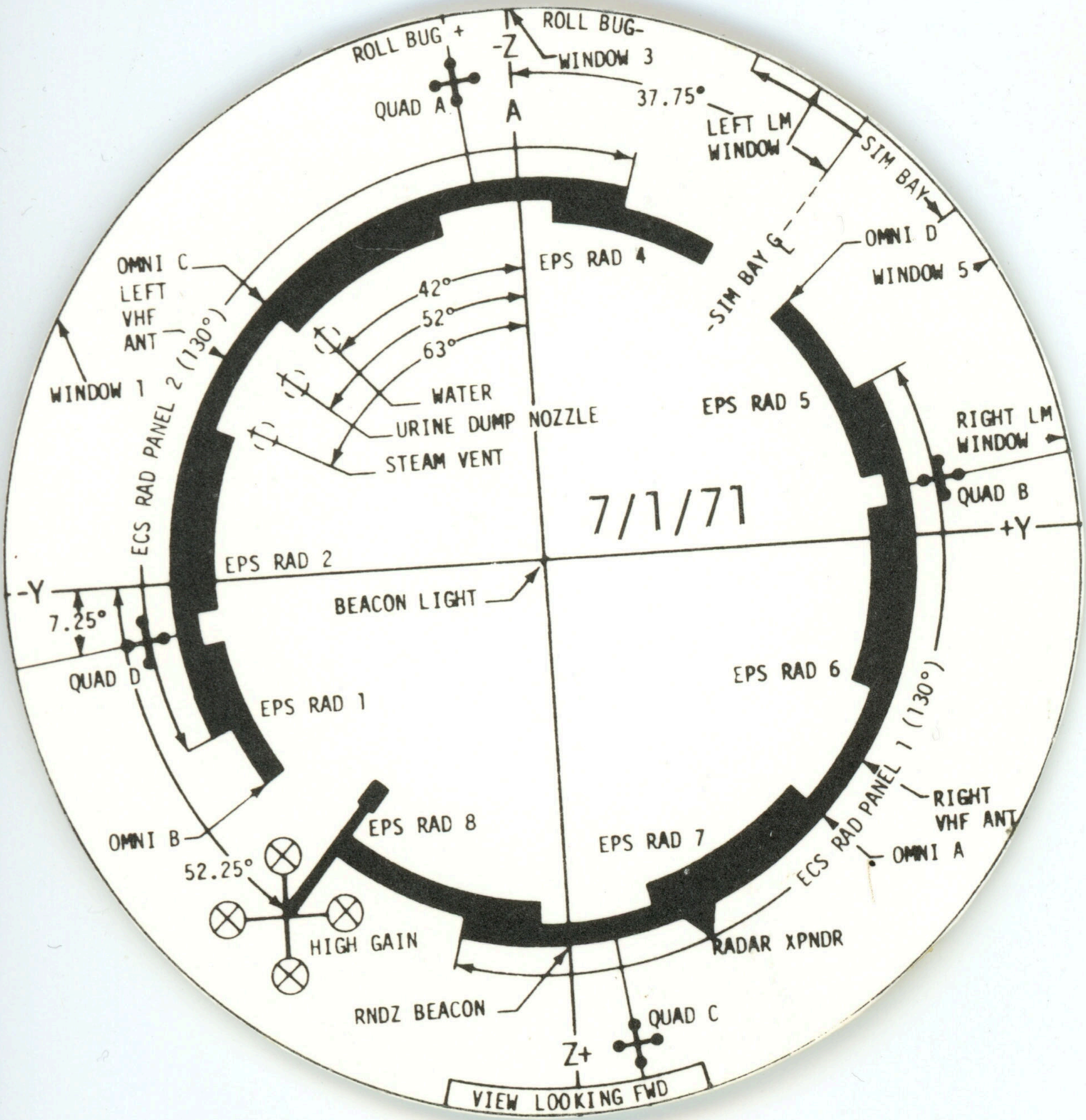
C. Attempt reacquisition
   with HGA if signal
   strength <60%.
D. Select omni desired
   if unable to acquire
   with HGA.
E. Verify
   AUDIO CTR &
   Personal
   COMM EQUIP
   Operation
F. If still
   no comm,
   XPNDR & PWR AMP - SEC

