MDO OTC 3121

JSC-09148

ASTP

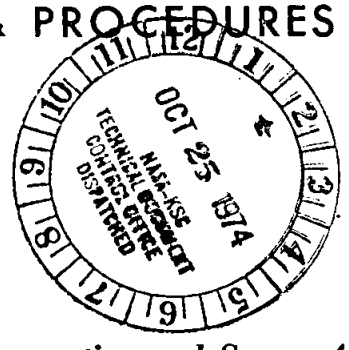
BASIC

ENTRY CHECKLIST

PREPARED BY

PROCEDURES BRANCH

CREW TRAINING & PROCEDURES DIVISION



National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER

Houston, Texas

OCTOBER 15, 1974

ASTP

JSC-09148
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ASTP ENTRY CHECKLIST

OCTOBER 15, 1974

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DKW

It is requested that any organization having comments, questions, or suggestions concerning this docement contact Charles O. Lewis, Procedures Branch, CG22, Bldg. 4, Room 211, Telephone 483-3048.

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ASTP ENTRY CHECKLIST

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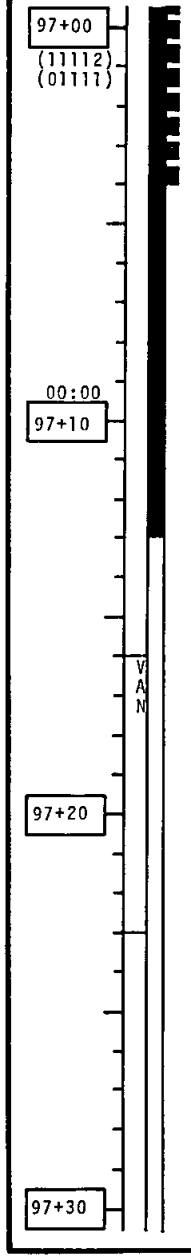


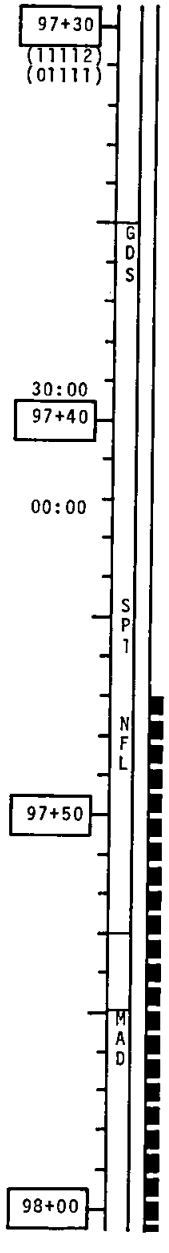
P52 (OPT 1) (33,37,42) (RECORD)
P00

START SCS DRIFT CK (BMAG 2)
ALIGN GDC
RESET AND START DET COUNTING UP

```
* IF BLOCK DATA DEORBIT * *
* P52 (OPT 2)             *
*    TALIGN = TIG - 90 SEC *
* * * * * * * * * * * * * *
```

P52 (OPTION 1)

N71 1ST STAR		X	0	0	0		
N71 2ND STAR		X	0	0	0		
N05(R1) $ ERR		X				•	
TIME OF GYRO TORQUE	HR	+	0	0			
	MIN	+	0	0	0		
	SEC	+	0			0	0



STDN UPLINK, UPDATE
P27 (SV, SPS TARGET LOAD, ENTRY TARGET LOAD)
PRELIMINARY DEORBIT BURN PAD (COPY Pg E/1-6)
PRELIMINARY ENTRY PAD (COPY Pg E/1-7)

END SCS DRIFT CK (BMAG 2)
PERFORM GDC/IMU COMPARISON CK LIST

```
*IF BMAG 2 >10°/HR/AXIS* * * * * * * *
*START SCS DRIFT CK (BMAG 1)           *
*  ALIGN GDC                           *
*  BMAG MODE (3) - RATE 1              *
*  RESET AND START DET COUNTING UP     *
* * * * * * * * * * * * * * * * * * * *
```

LOGIC SEQUENCER CK

UNSTOW AND DON LIFE VESTS (F1)
AND HEEL RESTRAINTS (B1)
UNSTOW HEADRESTS (B1)
INSTALL ENTRY CUE CARDS (R3)

PYRO BAT CK

GDC/IMU COMPARISON CK LIST

V16 N20E
FDAI SELECT - 1
FDAI SOURCE - ATT SET
ATT SET - GDC
ZERO FDAI 1 ERROR NEEDLES
WITH ASCP TW
KEY VERB WHEN ZERO
RECORD N20 VALUES
RECORD ASCP TW VALUES
RECORD DET
FDAI SELECT - 1/2

BMAG 2 GDC/IMU COMPARISON RESULTS

N20 IMU	R	+						
	P	+						
	Y	+						
ASCP tw GDC	R	X						X
	P	X						X
	Y	X						X
DET (30:00)	ΔT	X	X					

LOGIC SEQUENCER CK

NOTE: CHECKS STATUS OF ELS PUSHBUTTONS, CM/SM SEP SWITCHES, AND 24K' BARO SWITCHES
SECS PYRO ARM (2) - SAFE (VERIFY)
SECS LOGIC (2) - OFF (VERIFY)
(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 STDN
SECS LOGIC (2) - ON (UP)
ARM & SAFE PYROS PER STDN COMMAND
SECS LOGIC (2) - OFF
CB SECS ARM (2) - OPEN
ELS LOGIC - OFF
ELS - MAN
CB ELS/CM-SM SEP (2) - OPEN

