APOLLO 8

# TLI PROCEDURES

| PART NO. | S/N |
|---|---|
| SKB32100020-301 | 1003 |

CDR CMP LMP

00:00

TCYI = 72.2°

TPRE

TASC = 90.2°

TPRE

TASC = 108.2°

POST INSERTION CONFIG
SM/CM RCS/C&W CK

REMOVE HELMET & GLOVES

ECS POST INSERT CK

ECS POST INSERT CK

EPS PER MON
ECS MON CK
SPS PER MON
PUGS TEST
ECS REDUND
COMP CK
FC PURGE CK

GDC ALIGN

MOUNT ORDEAL

JETT OPTICS COVER

INSTALL COAS
COAS HORIZ CK

00:30

01:00

01:30

TCROSS

THAND

TCROSS

THAND

TCROSS

THAND

72.2°

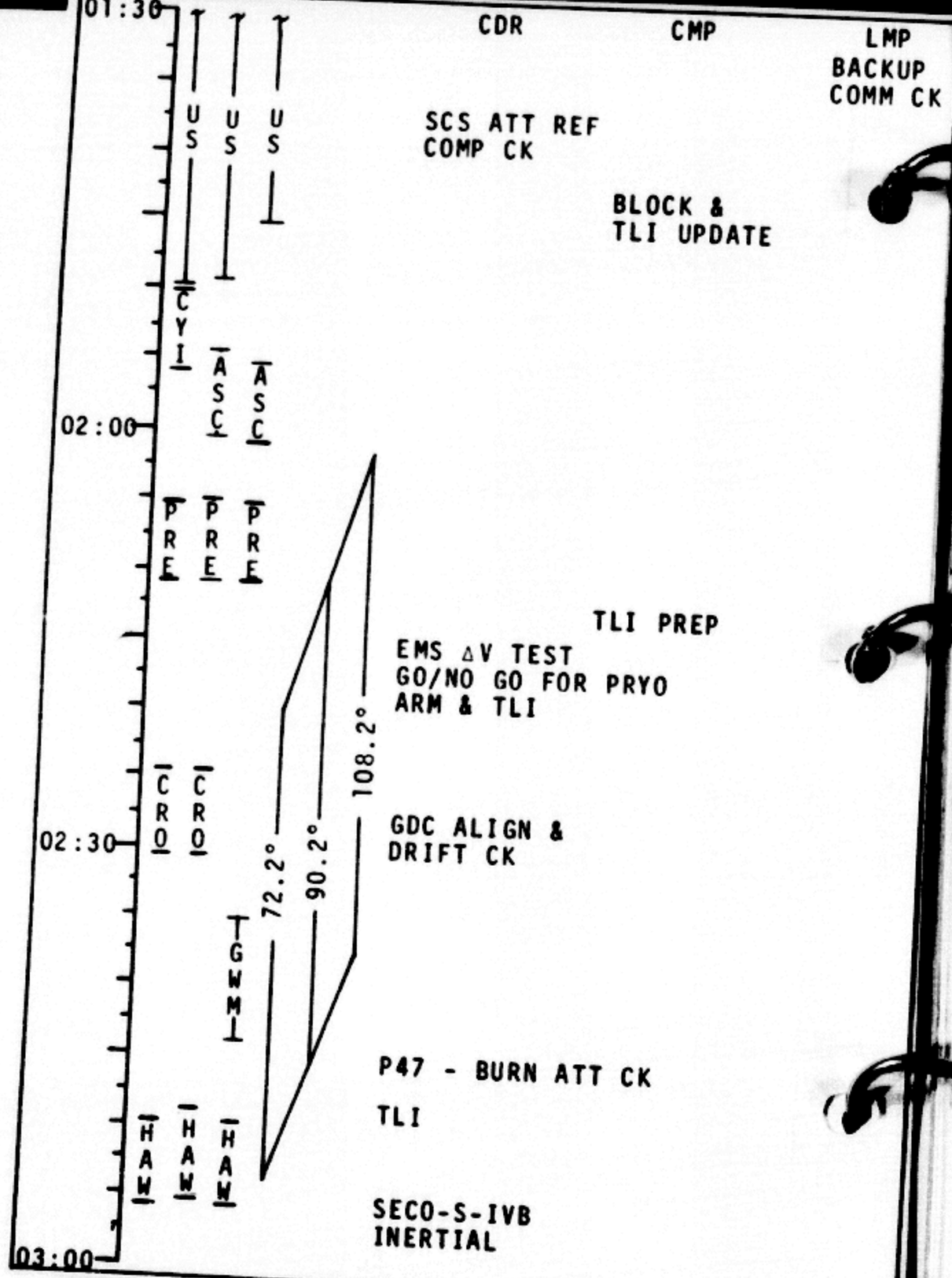
90.2°

108.2°

OPTICS CK
&
IMU REALIGN
P52

LAUNCH PREP

POST-INSERTION




Basic Date Nov. 6, 1968
Changed Dec. 11, 1968



## LAUNCH PREPARATION

-20:00 CTE UPDATE VERIFICATION
Change X STABLE MEMBER AZIMUTH, if necessary:
*V78E *
*F 06 29 X SM AZ (.01°) *
*V21E *
*Load new Azimuth_____ *
*PRO *
*GDC ALIGN, Pg L-8 *

-15:00 FDAI-1 - total att R=90+AZ, P=90, Y=0
BMAG MODE (3) - RATE 1
FDAI SCALE - 5/5
RATE - HIGH
RHC 2 - UNLOCK
1 - UNLOCK
ROT CONT PWR DIRECT (both) - MNA/MNB
CMC MODE - FREE

TRANS CONTR PWR - on (up) (verify)
ASTRO LAUNCH OPERATIONS VOICE CHECK
VOICE CHECK WITH MCCH
S-bd VOL TW (CDR) - FULL DECR
~~PAD COMM OFF~~
ADJUST MASTER VOL CONTROLS
SPS THRUST - NORMAL
ΔV THRUST A&B - OFF
LV SPS INDα/PC - α
SII/SIVB/GPI - SII/SIVB

EDS AUTO - on (up)
ABORT LV RATE - AUTO
ABORT 2 ENG OUT - AUTO
Verify CM RCS PROP tb(both)-gray
RCS CMD - OFF

-10:00 FC REACS v/v - LATCH
~~-08:00~~
-06:00 SCS TVC SERVO PWR 1 - AC1/MNA
2 - AC2/MNB

-04:00 ASTRO LAUNCH OPERATIONS COMM CHECK

-03:00 DSKY - Verify P02
V75 (NO ENTR)

~~PC HEAT 4 hr - TAPED~~
TAPE RCD FWD - FWD
TAPE MOTION - bp

~~-02:00~~
~~-01:15~~ GLY RAD PRI - PULL (BYPASS)

-01:15 MN BUS TIES (both) - ON
-01:00 **PAD CONN (2) - OFF**
-00:45 FLT RCDR - RCD
GDC ALIGN PB - PUSH & HOLD
R=90+AZ, P=90, Y=0
CDAI 2 Total att - NO MOTION
GDC ALIGN PB - REL

LAUNCH PREP

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## LAUNCH-INSERTION

-00:09 **Ignition CMD**
-00:01 **L/V ENGINES lts (5) - out**
00:00 **LIFT OFF lt - on**

00:00

* LIFTOFF VERIFIED: *
* If LIFTOFF lt OFF - PUSH *
* If NO AUTO ABORT lt ON - PUSH *

**Clock Running** (auto) - report
**MET Resets & starts counting up auto**
**P11 auto**

+4°/sec P,Y
±20°/sec R

* NO P11 - Key ENTER *
* START DET & RESET MET*

06 62 VI,H DOT, H PAD (fps,fps,.1nm)

