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<td>2-1</td>
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<td>4. EMERGENCY PROCEDURES</td>
<td>EMER/1-1</td>
</tr>
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LUNAR RETURN VEHICLE PREPARATION

1. INITIAL STOWAGE COMPLETED
2. CMC & IMU POWER UP pg G/2-1 & 2
3. SCS POWER UP pg G/2-4
4. P51 - IMU ORIENTATION pg G/6-1
5. LOAD DAP
   V48E T1102, 01111, PRO, PRO, PRO
6. -06:00h LAST MCC DECISION
7. -05:35h NO COMM - P52 & NAV SIGHTINGS
8. DON MAE WESTS & FOOT RESTRAINTS
9. ACTIVATE VHF FOR COMM CHECKS
10. VERIFY DSE POWERED
    cb S BD FM XMTR/DSE (2) - close (verify)
11. PERFORM UV PHOTOGRAPHY (Flight Plan)
12. -04:30h P27 (SV,REFSMAT), MNVR
    & ENTRY PAD UPDATES
13. -04:15h P52 - IMU REALIGN pg G/6-2
    (OPTION 3, then OPTION 1)
14. P37 (NO COMM ONLY)
15. ECS CKS
   02 SUPPLY REFILL pg S/1-7
   PGA verification, (if suited) S/1-10
   ECS Monitor Ck pg S/1-5
   (382) EVAP H2O CONT PRI vlv - AUTO
   EVAP H2O CONT SEC vlv - AUTO
   SUIT HEAT EXCH SEC GLY - FLOW
16  ✔  EPS CKS #1, 3, 4 (5 if req'd) pg S/1-2
17  ✔  SPS CK (If req'd) pg S/1-1
18  ✔  RCS CKS
     SM RCS Monit Ck pg S/1-1
     CM RCS Monit Ck pg S/1-1
19  ✔  C&W SYS CK pg S/1-17
20  ✔  CMC SELF CK pg G/2-3
21  ✔  DSKY COND LT TEST pg G/1-23

22 -03:45h  MIDCOURSE MANEUVER
           P30 - EXT ΔV
-03:15h   ✔  P40/41 - SPS/RCS THRUSTING
-03:00h   ✔  MIDCOURSE (#7) BURN

23 -02:55h  ✔  NO COMM NAV SIGHTINGS

24 -02:00h  LOGIC SEQUENCE CK
           (8)
           ✔  cb SECS LOGIC (2) - close (verify)
           ✔  cb SECS ARM (2) - close
           ✔  cb ELS/CM-SM SEP (2) - close
           ✔  ELS LOGIC - on (up)
           ✔  ELS - AUTO
           Coordinate next 3 steps with MSFN
           ✔  SECS LOGIC (2) - on (up)
           MSFN confirm GO for PYRO ARM as req'd
           ✔  SECS LOGIC (2) - OFF
           ✔  cb SECS ARM (2) - open
           ✔  ELS LOGIC - OFF
           ✔  ELS - MAN
           ✔  cb ELS/CM-SM SEP (2) - open

25 -01:35h  P52 - IMU REALIGN pg G/6-2 (OPTION 3)
           Record gyro torquing angles
           R  +006
           P  -010
           Y  +005
           *If >1°, recycle P52 *
           *If confirmed, use SCS for EMS entry*
GDC ALIGN
If drift $>10^\circ$/hr, change rate source

MNVR TO 0°, 265°, 0°
(Horizon Check at EI-17:00)

S-BD OMNI ANT - C

PERFORM BORESIGHT & SXT STAR CHECK

Drive Optics to 90° shaft angle
OPTICS PWR - OFF

EMS ENTRY CHECK
EMS FUNC - OFF
(8) cb EMS (2) - close
EMS MODE - STBY
EMS FUNC - EMS TEST 1 (wait 5 sec)
EMS MODE - NORMAL (wait 10 sec)
Check ind 1ts - off
RANGE ind - 0.0
Slew hairline over notch
in self-test pattern
EMS FUNC - EMS TEST 2 (wait 10 sec)
.05G 1t - on (all others out)
EMS FUNC - EMS TEST 3
.05G 1t - on
RSI lower 1t - on (10 sec later)
Set RANGE counter to 58 nm+0.0
EMS FUNC - EMS TEST 4
.05G 1t - on (all others out)
G-V trace within pattern to lwr rt
corner @9G
RANGE ind counts down to 0+0.2
EMS FUNC - EMS TEST 5
.05G 1t - on
RSI upper 1t - on (10 sec later)
RANGE ind - 0.0
Scribe traces vertical line 9g to
0.28+0.1
30

PRIMARY WATER EVAP ACTIVATION
- GLY EVAP H2O FLOW - AUTO
- GLY EVAP STM PRESS - AUTO
- PRI ECS GLY PUMP - AC1 (verify)

31

SEC WATER EVAP ACTIVATION
- ECS IND sel - SEC
- SEC COOL LOOP PUMP - AC2
- GLY DISCH SEC PRESS - 39-51 psig
- SEC COOL LOOP EVAP - EVAP
- SEC GLY EVAP OUT TEMP - 38-50.5°F
- SUIT CKT HT EXCH - BYPASS 20 sec, OFF
- ECS IND sel - PRIM

32

SET UP CAMERA
- CM4/DAC/18/CIN - BRKT, MIR
  (T16,250,7) 12 fps, MAG K

33 (-01:10h) CM RCS PREHEAT

Note: If sys test mtr 5c,d,6a,b,c,d
  all read 3.9 vdc (28°F) or more,
  omit preheat
- (8) cb RCS LOGIC (2) - close
- CM RCS LOGIC - on (up)
- cb CM RCS HTRS (2) - close
- (101) CM RCS HTRS - ON (LMP Confirm)
  (20 min or til lowest rdg is
   3.9 vdc) (Monitor Manf
   press for press drop)
EARTH/POST LANDING

FINAL STOWAGE

- Stow Optics
- Install Optics Covers
- Stow ORDEAL

(377) GLY TO RAD SEC vlv - BYPASS (verify)
- Verify EVA COUCH STRUT disengaged

(382) Cool pnl installed
- Y-Y struts (2) extended
- Stow Data Box R-12
- Attach both strut unlock lanyards
- Check for water in tunnel area
- Stow gas separator (A8)
- Stow CI injector (R6)
- WASTE MGMT DRAIN vlv - OFF
- Remove & stow URA, urine transfer hose and urine filter

35 (-00:50m)

TERM. CM RCS PREHEAT

(101) CM RCS HTRS - OFF (LMP confirm)
- CM RCS LOGIC - OFF
(8) cb CM RCS HTRS (2) - open

SYSTEMS TEST PANEL CONFIGURATION

- SYS TEST METER - 5B (BAT RLY BUS 3.4-4.1 vdc)

(101) CM RCS HTRS - OFF (verify)
- WASTE H2O DUMP HTR - OFF
- URINE DUMP HTR - OFF
(100) LEB FLOOD & INTGL LIGHTING - OFF

PYRO BATT CK

(250) cb PYRO A SEQ A - close (verify)
- cb PYRO B SEQ B - close (verify)
- DC IND - PYRO BAT A(B)
  *If PYRO BAT A(B) < 35 vdc *
  *cb PYRO A(B) seq A(B) - open *
  *cb PYRO A(B)BAT BUS A(B) TO PYRO*
  * BUS TIE - close*