PYRO BAT CK

(250) CB PYRO A SEQ A - CLOSE (VERIFY)
CB PYRO B SEQ B - CLOSE (VERIFY)
DC IND - PYRO BAT A, THEN B
*IF PYRO BAT A(B) <35 VDC *
*(REPLACES FAILED PYRO BAT *
* WITH ENTRY BAT): *
*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 (APPLIES ENTRY BAT C TO BOTH MAIN BUSES WHEN MN BUS TIE SWITCHES ARE ON)
DC IND - MNB

98+00
(11112)
(01111)

MAD

P52 (OPT 3) (33,37,42) (RECORD)
P00

*IF N93 > 1.5°/HR/AXIS: *
* RECYCLE P52 *
*IF CONFIRMED: *
* USE SCS FOR EMS *
* ENTRY *
* * * * * * * * * * * * *

98+10

30:00

*IF BMAG 2 >10°/HR/AXIS * * * * * * * *
*END SCS DRIFT CK (BMAG 1) PERFORM *
* GDC/IMU COMPARISON CK LIST Pg E/1-2*
* *

TAN

TRANSMIT GYRO TORQUE ANGLES AND
TIME OF GYRO TORQUE

98+20

EMS ENTRY CK

EMS ΔV TEST AND NULL BIAS CK

RSI ALIGNMENT
ALIGN GDC

98+30

SECONDARY WATER EVAP ACTIVATION

P52 (OPTION 3)

N71 1ST STAR		X	0	0	0		
N71 2ND STAR		X	0	0	0		
N05(R1) & ERR		X				•	
N93	X				•		
GYRO TORQUING ANGLES	Y				•		
	Z				•		
TIME OF GYRO TORQUE	HR	+	0	0			
	MIN	+	0	0	0		
	SEC	+	0			0	0

EMS ENTRY CK

(8) EMS FUNC - OFF
CB EMS (2) - CLOSE
EMS MODE - STBY
EMS FUNC - EMS TEST 1 (WAIT 5 SEC)
EMS MODE - NORMAL (WAIT 10 SEC)
CHECK IND LTS - OUT
RANGE IND - 0.0
SLEW HAIRLINE OVER NOTCH
IN SELF-TEST PATTERN
EMS FUNC - EMS TEST 2
.05G LT - ON (ALL OTHERS OUT)
WAIT 10 SEC
EMS FUNC - EMS TEST 3
.05G LT - ON
RSI LOWER LT - ON (10 SEC LATER)
SET RANGE COUNTER TO 58 NM ±0.0
EMS FUNC - EMS TEST 4
.05G LT - ON (ALL OTHERS OUT)
G-V TRACE WITHIN PATTERN TO LWR RT
CORNER @9G
RANGE IND COUNTS DOWN TO 0.0 ±0.2 NM
EMS FUNC - EMS TEST 5
.05G LT - ON
RSI UPPER LT - ON (10 SEC LATER)
RANGE IND - 0.0
SCRIBE TRACES VERTICAL LINE 9G TO
0.28 +0.1G
SET SCROLL TO 37K FPS
EMS - OFF/STBY

EMS ΔV TEST AND NULL BIAS CK

EMS MODE - STBY (VERIFY)
EMS FUNC - ΔV SET/VHF RNG
SET ΔV IND TO 1586.8 FPS
SET MODE - NORMAL
EMS FUNC - ΔV TEST
SPS THRUST LT - ON/OFF (10 SEC)
ΔV IND STOPS AT -0.1 TO -41.5
EMS MODE - STBY
EMS FUNC - ΔV SET/VHF RNG
SET ΔV IND TO -100.0 FPS
CMC MODE - FREE (UNTIL MEAS COMPLETE)
OR BMAG MODE (3) - RATE 2
EMS FUNC - ΔV (WAIT 5 SEC)
START DET
00:00 EMS MODE - NORM
01:40 EMS MODE - OFF/STBY
If ΔV <1 FPS, DO NOT BIAS
If ΔV >1 FPS BUT <10 FPS
STDN PROVIDE BIAS IN PAD ΔVC
If ΔV >10 FPS, EMS IS NO-GO

RSI ALIGNMENT

NOTE: RSI ALIGNMENT IS PERFORMED
EVEN IF RSI ALIGNMENT IS CORRECT
IN ORDER TO CHECK OPERATION OF RSI
FDAI SOURCE - ATT SET
ATT SET - GDC
EMS ROLL - ON (UP)
GDC ALIGN PB - PUSH & HOLD
YAW TM - POSITION RSI THRU 45° &
SET TO LIFT UP (HDS DN) OR TO
LIFT DN (HDS UP) ATT PER ENTRY
UPDATE PAD
GDC ALIGN PB - RELEASE
EMS ROLL - OFF

