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<tbody>
<tr>
<td>SKB32100020-301</td>
<td>1004</td>
</tr>
</tbody>
</table>
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

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

TRANS CONT PWR - on (up) (verify)
ASTRO LAUNCH OPERATIONS VOICE CHECK
VOICE CHECK WITH MCH
S-bd VOL TW (CDR) - FULL DECR

ADJUST MASTER VOL CONTROLS
SPS THRUST - NORMAL
ΔV THRUST A&B - OFF
LV SPS INDI/PC - 0
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
PC REAC ON - LATCH

SCS TVC SERVO PWR 1 - AC1/MNA
2 - AC2/MNB

-04:00

ASTRO LAUNCH OPERATIONS COMM CHECK

-03:00

DSKY - Verify PO2
V75 (NO ENTR)
LAUNCH-INSERTION

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

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

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

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

06 62 VI, H DOT, H PAD (fps, fps, lnm)

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

+00:42 MODE IB - report

+00:50 Monitor a to T +02:00
(1002, 6° Att error)

* LV Guv & LV Rate lts ON *
* 00:50 - 01:25 ABORT *

CABIN PRESSURE DECREASING (~14K)

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

+01:17 MAX Q
+01:50 MODE IC - report (R3 = 16.5lm)
- **+02:05** INBOARD CUTOFF - (1st 5 on)  
- **+02:06** LIFTOFF LIGHT - OUT  
- **+02:12** SIC/SII STAGING (1st off)  
- **+02:33** SII Ign Command (1st on)  
- **+02:36** SII 65% - 1st out  
- **+02:36** FDAI Scale - 50/10  
- **+02:36** QMBL Mot (4) - START - ON (LMF Confirm)  

**Check GPI**  
SII/SIVB/GPI - GPI (Momentarily)  
PITCH = +9°/sec P,Y  
VAN = +1.53

- **+03:00** SII SEP LITE - OUT report  
- **+03:07** TWR JETT (both) - on(up) (TFF>1+20)  
  * NO TWR JETT  
  * LES MOT FIRE P2 - PUSH  
  * No response go to pg EMG-4  
  
MAN ATT (3) - ACCEL CMD  
RCS CMD - ON  
SECS ARM cb (both) - open  
TWR JETT & MODE 11 - Report  
GLY EVAP STEAM PRES - AUTO  
GLY EVAP H2O FLOW - AUTO  

**Guidance Initiate** - report (08：05 +4sec)  
- **+03:33** Guidance Initiate  
- **+04:00** Guidance Status  
- **+05:00** Report Status  
- **+05:55** SIVB to Orbit  
- **+06:00** Level Sense Arm 08:05  
- **+06:55** Report Status  
- **+07:00** Report Status  
- **+07:15** Report Status  
- **+08:00** Report Status  
- **+08:20** GO/NO GO FOR STAGING - report
+08:40 S1I Cutoff - I ts on
+08:41 S1I Staging - I ts off
+08:45 S1V Ign Cmd - I t on
+08:46 S1V 65% - I t 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,
   * THCC CW & neutral in 1 sec *
   * or S1I/S1V3 sw LV STAGE *
+11:31 INSERTION - lt off (TB5 + 10 sec)

GM1L MTRs (4) - OFF (LMP Confirm)
MN BUS TIES (both) - OFF (LMP)
TVC SERVO PWR (both) - OFF
FLT RCDR - OFF (LMP)

KEY RLSE

Record HA_________ (mm)
   HP_________ (mm)
   TFF________ (min-sec)

PRO

Record VI__________ (fps)
   H DOT_________ (fps)
   H PAD_________ (mm)

V37E D0E
V66E (transfer SV into LM memory)
V48E 31102,01111 PRO,PRO,PRO
V46E
V83E (check 6) P TRIM -1.61
PRO Y TRIM +1.33

BDA LOS
   (____:____:____)
POST-INSERTION CHECKLIST

1  CMP Unstow Checklist
   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 02 - OFF (CW)
   TRANS CONT PWR - OFF
   ROT CONTR PWR DIRECT - OFF