(275) cb MNA BAT C - close
- cb MNB BAT C - close
- DC IND - MNB

DATE
6/11/71
38
CONFIGURE PNL 8
All cb's closed except:
✓ DIRECT ULLAGE (2) - open (verify)
✓ CM RCS HTRS (2) - open (verify)
✓ DOCKING PROBE (2) - open (verify)
✓ SPS P&Y (4) - open
✓ FLOAT BAG (3) - open (verify)
✓ SECS ARM (2) - open (verify)
✓ EDS BAT (3) - open (verify)
✓ ELS/CM-SM SEP (2) - open (verify)
✓ PL VENT - open (verify)
✓ SPS pilot valve MA A & M 12 (2) open

39 (__:__:__) FINAL GDC DRIFT CK (if req'd)
✓ If drift >10°/hr, Suspect GDC, Do not use RSI & FDAI #2

40
CM RCS ACTIVATION
(8)
✓ cb ELS/CM-SM SEP (2) - close
✓ cb SECS ARM (2) - close
Cue MSFN
✓ SECS LOGIC (2) - on(up)
MSFN confirm GO for PYRO ARM
✓ SECS PYRO ARM (2) - ARM
✓ CM RCS PRPLNT 1&2 tb (2) - gray (verify)
✓ CM RCS PRESS - on (up)
✓ RCS IND sw - CM1, then 2
✓ He PRESS stabilizes at 3300-3500 psia after 15 minutes
✓ MANF PRESS 287-302 psia
✓ SECS PYRO ARM (2) - SAFE

41 -00:45m P27 & ENTRY PAD UPDATE
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<tr>
<td>X X X 000</td>
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</tr>
<tr>
<td>X X X 000</td>
<td>Y 0.05 G</td>
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<tr>
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<tr>
<td>+ 361 78</td>
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<tr>
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<td>+</td>
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<tr>
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<td>LIFT VECTOR</td>
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</tbody>
</table>

**Notes:**
- NUN ORIT OWS
- RET 90K 6+04
- MAIN 8+30
- LOG 13+27
- Const. G. R. RT
- MOON SET 294+56+37

**Date:** 6/11/71
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<td>X X X</td>
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<tr>
<td>X X X</td>
<td>LIFT VECTOR</td>
</tr>
</tbody>
</table>
SUPERCIRCULAR ENTRY

1. Set DET (up, to EI)

2. EMS INITIALIZATION
   * Scroll not on 37K:*
   * EMS FUNC - TEST 5 *
   * Slew scroll to 37K*

   - EMS FUNC - RNG SET (verify)
   - SET RNG TO PAD DATA RNG
   - EMS FUNC - Vo SET
   - Slew Scroll to Pad Data VIO
   - EMS MODE - STBY (verify)
   - EMS FUNC - ENTRY

3. RSI ALIGNMENT
   - FDAI SOURCE - ATT SET
   - ATT SET - GDC
   - EMS ROLL - on (up)
   - GDC ALIGN pb - push & hold
   - YAW THUMBWHEEL - Position RSI thru 45° & back to LIFT UP
   - GDC ALIGN pb - release
   - EMS ROLL - OFF
   - Align GDC to IMU

4. CM RCS CHECK
   - AUTO RCS A/C ROLL (4) - OFF (verify)
   - cb RCS LOGIC (2) - close (verify)
   - SC CONT - SCS
   - MAN ATT (3) - MIN IMP
   - RCS TRNFR - CM
   - AUTO RCS SEL (RING 1) - OFF
   - AUTO RCS SEL (RING 2) - MNB
   - TEST RING 2 THRUSTERS
   - AUTO RCS SEL (RING 2) - OFF
   - AUTO RCS SEL (RING 1) - MNA
   - TEST RING 1 THRUSTERS
   - AUTO RCS SEL (RING 2) - MNB
   - RCS TRNFR - SM
   - MAN ATT (3) - RATE CMD
   - SC CONT - CMC/AUTO

Note: The page includes various checklists and instructions relevant to the supercircular entry procedure. Some annotations are handwritten on the page.


5 30:00m
(-30:00)
MN BUS TIE (2) - ON
TAPE RCDR - REWIND

6 35:00m
(-25:00)
SEPARATION CK LIST
- cb ELS/CM-SM SEP (2) - close (verify)
- PRIM GLY TO RAD - BYPASS (pull)
- REPRESS PKG vlv - FILL to 865-935, then ON
- O2 SM SUPPLY vlv - OFF
- SURGE TK - ON (verify)
- CAB PRESS REL vlv (2) - NORM
- ABORT SYS PRPLNT - RCS CMD (verify)
- SM RCS SEC PRPLNT FUEL PRESS (4) - OPEN
- VHF AM A&B - off (ctr)
- HI GAIN ANT PWR - OFF
- FC PUMPS (3) - OFF
- FC 2 MNA - OFF
- Verify Loads Balanced
(5) cb ECS RAD CONT/HTR (2) - open
- cb RAD HTRS OVLD (2) - open
- cb WASTE H2O/URINE DUMP HTR (2) - open
- POT H2O HTR - OFF
- GLY EVAP TEMP IN - MAN

7
VERIFY HORIZON CHECK ATT

R _________(0°)
P _________(265°)
Y _________(0°)

P61 - ENTRY PREP

8
V37E 61E (AVE G ON)

*05 09 01427 - ROLL REVERSED*
*05 09 01426 - IMU UNSAT *
9  F 06 61  IMPACT LAT, LONG, HDS UP/DN (+/-)  
    41:30m  (.01°, .01°, +00001)  
    (-18:30)  
    PRO  
10  F 06 60  GMAX, V400K, GAMMA EI  
    Record  
    GMAX  
    V400K  
    GAMMA EI  
    PRO  
11  F 16 63  RTOGO (.1nm)  
    PAD  
    VIO (fps)  
    PAD  
    TFE(min-sec)  
    If NO COMM, Set RTOGO & VIO in EMS  
    & initialize  
    (ACCEPT) PRO  
    (RECYCLE) V32E to 10  

P62 - CM/SM SEP & PRE-ENTRY MNVR  
12  F 50 25  00041 REQUEST CM/SM SEP  
    43:00m  
    (-17:00)  
    (265°P)  
    COMPARE HORIZON with 31.7° line  
    If not +5°, G&N NO GO  
    ✓ MAN ATT (3) - RATE CMD (verify)  
    ✓ ATT DB - MIN  
    ✓ RATE - HIGH  
    ✓ SC CONT - SCS  
    ✓ YAW 45° OUT-OF-PLANE (LEFT) (315°)  
    ✓ BMAG MODE (3) - ATT1/RATE 2  
    ✓ MN BUS TIE (2) - ON (verify)  
    ✓ PRIM GLY TO RAD - BYPASS (verify)  
    ✓ EMS MODE - STBY (verify)  
    ✓ CM RCS LOGIC - on (up)  
    ✓ SECS LOGIC (2) - on(up)(verify)  
    ✓ SECS PYRO ARM (2) - ARM  
    45:00m  
    (-15:00)  
    ✓ CM/SM SEP (2) - on (up)  
    If docking ring still on:  
    CSM/LM FNL SEP (2) - on(up)(verify)
E
2-4