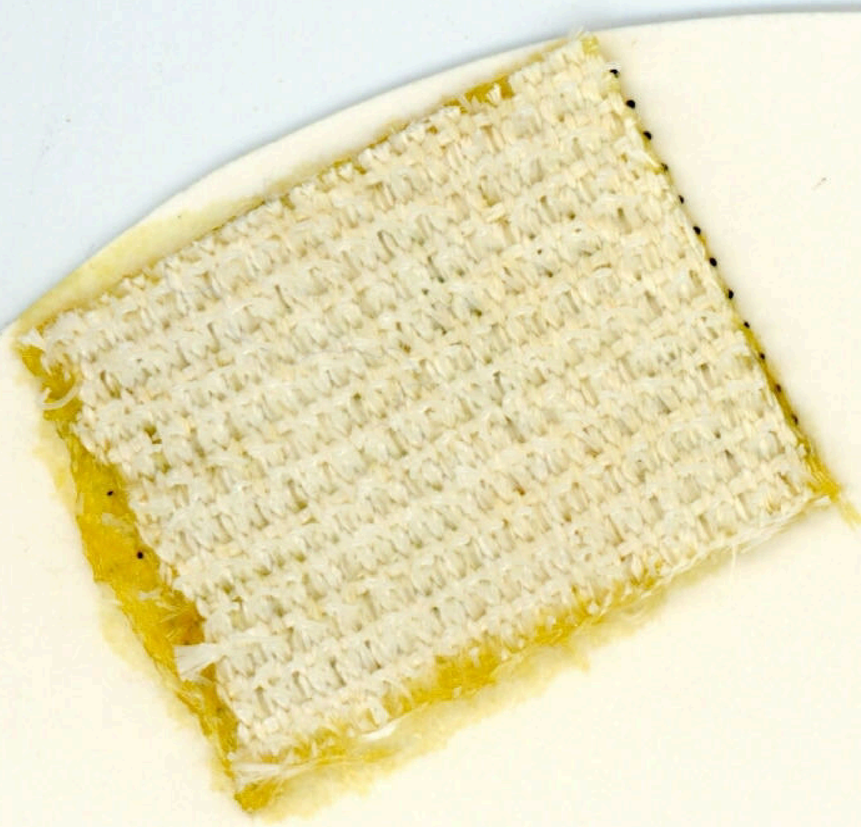


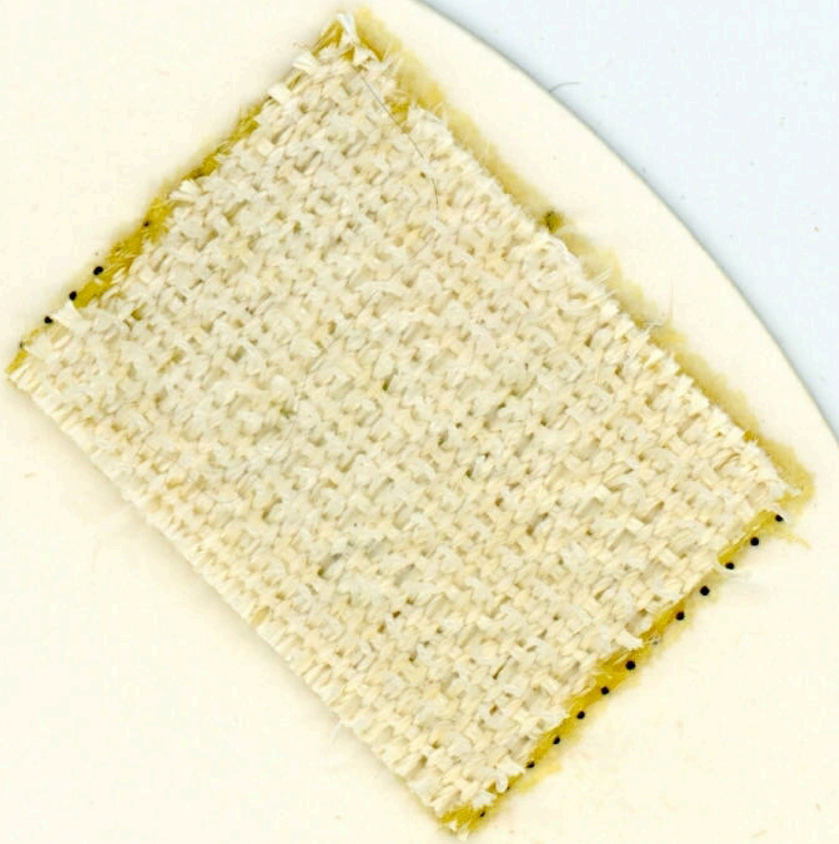
G. Wait 90 sec.
   If still no comm,
   PMP PWR-AUX.
H. If still no comm, S-BD
   AUX TAPE-DN VOICE BU
I. Request ground transmit
   CREW ALERT

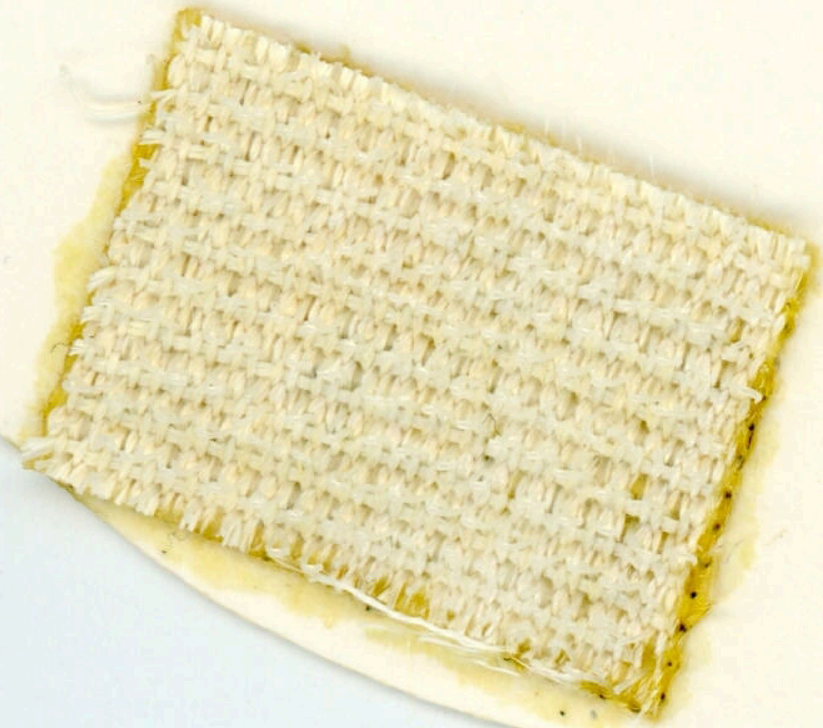
   When CREW
   ALERT ON,
   UP TLM -
     UP VOICE BU

   (Wait 3 min for MSFN reconfig.)
J. Go to T/C MALF.


ROLL BUG +
-Z
ROLL BUG-
WINDOW 3
QUAD A
A
37.75°
LEFT LM
WINDOW
SIM BAY
OMNI C
LEFT
VHF
ANT
(130°)
WINDOW 1
ECS RAD PANEL 2 (130°)
42°
52°
63°
WATER
URINE DUMP NOZZLE
STEAM VENT
EPS RAD 4
SIM BAY ℄
OMNI D
WINDOW 5
EPS RAD 5
RIGHT LM
WINDOW
QUAD B
+Y
7/1/71
EPS RAD 2
-Y
7.25°
BEACON LIGHT
QUAD D
EPS RAD 6
EPS RAD 1
ECS RAD PANEL 1 (130°)
RIGHT
VHF ANT
OMNI B
EPS RAD 8
EPS RAD 7
OMNI A
52.25°
ECS RAD
HIGH GAIN
RADAR XPNDR
RNDZ BEACON
QUAD C
Z+
VIEW LOOKING FWD







VAC XFER TO ECS

1. Thermal Mech Degrade
2. Lens crack or debris 7/13/71
3. Blade point missing
4. Plume shield missing
5. FOV obstruction ?

