

SPS DEORBIT & ENTRY

VEHICLE PREP COMPLETE (pg L/5-1 or pg L/4-10)P30 - EXTERNAL ΔV

- 1 V37E 30E
- 2 F 06 33 GETI (hrs,min,.01sec)
(ACCEPT) PRO
(REJECT) LOAD DESIRED GETI
- 3 F 06 81 $\Delta V_X, Y, Z$ (LV) (.1fps)
(ACCEPT) PRO
(REJECT) LOAD DESIRED DATA
- 4 F 06 42 HA,HP, ΔV (REQ) (.1nm,.1nm,.1fps)
Set ΔV counter
(ACCEPT) PRO
(REJECT) Reselect P30 or P27. Load new param.
- 5 F 16 45 MARKS,TFI,MGA (marks,min-sec,.01°)
*MGA -00002: If *
* IMU not aligned*
Set DET
PRO
- F 37 00E

6 SEPARATION CK LIST

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
cb SECS ARM (2) - close (verify)
cb SECS LOGIC (2) - close (verify)
ROT CONTR PWR NORM (2) - AC/DC
ABORT SYS PRPLNT - RCS CMD (verify)
SM RCS SEC PRPLNT FUEL PRESS (4)-OPEN

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CM RCS CHECK

AUTO RCS A/C ROLL (4) - OFF (verify)
 cb RCS LOGIC (2) - closed (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

8

SPS THRUSTING PREP

SPS GAUGING - AC1 (verify)
 PUG MODE - as req'd
 Load DAP
 BMAG MODE (3) - RATE 2
 SC CONT - CMC/AUTO

9

MNVR TO PAD BURN ATT (HDS UP)

V49E

R _____ (180°)
 P _____
 Y _____ (0°)

10

PERFORM BORESIGHT & SXT STAR CHECK

V41 N91E

Stow Optics eyepieces

11

V37E 40E

12

F 50 18 REQUEST MNVR TO FDAI RPY ANGLES (.01°)
 (AUTO) BMAG MODE (3) - RATE 2
 SC CONT - CMC/AUTO
 PRO

13

06 18 AUTO MNVR TO FDAI RPY ANGLES (.01°)

14 F 50 18 REQUEST TRIM MNVR TO FDAI RPY ANGLES
ALIGN S/C ROLL (.01°)
GDC ALIGN

TVC CHECK & PREP

+54:00m
(-06:00)

(8) cb STAB CONT SYS (a11) - close
cb SPS (12) - close
Set ΔVC (verify)
EMS FUNC - ΔV (verify)
MAN ATT (3) - RATE CMD
ATT DB - MIN
RATE - LOW
SCS TVC (2) - RATE CMD
ΔV CG - CSM
TVC GMBL DRIVE P&Y - AUTO
MN BUS TIE (2) - ON
TAPE RCDR - HBR/RCD/FWD/CMD RESET
SPS He v1vs (2) - AUTO
Check N2A & N2B
TVC SERVO PWR #1 - AC1/MNA
TVC SERVO PWR #2 - AC2/MNB
ROT CONTR PWR NORMAL (2) - AC
ROT CONT PWR DIRECT (2) - OFF
BMAG MODE (3) - ATT1/RATE 2
SC CONT - SCS
RHC #2 - ARMED

55:00m
(-05:00)

PRIMARY TVC CHECK

GMBL MOT P1-Y1-START/ON (LMP Confirm)
Verify TRIM CONTROL & SET
Verify MTVC
IF SCS: SCS TVC (2) - AUTO
SC CONT - CMC (SCS)
THC - CW
Verify NO MTVC

SEC TVC CHECK

GMBL MOT P2-Y2-START/ON (LMP Confirm)
SET GPI TRIM
Verify MTVC
THC NEUTRAL
Verify NO MTVC

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8-4

Verify GPI returns to 0,0(CMC)
or trim (SCS)
ROT CONT PWR NORM (2) - AC/DC
ROT CONT PWR DIRECT (2) - MNA/MNB
(TRIM) BMAG MODE (3) - RATE 2
PRO
BMAG MODE (3) - ATT1/RATE 2
ENTR

15 F 50 25 00204 GMBL TEST OPTION
(ACCEPT) SC CONT - CMC (verify)
PRO

Monitor GPI Response:
00,02,-02,00,02,-02,00, Trim
*TEST FAIL: *
*SC CONT - SCS *
SCS TVC(2) - AUTO
(REJECT) ENTR