✓ MAN ATT (3) - MIN IMP
✓ BMAG MODE (3) - RATE 2
✓ C&W MODE - CM
✓ RCS TRNFR - CM
✓ CM RCS MANF PRESS - 287-302 psia
✓ CM RCS LOGIC - OFF
✓ SECS PYRO ARM (2) - SAFE
Monitor V MNA/B: 280 V
*If <25 vdc, go to EMERG POWER DOWN*

✓ PITCH TO ENTRY ATT
  R ________ (0°)
  P ________ (152°)
  Y ________ (0°)

*If NO COMM Entry:
  * Track Horizon with 31.7° line*
  * to .05G
✓ EMS DATA - Verify
✓ EMS FUNC - ENTRY (verify)
✓ EMS MODE - NORMAL
  Verify .05G lt filter is down
PRO (Act ENTRY DAP Att Hold)

13 F 06 61 IMPACT LAT, LONG, HDS/DN (.01°, .01°, -.00001)
  PRO (CMC Guidance)

14 POSS 06 22 FINAL ATT DISP, RPY (.01°)
  (Only if X-axis beyond 45° of Vel vector)

P63 - ENTRY INIT

15 06 64 G, VI, RTOGO (.01G, fps, .1nm)
✓ FDAI SCALE - 5/5
✓ ROT CONTR PWR DIR (2) - MNA/MNB
  TAPE RCDR - HBR/RCD/FWD/CMD RESET

58:00m
(-02:00)
  Pitch error needle goes toward zero approaching .05G time
P64 - ENTRY POST .05G
(If no P64 at .05G +5 sec & .05G lt - on, GNCS NO GO)
16 06 74 BETA, VI, G (.01°, fps, .01G)

Start DAC

.05G time

RTOGO AT .05G AGREES WITH EMS-verify
HORIZ CHECK

.05G lt - on (EMS START)

* No EMS START within 3 sec:
  * EMS MODE - BACKUP/VHF RNG

If CMC is GO:
MAN ATT (3) - RATE CMD
SC CONT - CMC
  * If DAP NO GO:
    * SC CONT - SCS
    * FLY BETA
  * If CMC NO GO:
    * SC CONT - SCS
    * FLY EMS

.05G sw - on (up)

EMS ROLL - on (up)

NOTE: To monitor N68, (BETA, VI, HDOT)
Key V16 N68E
Compare RSI & FDAI
  * If CMC or PAD cmds Lift DN,*
  * or NO COMM Entry: *
  * MNVR Lift DN at .05G *
  * (Lift up at 1.5G) *

EMS GO/NO GO
G-V Plot within limits
Monitor G-meter for convergence with pad data (Do)
CMC is NO GO if commanding
>90° when G >6.52
Go to 20 (P67) or continue
P65 - ENTRY - UP CONT (VL>18K fps)

17  F 16 69  BETA (.01°) ________ PAD ________
    DL (.01G) ________ PAD ________
    VL (fps) ________ PAD ________

*IF NO AGREEMENT:*
*SC CONT - SCS *
*FLY EMS *

PRO

18  06 74  BETA,VI,G (.01°,fps,.01G)
(V<VL+500 fps & RDOT Neg) Go to 20

P66 - ENTRY - BALLISTIC (D<DL)

19  06 22  DESIRED GMBL ANGLES RPY (.01°)
Monitor horiz +12° of 31.7° mark

P67 - ENTRY - FINAL PHASE (AUTO AT .2G)

20  06 66  BETA,CRSRNG ERR,DNRNG ERR(.01°,.1nm,.1nm)
(+ is north & long)
BETA will be +15° until R3 > ~-24nm
Monitor lift vector on RSI & FDAI
CM RCS: change rings when HE PRESS <1150 psi

21  F 16 67  RTGO,LAT,LONG (Vrel=1000fps)
(.1nm,.01°,.01°)

SC CONT - SCS
RTGO NEG - LIFT UP
RTGO POS - LIFT DOWN
Monitor altimeter
Record LAT,LONG & VOICE TO RECY at 10K'
Record EMS RTGO
EMS MODE - STBY
EMS FUNC - OFF
Stop DAC
DAC - T11
Pre-entry attitude timeline.

Time to entry interface, min

Pre-entry attitude timeline.

- ECS, CRITICAL BURNS (OVER)
- LV
- EARTH/POST LANDING

DATE 6/11/71

CSM 9.1 - Pre-entry attitude timeline.

Mission independent
-1/8/71

Basic

Horizon at 31.7°

+45° DB

-45° DB

Pitch gimbal angle deg

0 10 20 30 40

150 200 250 300 350

Basic

DAP command
EARTH/POST LANDING

RRT
90K' (06:08) STEAM PRESS - pegged at ~ 90K
off (07:00) CABIN PRESS REL vlv (2) - BOOST/ENTRY
50K'
SECS PYRO ARM (2) - ARM
Check Altimeter

40K' (07:14)
* RCS CMD - OFF
* 40K' APEX COVER JETT PB-PUSH
* DROGUE DEPLOY PB - PUSH (2 sec*
* after apex cover jett)

30K' ELS LOGIC - on (up)
ELS - AUTO

24K' (07:45) RCS disable (auto)
* RCS CMD - OFF*

Apex cover jett (auto)
* APEX COVER JETT PB - PUSH*
(WAIT 2 SECS)
Drogue parachutes deployed (auto)
* DROGUE DEPLOY PB - PUSH*

If Both Drogues Fail:
* ELS - MAN
* Stabilize CM
* 5K' MAIN DPLY PB - PUSH*
* ELS - AUTO

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

08:35
10K' (08:41) Main parachutes deployed (Droques
(Cab Press +48s 02:27)
= 10 psia)
10K' (08:41) Main parachutes deployed (Droques 54s) (02:33)
MAIN DEPLOY PB - PUSH (within 1 sec
SURGE TK 02 vlv -OFF (if unsuited)
REPRESS PKG vlv -OFF (if unsuited)
DIRECT 02 vlv -OPEN
VHF ANT - RECY
VHF AM A - SIMPLEX
VHF BCN - ON
CABIN PRESS REL vlv (2) - CLOSE
CM RCS LOGIC - on (up)
  *If main or pyro bus lost,*
  * use RHC's for burn, *
  * not DUMP sw *
CM PRPLNT - DUMP (burn audible)
Monitor CM RCS 1&2 for He press decrease
  *If no burn or press decrease,*
  * use both RHC's *
  *DO NOT FIRE PITCH JETS *
CM PRPLNT - PURGE
  *CM RCS He DUMP PB - PUSH *
  *RHC (2) - 30 secs, NO PITCH*
Stow DAC
STRUT LOCKS (4) - UNLOCK
If night landing:
  cb FLOAT BAG #3, FLT/PL (1 cb) - close
  PL BCN LT - LOW
(275) cb FLT & PL BAT BUS A,B,&BAT C (3) - close
  cb FLT & PL MNA & B (2) - open
(5) cb BAT RLY BUS (2) - open
  cb RAD HTRS OVLD (2) - open (verify)
(8) cb SPS P&Y (4) - open (verify)

3K'
CM RCS PRPLNT (2) - OFF (terminates purge)
CABIN PRESS REL vlv (RH) - DUMP
ELS AUTO (verify)
ELS LOGIC - ON (verify)
FLOOD Lts - POST LDG