MODE IA

+00:02 **Yaw Mnvr** - report
+00:11 **Roll & Pitch Program** - report
+00:28 **Roll complete** - report

00:42

+00:42 **MODE IB** - report
PRPLNT DUMP - RCS CMD
+00:50 Monitor at to T +02:00
(100%, 6° Att error)
* LV Guid & LV Rate lts ON *
* 00:50 - 01:25 ABORT *

+4°/sec P,Y
±20°/sec R

**CABIN PRESSURE DECREASING** (~14K)

* NO PRESSURE DECREASE by 25K *
* CAB PRESS RELIEF vlv (RH) - *
* DUMP *
* IF NO RESULTS: *
* HATCH REL vlv - OPEN *
* CLOSE at 8 psia *

MODE IB

+01:17 **MAX Q**
+01:50 **MODE IC** - report (R3 = 16.5NM)

1:50

POST-INSERTION

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| | | |
|---|---|---|
| +02:00 | EDS AUTO - OFF | |
| | 2 ENG OUT - OFF | |
| | L/V RATES - OFF | |
| | α/Pc sw - Pc | |
| | GO/NO GO FOR STAGING - report | MODE IC |
| +02:05 | INBOARD CUTOFF - (lt 5 on) | |
| | LIFTOFF LIGHT - OUT | |
| +02:31 | OUTBOARD CUTOFF - report (lts 1,2,3,4 on) | |
| +02:32 | SIC/SII STAGING (lts off) | |
| +02:33 | SII Ign Command (lts on) | 02:33 |
| | SII SEP lt - on | |
| +02:36 | SII 65% - lts out | |
| | FDAI Scale - 50/10 | |
| | GMBL Mot (4) - START - ON (LMP Confirm) | |
| | Check GPI | |
| | SII/SIVB/GPI - GPI (Momentarily) | +9°/sec P,Y ±20°/sec R |
| | PITCH = -1.61 | |
| | YAW = +1.33 | |
| +03:00 | SII SEP LITE - OUT report | MODE IC |
| +03:07 | TWR JETT (both) - on(up) (TFF>1+20) | 3:07 |
| | *NO TWR JETT * | |
| | *LES MOT FIRE Pb - PUSH * | |
| | *No response go to pg EMG-4 * | |
| | MAN ATT (3) - ACCEL CMD | |
| | RCS CMD - ON | |
| | SECS ARM cb (both) - open | |
| | Twr Jett & MODE II - Report | |
| | GLY EVAP STEAM PRESS - AUTO | |
| | GLY EVAP H2O FLOW - AUTO | |
| | Guidance Initiate - report (OECO +44sec) | MODE II |
| +03:53 | Guidance Good | |
| +04:00 | Report status | |
| +05:00 | Report Status | |
| +05:53 | SIVB to Orbit Level Sense Arm 08:05 | |
| +06:00 | Report Status | |
| +06:15 | OMNI ANT-D (AZ<96°) | |
| +07:00 | Report Status | |
| +08:00 | Report Status | |
| +08:20 | GO/NO GO FOR STAGING - report | |

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## LAUNCH PARAMETERS

| Time | VI(FPS) | $\dot{H}$(FPS) | H,pad (nm) |
|---|---|---|---|
| 00:20 | 1366 | +212 | 0.4 |
| 00:40 | 1567 | +529 | 1.5 |
| 01:00 | 2060 | +949 | 3.9 |
| 01:20 | 2872 | +1449 | 7.9 |
| 01:40 | 4103 | +1991 | 13.5 |
| 02:00 | 5780 | +2553 | 21.0 |
| 02:20 | 7679 | +3033 | 30.4 |
| 02:40 | 8936 | +3117 | 40.7 |
| 03:00 | 9262 | +2795 | 50.5 |
| 03:20 | 9637 | +2505 | 59.5 |
| 03:40 | 10056 | +2245 | 67.1 |
| 04:00 | 10525 | +1987 | 74.3 |
| 04:20 | 11042 | +1737 | 80.0 |
| 04:40 | 11608 | +1498 | 85.9 |
| 05:00 | 12225 | +1267 | 90.0 |
| 05:20 | 12894 | +1049 | 94.1 |
| 05:40 | 13618 | + 847 | 97.2 |
| 06:00 | 14401 | + 666 | 99.6 |
| 06:20 | 15248 | + 506 | 101.5 |
| 06:40 | 16164 | + 371 | 102.9 |
| 07:00 | 17158 | + 265 | 104.0 |
| 07:20 | 18211 | + 170 | 104.6 |
| 07:40 | 19137 | + 61 | 105.0 |
| 08:00 | 20130 | + 12 | 105.2 |
| 08:20 | 21197 | + 37 | 105.2 |

POST-INSERTION

## LAUNCH PARAMETERS-cont'd

| | | | |
|---|---|---|---|
| 08:40 | 22356 | + 117 | 105.5 |
| 09:00 | 22637 | + 26 | 106.0 |
| 09:10 | 22825 | - 26 | 106.0 |
| 09:20 | 23016 | - 67 | 106.0 |
| 09:30 | 23211 | - 108 | 105.8 |
| 09:40 | 23408 | - 136 | 105.5 |
| 09:50 | 23608 | - 158 | 105.2 |
| 10:00 | 23811 | - 180 | 105.0 |
| 10:10 | 24017 | - 189 | 104.5 |
| 10:20 | 24225 | - 190 | 104.3 |
| 10:30 | 24436 | - 185 | 104.0 |
| 10:40 | 24650 | - 165 | 103.5 |
| 10:50 | 24886 | - 145 | 103.3 |
| 11:00 | 25083 | - 102 | 103.2 |
| 11:10 | 25304 | - 59 | 103.2 |
| 11:20 | 25527 | - 7 | 103.2 |
| 11:21 | 25565 | 0 | 103.3 |

LAUNCH PREP

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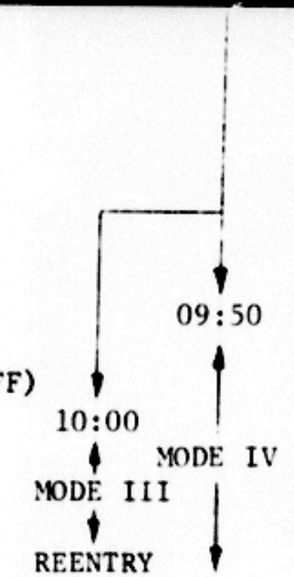
+08:40 SII Cutoff - lts on
+08:41 SII Staging - lts off
+08:45 SIV Ign Cmd - lt on
+08:46 SIV 65% - lt off
+09:00 Report Status
+09:50 Mode IV - Report
(VI~23,600,H DOT~0)
V82E N50E - F 16 50 (ΔR,HP,TFF)
+10:00 GO/NO GO FOR ORBIT - report
+11:21 SECO (lt on) - report
(Begin TB5)
* If no SECO, *
* THC CCW & neutral in 1 sec *
* or SII/SIVB sw LV STAGE *
+11:31 INSERTION - lt off (TB5 + 10 sec)




GMBL MTRS (4) - OFF (LMP Confirm)
MN BUS TIES (both) - OFF (LMP)
TVC SERVO PWR (both) - OFF
FLT RCDR - OFF (LMP)

KEY RLSE

Record HA_____ (.1nm)
HP_____ (.1nm)
TFF_____ (min-sec)
PRO
Record VI_____ (fps)
H DOT_____ (fps)
H PAD_____ (.1nm)