SEC WATER EVAP ACTIVATION

(165) ELECTROPHORESIS COOLING VLV - BYPASS (VERIFY)
ECS IND SEL - SEC
SEC COOL LOOP PUMP - AC2
GLY DISCH SEC PRESS - 40-52 PSIG
SEC COOL LOOP EVAP - EVAP
SEC GLY EVAP OUT TEMP - 38-50.5°F
ECS IND SEL - PRIM

98+30
(11112)
(01111)
00:00

CM RCS PREHEAT CK LIST

FINAL STOWAGE CK LIST

SET UP CAMERA FOR FIREBALL PHOTOGRAPHY
CM4/DAC/18/CX03 - BRKT, MIR
(T11, 1/500, 7) 12 FPS
ENTRY TV CONFIG

98+40

20:00
98+50

CM RCS PREHEAT TERMINATION CK LIST
CONFIGURE PANEL 8 CB'S (NOT SWITCHES)

99+00

CM RCS PREHEAT CK LIST

NOTES:
1. IF SYS TEST MTR 5C, 5D, 6A, 6B, 6C, & 6D ALL READ ≥4.0 VDC, OMIT PREHEAT
SYS TEST MTR - 5B (BAT RLY BUS)
2. IF PREHEAT REQ'D, PREHEAT UNTIL ALL JETS READ ≥4.0 VDC, OR 20 MINUTES, WHICHEVER OCCURS FIRST
3. CHECKS CM RCS 24, 25, 12, 14, 16, & 21 JET INJECTOR VALVE TEMPERATURES, RESP.
4. DIRECT COILS UTILIZED FOR PREHEATING JETS

(8) CB RCS LOGIC (2) - CLOSE
(1) CM RCS LOGIC - ON (UP)
(ENERGIZES RCS LOGIC BUS)
(8) CB CM RCS HTRS (2) - CLOSE
(101) CM RCS HTRS - ON (UP)
SET DET COUNTING UP

ENTRY TV CONFIG

Unstow launch bracket (A5)
Remove and stow U-mount holding CM tunnel TV camera and remount camera with launch bracket (A5)
Set camera - AVG,MASTER,LINEAR
Set lens(f,ZOOM,FOC) - 3.5, 9, ∞
TV STA SEL CM - CM (PNL 181)
TV STA SEL CM1 - CM1
CM/DM CAMR PWR - on (up)
CM1 TV STA PWR - ON

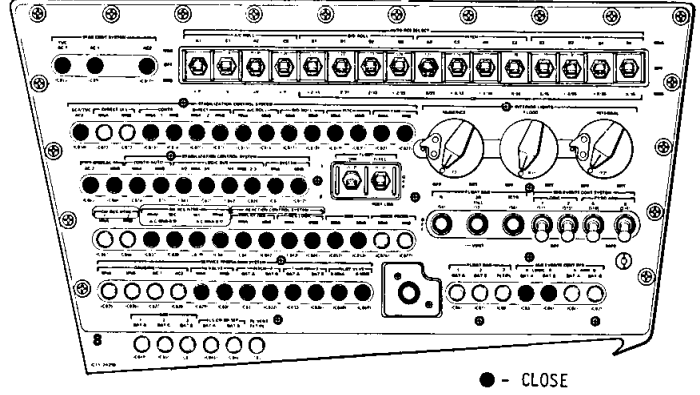
Check monitor, adjust lens if reqd
When TV setup satisfactory:
CM1 TV STA PWR - OFF
Remove monitor and cable and stow (A5)
CM1 TV STA PWR - ON
(VTR COMMANDED ON BY STDN (ORR) @ 100 + 10)

FINAL STOWAGE CK LIST

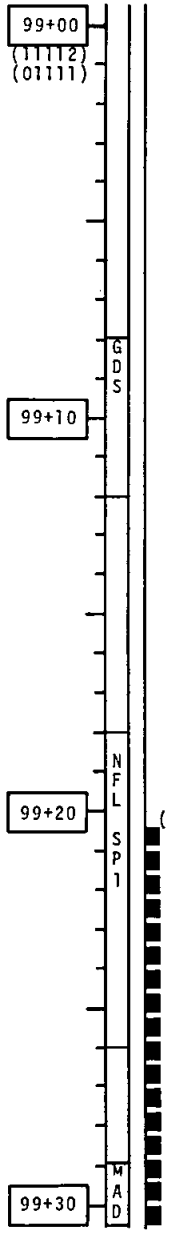
ORDEAL
FDAI (2) - INRTL
PWR - OFF, STOW
(377) GLY TO RAD SEC VLV - BYPASS (CCW) (VERIFY)
ATTACH BOTH STRUT UNLOCK LANYARDS
VERIFY SUIT BAGS TIED DOWN TO A1, A4, & A6
VERIFY UCTA'S STOWED IN PORTABLE WASTE STOWAGE CONTAINER (U1)
HDC AND MAG IN (B3), AND
DAC MAG CX02 IN (R13)
CHANGE DAC TO CM4 WINDOW
UNSTOW CX03 MAG FROM (TSB)
AND INSTALL ON DAC

CM RCS PREHEAT TERMINATION CK LIST

(101) CM RCS HTRS - OFF
(1) CM RCS LOGIC - OFF
(8) CB CM RCS HTRS (2) - OPEN
SYS TEST MTR - 5B (BAT RLY BUS)