800'
CAB PRESS RELF vlv - CLOSE (latch off)
MN BUS TIE (2) - OFF

POSTLANDING
STABILIZATION, VENTILATION, COMMUNICATIONS

Stabilization after landing
(229) cb MAIN REL PYRO (2) - close
MAIN RELEASE - on (up)
SECS PYRO ARM (2) - SAFE
SECS LOGIC (2) - OFF
  *No contact with recovery forces*
  *VHF AM A&B - off (ctr) *
  *VHF AM RCV ONLY - A *
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

Post Stabilization And Ventilation
PL BCN LT - BCN LT LOW (night landing)
PL VENT vlv - UNLOCK (Pull into detent)
Remove PL VENT Exh Cover
PL VENT - HIGH or LOW
If req'd:
PL DYE MARKER - ON
Release restraints
cb MNA BAT BUS A & BAT C (2) - open
cb MNB BAT BUS B & BAT C (2) - open
cb FLT & PL BAT C - open
cb PYRO A SEQ A - open
cb PYRO B SEQ B - open
Verify voltage > 27.5 vdc
*If < 27.5 vdc:
* cb FLT & PL-BAT BUS A&B (2) -open*
* cb FLT & PL BAT C (1) - close *
* GO TO LOW POWER CHECKLIST *
Unstow and install PLV DISTRIB DUCT
Deploy grappling hook and line if req'd

NOMINAL EGRESS & POWER DOWN
PL VENT - OFF
cb Pnl 250 (all) - open
Charge hatch counterbalance
Open side hatch (after collar installed)
ACTR HNDL SEL - N
GN2 vlv HNDL - VENT (pull)
GN2 vlv HNDL - PRESS (push)
Check Pressure Gauge (mid-white)
*repeat vent/press to obtain mid-white*
UNAIDED EGRESS PROCEDURES

PREPARATION
Disconnect umbilicals
Neck dams on (if suited)
Configure couch(s) - 270°
Armrests stowed
Unstow survival kits
Connect lanyards, (green to S/C, white to crew)

STABLE I
PL VENT - OFF
cb Pnl 250 (all) - open
Charge hatch counterbalance
Open side hatch
ACTR HNDL SEL - N
GN2 vlv HNDL - VENT (pull)
GN2 vlv HNDL - PRESS (push)
Check Pressure Gauge (mid-white)
*repeat vent/press to obtain mid-white*
Remove raft from kit No. 2
Put raft overboard & pull inflation lanyard
Pass hardware kit to Egress, inflate life vest, board raft
*If no ventilation or CM 02 supply,*
* initiate egress within 2-1/2 hrs*

STABLE II
PWR (3) - OFF
SUIT PWR (3) - OFF
PRESS EQUAL vlv - OPEN
Remove & stow hatch
Lower hardware rucksack down tunnel
Exit feet first; when clear of S/C inflate water wings
Remove life raft from kit No. 2 and inflate
*If no ventilation or CM 02 supply,*
* initiate egress within 2-1/2 hrs*
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
VHF AM B Rcvr and/or Survival Transceiver
*VHF Beacon not operating
*connect Survival Transceiver to ant
*cable conn P112 behind VHF ant access pnl*
*and place radio in BCN mode

LOW POWER CHECKLIST

VHF BCN - OFF
VHF AM (3) - RCV
FLOOD LTS - OFF
VHF AM A&B - off (ctr)
VHF AM RCV ONLY - A (verify)
POSTLANDING VENT SYS: minimize use
SURV RADIO - plug into VHF BCN ANT cable
conn P112 behind VHF ant access pnl & turn
radio on in BCN mode
EMERGENCY CSM/LV SEPARATION

IF POWERED FLT

TRANS CONTR - CCW (4 SEC)
MN BUS TIES - ON
TVC SERVO PWR 1 - AC1/MNA
TVC SERVO PWR 2 - AC2/MNB
BMAG MODE (3) - ATT 1/RATE 2
GMBL MTRS (4) - ON
ΔV THRUST A - NORMAL
DIR ULLAGE & THRUST ON PB - PUSH
SPS BURN (5 SEC) - THEN ΔV THRUST (2) - OFF
IF COASTING FLT

cb SECS ARM (2) (Pnl 8) - CLOSE
SECS LOGIC (2) - ON
SECS PYRO ARM (2) - ARM
ROT CONTR PWR DIR (2) - MNA/MNB
SC CONT - SCS
SEPARATE FROM LV AS APPLICABLE -
   IF BEFORE DOCKING, THC CCW (4 SEC)
IF DOCKED, UMBIL NOT CONNECTED, CSM/LM FINAL SEP (2) - ON
   IF DOCKED, UMBIL CONNECTED, SIVB/LM SEP - ON
TRANSLATE AWAY FROM LV & MANEUVER TO BURN ATTITUDE
ΔVCG - CSM OR LM/CSM AS APPLICABLE
MN BUS TIE (2) - ON
TVC SERVO PWR 1 - AC1/MNA
TVC SERVO PWR 2 - AC2/MNB
BMAG MODE (3) - ATT1/RATE 2
GMBL MTRS (4) - ON
ΔV THRUST A - NORMAL
DIR ULLAGE & THRUST ON PB - PUSH
SPS BURN (5) SEC - THEN ΔV THRUST (2) - OFF
SUIT COMPRESSOR LITE - CLOSED SUIT LOOP

SWITCH TO OTHER COMPRESSOR ON OTHER BUS
SEE ECS 9

O2 FLOW HI + RAPID LOSS OF SURGE TK PRESS + CABIN PRESS < 4.6 PSI

- CABIN PRESS RELF v1v (2) - CLOSE
- \( \sqrt{\text{TUNNEL EQUALIZATION v1v} } \) - CLOSED
- REPRESS PKG v1v - ON (WHEN SURGE TK PRESS < 150 PSI)
- \( \sqrt{\text{EMERG CABIN PRESS REGS} - \text{BOTH}} \)
- DON SUITS

CONTAMINATION IN CM

DON O2 MASKS

CONTAMINATION IN CLOSED SUIT LOOP

CHANGE TO OTHER SUIT COMPR
DIRECT O2 v1v - FULL OPEN THEN ADJUST FOR SUIT TO CABIN \( \Delta P \) OF 2 IN OF H2O

IF CONDITION PERSISTS

- SUIT COMPR (2) - OFF
- DOFF HELMETS
- DIRECT O2 v1v - CLOSE
- DON O2 MASKS

FIRE/SMOKE IN CM

MONITOR DC FOR HI CURRENT - REMOVE POWER FROM ASSOCIATED INVERTER
IF CURRENT REMAINS HI - REMOVE POWER FROM ASSOCIATED DC BUS
IF CLOSED SUIT LOOP, SWITCH SUIT COMPR TO GOOD AC BUS
IF HELMET OFF, SUIT COMPR (2) - OFF
RECONFIGURE INVERTER 3 ON LOST AC BUS
VERIFY RCS CONTROL POWER CONFIGURATION
IF HELMETS DON O2 MASKS
OFF [USE FIRE EXTINGUISHER OR H20 GUN (OPTIONAL)]

IF CLOSED SUIT LOOP [\( \sqrt{\text{EMERG CABIN PRESS REGS} - \text{OFF}} \)]
IF FIRE PERSISTS - DUMP CABIN
G&N CRITICAL BURNS