VAC XFER to ECS Mass Spec Beam Co.) Xerox

A. CMP ON OPS

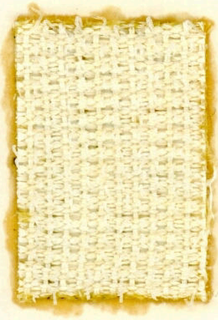
P302 SUIT FLOW - OFF (Ver)
Remove CMP ECS interconnect
Discon PCV
Discon SCU (Ver CLOSED)
Conn ECS hoses R/R, B/B
Purge Vlv - CLOSE
P302 SUIT FLOW - FULL
Verify flow from ECS
OPS O2 - OFF
Verify cuff gage 3.5-4.0
P603 EVA Sta O2 - OFF
P604 SUIT PRESS ALARM - OFF

B. CMP on EVA Umbilical

P302 SUIT FLOW - OFF (Ver)
Remove CMP ECS interconnect
OPS O2 - OFF (Ver)
Discon Purge Vlv
Discon OPS O2 hose
Conn ECS hoses R/R, B/B
P302 SUIT FLOW - FULL
EVA Sta O2 - OFF, Verify flow from ECS
P604 SUIT PRESS ALARM - OFF
PCV - CLOSE
Verify cuff gage 3.5-4.0

4.225

241:00 V49 352,063,050
:40 CDR-LMP INT CK
:45 CMP
:50 Depress
:55 Hatch Open
242:07



CDR ABORTS III & IV

7/1/71

III

:00	THC CCW
:03	LV SEP N50
:05	THC NEUT-+X
:24	TERM +X
	180-194-0
	EMS - NORM
	RATE - LOW
	BMAGS 1/2
	SCS TVC - AUTO
	ΔV THRUST A - NORM
	LV IND - GPI N62
2:05	DIR ULL+THRUST ON
	ΔR=0:(NO BURN-400 ΔR 0)
	TFF<1+00:OFF
	THRUST OFF
	SM SEP - LM SEP
	CM RCS (4)
	0-105-0
	EMS - ENTRY/NORM P62
	.05G - on
.2G	305-105-0
30K	ELS LOGIC/AUTO
	TWR-APEX-DROGUES
10K	MAINS

IV

:00	THC CCW
:03	LV SEP N50
:05	THC NEUT-+X-Damp RT
:24	TERM +X-Damp RT
	180-356-0
	EMS - NORM
	RATE LOW
	BMAGS 1/2
	LV IND - GPI
	ΔV THRUST A - NORM
<1:30	DIR ULL+THRUST ON
	PITCH DN 30°, STOP $\dot{H}$
	PITCH UP TO 330°,H=0 N62-N44
	HP STOP:THRUST OFF
	(+$\dot{H}$:AK)(-$\dot{H}$:ENTER)
	HA>200
	(+$\dot{H}$:OFF)(-H:HP>70)
	TFF<1+40,HP>70+6sec:
	THRUST OFF

AK = IV + P47

H=0:DIR ULL+THRUST ON V82

HP>100:THRUST OFF

	NO SIVB SEP	
HP<40	HP>40	
III RCS	+$\dot{H}$	-$\dot{H}$
ΔR=0	III RCS	III RCS
(270,105,0)	AT H=0	ASAP
	TO HP=40	
	(180,105,0)	
	1G:270-105-0	

GDO 21 09

5/10/71

LOI LIMITS JULY 26 7/1/71

VGO	BT	VM	MODE	ABORT LIMITS	CALL OUT MODES AND LIMITS
2999	00	0	I DPS @ 2hr	TIGHT	INADVERTANT SHUTDOWN
2347	1+38	652		TNK < 160+Pc↓ ΔP > 20+Pc↓ Pc < 80 or ↓> 10 & LO ΔV	A. LIMITS EXCEEDED- NO RELIGHT B. NO LIMITS EXCEEDED - RELIGHT
2208	1+58	791	I DPS @ 30m	LOOSE	INADVERTANT SHUTDOWN
2117	2+11	882	I DPS @ 30m +APS @ 2hr Later *	TNK < 115+Pc↓ Pc < 70 PHYSICAL	A. LIMITS EXCEEDED- NO RELIGHT B. NO LIMITS EXCEEDED - RELIGHT
1686	3+11	1313	II DPS @ 2hr +DPS @ PC		
1350	3+56	1649	III DPS @ PC		
0	ECO 6+40	2999	III DPS @ PC	TIGHT	

*IF NO COMM, APS ASAP after DPS

IF 1 BALL VLV CLOSES PREMATURELY,
SHUTDOWN GOOD BANK
10 SEC PRIOR TO CUTOFF

LOI NO GO'S

7/1/71

LOSS OF:

ECS: CABIN
FIRE or SMOKE
O2 MANIFOLD (Leak)
(2) MAIN O2 REGS
PRIM COOLANT LOOP
PRIM RADIATOR
GYLCOL (Leak)
HUMIDITY (High)
(2) SUIT COMP or (1) & VAC CLEANER
SUIT CIRCUIT
(3) OVRBD DUMPS

CRYO: O2 or H2 TANK

EPS: (2) FUEL CELL
ENTRY BAT
MN BUS/BAT BUS/AC BUS/BAT RELAY BUS
(2) INVERTERS
AC ØA (AC1 or AC2)
(4) DOCKING LATCHES

SEQ: SMJC ACTVD
SEQ SYSTEM

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

SPS: FU or OX TANK (Leak)
(2) GN2 TANK (Leak) & DPS
(2) BALL VLV BANK & DPS
FEEDLINE TEMP < 40°F
FU/OX ΔP > 20 psi
Pc < 70 psi
He TANK (Leak)

RCS: (2) SM He TANK (Leak)
Leak below ISO VLV
(2) PKG TEMP < 55°F
THRUSTERS:
(2) P,Y or (3) R
CM He TANK (Leak)
CM MANIFOLD (Leak)
CM RCS ARMED

TLI

7/13/71
~~7/1/71~~

JULY 26

SIVB SEP

1. V66E
2. MAN ATT (3) - RATE CMD
   THC PWR - ON
   RHC PWR - NORM/DIRECT
   RCS CMD - ON
   S/C CONT - SCS
   LV XLUNAR - SAFE
3. cb SECS ARM (2) - CLOSE
   SECS LOGIC (2) - ON
   SECS PYRO (2) - ARM
4. THC +X & HOLD (5sec)
   CSM/LV SEP - PUSH
5. OR - THC CCW (HOLD 5sec)

O>F:ΔP>36
F>O:ΔP>26
OX:P>50

TLI

ATT SET(180,59,8) - IMU
EMS ΔV TEST, SET ΔV 10401.1
cb DIRECT ULL (2) - CLOSE
UP TL - BLK
EDS PWR - ON
PYRO ARM (2) - ON
THC, RHC
SC CONT - SCS
LV IND - SII/SIVB
LV GUID - IU
XLUNAR - INJECT
SET DET : 51:00 2:40:23

1) Run at 1:00
2) Slight v.b. all the way
3). Order at 0 ~~7:1 slow~~

TB-6

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

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 ~~25°~~ 24°
54:00 ORDEAL 300/LUNAR, ~~28°~~
56:00 ORDEAL θ = ~~16°~~ 17°
*ORDEAL θ = 0° (N20)
*R2 ALIGN = 045 45°
56:45 (56:45) ORDEAL - OPR
θ = ~~13°~~ 14°
*MNVR/R2 IGN 038 38°
~~58:00~~ TVC SERVO 1 - ACT/MNA
58:15 AVG G
58:20 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 = ~~7°~~ 8°
*ORDEAL θ = 0°
*R2 IGN = 38 38°
ULLAGE OFF
59:59 LV ENG 1 LT - ON
*P = 0°, Y = 1 +1°