● - CLOSE
○ - OPEN



STDN UPLINK, UPDATE
P27 (SV, SPS TARGET LOAD)
FINAL DEORBIT BURN PAD (COPY Pg E/1-6)
FINAL ENTRY PAD (COPY Pg E/1-7)

TRANSMIT EMS NULL BIAS CK RESULTS

(101)CM RCS HTRS - OFF (VERIFY)
(1)CM RCS LOGIC - OFF (VERIFY)
(8)CB CM RCS HTRS (2) - OPEN (VERIFY)

CM RCS ACTIVATION

SM RCS PRPLNT CONFIG CK LIST

PRE-SEP CK LIST

* * * * * * * * * * * * *
* IF SM RCS OR HYBRID *
* DEORBIT BURN, *
* GO TO Pg E/5-1 *
* * * * * * * * * * * * *

CM RCS ACTIVATION

CB SECS ARM (2) - CLOSE
CUE STDN
SECS LOGIC (2) - ON (UP)
STDN CONFIRM GO
FOR PYRO ARM (IF POSS)
SECS PYRO ARM (2) - ON (UP)
CM RCS PRPLNT 1 & 2
TB (2) - GRAY (VERIFY) (INDICATES FUEL AND OXIDIZER ISOLATION VALVES OPEN)
CM RCS PRESS - ON (UP)
RCS IND SEL - CM1, THEN 2
HE PRESS STABILIZES AT 3600-3800 PSIA AFTER 15 MINUTES
MANF PRESS 287-302 PSIA
SECS PYRO ARM (2) - SAFE

SM RCS PRPLNT CONFIG CK LIST

SM RCS PSM PRPLNT (4) - CLOSE
TB (4) - BP
SM RCS QUAD He (4) - OPEN
TB (4) - GRAY
SM RCS QUAD PRPLNT (4) - OPEN
TB (8) -GRAY

PRE-SEP CK LIST

DC INDICATOR - BAT C
REQUEST STDN MONITOR NEXT STEP (IF POSS)
MN BUS TIE (2) - ON (UP)
CONNECTION WILL BE VERIFIED BY BAT C VOLTAGE DROP OF 0.5-5.0 VOLTS TO WITHIN 0.5 VOLTS OF MAIN BUS VOLTAGE
SECOND CONNECTION MAY BE LESS OBVIOUS
PRIM GLY TO RAD - BYPASS (PULL)
REPRESS PKG VLV - ON
O2 SM SUPPLY VLV - OFF
SURGE TK - ON (VERIFY)
CAB PRESS REL VLV (2) - NORM
(5) CB WASTE H2O/URINE DUMP HTR (2) - OPEN
CB ECS RAD CONT/HTRS MNA/B (2) - OPEN
CB ECS RAD HTRS OVLD (2) - OPEN
POT H2O HTR - OFF
GLY EVAP TEMP IN - MAN (REMOVES POWER FROM GLYCOL MIXER TO CONSERVE BATTERY POWER)
ABORT SYS PRPLNT - RCS CMD (VERIFY)

99+30
(11112)
(01111)
(11102)
(01111)

CYCLE CMC MODE SWITCH - FREE - AUTO
V48E, LOAD .5° DBD, N47 AND N48 FROM DEORBIT BURN PAD
P30, VERIFY N33 AND N81 FROM DEORBIT BURN PAD
SET DET COUNTING UP TO DEORBIT BURN TIG
P00, V62E
V49E, MNVR TO DEORBIT BURN PAD ATT

SXT BORESIGHT STAR CK, V41 N91E (Pg G/2-4)
(LIMIT: SXT FOV, GNCS GO/NO-GO)

*IF GNCS NO-GO SET TW's TO *
* PAD BURN ATT *
* SC CONT - SCS *
* TRACK HORIZ WITH 17° *
* WINDOW MK (HDS DN) *
* *
* AT TIG - 2 MIN, *
* HOLD ATT *
* GDC ALIGN PB - PUSH *
* BURN SCS ON 9° MK(0,180,0) *
* * * * * * * * * * * * * * * * *

99+40

STOW OPTICS EYEPIECES
CREW STRAPPED IN AND SEATS LOCKED
STOW COAS AND DIM LIGHTS
GO TO SPS BURN-ENTRY CUE CARD
(SINGLE BANK)

99+50

100+00

SPS DEORBIT BURN
RECORD BURN STATUS

DEORBIT BURN PAD

		NOMINAL	PRELIMINARY	FINAL
N33	HR	+ 1 0 0	+	+
	MIN	+ 0 0	+	+
	SEC	+ 0 0 . 0 0	+	+
N81	ΔVX	- 1 9 1 . 3		
	ΔVY	+ 0 0 0 . 0		
	ΔVZ	+ 0 2 0 . 1		
N22	R	+ 0 0 0 . 0 0	+ 0 0	+ 0 0
	P	+ 1 8 0 . 0 0	+ 0 0	+ 0 0
	Y	+ 0 0 0 . 0 0	+ 0 0	+ 0 0
	ΔVC	1 7 6 . 0		
	BT	0 0 0 7		
	ΔV_{70}	0 7 8 . 0		
N47	WT	+ 2 5 1 1 1	+	+
N48	PT	+ 0 3 8		
	YT	- 0 4 8		
	STAR	3 3		
	SFT	+ 0 4 8 . 5 0	+ 0	+ 0
	TRN	+ 3 2 2 0 0	+ 0 0	+ 0 0