V37E 00E
V66E (transfer SV into LM memory)
V48E 31102,01111 PRO,PRO,PRO
V46E CSM Wt 63531
V83E (check θ) P TRIM -1.61
PRO Y TRIM +1.33

BDA LOS
(__:__:__)

POST-INSERTION

TLI 1 REP

POST-INSERTION CHECKLIST

1 CMP Unstow Checklist

CDR
ELS - MAN (verify)
CM RCS LOGIC - OFF
CAB PRESS REL vlv (both) - NORMAL/LATCHED
PLSS vlv - OFF
SECS ARM cb (both) - open (verify)
FLOAT BAG cb (3) - open
ELS BAT cb (both) - open
PL VENT cb - open
DIR O2 - OFF (CW)
TRANS CONT PWR - OFF
ROT CONTR PWR DIRECT - OFF

MONITOR LV TANK PRESS
ΔP < 36 psid (OXID > FUEL)
ΔP < 26 psid (FUEL > OXID)
* EMERGENCY CSM/LV SEP pg EMG-5 *

CMP
SM RCS HTRS (4) - PRIM
CM RCS PRPLNT (both) - OFF
CM RCS PRPLNT tb (both) - bp
C/W function - NORMAL
HATCH GEAR BOX - LATCH
ACTR HNDL SELECTOR - neutral

LMP
STM/UR DUCT HTR cb (both) - close
TLM INPUTS - LOW
FC REACS vlv - NORM
H2 PURGE LINE HTR - ON
LMP Unstow Checklist

SYS VERIF & MONIT can be started at this time

2 SM RCS Ck (CMP)

3 CM RCS Ck (CMP)

POST-INSERTION

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4 C & W Ck (CMP)

5 CMP to LEB for MN REG Ck
PYRO A&B SEQ A&B cb (both) - open
SECS LOGIC (both) - OFF

6 SUIT CKT RET vlv - open (pulled) (CDR)
Remove Helmets & Gloves
DIRECT ULLAGE cb (both) - open
Panel 278 cb 1 & 2 - open (LMP)

7 SEC RAD LEAK Ck (CMP & LMP)

+20:00 8 ECS Post insertion Config
Gly RSVR BYPASS vlv - OPEN (CCW)
Gly RSVR OUT vlv - CLOSE (CW)
Gly RSVR IN vlv - CLOSE (CW)
ECS RAD FLOW CONT - PWR
PRIM GLY TO RAD vlv - NORMAL (push)
LMP note PRIM ACCUM QTY
ECS RAD HTR - PRIM 1
ECS RAD TEMP PRIM OUT below PRIM IN
*If outlet temp after 5 min *
*above INLET TEMP *
*PRIM GLY TO RAD vlv - BYPASS *
* (pull). Recheck in 10 min*
ECS RAD tb - GRAY
GLY EVAP TEMP IN - AUTO

DRINKING WATER SUPPLY vlv - ON (CCW)

CYI LOS
(__:__:__)

TAN AOS (V)
(__:__:__)

TAN LOS
(__:__:__)

SYS VERIFICATION & MONITORING

1 EPS Per Verif (LMP)

2 ECS MON Ck (LMP)

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TLI PREP

POST-INSERTION

3 SPS Monit Ck (LMP)

4 GDC ALIGN
ATT SET TW - IMU angles on FDAI 1
FDAI SELECT - 1
FDAI SOURCE - ATT SET
ATT SET - IMU
ATT SET TW - null FDAI 1 err needles
ATT SET - GDC
GDC ALIGN PB - push until needles null
Record Drift ____, ____, ____
BMAG MODE (3) - RATE 2

5 UNSTOW CAMERA BRACKET & ORDEAL (CDR)

6 MOUNT ORDEAL BOX & Initialize

7 ECS REDUNDANT COMPONENT CK, (LMP)

8 FC PURGE CHECK, (LMP)

9 UNSTOW CAMERAS (CMP)

SUNSET (__:__:__) 10 OPTICS DUST COVER JETT (CMP)

CRO AOS (__:__:__) 11 MCCH - G/N STATUS
X Torquing Angle _____

12 IMU REFSMMAT Realign Check (P52), (CMP)
If IMU is realigned,
Realign GDC (CDR)
00E
V46E
G/N PWR OPTICS - OFF

CRO LOS (__:__:__)

HSK AOS (S) (__:__:__) S-Bd VOL - UP

HSK LOS (__:__:__)

SUNRISE (__:__:__) S-Bd VOL - DN

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+01:20:00 13 BACKUP COMM CHECK (LMP)

US AOS (__:__:__)

14 SCS ATT Ref Comp Ck
V16 N20E
FDAI SELECT - 1
FDAI SOURCE - ATT SET
ATT SET - GDC
ATT SET dials - null FDAI 1 err needles
Key VERB when nulled(freeze display)
Record from DSKY:
R___,P___,Y___
Record ATT SET dials:
R___,P___,Y___

US AOS (__:__:__) 15 COPY TLI PAD

BDA LOS (__:__:__)

| TLI | | | TB6p (Lt out) |
|---|---|---|---|
| X : : | X : : | | |
| X X X | X X X | | R |
| X X X | X X X | | P |
| X X X | X X X | | Y |
| X X X : | X X X : | | BT |
| • | • | | ΔVC' |
| + | + | | VI |
| X X X | X X X | | R SEP |
| X X X | X X X | | P SEP |
| X X X | X X X | | Y SEP |

CYI AOS (__:__:__) 16 SV UPDATES (MCCH)

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TLI PAD

POST-INSERTION

## MANEUVER

| TLI +90 SPS / G&N | TLI +4 hrs SPS / G&N | PURPOSE PROP/GUID | |
|---|---|---|---|
| + 6 3 5 3 1 | + 6 3 5 3 1 | WT | N47 |
| − 0 0 1.6 1 | − 0 0 1.6 1 | $P_{TRIM}$ | N48 |
| + 0 0 1 3 3 | + 0 0 1 3 3 | $Y_{TRIM}$ | |
| + 0 0 | + 0 0 | HRS GET I | |
| + 0 0 0 | + 0 0 0 | MIN | N33 |
| + 0 | + 0 | SEC | |
| | | $\Delta V_X$ | N81 |
| | | $\Delta V_Y$ | |
| | | $\Delta V_Z$ | |
| X X X | X X X | R | |
| X X X | X X X | P | |
| X X X | X X X | Y | |
| + N/A | + N/A | $H_A$ | N44 |
| | | $H_P$ | |
| + | + | ΔVT | |
| X X X | X X X | ET | |
| X | X | ΔVC | |
| X X X X N/A | X X X X N/A | SXTS | |
| + 0 | + 0 | SFT | |
| + 0 0 | + 0 0 | TRN | |
| X X X | X X X | BSS | |
| X X | X X | SPA | |
| X X X | X X X | SXP | |
| 0 | 0 | LAT | N51 |
| | | LONG | |
| + | + | RTGO | EMS |
| + | + | VIO | |
| | | GET | .05G |

Basic Date of Maneuver: Dec. 6, 1968
Changed: Dec. 13, 1968

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Changed: Dec. 27, 1968

CSM 107



CYI LOS (02:53:30)

SUNSET (02:__:__)

TAN AOS (02:09:04)

TAN LOS (02:15:54)