NOT 30 SLOW

00:00 TIG
VI 35599 BT 5:55
00:02 LV ENG 1 LT - OFF
00:05 ORB RT OFF - IGN ON
06:03 SIVB ECO, TB7
06:13 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
BT>:02+EMS ΔVM - STG C/O
*THC - CCW, NEUT in 1 sec

7/1/71

CDR BOOST/ABORTS

~~7/13/71~~ ~~7/13/71~~

A

:00	THC CCW/NEUT SM SEP
:14	ELS LOGIC/AUTO
	TWR-APEX-DROGUES
3800	MAINS

B

:00	THC CCW/NEUT SM SEP
:11	CANARDS
:14	ELS LOGIC/AUTO
24K	CAB PRESS INCR
	TWR-APEX-DROGUES
10K	MAINS

C

:00	THC CCW/NEUT SM SEP	
:11	CANARDS	N44
	CM RCS (4)	N62
PLATFORM GO	NO GO	
HA >32:	or HA <32:	
TWR JETT	Damp R,Y	
MAN ATT P-RT CMD	PITCH+5°/s	
0-135-0	HI P:	
BMAGS 1/2	ROLL 90°,	
EMS - ENTRY/NORM	Damp w/YAW	
.05G - on		
30K	ELS LOGIC/AUTO	N67
24K	TWR-APEX-DROGUES	
10K	MAINS	

II

:00	THC CCW	
:03	LV SEP	N50
:05	THC NEUT-+X	
:24	TERM +X	
	0-120-0	
	TFF>2m: Yaw 45°L	
	SM SEP-LM SEP	
	CM RCS (4)	
	BMAGS 1/2	
	EMS - ENTRY/NORM	N62
	.05G - on	
30K	ELS LOGIC/AUTO	
24K	APEX-DROGUES	
10K	MAINS (DROGUES +49s)	

:00	IA	LIFTOFF -0.52,+1.90
:11		ROLL
:42	IB	PRPLNT DMP-RCS CMD
:50		
1:54	IC	H = 16.5 V82 N62
2:00		EDS AUTO-OFF
		2 ENG OUT-OFF
		LV RATES-OFF
2:16		ICO
2:40		STAGING
3:10		2d PLANE SEP (0+31)
3:16	II	TWR JET (TFF>1+20)
		~~α/PC - PC~~
		MAN ATT P - RT CMD
		STEAM+H2O - AUTO
3:20		GUID INIT (0+41)
4:00		TRAJECTORY STATUS
5:55		SIVB + COI
		α-PC,GPI
		GMBL MOTORS ON
6:45		SIVB to ORBIT
7:39		ICO
7:59		PU SHIFT N50
8:30		GO FOR STAGE
8:34		LEVEL SENSE ARM
9:08	IV	SPS COI (22918) N62
9:11		STAGING
10:00		SC GO/NO GO
10:05		SCS COI (23793)
11:39		SIVB C.O.
		(VI+100,HP>70,Ḣ<100)
11:49		SIVB LIGHT-OFF

LV IND-SII/SIVB

50	61	62	63	64	66
Δ.R	L.AT	VI.	RT.G	.XG	.XB
H.P	L.NG	Ḣ.	VIO	VI	X.R
TFF	DN-	.H	TFE	RT.G	DN.R

00-:50-2:00	2:00
4°/s 2 ENG	9°/s 3 SII ENG
R 20°/s	Y20°: UPSTAGE
5° ERR	GUID: POLY TILL AFTER TWR
+ α = 100%	(V46)(MAN ECO)

5/10/71

5/10/71

SIM EXP PREP 7/1/71

PNL 8 AUTO RCS SELECT - OFF
except A1,C2 (or D1,B2) A3,C4,B3,D4
cb SCS CONTR DIR 1 MNB - OPEN
cb SCS CONTR DIR 2 MNA - OPEN
PNL 1 RHC PWR DIR (2) - MNA/MNB
PNL 3 PCM BIT RATE - HIGH
PNL 5 NON ESS BUS - MNA
cb SCI EQUIP (3) - CLOSE
PNL 278 EXP COVERS tb (2) - GRAY
cb EXP COVERS DEPLOY - CLOSE
EXP COVERS (2) - OFF (ctr)
PNL 230 ALL tb's (8) - GRAY
MAP CAMERA ON - STBY
MAP CAMERA TRACK - OFF (ctr)
GAMMA RAY BOOM DPLY - OFF (ctr)
GAMMA RAY BOOM JETT - OFF (down)
MASS SPECT BOOM DEPLY - OFF (ctr)
MASS SPECT BOOM JETT - OFF (down)
IMAGE MTN - OFF, LASER ALTM - OFF
GAMMA RAY EXP - ON
MASS SPECT EXP - STBY
MASS SPECT ION SOURCE - OFF
DATA SYS ON - ON
DATA SYS CAL - OFF (down)
GAMMA RAY GAIN STEP - ctr
MASS SPECT MULT - LOW
MASS SPECT DSCRM - HIGH
PAN CAMERA SELF TEST - HTRS
PAN CAMERA STEREO - per flt plan
α RAY/X DR - α ON
SUBSAT EXTEND LAUNCH - OFF (ctr)
PAN CAMERA MODE - STBY
PAN CAMERA PWR - OFF (ctr)
PAN CAMERA EXPOSURE - OFF (ctr)
X-RAY - STBY
PNL 181 cb SM SECTOR 1 AC 2(3) - CLOSE
SM SECTOR 1 SM/AC PWR - ON (up)
cb LOGIC POWER (2) - CLOSE
LOGIC POWER (2) - DPLY/RETR
DOOR JETT - OFF (down and guarded)