ULLAGE: 15 SECS 4 QUADS

ULLAGE: _____ SECS _____ QUADS

TARGET HP = _____ NM

NOTE: LARGEST SPS EXECUTION ERRORS THAT CAN BE STEERED OUT BY ENTRY GUIDANCE:
BURN LATE (90 SEC)
UNDERBURN (11 FPS)
OVERBURN (16 FPS)
IF SPS TRIM RESIDUALS >+.2 FPS, .2G DOWN RANGE GNCS GO/NO-GO NAV CK IS NOT VALID

TAKEOVER RULES

P OR Y RATES	ATT DEVIATION	CO TIME
+5°/SEC TAKEOVER COMPLETE	+5° TAKEOVER COMPLETE	@BT +1 SEC

SPS BURN STATUS

		AFTER TRIM
ΔTIG		
ΔVC		
FDAI (IF ATTITUDE NOT NOMINAL)	R	+
	P	+
	Y	+
N85 (IF VG>.2)	VGX	0 0
	VGY	0 0
	VGZ	0 0

COMPLETION RULES

SITUATION	COMPLETION RULE
VG < 22 FPS	TRIM VG TO ±.2
VG > 22 FPS	RESTART SPS SCS
HP < 75, NO RESTART	USE RCS COMPLETION, CHARTS (4 OR 3 QUAD) AS APPLICABLE
HP > 75, NO RESTART, 4 QUAD CAPABILITY	USE RCS 4 QUAD COMPLETION CHART
HP > 75, NO RESTART, 3 QUAD CAPABILITY	GO AROUND 6 REVS TO BACKUP TARGET

100+00
(11102)
(01111)

100+10

0
R
R

100+20

100+30

WARNING: WAIT UNTIL COMP ACTY LT - OUT
V66E
CM RCS CK
BMAG MODE (3) - ATT 1/RATE 2

YAW TO CM/SM SEP ATT
PER ENTRY PAD REMARKS

V37 62E	P62	
CM/SM SEP CK LIST	F 50 25	
CM/SM SEP		
MONITOR V MNA/B		
YAW BACK TO 0°		
PRO	F 06 61	
VERIFY LAT, LONG FROM PAD		
LOAD R3 = -1 (LIFT UP); +1 (LIFT DN)		
PRO	P63	
(POSSIBLE 06 22 IF ANGLE OF ATTACK >045°)	06 64	
EMS INITIALIZATION		
PITCH TO PAD P.05G (050°)		
GO TO ENTRY (Pg E/2-1)		

*IF BOTH RINGS FAILED *
PERFORM ROLLING ENTRY
* CK LIST *
* * * * * * * * * * * * *

POSSIBLE ALARMS * * *
* 01427-ROLL REVERSED*
* 01436-IMU UNSAT *
* * * * * * * * * * * * *
IF <25 VDC, PERFORM CM LO *
* PWR RECONFIG, Pg E/7-8 *
* * * * * * * * * * * * * * * * *

*IF LIFT DN * * * * * * *
*ROLL TO 180° AND TRACK *
* HORIZ ON 9° WINDOW MK*
* * * * * * * * * * * * * *

CM RCS CK

AUTO RCS SEL A/C ROLL (4) - OFF (VERIFY)
CB RCS LOGIC (2) - CLOSE (VERIFY)
SC CONT - SCS/MIN IMP
RCS TRNFR - CM
AUTO RCS SEL (RING 1) - OFF
AUTO RCS SEL (RING 2) - MNB
TEST RING 2 THRUSTERS (MIN IMP MAY NOT PRODUCE AUDIBLE JET FIRING. USE 3 CYCLES)
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

CM/SM SEP CK LIST

CB SPS P & Y (4) - OPEN
CB ELS/CM-SM SEP (2) - CLOSE
VHF AM (A & B) - OFF (CTR)
CM RCS LOGIC - ON (UP)
CUE STDN IF IN CONTACT
STDN CONFIRM GO FOR PYRO ARM (IF POSS)
SECS PYRO ARM (2) - ON (UP)
VERIFY CORRECT SEP ATT PER ENTRY PAD REMARKS, Pg E/1-7
CM/SM 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
SECS PYRO ARM (2) - SAFE
CM RCS LOGIC - OFF

ENTRY UPDATE

	PRELIMINARY						FINAL					
AREA	X			—			X			—		
P .05G	+			•	0	0	+			•	0	0
N61 LAT		0		•				0		•		
LONG				•						•		
RTOGO .05G	+				•		+				•	
VIO .05G	+						+					
RET .05G	X	X		•			X	X		•		
RET .2G	X	X		•			X	X		•		
N66 DRE					•						•	
BANK AN	R			/			R			/		
RET RB	X	X		•			X	X		•		
RET BBO	X	X		•			X	X		•		
RET EBO	X	X		•			X	X		•		
RET DROG	X	X		•			X	X		•		
RET MAIN	X	X		•			X	X		•		

REMARKS:

EMS INITIALIZATION

EMS FUNC - TEST 5
VERIFY SCROLL ON 37K FPS
EMS FUNC - RNG SET
SET RNG TO PAD DATA RTOGO
EMS FUNC - VO SET
SLEW SCROLL TO PAD DATA VIO
EMS MODE - STBY (VERIFY)
EMS FUNC - ENTRY
VERIFY .05G IT FILTER IS DOWN