## P27 UPDATE

| | | | | | |
|---|---|---|---|---|---|
| PURP | | V | | V | |
| GET | : | : | : | : | |
| 304 | 01 | INDEX | | INDEX | |
| | 02 | | | | |
| | 03 | | | | |
| | 04 | | | | |
| | 05 | | | | |
| | 06 | | | | |
| | 07 | | | | |
| | 10 | | | | |
| | 11 | | | | |
| | 12 | | | | |
| | 13 | | | | |
| | 14 | | | | |
| | 15 | | | | |
| | 16 | | | | |
| | 17 | | | | |
| | 20 | | | | |
| | 21 | | | | |
| | 22 | | | | |
| | 23 | | | | |
| | 24 | | | | |

| | | | |
|---|---|---|---|
| N34 | HRS | X X X | X X X |
| | MIN | X X X X | X X X X |
| NAV CHECK | SEC | X X . | X X . |
| N43 | LAT | 0 . | 0 . |
| | LONG | . | . |
| | ALT | + 0 . | + 0 . |

TLI PREP

## TLI PREP

XLUNAR - Inject (verify)
EDS PWR - on(verify)

EMS FUNC - Off (verify)
EMS MODE - STBY
EMS FUNC - ΔV SET
EMS MODE - AUTO
Set ΔV ind. to +1586.8 fps
EMS FUNC sw - ΔV Test
  SPS THRUST LITE - on/off
  ΔV ind. stops at -20.8±20.7 (10 sec)

EMS MODE - STBY
EMS FUNC - ΔV SET
Set ΔVC _____
EMS Funct. - ΔV

GDC ALIGN
FDAI Scale - 5/1
FDAI Select - 1/2

CRO AOS
(__:__:__)

SECS LOGIC cb (both) - Close (verify)
SECS ARM cb (both) - open (verify)

TRANS CONTROL PWR -ON
ROT CONTR PWR NORMAL(both) - AC/DC(verify)
DIRECT(both) - MNA/MNB
LV/SPS Ind. - SII/SIVB (verify)
LV GUID. - IU (verify)
DIRECT ULLAGE cb (both) - closed

Set EVENT TIMER to 51:00
Begin MONITOR For TB6
SECS LOGIC (both) - on(up)
PYRO A&B SEQ A&B cb (both) - close

CRO LOS
(__:__:__)

CMP to Couch

POST-INSERTION
TLI PREP

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(02:41:00)

TB 6 - SII SEP Lite ON (TIG-9 min, 38 sec)

FDAI #2 ORB RATE at 180, 0, 0

51:00

SII SEP LITE OUT
Start DET COUNTING UP
SC CONT - SCS (verify)
MONITOR LV TANK PRESS
  ΔP < 36 psid (OXID > FUEL)
  ΔP < 26 psid (FUEL > OXID)
    *EMERGENCY CSM/LV SEP pg EMG-5*
UP TLM CM - BLOCK verify
UP TLM IU - BLOCK (verify)

57:00 V37E 47E (check bias) Record _____
V46E (Limit: 9.8 fps/min)
F 16 83 ΔVX,Y,Z (.1fps)
58:00 N62E
F 16 62 VI, HDOT, HPAD (fps,.1nm,fps)
MONITOR VI (  ) at ECO.
SCS TVC SERVO PWR 1 - AC1/MNA
2 - OFF
START TAPE RCDR
HBR,RECORD,FWD,CMD RESET, tb-bp
FLT RCDR - RECORD
EMS MODE - Auto

58:20 SII SEP lite - ON
58:36 * TLI Inhibit Signals will not *
* be honored after 59:42 *

58:38 SIVB ULLAGE Begins
59:42 SII SEP lite Off (TIG - 18 sec)
59:52 SIVB FUEL LEAD
59:55 SIVB ULLAGE discontinues
59:59 LV ENG 1 lite-on
(02:50:31)
00:00 SIVB IGNITION (__:__:__GETI)
00:02 LV ENG 1 lite-Off
SUNRISE MONITOR THRUST & ATTITUDE +45° P,Y ±10°/sec P,Y
(_:_:_) MONITOR LV TANK PRESS

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LAUNCH PREP
MODE II
MODE III

05:17 SIVB ECO (1t On) (BEGIN TB7)
*EMER SIVB CUTOFF AT 6 SEC *
*PAST BURN TIME IF VI ATTAINED*
* THC CCW & NEUTRAL IN 1 SEC *
* or SII/SIVB sw - LV STAGE *

HAW AOS
(__:__:__) KEY VERB (freeze display)
ECO + 10 sec - 1t off

SIVB ATT HOLD 20 sec & BEGIN VENTING
SIVB MNVR TO ORB RT (HDS DN) (.3°/sec)
Record VI _____
HDOT _____
HPAD _____

KEY RLSE

F 16 62

KEY RLSE

F 16 83 ΔV X,Y,Z (.1fps)
Record ΔVX _____
ΔVY _____
ΔVZ _____
ΔVC _____

HAW LOS
(__:__:__)

FLT RCDR - OFF
TAPE RCDR - STOP
EMS MODE - STBY
EMS FUNC - OFF

PRO

Start Battery Charge(BATT B), Pg S-4





| BURN STATUS REPORT | |
|---|---|
| _____ ΔTIG<br>_____ BT<br>_____ VGX<br>_____ R<br>_____ P<br>_____ Y | _____ VI<br>_____ HDOT<br>_____ H<br>_____ ΔVC<br>_____ FUEL<br>_____ OXID<br>_____ UNBAL |
| REMARKS | |

Premature Shutdown:
HA >60K nm - Lunar orb flyby (depend on ΔV req'd)
>22K nm - 2 phasing mnvrs to semi-synch orb. Dir entry
> 4K nm - Hi alt orb fol by deboost to HA=400nm
< 4K nm - Either hi or low alt, depend on ldmks

F 37
08:00
GDS AOS
(__:__:__) 00E
CMP TO LEB

PRE-SEPARATION
LOAD RCS DAP
V48E 11103 PRO,PRO,PRO
V46E
LOAD N22, Dock Att ___,___,___(V62)
(03:11:00) SIVB CLOSE VENTS
& MNVRS TO SEP ATT ___,___,___(1°/sec)

Prepare Camera Equip for SIVB photo
AUTO RCS SEL (16) - MNA/MNB (verify)
SCS TVC SERVO PWR 1 AC1/MNA (verify)
2 - OFF (verify)
SC CONT - CMC
CMC MODE - AUTO
BMAG MODE (3) - RATE 2 (verify)

DET Reset 58:00 (count up)
HAND Controllers - Armed
ATT Deadband - MIN
Rate - Low
GET SEP ___:___:___

SEPARATION
V60E
V63E

(03:19:00)
58:00
59:30

DET START
FLT RCDR - RECORD
TAPE RCDR - STOP/HBR/FWD
EMS FUNC - ΔV
EMS MODE - AUTO
MAN ATT(3) - RATE CMD

59:50

(03:21:00)
00:00

TRANS CONT - CCW, +X & HOLD

00:03

LV TANK PRESS ind(4) - 0 (CSM/LV SEP)

00:08

TRANS CONT - NEUT & +X OFF

* NO SEP: *
* SECS ARM cb(both) - close *
* TRANS CONT - +X & HOLD *
* CSM/LV SEP PB - push *
SECS ARM cb (both) - open

TVC SERVO PWR 1 - OFF

LAUNCH PREP
POST_INSERTION
TLI PREP

Basic Date Nov. 6, 1968
Changed 12 Dec. 13, 1968



EMERGENCY

TRANSPOSITION
1 V62E
00:20 V49E

2 F 06 22 DESIRED FINAL GMBL RPY ANGLES (.01°)
PRO

3 F 50 18 REQUEST MNVR TO FDAI RPY ANGLES (.01°)
00:30 (AUTO) PRO
(MAN) SC CONT - SCS
MNVR To 5
* If mnvr not started 30 sec *
* after SEP: *
* THC -X 2.5 sec (.5 fps) *