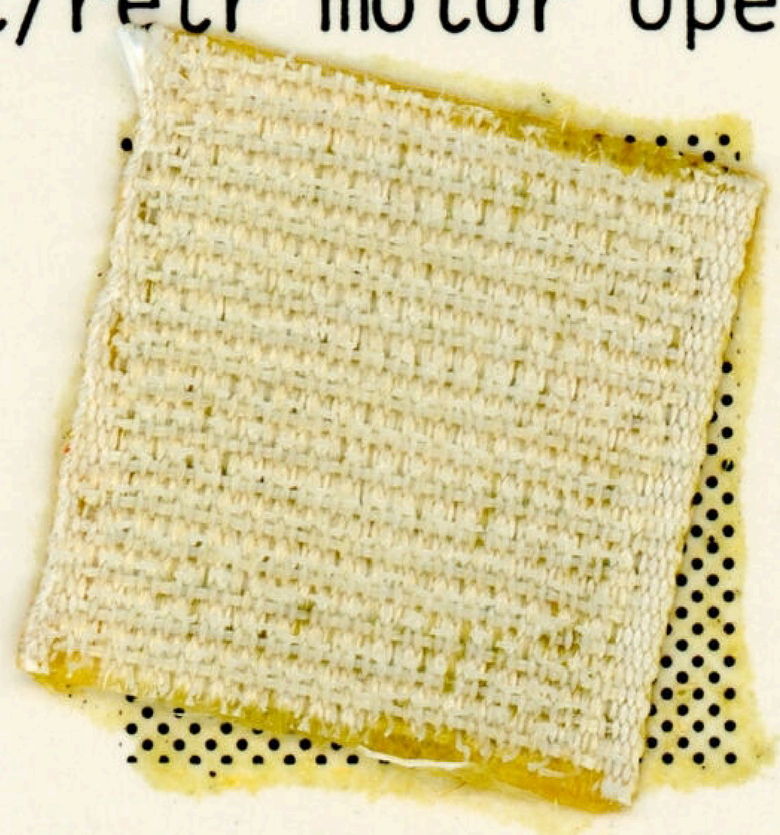
SIM TALKBACK SUMMARY 7/1/71

Mapping Camera - ON tb

1. 45>T>110° F, ON sw ON or STBY
2. ~4 sec bp when IMAGE MTN mechanism ON to OFF or OFF to ON
3. IMAGE MTN sw in INCR before 60 NMI

Mapping Camera - TRACK EXTEND tb

1. bp when ext/retr motor operating



Pan Camera tb

1. Malfunction when in OPERATE mode
   a. Lens rotation stops
   b. No film motion
   c. Supply spool empty (15 sec delay)
   d. No stereo gimbal (if in STEREO)
   e. Capping shutter failure
2. 2 sec bp when PWR sw OFF to PWR
3. 2 sec bp when MODE sw STBY to operate
4. ~30 sec bp during SELF TEST. If failure, 2 sec gray then bp

BOOM DEPLOY tb (2)

1. bp when exp not completely in or out

BOOM JETT tb (2)

1. gray - normal jettison, bp when sw at JETT and DPLY at OFF - jettison failure

COVER tb (2) Panel 278

1. bp (~2 sec) when cover not completely open or closed

POWER LOSS

7/13/71

	G&N	SCS
	TVC GMBL DR P&Y - 2	TVC GMBL DR P&Y - 2 SCS TVC - RT CMD
	Reconfigure →	
MNA	FDAI 1 GMBL MTRS P1&Y1 ΔV THRUST A GDC/Except RSI BMAG 1 SCS AUTO ΔV	*cb SPS P2&Y2 - open FDAI - 2, SOURCE - CMC RHC PWR DIR 2 - MNB BMAGS - RATE 2 (up) ✓ ΔV THRUST B - NORM AUTO RCS - MNB
MNB	Reconfigure →	SCS TVC - RT CMD
	FDAI 2 GMBL MTRS P2&Y2 ΔV THRUST B GDC BMAG 2	TVC GMBL DR P&Y-1 *cb SPS P1&Y1 - open RHC PWR DIR 1 - MNA BMAGS - RATE 1 (dn) ✓ ΔV THRUST A - NORM AUTO RCS - MNA
	TVC SERVO 1 - AC2/MNB	TVC SERVO 1 - AC2/MNB SCS TVC - RT CMD
	Reconfigure →	
AC1	FDAI 1 GDC/Except RSI BMAG 1 MIN IMP RT CMD RHC 1 GPI1 SCS AUTO ΔV EMS ΔV Ltg	BMAGS - RATE 2 (up) FDAI - 2, SOURCE - CMC *DURING CRIT BURNS: AFTER GMBL MTRS ON
AC2	Reconfigure →	TVC SERVO 2 - AC1/MNA BMAGS - RATE 1 (dn) SCS TVC - AUTO ΔV CG - LM/CSM MTVC with TRIM TWS
	FDAI 2 GDC BMAG 2 RT CMD MTVC GPI 2	

UNDOCK SEP

7/1/71

100 : 13 : 56.00	GETI	N33
0, 0, -1.0	ΔVXYZ	N81
0 108 0	RPY	N22

P30 Load SEP
V49 MNVR to UNDOCK ATT
Set EMS ΔV -100.0, CK NULL BIAS, ΔV/STBY
GDC ALIGN, Verify ORDEAL, h = 40 nm
ATT DB - MIN, RATE - LOW
RHC PWR NORM - AC/DC
RHC PWR DIRECT - MNA/MNB
AUTO RCS (16) - MNA or MNB
cb DOCK PROBE (2) - close
P41 AUTO TRIM, SC CONT - SCS
BMAG (3) - ATT 1/RATE 2
V48 Load DAP 11101, X1111
RHC & THC - ARMED
59:30 EMS MODE - NORM, DAC - ON
THC PWR - on
00:00 PROBE - EXTD/REL Momentary
Damp ~ 5s
PROBE - EXTD/REL (Hold till free)
After 2s, THC -X for ~3s, VGX to +2.0
Verify SEP, PROBE EXTD/REL - OFF
cb DOCK PROBE (2) - open
THC & RHC - LOCKED, THC PWR - OFF
POO, SC CONT - CMC, ATT DB - MAX
ΔVCG - CSM, BMAG (3) - RATE 2
RHC PWR DIR - OFF
AUTO RCS ROLL (4) - OFF
EMS FUNC - ΔV SET/VHF RNG,
EMS MODE - VHF RNG
VHF ANT - LEFT
VHF AM A - OFF, B - DUPLEX
VHF RANGING - RANGING

LMP BOOST/ABORTS

7/1/71

5+55

00:00	IA
00:42	IB
00:50	CAB PRESS DECR
01:54	IC
02:39	OECO/STAGING/IGN
03:16	TWR JETT II GLY EVAP STM & H2O - AUTO
06:05	GMBL MTRS - on ✓
06:15	OMNI ANT - D (C if AZ > 96°)
09:08	IV
09:10	OECO/STAGING/IGN
10:17	III
11:39	SECO
11:49	INSERTION