16 06 40 TFI, VG, Δ VM (min-sec,.1fps)
*PROG ALARM - TIG Slipped *
*V5N9E 01703 *
*KEY RLSE TO 16 *
Burn can't be slipped >70sec
FDAI SCALE - 5/1
RATE - HIGH
UPDATE DET

TIG-3 min
HORIZ CHK - Horiz on 3° window mk
(hds up)(Limit +3° GNCS GO/NO-GO)
*If NO GO, set $\bar{t}w$ 180°,180°,0° *
* Track horiz with 7° window mk*
* (hds up) *
* At TIG-2 min, Align GDC *

59:00
(-01:00)

EMS MODE - NORMAL
TRANS CONTR PWR - on (up)
 Δ V THRUST A(B) - NORMAL
THC - ARMED
RHC (2) - ARMED

59:25
(-00:35)

DSKY BLANKS

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59:30
(-00:30) (AVE G ON)

06 40 TFI, VG, ΔVM (min-sec, .1fps)
CHECK PIPA BIAS <2fps for 5 sec

59:XX
(-00:XX) ULLAGE
Horiz on 15° window mark (hds up)
*If no ULLAGE: *
* DIR ULLAGE PB - PUSH*
* Control Att with RHC*

MONITOR ΔVM (R3) COUNTING UP

59:55
(-00:05)
F 99 40 ENG ON ENABLE REQUEST
(AUTO IGN) PRO AT TFI >0 Sec
(BYPASS IGN) ENTR to 19 (prfrm switching in 18)
EXIT - V37E 00E

17 00:00 IGN *IF SCS: THRUST PB - PUSH*

06 40 TFC, VG, ΔVM (min-sec, .1fps, .1fps)

*F 97 40 SPS Thrust fail *
*ΔV THRUST B(A) - NORMAL *
*(CONT GUID) PRO to 06 40 *
(RECYCLE) ENTR to TIG-05sec

00:03 SPS THRUST Lt - ON
ΔV THRUST B(A) - NORMAL
IF SCS: +X & THRUST PB - PUSH

MONITOR THRUSTING

Pc 95-105 psia
EMS COUNTING DOWN
SPS INJ VLVS (4) - OPEN
SPS He vlvs tb-gray
SPS FUEL/OXID PRESS - 170-195 psia
PUGS - BALANCED

00:XX ECO

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18 F 16 40 TFC (STATIC), VG, ΔVM (min-sec, .1fps)
 ΔV THRUST A&B - OFF
 VERIFY THRUST OFF
 SPS INJ VLVS (4) - CLOSED
 SPS He vlvs tb (2) - bp
 GMBL MTRS (4) - OFF (LMP Confirm)
 TVC SERVO PWR 1&2 - OFF
 PRO

19 F 16 85 VG XYZ (CM) (.1fps)
 NULL RESIDUALS
 TRANS CONTR PWR - OFF
 cb DIRECT ULLAGE (2) - open
 cb SPS P & Y (4) - open
 RECORD ΔV COUNTER & RESIDUALS ΔVC _____
 EMS FUNC - OFF VGX _____
 EMS MODE - STBY VGY _____
 PRO VGZ _____
 BMAG MODE (3) - RATE 2
 TAPE RCDR - off (ctr)
 PCM BIT RATE - LOW

20 F 37 V82E

21 F 16 44 HA,HP,TFF (.1nm,min-sec)
 PRO

22 F 37 00E

23 When COMP ACTY 1t out:
 V66E

24 MNVR TO CM/SM SEP ATT
 SC CONT - SCS
 YAW right 45° from Burn Att (315°)
 BMAG MODE (3) - ATT 1/RATE 2

25

PWR REDUCT

HI GAIN ANT PWR - OFF
 FC PUMPS (3) - OFF
 FC 2 MNA - OFF
 Verify loads balanced
 VHF AM (A&B) - off (ctr)
 (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

P61 - ENTRY PREP

26

V37E 61E (AVE G ON)
 05 09 01427 - ROLL REVERSED
 *05 09 01426 - IMU UNSAT *

27

F 06 61 IMPACT LAT, LONG, HDS UP/DN (+/-)
 (.01°, .01°, +00001)