IF NO START OR ISS LITE + PROG LITE
IF CMC LITE, PROG ALARM 1407 OR EARLY CUTOFF

SCS TVC (2) - AUTO
SC CONT - SCS
✓ ATTITUDE
SPS THRUST - DIRECT (MOMENTARY), IF REQ'd

IF ABNORMAL DYNAMICS

THC CW, control rates by MTVC
After SHUTDOWN, AUTO RCS (16) - OFF

SCS CRITICAL BURN

IF NO START OR EARLY CUTOFF

SPS THRUST - DIRECT (MOMENTARY)

IF RATE NEEDLE HARDOVER & FDAIs DIVERGE OPPOSITE

BMAG MODE (3) - RATE 1
THC - CW, use MTVC

IF ABNORMAL DYNAMICS IN AUTO MODE

THC - CW, use MTVC
BMAG MODE (3) - RATE 2

IF ABNORMAL DYNAMICS IN MTVC MODE

THC - CW
IF PROBLEM PERSISTS, SHUTDOWN
AUTO RCS (16) - OFF
SPS

IF NO CUTOFF AFTER ΔV THRUST (BOTH - OFF)
cb SPS PILOT VLVS - open

IF EMS & N40 (R3) STILL COUNTING AFTER SHUTDOWN
SC CONT - SCS
TRANS CONT PWR - OFF
cb DIR ULLAGE (2) - open
IF CONDITION PERSISTS, AUTO RCS SEL (16) - OFF
SM RCS PRPLNT (AFFECTED QUAD) - OFF

SPS PRESS LITE

CONTINUE CRITICAL BURN

IF FUEL & OX PRESS (BOTH) > 200 PSI

SPS HE vlvs (2) - OFF, THEN CONTROL MANUALLY BETWEEN 170-200 PSI

IF FUEL/OX ΔP > 20 PSI

SPS HE vlvs (2) - ON
IF CONDITION PERSISTS, SPS HE vlvs(2)-OFF(Until Pc <70)

G&C (COASTING, ENTRY)

CMC LITE

SC CONT - SCS
SEE G&N 5

ISS LITE + PROG ALARM LITE

SC CONT - SCS
SEE G&N 6
**EMERGENCY POWER DOWN**

**CAUTION:** USE BATTS ONLY WHEN MAIN BUS VOLTS < 24.5

<table>
<thead>
<tr>
<th>CONFIGURE FOR USE OF AUX BATTERY</th>
<th>DC AMPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUEL CELL 2 MNA &amp; MNB (2) - OFF</td>
<td></td>
</tr>
<tr>
<td>cb CRYO O2 ISOL/AUX BAT - CLOSE (Pnl 226)</td>
<td></td>
</tr>
<tr>
<td>SM PWR SOURCE - AUX BAT (mom) (Pnl 278)</td>
<td></td>
</tr>
<tr>
<td>O2 TANK 3 ISOL - CLOSE ((\sqrt{T}-tb-bp)) (Pnl 278)</td>
<td></td>
</tr>
<tr>
<td>FUEL CELL 2 MN A(B) - as desired</td>
<td></td>
</tr>
</tbody>
</table>

**INSURE DSE IS RECORDING**

| IF UNSUITED, SUIT COMP (2) - OFF                                                             |        |
| FC PUMPS (3) - OFF (Until Tskin > 475°F)                                                     | 8.7 TOTAL |
| cb G\&N OPTICS MNA & MNB (2) - OPEN (Pnl 5)                                                  | 3.1     |
| G\&N PWR (AC) - OFF (Pnl 5)                                                                  | 0.9     |
| O2 HTRS (3) - OFF (CTR)                                                                      | 17.0    |
| H2 HTRS (2) - OFF (CTR)                                                                      | 1.4 EA  |
| H2 FANS (3) - OFF (CTR)                                                                      | 1.0     |
| C/W NORMAL - ACK                                                                             |         |
| LM PWR - RESET - OFF                                                                         | 15.0 MAX |
| ECS RAD HTRS (2) - OFF                                                                       | 17.2 EA |
| POT H20 HTR - OFF                                                                            | 1.6 MAX |
| SM RCS HTRS (4) - OFF                                                                        | 3.3 MAX EA |
| HGA PWR - OFF                                                                                | 2.9     |
| LIGHTS - Min Reqld                                                                           | 5.3 MAX |
| EXT LTS - OFF                                                                                | 4.6     |
| NON ESS BUS - OFF (SPS Burn-Damage SIM CAM)                                                  | 4 - 6   |
| VHF RANGING - OFF                                                                            | 1.4     |
| S BD AUX TV - OFF                                                                           | 5.3     |
| SPS LINE HTR - OFF                                                                          | 6.2 (A/B) |
| RNDZ XPNDR PWR - OFF or HEATER (Pnl 100)                                                     | 3.0     |
| SIG CONDR/DRIVER BIAS PWR (2) - OFF                                                          |         |
| SECURE ONE BMAG                                                                              | 2.6     |
| SELECT SINGLE JET CONTROL                                                                    |         |
| EMS FUNC - OFF                                                                               |         |
| RHC PWR DIRECT (2) - OFF                                                                     |         |
| THC PWR - OFF                                                                                |         |
| CONFIGURE FOR SINGLE INVERTER OPERATION                                                      |         |
| TURN OTHER INVERTER OFF                                                                      | 4.0 MAX |
| BAT CHGR - OFF                                                                               |         |
| NOTE MISSION TIME                                                                            |         |
| cb TIMERS (2) - OPEN (Pnl 229)                                                               |         |
| AC INVERTER (9) - OFF                                                                        |         |
| CM RCS HTRS - OFF                                                                            |         |
| ISOLATE FAILED FC's from MAIN BUSES                                                          |         |

**NOTE:**
- TIMERS (2) - OPEN (Pnl 229)
- AC INVERTER (9) - OFF
- CM RCS HTRS - OFF
- ISOLATE FAILED FC's from MAIN BUSES
## ECS Power Down

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECS GLY PUMP sel - OFF (ISS LIMIT 2.5 HRS)</td>
<td>2.6</td>
</tr>
<tr>
<td>ECS RAD FLOW CONT PWR - off (CTR)</td>
<td>0.7</td>
</tr>
<tr>
<td>GLY EVAP TEMP IN - MAN</td>
<td></td>
</tr>
<tr>
<td>ECS RAD HTRS (2) - OFF</td>
<td></td>
</tr>
<tr>
<td>GLYCOL EVAP H2O FLOW - OFF</td>
<td>~0.1</td>
</tr>
<tr>
<td>GLYCOL EVAP STEAM PRESS - MAN</td>
<td>~0.2</td>
</tr>
</tbody>
</table>

**Total**: 3.7

## COMM Power Down

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF VOICE DESIRED</td>
<td></td>
</tr>
<tr>
<td>UP TLM CMD RESET - RESET then OFF</td>
<td></td>
</tr>
<tr>
<td>S-BD AUX TAPE - DN VOICE BU</td>
<td></td>
</tr>
<tr>
<td>S-BD MODE PCM - OFF</td>
<td></td>
</tr>
<tr>
<td>PCM BIT RATE - HIGH</td>
<td></td>
</tr>
<tr>
<td>S-BD PWR AMP - OFF (CTR)</td>
<td></td>
</tr>
<tr>
<td>TAPE RCDR - OFF (CTR)</td>
<td>4.0</td>
</tr>
<tr>
<td>SCE PWR - OFF (CTR)</td>
<td>1.6</td>
</tr>
<tr>
<td>cb INSTR ESS MNA &amp; MNB (2) - OPEN (Pnl 5)</td>
<td>4.9</td>
</tr>
<tr>
<td>TELCOM GRP 1 &amp; 2 (2) - OFF</td>
<td>1.6</td>
</tr>
</tbody>
</table>