IA	<3.8K - MAINS
IB	24K - TWR JETT Ck LANDING PHASE
IC	HA>32 & PLAT GO: MAN ATT P - RT CMD 0-135-0 BMAGS 1/2 EMS - ENT/NORM .05G, Max lift <32 or PLAT NO GO: Estab P rate +5°/s Ck LANDING PHASE

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

III	BMAGS 1/2 ΔR>0: 180-194-0 (Horiz/BEF/UP) 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) LM SEP EMS - ENT/NORM
.05G	.05G/EMS ROLL - on
.2G	305-105-0 Half lift Ck LANDING PHASE

IV	BMAGS 1/2 180-356-0
	FIXED ATT: (Horiz/SEF/DN)
	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 THRUST OFF

TLI NO GO'S

7/1/71 #

LOSS OF:

ECS:
- CABIN
- FIRE or SMOKE
- O2 MANIFOLD (Leak)
- (2) MAIN O2 REG
- PRIM COOLANT LOOP
- PRIM RADIATOR
- GLYCOL (Leak)
- HUMIDITY (High)
- (2) SUIT COMP
- SUIT CIRCUIT
- (3) OVRBD DUMPS

CRYO:
- O2 or H2 TANK

EPS:
- (2) FUEL CELL
- ENTRY BAT
- MN BUS/BAT BUS/AC
- BUS/BAT RELAY BUS
- (2) INVERTERS
- AC ØA (AC1 or AC2)

SEQ:
- SMJC ACTVD
- SEQ SYSTEM

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

SPS:
- FU/OX (Leak)
- GN2 TANK (Leak)
- BALL VALVE BANK
- FEEDLINE TEMP < 40°F
- FU/OX ΔP > 20 psi
- ULLAGE Capability
- He TANK (Leak)

RCS:
- SM He TANK (Leak)
- Leak below ISO VLV
- PKG TEMP < 55°F
- THRUSTERS:
  - (2) P,Y or (3) R
- CM He TANK (Leak)
- CM MANIFOLD (Leak)
- CM RCS ARMED

LANDING 5/10/71

		Watch
90K	(06:36) STM peg	0:00
50K	CAB PRESS - B/E	0:54
	SECS PYRO (2) - ARM	
40K	CM UNSTABLE:	
	RCS CMD - OFF	
	40K APEX JETT	
	+2sec DROGUES	
30K	ELS LOGIC	
	ELS AUTO, Start DAC	
24K	RCS disable	1:38
	RCS CMD - OFF	
	*APEX JETT *	
	+2sec DROGUES	
	DROGUES FAIL:	
	*ELS - MAN *	
	*Stabilize CM *	
	*5K MAINS *	
	*ELS - AUTO *	
	CAB PRESS increasing	
17K	No Incr: *CAB PRESS - DUMP*	
10K	MAINS (auto)	
	In 1 sec, MAIN DEPLOY pb - push	
	SURGE TK O2 - OFF	
	REPRESS PKG - OFF	
	DIRECT O2 - OPEN	
	VHF ANT - RECY, AM A - SIMPLEX, BCN - ON	
	Voice Report	
	CAB PRESS REL (2) - CLOSE	
	CM RCS LOGIC - on (up)	
	CM PRPLNT - DUMP	
	CM PRPLNT - PURGE	

RRT	2 9 4 5 8 5 4
.05G	0 0 2 8
Vcirc	0 2 1 3
BBO	0 0 1 8
EBO	0 3 3 7
DRO	0 7 4 4
MAINS	0 8 3 2

	Stow DAC
	STRUT LOCKS (4) - UNLOCK
	cb FLT/PL BAT (3) - close
	cb FLT/PL MNA & B (2) - open
	cb BAT RELAY BUS (2) - open
3K	CM RCS PRPLNT (2) - OFF,
	CAB PRESS REL (RH) - DUMP, FLOODS - PL
800	CAB PRESS REL - CLOSE
	MN BUS TIE (2) - OFF

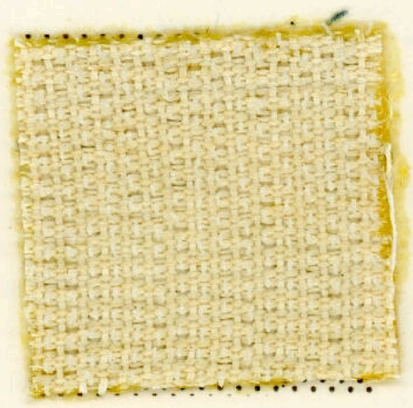
POST LANDING

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

STABLE

[II] VHF A,B & BCN
Off while invertd
FLT BAGS - FILL
Upright +2m & OFF
[I] 10m cooling,
FLT BAGS - FILL
Fill 7m, then OFF

5/10/71



S-IVB MNVR TO SEP ATT: TB7 + 15 MIN.

SEP ATT R 359 P 077 Y 320

EXTR ATT R 301 P 257 Y 040

CABIN PRESS ~5.7 psi

cb DOCKING PROBE(2) - close
COAS PWR & CHK
DAP 11103/01111 - V46E
N17 (SEP) N22 (DOCK)
V63
DOCK PROBE EXTD/REL - RETRACT
SM RCS tb(8) - gray
AUTO RCS (16)
EMS -100, FDAI -5/1
DET 59:30
MAN ATT (3) - RATE CMD
LIMIT CYCLE - OFF, DB - MIN, RATE - LOW
THC PWR - on
RHC - NORM (2) - DIRECT (2)
ASCP 0, 180, 0
GDC
CMC/FREE
BMAG (3) - RATE 2
cb RCS LOGIC (2) - open
TVC SERVO PWR #1 - AC1/MNA
FC REAC vlv - LATCH
V49E TO F 06 22
THC & RHC - ARMED
cb SECS LOGIC/ARM - closed
SECS LOGIC (2) - on
RCS CMD, TAPE RCDR
SECS PYRO ARM
GDC
EMS - ΔV/NORM
V62E

T&D CONTINUED

SEP GET _____ : _____ : _____

59:30	START DET ✓
59:50	CMC/AUTO — BMAGS- ATT 1/RT 2
59:58	+X THRUST
00:00	CSM/LV SEP
00:03	STOP THRUST ~0.5 fps - SC CONT - SCS
	CHK RCS
	FC REAC - NORM

O2 TK 3 ISOL vlv tb - gray
MAN ATT(Pitch) - ACCEL CMD

00:15 Pitch up ~~~0.5°/sec~~ AT 2°/SEC for 180°.
When Pitch error needle is ~~positive~~ null
PRO F 50 18 - SC CONT - CMC
PRO 06 18
MAN ATT(Pitch) - RATE CMD BMAGS-RT2
F 50 18 ENTR AT COMPLETION