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

2  SM RCS HTRS (4) - PRIM
    CM RCS PREFLT (both) - OFF
    CM RCS PREFLT th (both) - hp
    C/W function - NORMAL
    HATCH GEAR BOX - LATCH
    ACTR HNDL SELECTOR - neutral

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

SYS VERIF & MNIT can be started at this time

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)

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 cb - GRAY
    GLY EVAP TEMP IN - AUTO

DRINKING WATER SUPPLY vlv - ON (CCW)

CVI LOS
   (___:___)

TAN AOS (V)
   (___:___)

TAN LOS
   (___:___)

SYS VERIFICATION & MONITORING

1  EPS Per Verif (LMP)

2  ECS MON Ck (LMP)
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 - GDC
   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

MCCN - G/N STATUS

X Torquing Angle ________

12 IMU REFSMMAT Realign Check (P52), (CMP)

If IMU is realigned,
Realign GDC (CDR)

CRO LOS  

00E

V46E

G/N PWR OPTICS - OFF

HSK AOS (S)  

S-Bd VOL - UP  

HSK LOS  

____:__

SUNRISE  

S-Bd VOL - DN  

____:__

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

US AOS  

____:__

14 SCS ATT Ref Comp Ck

V16 N20E

FDAQ SELECT - 1

FDAQ SOURCE - ATT SET

ATT SET - GDC

ATT SET dials - null FDAI 1 err needles

Key VERB when muddled(freeze display)

Record from DSKY:

R___P___Y

Record ATT SET dials:

R___P___Y

US AOS  

____:__

15 COPY TLI PAD

BDA LOS  

____:__

TLI

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<tr>
<th>X</th>
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</table>

CTI AOS  

____:__

16 SV UPDATES (MCCH)
05:17

SIVB ECO (lit on) (BEGIN TB7)
*EMER SIVB CUTOFF AT 6 SEC
*PAST BURN TIME IF VI ATTAINED*
*TVC CLK & NEUTRAL IN 1 SEC*
*or SIV/SIVB sw - IN STAGE *

HAW AOS
(____:____)

KEY VERB (freeze display)
ECO + 10 sec - lit off

SIVB ATT HOLD 20 sec & BEGIN VENTING
SIVB MNVR TO ORB RT (HDS DN) (.1°/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 5-4
L-15

BURN STATUS REPORT

<table>
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<tr>
<th>ATIG</th>
<th>VI</th>
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<tbody>
<tr>
<td>BT</td>
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<td>Y</td>
<td>OXID</td>
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<td></td>
<td>UNBAL</td>
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</tbody>
</table>

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

08:00
GDS AOS

PRE-SEPARATION
LOAD RCS DAP
V46E 11103 PRO, PRO, PRO
V46E
LOAD N22, Dock Att ___:___:___ (V62)
SIVB CLOSE VENTS
8 MNVRS TO SEP ATT ____:____:___ (1°/sec)
Prepare Camera Equip for SIVB photo
AUTO RCS SEL (16) - SNA/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 : : : :

SEP REATION
V60E
V63E

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

(03:21:00)
00:00
00:03

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 (b(both)) - open

TVC SERVO PWR 1 - OFF

L-17

TRANSPOSITION
1 00:20
V62E
V49E

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

3 F 50 18 REQUEST MNVR TO FDAI RPY ANGLES
    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
    FLT RCDR - OFF
    (.01°)

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

TRANS CONT - Null opening rate

EDS PWR - OFF
STOP/LBR/FWD
NONESS BUS - OFF
EDS cb (3) - open
SPS P162, Y162, 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
Conduct SIVB Photography