**Total**: 13.0

## CMC/IMU Power Down

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETE ALIGNMENT TRANSFER</td>
<td></td>
</tr>
<tr>
<td>CMC MODE - FREE</td>
<td></td>
</tr>
<tr>
<td>cb G&amp;N IMU MNA &amp; MNB (2) - OPEN (Pnl 5)</td>
<td></td>
</tr>
<tr>
<td>V37E06E</td>
<td>3.0</td>
</tr>
<tr>
<td>F V50 N25, 00062, CMC PWR DN PRO, HOLD (~5 SEC) UNTIL STBY LT - ON</td>
<td></td>
</tr>
</tbody>
</table>

**Total**: 6.0

## SCS Power Down

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCEPTABLE S/C ATTITUDE</td>
<td></td>
</tr>
<tr>
<td>BMAG PWR (2) - OFF</td>
<td></td>
</tr>
<tr>
<td>FDAI/GPI PWR - OFF</td>
<td></td>
</tr>
<tr>
<td>SCS ELECTRONICS PWR - ECA (REQUIRES AC1 &amp; MNB)</td>
<td></td>
</tr>
<tr>
<td>ORDEAL PWR &amp; LIGHTING - OFF</td>
<td></td>
</tr>
<tr>
<td>cb SCS LOGIC BUS (4) - OPEN (Pnl 8)</td>
<td>2.0</td>
</tr>
<tr>
<td>SCS ELECTRONICS PWR - OFF</td>
<td></td>
</tr>
<tr>
<td>RHC PWR NORM (2) - OFF</td>
<td></td>
</tr>
</tbody>
</table>

**Total**: 6.0
LAUNCH BUS LOSS

MN BUS A LOST - LAUNCH

EDS AUTO/OFF - OFF
TVC GMBL DR (P,Y) - 2
SCS TVC (P,Y) - RATE CMD
BMAG MODE (3) - RATE 2
FDAO SEL - 2

cb SPS PITCH 2 & YAW 2 (Pnl 8) - OPEN
(AFTER GIMBAL MOTORS ON)

AC INV 3 - MNB
AC INV 3 AC 1 - ON
AC INV 1 AC 1 - OFF
A11 F/C MNA - OFF
ALL F/C MNB - MNB (BEFORE CM/SM SEP)
cb MNA BAT BUS A (Pnl 275) - OPEN
cb MNB BAT C (Pnl 275) - CLOSED

MN BUS B LOST - LAUNCH

EDS AUTO/OFF - OFF
TVC GMBL DR (P,Y) - 1
SPS TVC (P,Y) - RATE CMD
BMAG MODE (3) - RATE 1
FDAO SEL - 1

cb SPS PITCH 1 & YAW 1 (Pnl 8) - OPEN
(AFTER GIMBAL MOTORS ON)

AC INV 3 - MNA
AC INV 3 AC 2 - ON
AC INV 2 AC 2 - OFF
A11 F/C MNB - OFF
ALL F/C MNA - MNA (BEFORE CM/SM SEP)
cb MNB BAT BUS B (Pnl 275) - OPEN
cb MNA BAT C (Pnl 275) - CLOSED
AC BUS 1 LOST - LAUNCH

BMAG MODE (3) - RATE 2
FDAl SEL - 2
TVC SERVO PWR 1 - AC2/MNB
SCS TVC PITCH, YAW - RATE CMD

AC INV 1 MNA - OFF
SUIT COMPR - AC 2
ECS GLY PUMP - AC 2
S BD NORM XPNDR - SEC
S BD NORM PWR AMP - SEC

AC BUS 2 LOST - LAUNCH

✓BMAG MODE (3) - RATE 1
FDAl SEL - 1
TVC SERVO PWR 2 - AC1/MNA
MTVC WITH THUMBWHEELS (MODE III OR IV)

AC INV 2 MNB - OFF
✓SUIT COMPR - AC 1
✓ECS GLY PUMP - AC 1

BAT BUS A LOST - LAUNCH

EDS AUTO/OFF - OFF
AUTO RCS SEL (RING 1) - OFF
IF BUS LOST BEFORE GMBL MTRS ON
TVC GMBL DR (P,Y) - 2
cb SPS P2 & Y2 (Pnl 8) - OPEN
(AFTER SEC GIMBAL MOTORS ON)

cb MNA BAT C (Pnl 275) - CLOSED

BAT BUS B LOST - LAUNCH

EDS AUTO/OFF - OFF
AUTO RCS SEL (RING 2) - OFF
IF BUS LOST BEFORE GMBL MTRS ON
TVC GMBL DR (P,Y) - 1
cb SPS P1 & Y1 (Pnl 8) - OPEN
(AFTER PRI GIMBAL MOTORS ON)

cb MNB BAT C (Pnl 275) - CLOSED
SPS BURN BUS LOSS

MN BUS A LOST - SPS BURN

TVC GMBL DR (P,Y) - 2
\(\sqrt{SCS\ TVC\ (P,Y)}\) - RATE CMD
\(cb\ SPS\ P2\ &\ Y2\ (Pn1\ 8)\) - OPEN
(CRIT BURNS - AFTER GMBL MTRS ON)
FDAI SEL - 2
\(\sqrt{FDAI\ SOURCE\ -\ CMC}\)
RHC PWR DIRECT 2 - MNB
BMAG MODE (3) - RATE 2
\(\sqrt{\Delta V\ THRUST\ B\ -\ NORM}\)
AUTO RCS SEL - MNB

AC INV 3 - MNB
AC INV 3 AC 1 - ON
AC INV 1 AC 1 - OFF
A11 F/C MNA - OFF
ALL F/C MNB - MNB
\(cb\ MNA\ BAT\ BUS\ A\ (Pn1\ 275)\) - OPEN

MN BUS B LOST - SPS BURNS

SCS TVC (P,Y) - RATE CMD
TVC GMBL DR (P,Y) - 1
\(cb\ SPS\ P1\ &\ Y1\ (Pn1\ 8)\) - OPEN
(CRIT BURNS - AFTER GMBL MTRS ON)
FDAI SEL - 1
\(\sqrt{FDAI\ SOURCE\ -\ CMC}\)
RHC PWR DIRECT 1 - MNA
BMAG MODE (3) - RATE 1
\(\Delta V\ THRUST\ A\ -\ NORM\)
AUTO RCS SEL - MNA

AC INV 3 - MNA
AC INV 3 AC 2 - ON
AC INV 2 AC 2 - OFF
A11 F/C MNB - OFF
A11 F/C MNA - MNA
\(cb\ MNB\ BAT\ BUS\ B\ (Pn1\ 275)\) - OPEN
AC BUS 1 LOST - SPS BURNS

- TVC SERVO PWR 1 - AC2/MNB
- SCS TVC (P&Y) - RATE CMD
- BMAG MODE (3) - RATE 2
- FDAI SEL - 2
- FDAI SOURCE - CMC

- AC INV 1 MNA - OFF
- SUIT COMPR - AC 2
- ECS GLY PUMP - AC 2
- S BD NORM XPNDR - SEC
- S BD NORM PWR AMP - SEC
- SPS GAUGING - AC 2