THRUST +X ~4 sec (~.7 fps)
~~DAP 11102, 01111~~
DAC - ON
BMAG (3) - ATT 1/RATE 2

CAPTURE

CMC/FREE
PROBE RETR - PRIM 1 (PRIM 2 Alternate)
SECS PYRO ARM - SAFE
SECS LOGIC (2) - OFF
EDS PWR - OFF
cb EDS (3) - open
DOCK PROBE EXTD/REL - OFF
DOCK PROBE RETRACT(2) - OFF
cb DOCK PROBE (2) - open
TAPE RCDR
PCM - LOW
DAC/TV - off

If Dock PROBE remains gray after capture: RETR-PRIM 1 (Sec 1) in that system

T&D CONTINUED

SEP GET _____ : _____ : _____

59:30	START DET ✓
59:50	CMC/AUTO BMAGS - ATT 1/RT 2
59:58	+X THRUST
00:00	CSM/LV SEP
00:03	STOP THRUST ~0.5 fps
	CHK RCS
	FC REAC - NORM

SC CONT - SCS
O2 TK 3 ISOL vlv tb - gray
MAN ATT(Pitch) - ACCEL CMD
00:15 Pitch up ~2.0°/sec FOR 180°
~~When Pitch error needle is positive,~~
PRO F 50 18 SC CONT - CMC
PRO 06 18 BMAGS - RT 2
MAN ATT(Pitch) - RATE CMD - +X ~4 SEC (~.7 FPS)
F 50 18 ENTR AT COMPLETION

~~THRUST +X 04 SEC (~.7 FPS)~~
[redacted]
DAC - ON
BMAG (3) - ATT 1/RATE 2

CAPTURE

CMC/FREE
PROBE RETR - PRIM 1 (PRIM 2 Alternate)
SECS PYRO ARM - SAFE
SECS LOGIC (2) - OFF
EDS PWR - OFF
cb EDS (3) - open
DOCK PROBE EXTD/REL - OFF
DOCK PROBE RETRACT(2) - OFF
cb DOCK PROBE (2) - open
TAPE RCDR
PCM - LOW
DAC/TV - off

If Dock PROBE remains gray after capture: RETR-PRIM 1 (Sec 1) in that system

SPS BURN

7/1/71

① EMS-OFF
② CB EMS A&B-CLSD
③ CB GRP5-CLSD
④ CB SPS PLT ULUS(2)-OPEN

CMC, ISS & SCS - on
Cycle CRYO FANS
EMS ΔV CK, Set ΔV, EMS FUNC - ΔV
√SIM PWR DN (NOMINAL, for SPS)
BMAG (3) - RATE 2
AUTO RCS SELECT - as req
LOAD DAP, RHC PWR NORM (2) - AC/DC
Set DET, SC CONT - CMC/AUTO
MNVR to PAD BURN ATT: V62E, V49E

GMBL TRIM
P ~~+1.68~~
Y ~~+1.65~~
~~P +1.63~~
~~Y +1.98~~

P+57
Y+88

BORESIGHT & SXT STAR CHECK, V41 N91E
P40 to F 50 18, Align SC ROLL, GDC ALIGN
cb STAB CONT (Pnl 8) & SPS(12) - close
MAN ATT (3) - RATE CMD
ATT DB - MIN, RATE - LOW, THC PWR - on
SCS TVC (2) - RATE CMD
ΔVCG - LM/CSM or CSM
TVC GMBL DR P & Y - AUTO
54:00 MN BUS TIE (2) - on.
(-06:00) HBR/RCD/FWD/CMD RESET
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
If 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

SPS BURN CONTINUED

7/1/71

F 50 25 GMBL TEST OPTION
(ACCEPT) PRO
06 40 FDAI SCALE - 5/5
RATE - HIGH, IF SCS: After IGN
Update DET, SPS He VLV (2) - AUTO ✓, Ck N2A & N2B

SPS PILOT VLV (B) - CLOSED

58:00	*ΔV THRUST A(B) - NORM
(-02:00)	THC & RHC (2) - ARMED
59:30	EMS - NORM
(-00:30)	CM PIPA BIAS < 2 fps for 5 sec
59:XX	
(-00:XX)	*ULLAGE 12 sec.

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

00:00	*IGN *If SCS: THRUST PB - PUSH
00:03	~~ΔV THRUST (2) - NORMAL~~
00:XX	ECO
F 16 40	ΔV THRUST (2) - OFF
F 16 85	Null residuals
	Record ΔV counter & residuals
	GMBL MOT (4) - OFF
	TVC SERVO PWR 1 & 2 - OFF
	MN BUS TIE (2) - OFF
	EMS FUNC - OFF, MODE - STBY
	THC PWR - OFF, RHC PWR DIRECT (2) - OFF
	cb DIRECT ULLAGE (2) - open
	cb SPS P1 & Y1 - open, CB SPS PCT VLV(B) - OPEN
	BMAG MODE (3) - RATE 2, CB EMS (2) - OPEN
	PCM BIT RATE - LOW

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

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

P61
06 61 L.AT +26.13

LO.NG -158.13
LIFTUP -00001
PRO (41:30)

06 60 GM.AX V400K, γ
PRO (EMS)
16 63 RTG.O _____ (10849)

VIO. _____ (36178)

PRO RET.05G 29 =DET+TFE

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

7/13/71

43:00(17:00) P62
HRZN CK:(31.7±5)P 267 ±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 0 P 153 Y 0

: MOONSET GET 294:56:37

P _____

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

00:00 RRT 294 : 58 : 54

: 29 .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

2:12 V CIRC
*DL _____ _____ *VL _____

7:44 DROG GET ____:____:____

P63
06 64 .OG, VI., RTG.O
V16 63 RTG.O, VIO., TFE
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., .OG
1.5:L UP

MAX ____ (±1G)(EMS)
>6.5 ROLL <90°(EMS)
<5.5 G&N ROLL >90°
DO 4.0 MODULATE

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

.DL _____/____ (EMS)