ROLLING ENTRY CK LIST

* * * * * * * * * * * * * * * * * * *
* BMAG MODE (3) - ATT 1/RATE 2 *
* MAN ATT (3) - RATE CMD (VERIFY) *
* SC CONT - SCS *
* MNVR TO 0° , ____ . 0° *
* (PITCH FROM ENTRY PAD REMARKS) *
* DBD/RATE - MIN/LOW *
* AT RET .05G -90 SEC, JUST *
* BEFORE CM/SM SEP: *
* MAN ATT ROLL - ACCEL CMD *
* ROLL RIGHT ~20°/SEC *
*
* CAUTION: ATT HOLD IN PITCH AND YAW MUST BE MAINTAINED UNTIL CM/SM SEP *
*
* * * * * * * * * * * * * * * * * * *

P63 - ENTRY - INIT

1 06 64 G,VI,RTOGO (.01G,fps,.1nm)

RET .05G -5 min
FDAI SCALE - 5/5
RHC PWR DIRECT #2 - MNA/B

RET .05G -1 min
GNCS HORIZ CK

If lift up

At RET .05G -1 min, ck horiz on 33° window mk (Limit: ±5°, GNCS GO/NO-GO)
If GO, continue hold pad entry att
If NO-GO, track horiz
* on 29° window mk *
Hold lift up to .2G

RET .05G (+0__:__) (__:__:__)
EMS MODE - BACKUP/VHF RNG
(.05G lt - on)
.05G sw - on (up)
EMS ROLL - on (up)

GNCS HORIZ CK

If lift dn

****
*At RET .05G, compare IMU *
* with pad entry att *
* (Limit: ±5°, GNCS GO/NO-GO) *
* Whether GO *or NO-GO*, *
* continue track horiz on *
* 9° window mk *
*Hold lift dn to 1G (G-meter) *
****

P64 - ENTRY - POST .05G

2 06 74 BETA,VI,G (.01°,fps,.01G)
Start DAC

RET .2G (+0__:__)
P67 - ENTRY - FINAL PHASE (POST .2G)

3 06 66 BETA,CRSRNG ERR,DNRNG ERR (.01°,.1nm)
(+ is north & long)

DOWN RANGE GNCS GO/NO-GO NAV CK:
KEY VERB
Record DNRNG ERR _____ PAD _____
KEY RLSE
(Limit: +70 nm (lift up) or ±120 nm (lift dn), GNCS GO/NO-GO)
*If GNCS NO-GO: *
* Fly EMS (Pg E/2-2)*

1ST CROSS RANGE GNCS GO/NO-GO NAV CK
If initial BETA direction not same as PAD _____, GNCS is NO-GO
*If GNCS NO-GO: *
* Fly EMS (Pg E/2-2)*

MAN ATT (3) - RATE CMD

At .2G (lift up) or 1G (lift dn)

If GNCS is GO:
SC CONT - CMC/AUTO

*If DAP NO-GO: *
* SC CONT - SCS*
* Fly BETA *

*If GNCS NO-GO: *
* Fly EMS *
* Go to PAD BACKUP BANK AN at .2G *
* Reverse bank at RET RB *
* At 800 nm scroll line *
* If RTOGO <500 nm, roll toward 90° *
* If RTOGO >600 nm, roll toward 0° *
* Fly to get RTOGO convergence between *
* 300 nm and 200 nm scroll lines *
* At 4000 fps for nom tgt, 16 nm at 2.7G*
* If RTOGO >16 nm, fly toward lift up *
* If RTOGO <16 nm, fly toward lift dn *

*If GNCS & EMS NO-GO: *
* Fly PAD bank/reverse bank*

CM RCS CK
RCS IND - CM 1, 2
*If both RCS rings *
* He pressure <2000 psia:*
* Roll right ~20°/sec *

Select best omni as req'd to maintain
comm after exit blackout

RET RB
-1 min
(+0__:__)

2ND CROSS RANGE GNCS GO/NO-GO NAV CK:
If BETA reverses earlier than 1 min
before PAD RET RB, GNCS is NO-GO.
*If GNCS NO-GO: *
* Fly EMS (see above)*

RET
90K'(__:__) STEAM PRESS - pegged at ~90K' Start Watch (00:00)

4 F 16 67 RTOGO,LAT,LONG(Vrel=1000fps) (.1nm,.01°)
SC CONT - SCS
RTOGO NEG (R1) - LIFT UP
RTOGO POS (R1) - LIFT DN

Monitor altimeter
Stop DAC
DAC - T8

Go to EARTH/POST LANDING, pg E/3-1

RET

50K'(__:__) CABIN PRESS REL vlv (2) - BOOST/ENTRY — Watch (00:50)

SECS PYRO ARM (2) - on (up)

Check altimeter

40K'(__:__) *If CM unstable: — *(01:04)
* RCS CMD - OFF *
* 40K' APEX COVER JETT pb - push *
* DROGUE DEPLOY pb - push *
* (2 sec after apex cover jett)*

30K' ELS LOGIC - on (up) — (01:23)
ELS - AUTO

Start DAC (01:36)