CSM Evasive Maneuver

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

2. V37E 47E
   AVX,Y,Z
   THC -X 1.5 fps (15 sec)

3. F 37
   OOE

4. V66E

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

   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
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
   Following 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
   Following normal RCS dump procedure is oxid rich:
   using TBD deviations for an oxid-rich dump.
5  CAB PRESS RELF v1v (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 02 to maintain suit to cabin AP > 0.38 psig.
   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 - ACl
2  SUIT COMPR 1 - OFF
3  DIRECT O2 vlv - OPEN CCW for 1 minute then close CCW
   If condition persists:
4  SUIT COMPR 2 - OFF
5  DIRECT O2 vlv - OFF
6  Doff helmet
7  Don emergency O2 masks
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 X LUNAR - SAFE
SECS LOGIC(both) - on(up)
PYRO A&B SEQ A&B cb(both) - close
ROT CONTR PWR DIRECT (both) - MNA/NMA
SC CONT - SCS
EMAG MODE(3) - ATT1/BATE2
SCS TVC SERVO PWR 1 - AC1/MNA
   2 - AC2/NMA
   (Continue through thrusting)

THRUSTING
TRANS CONTR - CW(4sec) & +X
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

MM BUS TIE (both) - ON
CMDL RTS(4) - ON (LMF Confirm)
AV THRUST A - NORMAL
THRUST ON PB - PUSH
TRANS CONTR +X - RELEASE
AV THRUST A&B - OFF when clear
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: AV THRUTh 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)
  - FSAI SELECT 2(1)
  - TVC SERVO PWR 1-AC2/MNB(2-AC1/MNA)

**EMERGENCY POWER DOWN**

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

Power down the following components until bus voltage >76.5 VDC:
- 02 HTRT (both)-OFF
- Non ESS Bus-Off
- FLT RCDR-Off
- GMBL MTR (P2,Y2)-OFF
- S-BD PWR AMP-Off
- FC PUMPS (3)-OFF
- H2 HTRT (both)-OFF
- CAB FANS (both)-OFF
- LIGHTS-Min req'd
- CNC to STDBY

**V46E**
- F 04 46 Load 0 Left digit RL
- PRO,PRO,PRO, V46E
- F 50 25 0062 CNC PWR DN
- PRO- HOLD until STBY 1t on

- G&N PWR - OFF
- IMU PWR DN (STBY)
- CMC MODE - FREE
- G&N IMU PWR-OFF

- ECS GLY PUMPS - OFF
- ECS RAD CONT/HTR cb(both)-OPEN
- TAPE RCDR - OFF
- POWER SCE-OFF
- VHF/AM A-OFF
- TELECOM GRP 162-OFF
- INSTRMN ESS MN A&B cb(both)-OPEN 5.54
- SUIT COMPR(both)-OFF
- DIR 02-ON

**NOTE:** 2-1 Entry possible powered down, however items may be desired if bus voltage permits.
SM RCS Thruster(s) Fails On
1. RCS CMD - OFF
2. RO1 CONT PWR DIRECT (both) - OFF
3. ECS DIRECT ULL ch(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 vlv(s) (4) - OFF

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

Cabin Pres. Less Than 5psi And Decreasing
1. Cabin pres. relief vlv(b/t) - Closed
2. Don HELMETS AND GLOVES
3. If not suited and in other than 100% O₂ atmosphere utilize O₂ mask.

HI O₂ 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 redundant suit compr on alternate bus
2. Direct O₂ vlv - On
3. When feasible remove helmets

Prim EVAP Out Temp High (Approaching 60°F)
1. ECS INSD 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 Conjunction 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) FHI HI
1. FC 1 (2)(3) Pumps - OFF
2. POT H₂O Inlet vlv - Close
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
II <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
(10.3 nm to TWK JETT) (01:50 - 03:07)

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

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

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

<table>
<thead>
<tr>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>TMR JETT sec(2) - on(up)</td>
<td>Estab. +5°/SEC</td>
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<tr>
<td>AN PITCH - RATE CMD</td>
<td>pitch rate</td>
</tr>
<tr>
<td>ENT ATT 30°, P135°, X0°</td>
<td>EXCESSIVE + PITCH RATES</td>
</tr>
<tr>
<td>C/AG - ATT/ RATE 2</td>
<td></td>
</tr>
<tr>
<td>RCS PUMG - ENTRY</td>
<td>*ROLL 90° *</td>
</tr>
<tr>
<td>EWS MODE - AUTO</td>
<td>*USE YAW THRUSTERS TO *</td>
</tr>
<tr>
<td>At .05G Lt, .05G sec - on(up)</td>
<td>*CONTROL RATE *</td>
</tr>
<tr>
<td>Fly Max Lift</td>
<td><em>ROLL BACK TO HEADS DN</em></td>
</tr>
</tbody>
</table>