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

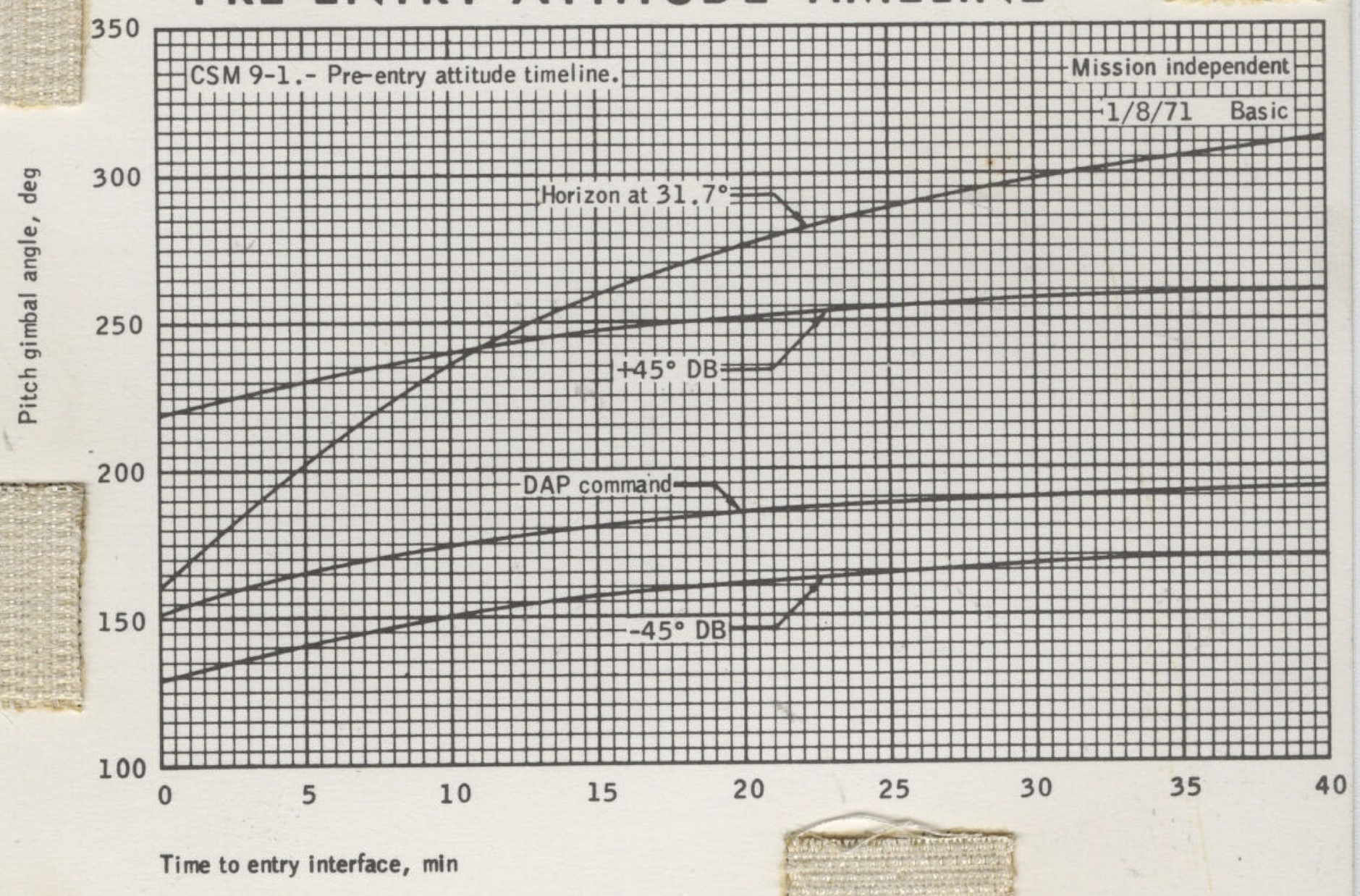
P66 <.2G KREL
06 22 RPY HRZN 31.7±12°
<.05G ATT HOLD L UP,
✓ N22

P67 .2G
V16 68 BE.TA, VI., HDOT.
~~NEG (IF +:EMS)~~
06 66 BE.TA,XER.R,DNER.R
STER CMD,DRE-~~28~~ TO 0
V16 64 .OG, VI., RTG.O(MON)
3800:STEAM PRESS
2200:N67
1700:50K PYRO ARM
3+31
16 67 RTG.O, L.AT, LO.NG

30K ELS LOGIC-ON
ELS AUTO

5/10/71

PRE-ENTRY ATTITUDE TIMELINE



Apollo 15 LM Cue Cards Small (16 cards)

- **These include all of the cue cards that have handwriting on them**
- **There are a few with no handwriting; included because they have a July date (others with earlier date and no handwriting are not included in this list)**
- **They all have Velcro on at lest one side**
- **Listed from largest to smallest:**

ENTRY 7/13/71 (8x6 with smaller piece attached; DRS handwriting)
Back side: Pre-Entry Attitude Timeline 5/10/71

SPS BURN 7/1/71 (8x6; non-drs handwriting)
Back side: SPS BURN CONTINUED 7/1/71

T&D 5/10/71 (8x6; white velcro; non-drs handwriting)
Back side: T&D CONTINUED 5/10/71

T&D 5/10/71 (8x6; blue velcro; non-drs handwriting)
Back side: T&D CONTINUED 5/10/71

TLI 7/13/71 (typed date of 7/1/71 crossed out & new date handwritten (not DRS writing) (2 narrow rectangle strips taped together; DRS handwriting)
Back side is blank except for date: 7/1/71

CDR BOOST/ABORTS (typed date of 7/1/71 crossed out & new date handwritten (not DRS writing) (2 narrow rectangle strips taped together; non-drs handwriting)
Back side is blank except for date: 5/10/71

LANDING 5/10/71 (odd shape; non-drs handwriting)
Back side is blank except for date: 5/10/71

NO TITLE 7/1/71 (odd shape; DRS handwriting)
Back side: COAS BORESIGHT LOG 7/1/71

LMP BOOST/ABORTS 7/1/71 (odd shape; only one piece of handwriting, possibly DRS)
Back side: TLI NO GO'S 7/1/71

POWER LOSS 7/13/71 (odd shape; DRS handwriting)
Back side: UNDOCK SEP 7/1/71

SIM EXP PREP 7/1/71 (rectangle; no handwriting, but 7/1/71 date)
Back side: SIM TALKBACK SUMMARY 7/1/71

CDR ABORTS III & IV 7/1/71 (rectangle; one piece of handwriting, possibly DRS)
Back side is blank except for date: 5/10/71

LOI LIMITS JULY 26 7/1/71 (rectangle; DRS handwriting)
Back side: LOI NO GO'S 7/1/71

VAC XFER TO ECS 7/13/71 (narrow rectangle; DRS writing)
Back side is blank

LOSS OF COMM 7/1/71 (triangle; one piece of handwriting on back - non-DRS)
Back side: AC PWR 5/10/71

Small Round Piece with NO TITLE, at bottom is "VIEW LOOKING FWD" 7/1/71 (at center is: BEACON LIGHT; no handwriting
Back side is blank