24K'(__:__) RCS disable (auto)
(May be 23K') *RCS CMD - OFF*
Apex cover jett (auto)
APEX COVER JETT pb - push
(Wait 2 sec)
Drogue parachutes deployed (auto)
DROGUE DEPLOY pb - push

*If both drogues fail: *
* ELS - MAN *
* Stabilize CM (direct RCS)*
* 5K' MAIN DPLY pb - push *
* ELS - AUTO *

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

CM RCS PRPLNT (2) - OFF

10K'(__:__) Main chutes deployed(drogues +46 sec) (02:22)
(Cab Press MAIN DEPLOY pb - push
= 10 psia)
(3) VHF ANT - RECY
VHF AM A - SIMPLEX
(If B-SIMPLEX or A-DUPLEX req'd, turn beacon off during comm)
VHF BCN - ON
Record LAT _____, LONG _____,
& voice to REC'Y at 10K'
IF GNCS NO-GO, RECORD EMS RTOGO _____
EMS - OFF/STBY
If no contact with recovery forces:
* Refer to POST LANDING *
* COMMUNICATIONS, Pg E/3-2 *
CABIN PRESS REL vlv (RH) - DUMP
Stow DAC
STRUT LOCKS (4) - UNLOCK
*If night landing: *
* cb FLOAT BAG #3, FLT/PL (1) - close *
* PL BCN LT - LO *
* (Max. of 5 minutes operation in HI,*
* if requested by recovery) *
(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 ECS RAD HTRS OVLD (2) - open (verify)
(8) cb SPS P & Y (4) - open (verify)
(2) ELS - AUTO (verify)
ELS LOGIC - on (up) (verify)
(8) FLOOD LTS - POST LDG
800' (325) CAB PRESS RELF vlv (2) - CLOSE (latch off)
(5) MN BUS TIE (2) - OFF

STABILIZATION AFTER LANDING

(229) cb MAIN REL PYRO (2) - close
(2) MAIN RELEASE - on (up)
(8) SECS PYRO ARM (2) - SAFE
SECS LOGIC (2) - OFF
(8) cb PL VENT - close
cb FLOAT BAG (3) - close
(278) cb UPRIGHT SYS COMPRESS (2) - 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

POST STABILIZATION AND VENTILATION

(15) PL BCN LT - LO (night landing)
(Max. of 5 minutes operation in HI, if requested by recovery)
(2) PL VENT vlv - UNLOCK (pull into detent)
Remove PL VENT exh cover
(15) PL VENT - HIGH or LOW
(Max. of 12 hours operation in HIGH, if selected)
If fan frozen
* PL VENT - LOW *
* cb PL VENT - open *
*To close PLV: *
* cb PL VENT - close *
* PL VENT - OFF *
If attitude switch failure, to operate PLV
* PL VENT - LOW *
(376) * PLVC - OPEN *
*To turn off PLV: *
* PL VENT - OFF *

If dye marker req'd:
PL DYE MARKER - ON (by request)
(275) cb MNA BAT BUS A & BAT C (2) - open
cb MNB BAT BUS B & BAT C (2) - open
cb FLT & PL BAT C - open
(250) cb PYRO A SEQ A - open
cb PYRO B SEQ B - open
Verify BAT BUS A & B voltage ≥27.5 vdc
*If <27.5 vdc: *
* cb FLT & PL BAT C (1) - close *
* cb FLT & PL BAT BUS A & B (2) - open*
* Go to LOW POWER CHECKLIST, Pg E/3-5 *
(U3) Unstow and install PLV DISTRIB DUCT (3)
Deploy grappling hook and line if req'd (by request)

POST LANDING COMMUNCIATIONS

(3) VHF ANT - RECY (verify)
VHF BCN - ON (verify)
(6,9) VHF AM - T/R (verify)
(3) VHF AM A & B - SIMPLEX (verify)
*If no contact with recovery forces: *
(6,9) * VHF AM - REC *
* CP attempt to contact recovery forces *
* If contact reestablished and AC *
* or DP wish to transmit: *
(6,9) * VHF AM - T/R (only long enough to *
* transmit, then VHF AM - REC) *
If still no contact with recovery forces:
* Monitor VHF Beacon transmission with *
* VHF AM B Rcvr and/or Survival Trncvr *
* (VOICE) *
* If VHF Beacon not operating: *
* Connect Survival Trncvr cable conn *
* J1 to bcn ant cable conn P112 *
* behind ant access pnl and place *
* radio in BCN mode *
* (Use tool E to open VHF antenna *
* access panel and tool F to loosen*
* connector P112) *
If shipboard recovery, go to Pg E/3-3
If helicopter recovery, go to Pg E/3-3
If unaided egress, go to Pg E/3-4

SHIPBOARD EGRESS & POWERDOWN

COMMENTS:
- Recovery will keep you informed of retrieval status.
- CM will remain powered up for comm until immediately prior to egress.
- Stay strapped in couch for retrieval.
- Recovery will open hatch.