00:24 TRANS CONT~X OFF
Entry ATT - (P=0°, Y=120°, X=0°) (Compl by 1:40)
RCS C/AG - NOTE TFF
If TFF<2 min, Yaw 45° (LEFT) out-of-plane
RMACS 3) - ATT/ RATE 2
SECS ARM cb (both) - close GTT 400,
CM/SM SEP - on (up)
CM RCS - PRESS
RCS TRNFR - CM
RCS CMD - ON
C/AG MODE - CM
EWS PUMG - ENTRY
EWS MODE - AUTO

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

GO TO LANDING PHASE pg A-6

MODE II RCS ABORT
(TWR JETT to Mode IV) (03:07 - 03:15)

00:00 TRANS CONT~CM (4 Sec, Min) + X & HOLD
*No BTOC-Reset THR, Rcm, Range CMD |
*Reset & start JET

00:03 CSM/LV SEP |
* SECS ARM cb (both) - close |
* CSM/LV SEP - PUSH

MAN ATT(3) - RATE CMD

00:05 TRANS CONT~NEUTRAL + X
*EXCESSIVE RATES: *
* ΔV THRUST A-NORMAL *
* SPS THRUST - DIRECT ON *
*Then Rates Damped: *
* ΔV THRUST A(2) - OFF *
* SPS THRUST - NORMAL *

00:24 TRANS CONT~X OFF
Entry ATT - (P=0°, Y=120°, X=0°) (Compl by 1:40)
RCS C/AG - NOTE TFF
If TFF<2 min, Yaw 45° (LEFT) out-of-plane
RMACS 3) - ATT/ RATE 2
SECS ARM cb (both) - close GTT 400,
CM/SM SEP - on (up)
CM RCS - PRESS
RCS TRNFR - CM
RCS CMD - ON
C/AG MODE - CM
EWS PUMG - ENTRY
EWS MODE - AUTO

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

GO TO LANDING PHASE pg A-6
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
  * S11/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

00:05 TRANS CONTR - NEUTRAL & +X
  RATE CMD 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 VS2E N30E 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)
  SNAG MODE(H) ATT1/RATL.2
  EMS - AUTO
  ΔV THRUST A-NORMAL GET1

01:50 Start Tillage (+X) ΔV

02:05 THRUST ON PB - PUSH VC

Burn to VC (ΔR=0) Δth

ΔV THRUST A&B - OFF GET 400K

If TFF<2min,Yaw(RT)45° β(0,05G)

out-of-plane GET Drogue

SECS ARM cb (both) - close Entry R

CM/SM SEP - on (up) P

CM RCS PRESS - on (up) Y

RCS TRANSFER - CN

RCS CMD - ON

C&W MODE - CM

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

Nov. 6, 1968 Dec. 15, 1968
LANDING PHASE (30K, DESCENDING)

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

24K'
Tor jett (auto)
*TUR JETT (both) - on (up)*
Apex cover jett (auto)
*APEX COVER JETT PB-PUSH* *
(HOLD 2 SECS)
Drogue deployed (auto)
*DROG DLPLY PB-PUSH*
If Drogue Fail:
* ELS - MAN *
* RCS CMD - ON *
* STABILIZE CM *
* 5K' MAIN DLPLY PB - PUSH *
* ELS - AUTO *

23.5K' Cabin Pressure Increasing
*If not increasing by 17K': *
*CABIN PRESS REL vlv (PH) = DUMP *

