

HYBRID RCS DEORBIT & ENTRY

VEHICLE PREP COMPLETEP30 - EXTERNAL ΔV

V37E 30E

- 1
- 2 F 06 33 GETI (hrs,min,.01sec)
(ACCEPT) PRO
(REJECT) LOAD DESIRED GETI
- 3 F 06 81 ΔVX,Y,Z (LV) (.1fps)
(ACCEPT) PRO
(REJECT) LOAD DESIRED DATA
- 4 F 06 42 HA,HP,ΔV (REQ) (.1nm,.1nm,.1fps)
Record ΔV _____
(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
- 6 F 37 00E

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

DATE 12/13/71

8

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 1) - MNA
- AUTO RCS SEL (RING 2) - OFF
- TEST RING 1 THRUSTERS
- AUTO RCS SEL (RING 2) - MNB
- RCS TRNFR - SM
- MAN ATT (3) - RATE CMD

9

RCS THRUSTING PREP

- Load DAP
- BMAG MODE (3) - RATE 2
- SC CONT - CMC/AUTO

10

MNVR TO PAD BURN ATT (HDS DN)

V49E

- R _____ (0°)
- P _____ (180°)
- Y _____ (0°)

11

PERFORM BORESIGHT & SXT STAR CHECK

V41 N91E

Stow optics eyepieces

12

V25 N17E

(.01°)

- Load Pad Data GMBL Angles
for CM BURN ATT
- ATT SET tw - SET
to PAD DATA GMBL ANGLES
for CM BURN ATT

DATE 12/13/71

13

PWR REDUCTION

MN BUS TIE (2) - ON
 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

14

P41 - RCS THRUSTING
V37E 4TE

15 F 50 18 REQ MNVR TO BURN ATT (HDS DN) (.01°)
 (AUTO) BMAG MODE (3) - RATE 2
 SC CONT - CMC/AUTO
 PRO

16 06 18 AUTO MNVR TO FDAI RPY (.01°)

17 F 50 18 REQ TRIM (.01°)

ALIGN SC ROLL
 (AUTO TRIM) PRO
 ATT DB - MIN
 RATE - LOW
 BMAG MODE (3) - ATT1/RATE 2
 If long Lambert (P37) burn
 BMAG MODE (3) - RATE 2
 ENTR

DATE 12/13/71

18 55:00m
06 85 VG X,Y,Z (.1fps)

RECHECK BORESIGHT STAR
TRANS CONTR PWR - on (up)
EMS MODE - STBY (verify)
EMS FUNC - ΔV SET/VHF RNG
SET ΔV for SM BURN = ΔV pad +100.0
EMS FUNC - ΔV
S BD OMNI ANT - C
Cue MSFN
SECS LOGIC (2) - on (up)(verify)
MSFN confirm Go for PYRO ARM (if poss)
SECS PYRO ARM (2) - ARM
CM RCS LOGIC - on (up)
PRIM GLY TO RAD - BYPASS (verify)
MN BUS TIE (2) - ON (verify)

19 59:25
DSKY BLANKS

20 59:30
16 85 VG X,Y,Z (AVE G ON) (.1fps)
RHC's & THC - ARMED
TAPE RCD - HBR/RCD/FWD/CMD RESET
EMS MODE - NORMAL

00:00
21 F 16 85 REQ NULL VG X,Y,Z (.1fps)
BURN EMS ΔV CTR TO 100
RESET DET & COUNT UP

↑
1 min
↓

RATE - HIGH
SC CONT - SCS
(8) cb ELS/CM-SM SEP (2) - close

CM/SM SEP (2) - on (up)
MAN ATT PITCH - ACCEL CMD
V63E (N17, CM BURN ATT)

*If CMC NO GO: *
* FDAI SOURCE - ATT SET*
* FDAI SEL - 1 or 2 *
* ATT SET - GDC *

C&W MODE - CM
RCS TRNFR - CM

Monitor V MNA/B:

If <25 vdc, go to EMERG POWER DOWN
MNVR TO CM BURN ATT(NULL ERR NEEDLES)

R 0°
($\theta \sim 290$) P $\frac{\quad}{\quad}$ ($\sim 110^\circ$ from SM BURN ATT)
Y 0°
CM RCS LOGIC - OFF

22 CM RCS BURN
FDAI SCALE - 5/5
RHC #1-Continuous Pitch Down
RHC #2-Modulate Pitch to null needles
BURN VGZ TO ZERO
* If only 1 RHC: *
* Pulse + P=5° from retro att*
* Maintain rates <3°/sec *

23 BURN COMPLETION AT:
 ΔV CTR= _____ or DET= _____

- 24 V82E
F 16 44 HA,HP,TFF (.1nm,min-sec)
Check HP <40nm:
If > Pad data, continue burn
until < Pad
PRO
- 25 F 16 85 VG X,Y,Z (.1fps)
Read VG residuals to MSFN
PRO
- 26 F 37 00E
When OMC ACTY 1t out:
V66E
EMS FUNC - OFF
EMS MODE - STBY
MAN ATT (3) - MIN IMP
TRANS CONT PWR - OFF
BMAG MODE (3) - RATE 2
cb DIRECT ULLAGE (2) - open
TAPE RCDR - off (ctr)
PCM BIT RATE - LOW
THC - LOCKED
- 27 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 1t filter is down

28

RSI ALIGNMENT

FDAI SOURCE - ATT SET
 ATT SET - GDC
 EMS ROLL - on (up)
 GDC ALIGN PB - PUSH & HOLD
 YAW tw - Position RSI to LIFT DN
 GDC ALIGN PB - RELEASE
 EMS ROLL - OFF
 ALIGN GDC TO IMU

P61 - ENTRY PREP

29

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

30

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

PAD VALUES

LAT _____
 LONG _____
 HDS UP +1

PRO

31

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

*N60 not valid for *
 * earth orbit Entry*

PRO

32

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 31 (TFE accuracy is ±1 min)

DATE 3/7/72

P62 - CM/SM SEP & PRE-ENTRY MNVR

33 F 50 25 00041 REQUEST CM/SM SEP

MNVR TO ENTRY ATT
R 180° (Lift DN)

P
Y 0°

MAINTAIN HORIZ TRACK

PRO (Act ENTRY DAP Att Hold)

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

PRO (CMC Guidance)

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

P63 - ENTRY INIT

36 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/CMD RESET

HORIZ CK

Pitch error needle goes toward
zero approaching .05G time

L
6-9

P64 - ENTRY POST .05G

37 06 74 BETA, VI, G (.01°,fps,.01G)
Start DAC

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

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

EMS MODE - BACKUP/VHF RNG

.05 G Lt - on

.05 G sw - on (up)

EMS ROLL - on (up)

Track horiz with 9° window mk
Maintain SCS control,
Lift DN until 1G

Compare RSI & FDAI

EMS GO/NO GO

G-V Plot within limits

DATE 12/13/71

L
6-10

P67 - ENTRY - FINAL PHASE (0.2G)

38 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 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 *

*If after 1G, both RCS ring *

* He press <1650 psia: *

* Roll 20°/sec & disable RCS*

* After peak G, enable RCS *

* & fly BETA = 90° *

39 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

DATE 3/7/72

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