4 06 18 AUTO MNVR TO FDAI RPY ANGLES (.01°)
00:45 FLT RCDR - OFF

5 F 50 18 REQ TRIM (.01°)
(TRIM) - Go to 3
(BYPASS) - BMAG MODE(3)-ATT1/RATE2
ENTR

6 TRANS CONT - Null opening rate

EDS PWR - OFF
TAPE RCDR - STOP/LBR/FWD
NONESS BUS - OFF
EDS cb (3) - open
SPS P1&2, Y1&2, cb (4) - open

Hi Gain Ant Activation

HGA FLT BUS cb - close
GROUP 2 cb - close
TRACK - MAN
PWR - on(up)

CMP to LEB
PYRO A&B SEQ A&B cb(both) - open
SECS LOGIC (both) - OFF

Basic Date
Changed

Conduct SIVB Photography

(03:36:00) CSM Evasive Maneuver

1 MNVR to Local Vert (+X towards earth)
Maintain SIVB in CDR's window

2 V37E 47E
F 16 83 ΔVX,Y,Z (.1fps)
THC -X 1.5 fps (15 sec)

3 PRO
F 37 00E

4 V66E

TLI PREP

POST INSERTION

Basic Date Nov. 6, 1968
Changed Dec. 13, 1968

Basic Date Nov. 6, 1968
Changed Dec. 27, 1968

L
EMG-1

## PAD EMERGENCY PROCEDURES

**RAPID HATCH OPENING**

1 Actr handle rel - push or squeeze Side Hatch

2 Actr handle - operate (until hatch is unlatched)
* If hatch fails to open *
* GN2 change knob (both) - CW *
* GN2 vlv handle - unlock and *
* push (outboard) *

**FIRE IN CM DURING BOOST**

1 CABIN FAN (both) - OFF

2 Monitor EPS indicators for excessive current.
Immediately remove power from affected bus.
If in abort modes I or II:
Verify suit compressor on good AC bus
If in abort mode III with affected bus Main A (B):
TVC GMBL DRIVE (2) - 2(1)
AC INV 1 (2) AC BUS 1 (2) - OFF
AC INV 2 (1) AC BUS 1 (2) - ON(up)

3 CAB PRESS RELF vlv (RH) - DUMP

4 ABORT using appropriate mode

EMERGENCY

MODE II
MODE III

EMERGENCY

FIRE/SMOKE IN CM DURING ENTRY

1 CABIN FAN (both) - OFF

2 Monitor EPS indicators for excessive current. Immediately remove power from affected bus.

3 ROT CONTR PWR DIRECT (both) - MNA/MNB & maintain attitude if required.

4 If affected bus is:

MNA
- AC INV 1 AC BUS 1 - OFF
- AC INV 2 AC BUS 1 - ON
- Set up for CM/RCS sys 2
  - AUTO RCS SEL A/C ROLL (4) - OFF
  - CM 1(6) - OFF
  - CM 2(6) - MNB
- ~~Follow normal~~ RCS dump ~~procedure~~ is fuel rich ~~using TBD deviations for a fuel rich dump~~.

MNB:
- AC INV 2 AC BUS 2 - OFF
- AC INV 1 AC BUS 2 - ON
- ~~Follow normal~~ RCS dump ~~procedure~~ is oxid rich ~~using TBD deviations for an oxidizer rich dump~~.

5 CAB PRESS RELF vlv (RH) - DUMP

6 Continue ENTRY







Contamination in CM

1 Don O2 masks and/or PGA's immediately

2 Evaluate contamination level (isolate & correct source of contamination if possible) and proceed with one of the following steps:

a. Retain O2 masks or remain in suit and accept contamination level in cabin.

CAUTION

If in PGA's, adjust DIRECT O2 to maintain suit to cabin ΔP > 0.38 psi.

b. Retain O2 masks and scrub cabin atmosphere through suit loop. If initially suited, establish partially suited or shirtsleeve configuration and don O2 masks.

CAUTION

Change LiOH cartridges after scrub completed.

c. Retain PGA's or don PGA's
Verify suit integrity (visually)
Perform Cabin Dump
Perform Cabin Repress

Contamination In Suit

1 SUIT COMPR 2 - AC1

2 SUIT COMPR 1 - OFF

3 DIRECT 02 vlv - OPEN (CCW) for 1 minute then close (CW)

If condition persists:

4 SUIT COMPR 2 - OFF

5 DIRECT 02 vlv - OFF

6 Doff helmet

7 Don emergency 02 masks

EMERGENCY

LET FAILS TO JETTISON
LEGS CUT/NO MOTOR FIRE (pyro audible)
LES MOTOR FIRE pb - push
NO RESPONSE to ABRT SYS TWR JETT switches
cb SECS ARM (2) - close (verify)
cb SECS LOGIC (2) - close (verify)
cb EDS (3) - close (verify)
SECS LOGIC (both) - on (up) (verify)
SECS PYRO ARM (2) - ARM (verify)
EDS PWR - on (up) (verify)
ABRT SYS TWR JETT (both) - on (up) (verify)





## EMERGENCY CSM/LV SEPARATION

**COASTING**
LV XLUNAR - SAFE
SECS LOGIC(both) - on(up)
PYRO A&B SEQ A&B cb(both) - close
ROT CONTR PWR DIRECT (both) - MNA/MNB
SC CONT - SCS
BMAG MODE(3) - ATT1/RATE2
SCS TVC SERVO PWR 1 - AC1/MNA
2 - AC2/MNB
(Continue through thrusting)

**THRUSTING**
00:00 TRANS CONTR - CCW(4sec) & +X
00:04 MAN ATT(3) - RATE CMD
TRANS CONTR - NEUTRAL & +X
* NO SEP: *
* SECS ARM cb(both) - close *
* TRANS CONT +X & HOLD *
* CSM/LV SEP PB - PUSH & HOLD *
* SECS ARM cb(both)-open *
MN BUS TIE (both) - ON
GMBL MTRS(4) - ON (LMP Confirm)
ΔV THRUST A - NORMAL
THRUST ON PB - PUSH
TRANS CONTR +X - RELEASE
ΔV THRUST A&B - OFF when clear

EMERGENCY POWER DOWN

NOTE: Use only after FC or BAT loss, no short verified, & main bus voltage <26.0 VDC.

Powerdown the following components until bus voltage>26.5 VDC:

| | | |
|---|---|---|
| O2 HTRS (both)-OFF | | 11.0amps |
| Non ESS Bus-OFF | | 4.9 |
| FLT RCDR-OFF | | .74 |
| GMBL MTRS P2,Y2-OFF | | 10.0 |
| S-BD PWR AMP-OFF | | 3.53 |
| FC PUMPS (3)-OFF | | 3.3ea. |
| H2 HTRS(both)-OFF | | 1.44 |
| CAB FANS (both)-OFF | | 1.94 |
| LIGHTS-Min req'd | | - |
| CMC to STDBY | | 2.0 |
| V48E | | |
| F 04 46 Load 0 Left digit R1 | | |
| PRO,PRO,PRO, V46E | | |
| F 50 25 00062 CMC PWR DN | | |
| PRO- HOLD until STBY lt on | | |
| G&N PWR - OFF | | 1.5 |
| IMU PWR DN (STBY) | | 5.7 |
| CMC MODE - FREE | | - |
| G&N IMU PWR-OFF | | - |
| ECS GLY PUMPS -OFF | | 2.77 |
| ECS RAD CONT/HTR cb(both) | OPEN | 2.69 |
| TAPE RCDR - OFF | | 1.82 |
| POWER SCE-OFF | | .65 |
| VHF/AM A-OFF | | 1.0 |
| TELECOM GRP 1&2-OFF | | 2.2 |
| INSTRUM ESS MN A&B cb(both) | OPEN | 5.54 |
| SUIT COMPR(both)-OFF | | 8.4 |
| DIR O2-ON | | |

NOTE: 2-1 Entry possible powered down, however items may be desired if bus voltage permits.