AC BUS 2 LOST - SPS BURNS

- TVC SERVO PWR 2 - AC1/MNA
- BMAG MODE (3) - RATE 1
- SCS TVC (P&Y) - AUTO
- VCG - LM/CSM
- MTVC WITH TRIM THUMBWHEELS (SCS BURN ONLY)
- FDAI SEL - 1
- FDAI SOURCE - CMC

- AC INV 2 MNB - OFF
- SUIT COMPR - AC 1
- ECS GLY PUMP - AC 1

BAT BUS A LOST - SPS BURNS

- TVC GMBL DR (P,Y) - 2
  (IF BUS LOST BEFORE GMBL MTRS ON)
- cb SPS P2 & Y2 (Pn1 8) - OPEN
  (CRIT BURNS - AFTER GMBL MTRS ON)
- cb MNA BAT C (Pn1 275) - CLOSED

BAT BUS B LOST - SPS BURNS

- TVC GMBL DR (P,Y) - 1
  (IF BUS LOST BEFORE GMBL MTRS ON)
- cb SPS P1 & Y1 (Pn1 8) - OPEN
  (CRIT BURNS - AFTER GMBL MTRS ON)
- cb MNB BAT C (Pn1 275) - CLOSED
ENTRY BUS LOSS

**MN BUS A LOST - ENTRY**

- BMAG MODE (3) - RATE 2
- FDAI SEL - 2
- /FDAI SOURCE - CMC
- AUTO RCS SEL (12) - MNB (ONLY IF BUS LOST AFTER SM SEP)

AC INV 3 - MNB
AC INV 3 AC 1 - ON
AC INV 1 AC 1 - OFF
A11 F/C MNA - OFF
ALL F/C MNB - MNB (BEFORE CM/CM SEP)
cb MNA BAT BUS A (Pnl 275) - OPEN
cb MNB BAT C (Pnl 275) - CLOSED

**MN BUS B LOST - ENTRY**

- BMAG MODE (3) - RATE 1
- FDAI SEL - 1
- /FDAI SOURCE - CMC
- AUTO RCS SEL (12) - MNA (ONLY IF BUS LOST AFTER SM SEP)

AC INV 3 - MNA
AC INV 3 AC 2 - ON
AC INV 2 AC 2 - OFF
A11 F/C MNB - OFF
A11 F/C MNA - MNA (BEFORE CM/SM SEP)
cb MNB BAT BUS B (Pnl 275) - OPEN
cb MNA BAT C (Pnl 275) - CLOSED

**AC BUS 1 LOST - ENTRY**

- BMAG MODE (3) - RATE 2
- FDAI SEL - 2
- /FDAI SOURCE - CMC

AC INV 1 MNA - OFF
SUIT COMPR - AC 2
ECS GLY PUMP - AC 2
S BD NORM XPNDR - SEC
S BD NORM PWR AMP - SEC
EMER 1-13

AC BUS 2 LOST - ENTRY

BMAG MODE (3) - RATE 1
FDAI SEL - 1
✓FDAI SOURCE - CMC

AC INV 2 MNB - OFF
✓SUIT COMPR - AC 1
✓ECS GLY PUMP - AC 1

BAT BUS A LOST - ENTRY

cb SCS B/D ROLL, P&Y (MNA) (3) (Pn1 8)
Before CM/SM SEP - OPEN
After RCS transfer to CM - CLOSE

cb SCS CONTR/AUTO (2) (Pn1 8) - OPEN
(AFTER APEX COVER JET)

cb MNA BAT C (Pn1 275) - CLOSED

BAT BUS B LOST - ENTRY

cb SCS B/D ROLL, P&Y (MNB) (3) (Pn1 8)
Before CM/SM SEP - OPEN
After RCS transfer to CM - CLOSE

cb SCS CONTR/AUTO (2) (Pn1 8) - OPEN
(AFTER APEX COVER JET)

cb MNB BAT C (Pn1 275) - CLOSED
ALL FC'S DISCONNECTED - POWERED FLT
ATTEMPT FC RECONNECT (ONE BUS AT A TIME)

IF RECONNECT NOT SUCCESSFUL

FC 1 - MN B
FC 2 - MN B
FC 3 - MN A

IF STILL NO SUCCESS

SCE PWR - AUX
EDS AUTO/OFF - OFF
cb MNA BAT C (Pnl 275) - CLOSED
cb MNB BAT C (Pnl 275) - CLOSED

AC BUS OVERLD + AC BUS + MN BUS UNDER V LITES
AFFECTED AC BUS - OFF (REASON - AC BUS SHORT)

FC 1 (2,3) LITE
VERIFY FC 1 (2,3) REAC tb - gray

IF tb BP

FC 1 (2,3) REAC vlv - OPEN (up)

IF tb STILL BP & REAC FLOW ~O

OPEN CIRCUIT FC 1 (2,3)
SM RCS THRUSTER FAILED ON

BMAG MODE (3) - RATE 2
CHG TO OTHER SC CONT MODE
ROT CONT PWR DIR (2) - MNA/MNB
STOP SPACECRAFT RATES WITH DIRECT RCS
AUTO RCS SEL (16) - OFF

IF CONDITION PERSISTS

AUTO RCS SEL (16) - ON (AS REQ'D)
MAN ATT (3) - ACCEL CMD
STOP SPACECRAFT RATES
cb SCS DIR ULL (2)(Pnl 8) - open
ROT CONT PWR DIR (2) - OFF

IF CONDITION PERSISTS

NEUTRALIZE RHC
SM RCS PRPLNT (AFFECTED QUAD) - OFF

SM RCS LITE

SM RCS HE (2) - CLOSE
SEE RCS 1

SM RCS QUAD SECURE

SM RCS He 1 & 2 (AFFECTED QUAD) (2) - CLOSE
SM RCS PRIM PRPLNT (AFFECTED QUAD) - CLOSE
Fire one jet in affected quad - 2 sec continuously
AUTO RCS SELECT (AFFECTED QUAD) (4) - OFF (except BOOST)
CM RCS FAILS TO PRESSURIZE OR FEED PRPLNT

**IF NO PRESSURIZATION**

- √cb EPS BAT BUS (2) (Pnl 229) - CLOSE
- √cb PYRO A/B SEQ A/B (2) (Pnl 250) - CLOSE
- √cb SECS ARM (2) (Pnl 8) - CLOSE
- √SECS PYRO ARM (2) - ARM
- √SECS LOGIC (2) - ON
- CM RCS - PRESS

**IF NO RCS PRPLNT FEED**

- √cb EPS GRP 1 & 3 (Pnl 229) - CLOSE
- √cb SM RCS HTR A&B (Pnl 8) - CLOSE
- √cb RCS PRPLNT ISOL (2) (Pnl 8) - CLOSE
- CM RCS PRPLNT - ON