PAD VALUES

LAT _____
 LONG _____
 HDS DN -1

PRO

28

F 06 60 GMAX,V400K,GAMMA EI (.01G, fps,.01°)

*N60 not valid for *
 * earth orbit Entry*

PRO

29

F 16 63 RTOGO (.1nm) PAD _____
 VIO (fps) PAD _____
 TFE (min-sec)

RTOGO & VIO not valid for
 * earth orbit Entry *

(ACCEPT) PRO
 (RECYCLE) V32E to 28 (TFE accuracy is +1 min)

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P62 - CM/SM SEP & PRE-ENTRY MNVR

30 F 50 25 00041 REQUEST CM/SM SEP

cb ELS/CM-SM SEP (2) - close
PRIM GLY TO RAD - BYPASS (verify)
EMS MODE - STBY (verify)
CM RCS LOGIC - on (up)
Cue MSFN
SECS LOGIC (2) - on (up) (verify)
MSFN confirm GO for PYRO ARM (if poss)
SECS PYRO ARM (2) - ARM
MN BUS TIE (2) - ON (verify)

CM/SM SEP (2) - on (up)
*If docking ring still on: *
* cb CSM/LM FNL SEP (2) - close*
* CSM/LM FNL SEP (2) - on(up) *
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
Monitor V MNA/B:
If <25vdc go to EMERG POWER DOWN

YAW back to 0°
MNVR to ENTRY ATT
R 0° (Lift UP)
P Horiz on 29° mark(400K)
Y 0°
MAINTAIN HORIZ TRACK

PRO (Act ENTRY DAP Att Hold)

31 F 06 61 IMPACT LAT, LONG, HDS DN
(.01°, .01°, -00001)

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8-9

EMS INITIALIZATION

If scroll not on 37K:
* EMS FUNC - TEST 5 *
* Slew scroll to 37K *
EMS FUNC - RNG SET
Set RNG TO PAD DATA RNG
EMS FUNC - Vo SET
Slew scroll to PAD DATA VIO
EMS MODE - STBY (verify)
EMS FUNC - ENTRY
Verify .05G lt filter is down

RSI ALIGNMENT

FDAI SOURCE - ATT SET
ATT SET - GDC
EMS ROLL - on(up)
GDC ALIGN PB - PUSH & HOLD
YAW tw - Position RSI thru 45° &
back to LIFT UP
GDC ALIGN PB - RELEASE
EMS ROLL - OFF
Align GDC to IMU

PRO (CMC Guidance)

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

P63 - ENTRY INIT

33 06 64 G,VI,RTOGO (.01G, fps, .1nm)
FDAI SCALE - 5/5
ROT CONTR PWR DIR (2)-MNA/MNB(verify)
TAPE RCDR - HBR/RCD/FWD/OMD RESET
HORIZ CK - 29° mark
Pitch error needle goes toward
zero approaching .05G time

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P64 - ENTRY POST .05G

34 06 74 BETA, VI, G

(.01°, fps, .01G)
Start DAC

.05G time
(+0 :)
(: :)

RTOGO AT .05G AGREES WITH EMS-verify
HORIZ CK - 29° mark

EMS MODE - BACKUP/VHF RNG
.05 G Lt - on
.05 G sw - on (up)
EMS ROLL - on (up)

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 *
- * Track horiz with 29° *
- * window mk *
- * Maintain Lift UP until .2G* *
- * Fly EMS *

Compare RSI & FDAI

- *If CMC or PAD cmds Lift DN,*
- * MNVR Lift DN *

EMS GO/NO GO

G-V Plot within limits

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P67 - ENTRY - FINAL PHASE (0.2G)

35 06 66 BETA,CRSRNG ERR,DNRNG ERR (.01°, .1nm, .1nm)
(+ is north & long)
KEY VERB
Record DNRNG ERR _____
KEY RLSE
Limit: +100nm from PAD DRE
Monitor lift vector on RSI & FDAI

*If after 1G, both RCS ring *
* He press <1650 psia: *
* Roll 20°/sec & disable RCS*
* After peak G, enable RCS *
* & fly BETA = 90° *

36 F 16 67 RTOGO,LAT,LONG (Vrel=1000fps)
(.1nm, .01°, .01°)
SC CONT - SCS
RTOGO NEG - LIFT UP
RTOGO 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 - T8

Go To EARTH/POST LANDING pg L/9-1

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