10K'
Main parachutes deployed (DROG+30 sec)
MAIN DEPLOY PB - PUSH (within 1 sec)
VHF ANT - RECY
VHF AP (A) - SIMPLEX
VHF BCN - ON
RCS DUMP
CABIN PRESS REL vlv-(both)-CLOSE
DIRECT D2 - OPEN (C2W)
CM RCS LOGIC - on (up)
CM PRPLNT - DUMP (burn audible)
MONITOR CM RCS 1&2 for de press decrease
*NO BURN or PRESS DECREASE*
* USE BOTH RHC's *
*DO NOT FIRE PITCH JETS *
CM PRPLNT-PURGE (to zero de press)
*CM RCS de DUMP PB-PUSH*
*RHC (both) - 30 secs *
* NO PITCH *
CABIN PRESS REL vlv = BOOST/ENTRY
STRUT LOCKS-UNLOCK

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

7K'
CABIN PRESS REL vlv (PH) = DUMP
FLOOD LT - POST LDG
CM RCS PRPLNT (both) = OFF
ROT CONTR PWR DIRECT = OFF

800'
CAB PRESS REL vlv - CLOSE (latch off)
IN BUS TIES (both) - OFF

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

GO TO POSTLANDING A-8
POSTLANDING

STABILIZATION, VENTILATION, COMMUNICATIONS

1 Remove helmets
DIRECT 02 - 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
*N no contact: *
*VHF AM A & B - OFF *
*VHF AM RCV only - A*
PL VENT cb - close
FLOAT BAG cb (1) - 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 (Full)
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

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)
It 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
EGRESS PROCEDURES

STABLE I

Disconnect umbilicals

CNP Neck dam on

CDR Center couch - 270° position

CNP,LMP Armsrests 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)

CDN Side hatch opened

CNP Pl VENT-OFF

CNP Pnl 250 cbs(all)-open

Egress with liferaft

LMP Put hardware kit out

LMP,CNP Egress or C. STABLE II

LMP CB CREEK STA AUDIO (3) - open

ALL PUR (3) - OFF

SUIT PWR (3) - OFF

Remove helmets

Disconnect umbilicals

Release footstraps

Release restraint harness

Couch seat pans (3) - 170° position

CNP Armsrests folded

Survival kits removed from stowage

CDR Connect liferaft mainline to CDR or S/C

CNP 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

CNP PRESSURE EQUALIZATION vlv - OPEN

CNP,LMP Remove and stow fwd hatch

CNP 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
TLI 10 MIN ABORT

00:00
TRANS CONTR - CCW (4 sec) & +X
DET RESET (verify)
* NO SEP:
  * SECS ARM cb (both) - close
  * CSM/LV SEP PB - PUSH
  * AFTER SEP:
    * SECS ARM cb (both) - open
MAN ATT(3) - RATE CMD
TRANS CONTR - neutral then +X for 10 sec
SIVB/GPI sw - GPI
  *Excessive rates:
    * AV THRUST A - NORMAL
    * SPS THRUST - DIRECT
    * When rates damped:
      * AV THRUST A&8(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
MSM MODE (3) - ATT 1/RATE 2

01:00
TRANS CONTR -X (8 to 10 sec)
RATE - HIGH
MNAV TO RETRO ATT
R (180°)
P (199°)
Y (0°)

RETRO UPDATE
GETI 0.05G
AV 1999.9
VC
Δt
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 - ∆V SET
SET ∆V from chart
EMS FUNC - ∆V
EMS MODE - AUTO

09:45
AV THRUST A - NORMAL
V37E 47E (THRUST MONITOR)
F 16 83 ∆VX,Y,Z

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

09:50
TRANS CONTR + X

10:00
THRUST ON PB - PUSH
TRANS CONTR +X - PUSH
BURN AV req'd
AV THRUST A&8 - OFF
Report cutoff
SPS P2, Y2 cb - close
GMBL MTRS(4) - OFF (LMP Confirm)
TRANS CONT PWR - OFF
TVC SERVO PWR (both) - OFF
MN BUS TIE (both) - OFF
SPS P162, Y162 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).

ILI 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 HOT P1-Y1-START/ON (LMP confirm)
Verify Thumbswheel Trim
THC - CW
Verify NO MTVC

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