Basic Date Nov. 6, 1968
Changed Dec. 17, 1968

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BUS LOSS PROCEDURES

MN A (B) Lost

EDS AUTO - OFF
MN B(A) BAT C cb - close
INV 1(2) MN A(B) - OFF
INV 3 MN B(A) - AC1(2)
FC 2 MN A(B) - OFF
MN B(A) - ON
FC 1(3) - OFF
FDAI SELECT 2(1)
TVC GMBL DR 2(1)
BMAG MODE - RATE 2 (RATE 1)
S/C Roll Info RSI (FDAI #1 roll bug)
If Aborting With SPS: ΔV THRUST B(A)-ON
If CM/SM Sep is required:
RCS TRNFR - SM
RCS AUTO Select. D1,D2,A3,C4,D3,B4-MN B or OFF
After Sep:
RCS TRNFR - CM

BAT BUS A(B) LOST

EDS AUTO - OFF
MN A(B) To BAT C cb - Close
If CM/SM Sep is required:
RCS TRNFR - SM
AUTO RCS Select-D1,D2,A3,C4,D3,B4-MN B or OFF
At Apex Cover Jett - SCS CONTR/AUTO cb(both) - open

AC1 (2) Lost

INV 1(2) MN A(B) - OFF
INV 3 MN A(B)-AC1(2)
If AC Bus problem persist:
S-Bd PWR AMP - SEC (Pri)
S-Bd XPNDR - SEC (Pri)
BMAG MODE - RATE 2(RATE 1)
FDAI SELECT 2(1)
TVC SERVO PWR 1-AC2/MNB(2-AC1/MNA)

SM RCS Thruster(s) Fails On
1. RCS CMD - OFF
2. ROT CONTR PWR DIRECT (both) - OFF
3. SCS DIRECT ULL cb(2) - Open
4. If SM RCS prplnt qty still decreases:
   SM RCS prplnt vlv - OFF (affected quad)

SMJC - Fires Prematurely
1. MNA - OFF; if jet firing stops, reconfigure
   AC1 MNA is lost until CM/SM sep.
2. If jets still fire:
   MNA - ON
   AC1 - ON
   MNB - OFF; reconfigure AC2. MNB lost
   until CM/SM sep.
3. If jets still fire:
   SM RCS prplnt vlvs (4) - OFF

SM RCS A(B)(C)(D) C&W Light On
1. He 1&2 - Off (affected quad)

Cabin Pres. Less Than 5psia And Decreasing
1. Cabin pres. relief vlv(both) - Closed
2. Don HELMETS AND GLOVES
3. If not suited and in other than 100% $O_2$
   atmosphere utilize $O_2$ mask.

Hi $O_2$ Flow Light On
1. Verify Hi flow indication
2. CK for decreasing surge tank pres.
3. If surge tank is decreasing And Cab press norm:
   Surge Tank - Off

Suit Compressor Fails While Suited
1. Select redund suit compr on alternate bus
2. Direct $O_2$ vlv - On
3. When feasible remove helmets

Basic Date — Nov. 6, 1968
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Prim EVAP Out Temp High (Approaching 60°)

1. ECS IND SEL. - SEC
2. SEC COOL Loop Pump - AC 1(2)
3. SEC Cool Loop EVAP - EVAP

MN Bus A(B) Undervolt Light On
1. Check bus voltages.
2. If FC 1(2)(3) current is higher than normal
   & Bus voltage low: Isolate affected bus
3. Reconfigure Bus loads.

AC Bus 1 (2) Light On In Conjuction With MN BUS A(B) Undervolt and/or AC Bus 1(2) Overload
1. Turn off associated inverter within 5 seconds

FC 1 (2)(3)FH HI
1. FC 1 (2)(3) Pumps - OFF
2. POT $H_2O$ Inlet vlv - Close

Basic Date — Nov. 6, 1968
Changed — Dec. 17, 1968

ABORT PROCEDURES

MODE IA ABORT
(00:00 to 00:42) (10K)

00:00 TRANS CONTR - NEUTRAL
*CM/SM SEP (both) - on (up)*

00:14 ELS - AUTO
ELS LOGIC - on (up)
TWR JETT (both) - on (up)
APEX COVER JETT PB-PUSH
DROGUE DEPLOY PB-PUSH
CM RCS He DUMP PB-PUSH
Monitor altimeter
If <3800 ft-DEPLOY MAINS
>3800 ft-NO ACTION

00:28 If <10,000 ft-DEPLOY MAINS

GO TO LANDING PHASE AT 10,000 ft pg A-6

MODE IB ABORT
(00:42 to 16.5 nm) (1:50)

00:00 TRANS CONTR - NEUTRAL
*CM/SM SEP (both) - ON*

00:11 CANARD DEPLOY - PUSH

00:14 ELS - AUTO
ELS LOGIC - on (up)
RCS CMD - ON

GO TO LANDING PHASE pg A-6

MODE IC ABORT
(16.5 nm to TWR JETT) (01:50 - 03:07)

00:00 TRANS CONTR - NEUTRAL
*CM/SM SEP (both) - on (up)*
RCS CMD - ON

00:11 CANARDS DEPLOY
CM RCS PRESS - on (up)
RCS TRNFR - CM
RCS IND - CM (1 or 2)

00:14 S/C PLATFORM GO/NO GO (Excessive Rates)

| GO | NO GO |
|---|---|
| TWR JETT sw(2)-on(up)<br>MAN PITCH - RATE CMD<br>ENT ATT RO°,P135°,YO°<br>BMAG - ATT1/RATE 2<br>EMS FUNC - ENTRY<br>EMS MODE - AUTO<br>At .05G Lt,<br>.05G sw-on(up)<br>Fly Max Lift | Estab. +5°/SEC<br>pitch rate<br>EXCESSIVE + PITCH RATES<br><br>*ROLL 90° *<br>*USE YAW THRUSTERS TO *<br>*CONTROL RATE *<br>*ROLL BACK TO HEADS DN* |

θ(.05G)_____
GET DROGUE_____

*LET FAILS To JET - EMG-4*

GO TO LANDING PHASE pg A-6



Basic Date Nov. 6, 1968
Changed Dec. 6, 1968

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MODE II SCS ABORT
(TWR JETT to MODE IV) (03:07 - 09:50)

00:00 TRANS CONTR - CCW (4 Sec. Min.)+X & HOLD
*No BECO-Reset THC,Req.Range CMD*
*Reset & start DET *
00:03 CSM/LV SEP * NO SEP: *
* SECS ARM cb (both) - close *
* CSM/LV SEP - PUSH *

MAN ATT(3) - RATE CMD
00:05 TRANS CONTR - NEUTRAL +X
*EXCESSIVE RATES: *
* ΔV THRUST A-NORMAL *
* SPS THRUST - DIRECT ON *
*When Rates Damped: *
* ΔV THRUST A&B (2) - OFF *
* SPS THRUST - NORMAL *

00:24 TRANS CONTR +X OFF
Entry ATT - (R=0°,P=120°,Y=0°)(Compl by 1:40)
V82E - NOTE TFF
If TFF>2 min, Yaw 45° (LEFT) out-of-plane
BMAGS (3) - ATT1/RATE 2
SECS ARM cb (both) - close GLT 400K_____
CM/SM SEP - on (up) θ(.05G)_____
CM RCS - PRESS GET DROGUE_____
RCS TRNFR - CM
RCS CMD - ON
C&W MODE - CM
EMS FUNC - ENTRY
EMS MODE - AUTO