**IF STILL NO FEED**

- cb EPS GRP 5 (Pnl 229) - CLOSE
- cb RCS LOGIC (2) (Pnl 8) - CLOSE
- CM RCS LOGIC - ON
- CM PRPLNT - DUMP MOMENTARILY, THEN OFF
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00110</td>
<td>Mark reject has been entered but ignored. Continue.</td>
</tr>
<tr>
<td>00113</td>
<td>No inbits (chan 16). Continue: if alarm recurs use MDC DSKY.</td>
</tr>
<tr>
<td>00114</td>
<td>More marks made than desired. Continue.</td>
</tr>
<tr>
<td>00115</td>
<td>V41 N91 keyed with OPTICS MODE not in CMC. OPTICS MODE - CMC and OPTICS ZERO - OFF.</td>
</tr>
<tr>
<td>00116</td>
<td>Optics switch altered before 15 sec zero time elapsed. OPTICS ZERO - ZERO (15 sec).</td>
</tr>
<tr>
<td>00117</td>
<td>V41 N91 keyed but CMC has reserved OCDU (from start of gimbal test in P40 until termination of TVC functional allocation of the &quot;optics&quot; CDU Driving Output). V41 N91 not yet available.</td>
</tr>
<tr>
<td>00120</td>
<td>Optics torque has been requested but optics have not been zeroed since last FRESH START or RESTART. OPTICS ZERO - OFF then ZERO (15 sec).</td>
</tr>
<tr>
<td>00121</td>
<td>In 0.05 sec following mark, an ICDU changed by more than 0.033°. Repeat MK.</td>
</tr>
<tr>
<td>(m)00205</td>
<td>PIPA saturated. Use SCS control (G&amp;N 12).</td>
</tr>
<tr>
<td>00206</td>
<td>The IMU zero routine has been entered with both the GMBL LOCK It and NO ATT It on Coarse align to 0,0,0. Reselect V40E.</td>
</tr>
<tr>
<td>(m)00207</td>
<td>ISS turn-on request not present for 90 sec. Redo IMU turn on (G&amp;N 12).</td>
</tr>
<tr>
<td>(m)00210</td>
<td>The IMU is not operating. Redo IMU turn on. If alarm recurs perform fresh start (V36E). Consult MSFN. (G&amp;N 12).</td>
</tr>
</tbody>
</table>
(m)00211 Coarse align error
If P51(3)/52(4) in progress record gyro
torquing angles and perform fine align
check in P52(4)
Otherwise, see G/1-24. (G&N 12).

(m)00212 PIPA fail, but PIPA is not being used
PIPA BIAS check (G&N 6/8).

(m)00213 IMU not operating with turn-on request
See 00210

00214 Program using IMU when turned OFF
See 00210 or exit program.

(m)00217 IMU coarse align or pulse torque
difficulty has occurred
If code 211 also, perform 211 cure only
Reinitiate current program.
If alarm recurs, terminate use of
ISS (G&N 12).

00220 IMU orientation unknown
Align or if aligned set REFSMMAT flag

00401 Desired middle gimbal angle is excessive
Call N22 - maneuver if MGA < 85° or
realign IMU.

00402 Second MINKEY pulse torque must be done.

00404 Target out of view (90 deg test)
(G/3-7,3-11,6-3,7-16)

00405 Acceptable star pair is not available
(G/6-3,6-6)

00406 Rend navigation not operating
Select P20 Opt. 0 or 4 or continue.

00421 W-matrix overflow
Notify MSFN but continue.
W-matrix automatically reinitialized at
next mark.

00600 No solution on first iteration in P31 or
P32/72
(G/4-6,4-8)

00601 Post CSI Perigee/lune alt <85nm/ 5.8nm
(G/4-6, 4-8)

00602 Post CDH Perigee/lune alt <85nm/ 5.8nm
(G/4-6, 4-8)

00603 Time from TIG (CSI) to TIG (CDH)
<10 min
(G/4-6, 4-8)
00604 Time from TIG (CDH) to TIG (TPI) <10 min (G/4-6,4-8)
00605 Number of iterations exceeds loop maximum (G/4-6,4-8,4-15,4-16)
00606 ΔV (CSI) has been >1000 fps for last two iterations (G/4-6,4-8)
00611 No TIG for given ELEV angle (G/4-10,4-12)
00612 State vector in wrong sphere of influence at TIG (G/4-15)
00613 Reentry angle out of limits (G/4-16)
(m)00777 ISS warning caused by PIPA fail (G&N 6).
01102 CMC self test error (G/2-3)
(m)01105 Downlink too fast Rset. If alarm recurs DOWNLINK FAILURE. (G&N 12).
(m)01106 Uplink too fast Rset. If alarm recurs UPLINK FAILURE. (G&N 12).
(m)01107 Phase table failure-assume erasable memory is destroyed
If Comm:  1. V74 CMC DOWNLINK
         2. P27 As Necessary.
         3. V48 As Necessary (V46).
         4. Reestablish REFSMMAT via P51 As Necessary.
         If FRESH START recurs, CMC FAILURE (SSR-3).
If no Comm, pg G/9-1
01301 Arcsin or arccos input is greater than one
Notify MSFN, continue.
(m)01407 VG increasing (G&N 12).
01426 IMU unsatisfactory
Realign or use SCS.
01427  IMU reversed
       Note FDAI operation is inverted.
01520  V37 request not permitted at this time
       Wait till COMP ACTY lt.
       not on continuously - reselect V37 or if
       P62-67, select P00 and then desired
       program.
01600  Overflow in drift test
       This is gnd test alarm only.
01601  Bad IMU torque abort
       See 01600
01703  Insufficient time for integration.
       TIG slipped
       (G/5-3,5-18)
(m)03777  ISS warning caused by ICDU fail
       (G&N 6)
(m)04777  ISS warning caused by ICDU & PIPA fail
       (G&N 6)
(m)07777  ISS warning caused by IMU fail
       (G&N 6)
(m)10777  ISS warning caused by IMU & PIPA
       fail (G&N 6)
(m)13777  ISS warning caused by IMU & ICDU fail
       (G&N 6)
(m)14777  ISS warning caused by IMU,ICDU & PIPA
       fail
       (G&N 6)
**20430 Orbital integration has been
       terminated to avoid possible
       infinite loop.
       Notify MSFN.
**20607  Probable S.V. uplink required
       No solution to conic subroutine
       Reselect program.
**20610  Alt at specified TIG in P37 < 400K ft
       Reselect P37 and decrease TIG.
**21204  Negative or zero time waitlist call.
       If ave-g or ext. vb. on, continue.
       Otherwise reselect program.
**21206  Second job attempts to go to sleep via
       keyboard and display program
       See 21204.
**21210 Second attempt is made to stall
Reselect program
Do not attempt use of IMU while CMC is using it.

**21302 SQRT called with negative argument
See 21204

**21501 Keyboard and display alarm during internal use
See 21204

**21502 Illegal flashing display
See 21204

**21521 P01 selected and P11 has already been performed
Select correct program

*31104 Delay routine busy
Reselect extended verb or continue with program.
Notify MSFN.

*31201 Executive overflow - no vac area
Reselect Extended Verb and/or Continue Program.

*31202 Executive overflow - no core sets
See 31201

*31203 Waitlist overflow - too many tasks
See 31201

*31211 Illegal interrupt of extended verb
Reselect extended verb after optics marking is completed.

(m) - Malf procedure indicated

**(2xxxx) - Generates restart (no It), F37 (POOD00)

*(3xxxx) - Restart (no It) and program continues (i.e. attempted recovery)(BAILOUT)

NOTE - All **alarms act as *type if they occur when Ave-g is on or display type extended verb is active.