Set up Single Ring RCS
At .05G Lt, Sw - on (up)
EMS ROLL - ON
Fly Max. Lift
N62E

GO TO LANDING PHASE pg A-6

Basic Date Dec. 15, 1968
Changed

CSM 103

MODE III SPS ABORT
(ΔR=-368 NM to INSERTION) (10:00 - 11:21)

00:00 TRANS CONTR - CCW (4 Sec Min) +X & HOLD
*NO BECO - RESET THC, *
* SII/SIVB sw-LV STAGE*
*Reset & start DET
00:03 CSM/LV SEP * NO SEP: *
* SECS ARM cb (both) - close *
* CSM/LV SEP PB - PUSH *
* AFTER SEP: *
* SECS ARM cb (both) - open *
MAN ATT (3) - RATE CMD
00:05 TRANS CONTR - NEUTRAL & +X
SIVB/GPI Sw - GPI
*EXCESSIVE RATES: *
* ΔV THRUST A-NORMAL *
* SPS THRUST - DIRECT *
*When Rates Damped: *
* ΔV THRUST A&B(2)-OFF *
* SPS THRUST - NORMAL *

00:24 TRANS CONTR +X OFF
KEY V82E N50E ΔR,HP,TFF (.1nm,min-sec)
If ΔR>0:
MNVR to retro att (R=180°,P=194°,Y=0°)
(Scribe on horiz, BEF. Hds up)
BMAG MODE(3)-ATT1/RATE2
EMS - AUTO RATE-LOW
ΔV THRUST A -NORMAL
01:50 Start Ullage (+X)
02:05 THRUST ON PB - PUSH
Burn to VC (ΔR=0)
RATE-HIGH ΔV THRUST A&B - OFF
If TFF>2min,Yaw (RT)45°
out-of-plane
SECS ARM cb (both) - close
CM/SM SEP - on (up)
CM RCS PRESS - on (up)
RCS TRANSFER - CM
RCS CMD - ON
C&W MODE - CM

GETI 3999.9
ΔV
VC
Δtb
GET 400K
θ(.05G)
GET Drogue
Entry R
P
Y

MODE I MODE III MODE II

Basic Date Nov. 6, 1968
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Mnvr to entry att (R=0°),P=105°,Y=0°)
(BEF, Hds Dn, Full Lift)
Note TFF
EMS Func - ENTRY
EMS MODE - AUTO
Set up single ring RCS
.05G Lt., sw - on (up)
EMS Roll - on (up)
.2G Lt., Roll left 55°
Fly Half Lift

GO TO LANDING PHASE pg A-6

Basic Date Nov. 6, 1968
Changed Dec. 6, 1968

CSM

LANDING PHASE MODE IV 10 MIN TLI 90 MIN ABORT

LANDING PHASE

LANDING PHASE (30K, DESCENDING)

30K' **ELS cb (both - close (verify)**
**ELS LOGIC - on (up)**
**ELS - AUTO**
**RCS CMD - OFF**

24K' Twr jett (auto)
***TWR JETT (both) - on (up)***
Apex cover jett (auto)
***APEX COVER JETT PB-PUSH) ***
(WAIT 2 SECS)
Drogues deployed (auto)
***DROG DPLY PB-PUSH***

If Drogues Fail:
*** ELS - MAN ***
*** RCS CMD - ON ***
*** STABILIZE CM ***
***5K' MAIN DPLY PB - PUSH***
*** ELS - AUTO ***

23.5K' Cabin Pressure increasing
***If not increasing by 17K': ***
MODE 1A → ***CABIN PRESS REL vlv (RH)-DUMP ***

10K' Main parachutes deployed (DROG+30 sec)
**MAIN DEPLOY PB - PUSH (within 1 sec)**
VHF ANT - RECY
VHF AM (A) - SIMPLEX
VHF BCN - ON

**RCS DUMP**
CABIN PRESS REL vlv-(both)-CLOSE
DIRECT O2 - OPEN (CCW)
CM RCS LOGIC - on (up)
CM PRPLNT - DUMP (burn audible)
MONITOR CM RCS 1&2 for He press decrease
***NO BURN or PRESS DECREASE***
*** USE BOTH RHC's ***
***DO NOT FIRE PITCH JETS ***
CM PRPLNT-PURGE (to zero He press)
***CM RCS He DUMP PB-PUSH***
***RHC (both) - 30 secs ***
*** 30 PITCH ***
CABIN PRESS REL vlv - BOOST/ENTRY
STRUT LOCKS-UNLOCK

MODE I MODE III MODE II

Nov. 6, 1968
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Basic Date Changed

Nov. 6, 1968
Dec. 6, 1968
Basic Date Changed

C-03 C-03



MODE IV 10 MIN

FLT & PL BAT BUS A,B,&BAT C cb (3) - close
FLT & PLT MNA & B cb (2) - open
ECS RAD HTR OVLD cb (2) - open
**SPS P&Y cb (4) - open**

3K' **CABIN PRESS REL vlv (RH) - DUMP**
FLOOD LT - POST LDG
CM RCS PRPLNT (both) - OFF
ROT CONTR PWR DIRECT - OFF

800' **CAB PRESS RELV vlv - CLOSE (latch off)**
MN BUS TIES (both) - OFF

+00:18m LANDING
**MAIN REL PYRO cb (both) - close**
**MAIN REL - on (up)**

**GO TO POSTLANDING A-8**

TLI 90 MIN ABORT

LANDING PHASE

MODE I

MODE III

MODE II

## POSTLANDING

### STABILIZATION, VENTILATION, COMMUNICATIONS

1 Remove helmets
DIRECT O2 - CLOSE (CW)

2 Stabilization after landing
ELS - AUTO (verify)
MAIN REL PYRO cb (both) - close (verify)
MAIN RELEASE - on (up) (verify)
SECS PYRO (both) - SAFE
SECS LOGIC (both) - OFF
BAT RLY BUS cb (2) - OPEN
*No contact: *
*VHF AM A & B - OFF *
*VHF AM RCV only - A*
PL VENT cb - close
FLOAT BAG cb (3) - Close
UPRIGHT SYS COMPRESS cb (both) - close
If Stable II:
FLOAT BAG(3) - FILL Till 2 min after upright, then - OFF
VHF AM A/B & BCN - OFF while inverted
If Stable I:
After 10 min Cooling Period,
FLOAT BAG(3) - FILL 7 min, then off

3 Post Stabilization and Ventilation
PL BCN LT - BCN LT LOW
PL VENT vlv - UNLOCK (Pull)
Remove PL VENT Exh Cover
PL VENT - HIGH or LOW
PL DYE MARKER - ON (swimmer comm)
Release footstraps and restraints
MNA BAT BUS A & BAT C cb (2) - open
MNB BAT BUS B & BAT C cb (2) - open
FLT & PL BAT C cb - open

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PYRO A SEQ A cb - OPEN
PYRO B SEQ B cb - OPEN
* EACH HR - CHECK D-C VOLTS 27.5 V *
* If Not: *
* FLT & PL-BAT BUS A&B cb (2) -OPEN*
* FLT & PL BAT C cb (2) - OPEN *
* GO TO LOW POWER CHECKLIST pg E-38*
Unstow and install PLV DISTRIB DUCT
Deploy grappling hook and line if req.

4 Post Landing Communications
VHF ANT-RECY (verify)
VHF BCN - ON (verify)
If no contact with recovery forces perform VHF BEACON Check
MONITOR VHF BEACON transmission with Survival Transceiver
* VHF Beacon not operating *
* connect Survival Transceiver to ANT*
* Cable and place radio in BCN mode *

### LOW POWER CHECKLIST

VHF BCN - OFF
VHF (3) - RCV
FLOOD FIXED - OFF
VHF AM A & B - OFF (center)
VHF AM REC ONLY - A (verify)
COUCH LIGHTS - OFF
POSTLANDING VENT SYS: minimize use
SURV RADIO - plug into VHF BCN ANT cable
CONN & turn radio on in BCN mode

MODE IV 10 MIN

TLI 90 MIN ABORT

LANDING PHASE

## EGRESS PROCEDURES

### STABLE I

Disconnect umbilicals
Neck dam on
CMP — Center couch - 270° position
CDR,LMP — Armrests folded
CDR — Connect raft to S/C, if desired, with green lanyard
Connect raft white lanyards to suits & inflate water wings when exiting
Hatch piston press vlv - Press (Inbd)
CMP — Side Hatch opened
CDR — PL VENT-OFF
CMP — Pnl 250 cbs(all)-open
Egress with liferaft
LMP — Put hardware kit out
LMP, CDR or C. — Egress

### STABLE II

LMP — CB CREW STA AUDIO (3) - open
ALL — PWR (3) - OFF
SUIT PWR (3) - OFF
Remove helmets
Disconnect umbilicals
Release footstraps
Release restraint harness
Couch seat pans (3) - 170° position
CMP — Arm rests folded
Survival kits removed from stowage
CDR — Connect liferaft mainline to CDR or S/C
CMP — Connect first white lanyard from liferaft to suit
CDR — Connect third white lanyard from liferaft to suit
LMP — Connect rucksacks together to yellow lanyard on raft bag
CMP — PRESSURE EQUALIZATION vlv - OPEN
CMP,LMP — Remove and stow fwd hatch
CMP — Exit feet first with rucksacks; when clear of S/C inflate water wings and raft
LMP — Exit feet first; when clear of S/C inflate water wings
CDR — Exit feet first; when clear of S/C inflate water wings

MODE I
MODE III
MODE II

Basic Date — Changed — Nov. 6, 1968 — Dec. 17, 1968

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MODE IV SPS TO ORBIT
(VI=23,600 fpsDOT≈-150 to INSERTION)

00:00 TRANS CONT - CCW (4 Sec Min) +X & HOLD
*NO SECO-RESET THC, *
* SII/SIVB sep-LV STAGE*
*RESET & START DET *

00:03 CSM/LV SEP
* NO SEP: *
* SECS ARM cb (both) - close *
* CSM/LV SEP PB - PUSH *
* AFTER SEP: *
* SECS ARM cb (both) - open *
MAN ATT(3) - RATE CMD

00:05 TRANS CONTR - NEUTRAL +X
SIVB/GPI Sw - GPI
*EXCESSIVE RATES: *
* ΔV THRUST A - NORMAL *
* SPS THRUST - DIRECT *
*When Rates Damped: *
* ΔV THRUST A&B(2)-OFF *
* SPS THRUST - NORMAL *

00:24 TRANS CONTR - +X OFF

Leave to Insertion Att (R=180°,P=347°,Y=0°)
(Before 01:50)
(Scribe on horiz, SEF, nds Dn)
AUAG(3)-ATT1/RATE2 Not-low
SPS MODE - AUTO
ΔV THRUST A- NORMAL

GETI 3999.9
ΔV
VC
Atb

01:50 Start Ullage (+X)
02:05 THRUST ON PB - PUSH
Burn to VC (hp>75 nm)
ΔV THRUST A&B - OFF
ORBL MNVR (4) - OFF

GO TO INSERTION (+11:31) pg L-5

MODE IV TILL 30 MIN ABORT

## TLI 10 MIN ABORT

00:00 TRANS CONTR - CCW (4 sec) & +X
DET RESET (verfiy)
* NO SEP:
* SECS ARM cb (both) - close
* CSM/LV SEP PB - PUSH
* AFTER SEP:
* SECS ARM cb (both) - open

00:03 MAN ATT(3) - RATE CMD

00:05 TRANS CONTR - neutral then +X for 10 sec

SIVB/GPI sw - GPI
*Excessive rates:
* ΔV THRUST A -NORMAL
* SPS THRUST - DIRECT
*When rates damped:
* ΔV THRUST A&B(2) - OFF
* SPS THRUST - NORMAL
MNA BAT C cb - close
MNB BAT C cb - close

00:14 TRANS CONTR +X - OFF
V37E 00E
PITCH UP to LOCAL VERT (+X axis toward the earth)
RATE - LOW
BMAG MODE (3) - ATT 1/RATE 2

01:00 TRANS CONTR -X (8 to 10 sec)

RATE - HIGH

MNVR TO RETRO ATT
R_____(180°)
P_____(199°)
Y_____(0°)

MODE I MODE III MODE II TLI 10 MIN ABORT

Basic Date Nov. 6, 1968
Changed Dec. 15, 1968

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RETRO UPDATE
GETI 3999.9
ΔV
VC
Δtb
GET 400K

0.05G
GET DROGUE
ENTRY P
R
Y

ALIGN HORIZ ON RET +1° MK
GMBL CHECK (Time Permitting)
MN BUS TIE (both) - ON
GMBL MTRS(4) - ON (LMP Confirm)
SPS P2,Y2 cb - open
RATE - LOW
EMS MODE - STBY
EMS FUNC - ΔV SET
SET ΔV from chart
EMS FUNC - ΔV
EMS MODE - AUTO

09:45 ΔV THRUST A - NORMAL
V37E 47E (THRUST MONITOR)

F 16 83 ΔVX,Y,Z

NOTE: For aborts during 1st min of TLI, KEY V82E F 16 44 (Ha,Hp,Tff) Burn until Hp < 19NM.

09:50 TRANS CONTR + X

10:00 THRUST ON PB - PUSH
TRANS CONTR +X - OFF
BURN ΔV req'd
ΔV THRUST A&B - OFF
Report cutoff
SPS P2, Y2 cb - close
GMBL MTRS(4) - OFF (LMP Confirm)

TLI 90 MIN ABORT

TRANS CONT PWR - OFF
TVC SERVO PWR (both) - OFF
MN BUS TIE (both) - OFF
SPS P1&2, Y1&2 cb - open

F 37 00E

Go to ENTRY PREP & SUPERCIRC ENTRY PROCEDURE
If est. time to EI<01:55:00 omit MCC and enter the SUPERCIRC CKLIST as early as possible.

If est. time to EI>01:55:00 anticipate a MCC Enter the ENTRY PREP CKLIST at step 10 pg E-1(P).

TLI 90 MIN ABORT

Go to EMERG SEP pg EMG-5
then to SPS THRUSTING PROCEDURES.







SCS GMBL CK

STAB CONT SYS cb (Pnl 8 ) - close
SPS cb (12) - close
ROT CONTR PWR DIRECT (both) - OFF
SCS TVC (both) - AUTO
TVC GMBL DRIVE P&Y- AUTO
MN BUS TIES (both) - ON
TVC SERVO PWR 1 - AC1/MNA
2 - AC2/MNB
TRANS CONTR PWR - ON
ROT CONTR PWR NORMAL 2 - AC
RHC #2 - ARMED

PRIMARY TVC CHECK
GMBL MOT P1-Y1-START/ON(LMP confirm)
Verify Thumbwheel Trim
THC - CW
Verify NO MTVC

SEC TVC CHECK
GMBL MOT P2-Y2-START/ON (LMP confirm)
SET GPI TRIM
Verify MTVC
THC NEUTRAL
GPI returns to trim pos
ROT CONT PWR NORM 2 - AC/DC