GEAR BOX SEL - N (verify)
ACTR HNDL SEL - N (verify)
Check hatch GN2 pressure gauge
If in green:
- GN2 vlv HNDL - VENT (pull)
- GN2 vlv HNDL - Neutral (detent)
- Check pressure gauge (mid-white)
- *Repeat press/vent to obtain mid-white*

If not green:
- Charge hatch counterbalance
- GN2 vlv HNDL - PRESS (push)
- GN2 vlv HNDL - Neutral (detent)
- Check pressure gauge (mid-white)
- *Repeat press/vent to obtain mid-white*

Inform recovery you are ready for egress

(15)
- PL VENT - OFF
- cb PANEL 250 (all) - open

Egress
- *If required - open side hatch *
- * GEAR BOX SEL - UNLATCH *
- * ACTR HNDL SEL - UNLATCH *
- * LOCK PIN REL KNOB - UNLOCK *
- * Operate ratchet handle until hatch open*
- * Verify hatch overcenter lock engaged *
- * ACTR HNDL SEL - N *

HELICOPTER EGRESS & POWERDOWN

COMMENTS:
- CM VHF - BCN and BCN LT will remain on to aid in maintaining visual/radio acquisition after crew egress.
- Swimmer will open hatch.
- Swimmer will hand in equipment bag containing Life Preserver Units (LPU), Tempscribe temperature recorder, and tape.
- Crew will close hatch; swimmers will assist.

GEAR BOX SEL - N (verify)
ACTR HNDL SEL - N (verify)
Check hatch GN2 pressure gauge
If in green:
- GN2 vlv HNDL - VENT (pull)
- GN2 vlv HNDL - Neutral (detent)
- Check pressure gauge (mid-white)
- *Repeat press/vent to obtain mid-white*

If not in green:
- Charge hatch counterbalance
- GN2 vlv HNDL - PRESS (push)
- GN2 vlv HNDL - Neutral (detent)
- Check pressure gauge (mid-white)
- *Repeat press/vent to obtain mid-white*

Inform swimmer you are ready for equipment bag by knocking on side hatch window
Receive equipment bag from swimmer
Close hatch
- GEAR BOX SEL - LATCH
- ACTR HNDL SEL - LATCH
- Overcenter Lock - Disengage
  (Use D Ring to disengage lock)
- Operate ratchet handle until hatch locked
- GEAR BOX SEL - N
- ACTR HNDL SEL - N

Tape Tempscribe to X-X foot strut
Don LPU's
(15) PL VENT - OFF
PL BCN LT - LO (verify) (night landing only)
(3) VHF AM A/B - OFF
(6,9,10) VHF AM - OFF
Inform swimmer you are ready for egress by knocking on side hatch window
Egress, inflate LPU when out of hatch

3 CREWMEN UNAIDED EGRESS PROCEDURES

*If no ventilation or CM O2 supply *
* If Stable I, open side hatch as req'd*
* If Stable II, initiate egress within *
* 2-1/2 hrs *

STABLE I

Disconnect umbilicals (if suited)
(F2) Neck dams on (if suited)
Configure center couch to 0°
Armrests stowed
Check hatch GN2 pressure gauge
If in green:
GN2 vlv HNDL - VENT (pull)
GN2 vlv HNDL - Neutral (detent)
Check pressure gauge (mid-white)
Repeat press/vent to obtain mid-white
If not in green:
Charge hatch counterbalance
GN2 vlv HNDL - PRESS (push)
GN2 vlv HNDL - Neutral (detent)
Check pressure gauge (mid-white)
Repeat press/vent to obtain mid-white
Remove TV camera, bracket
(R4) Unstow rucksacks 1B & 2
Connect lanyards
(yellow to rucksack, green to head strut, white to crew, in order of egress printed on lanyards)

(15) PL VENT - OFF
cb PANEL 250 (all) - open
Open side hatch
GEAR BOX SEL - UNLATCH
ACTR HNDL SEL - UNLATCH
LOCK PIN REL KNOB - UNLOCK
Operate ratchet handle until hatch opens
Verify hatch overcenter lock engaged
ACTR HNDL SEL - N
Remove life raft from rucksack 2
Throw life raft overboard and inflate
Transfer to life raft with rucksack 1B

CAUTION: Inflate life vests and egress in order designated on white lanyards.

Last man out disconnect green lanyard from head strut. Attach lanyard to sea anchor attach fitting on CM

STABLE II

Disconnect umbilicals (if suited)
(F2) Neck dams on (if suited)
Configure center couch to 0°
Armrests stowed
(6,9,10) PMR (3) - OFF
SUIT PMR (3) - OFF
Remove TV camera, bracket
(F1) Stow on F1
(R4) Unstow rucksacks 1B & 2
Attach yellow lanyards from rucksack 2 to 1B
Reposition umbilicals to clear tunnel area
Review tunnel hatch handle location and hatch unlocking procedure
PRESS EQUAL vlv - OPEN
Pull detent knob on end of handle, then pivot up 90°
Rotate crank ~3 turns CCW to fully open valve
NOTE: Tunnel will fill with water

(F2) Remove and stow tunnel hatch on F2
Connect lanyards from rucksack 2 (green to foot strut, white to crewmen, in order of egress printed on lanyards)

Egress Procedure: Face LEB, verify lanyard routing, exit feet first, first man carrying rucksack. When clear of S/C inflate life vest and board raft.

> CAUTION: Egress in order designated on white lanyards.

1st man out - Before egress lower rucksack 1B through tunnel. Carry rucksack 2 out. After egress inflate raft, retrieve rucksack 1B.

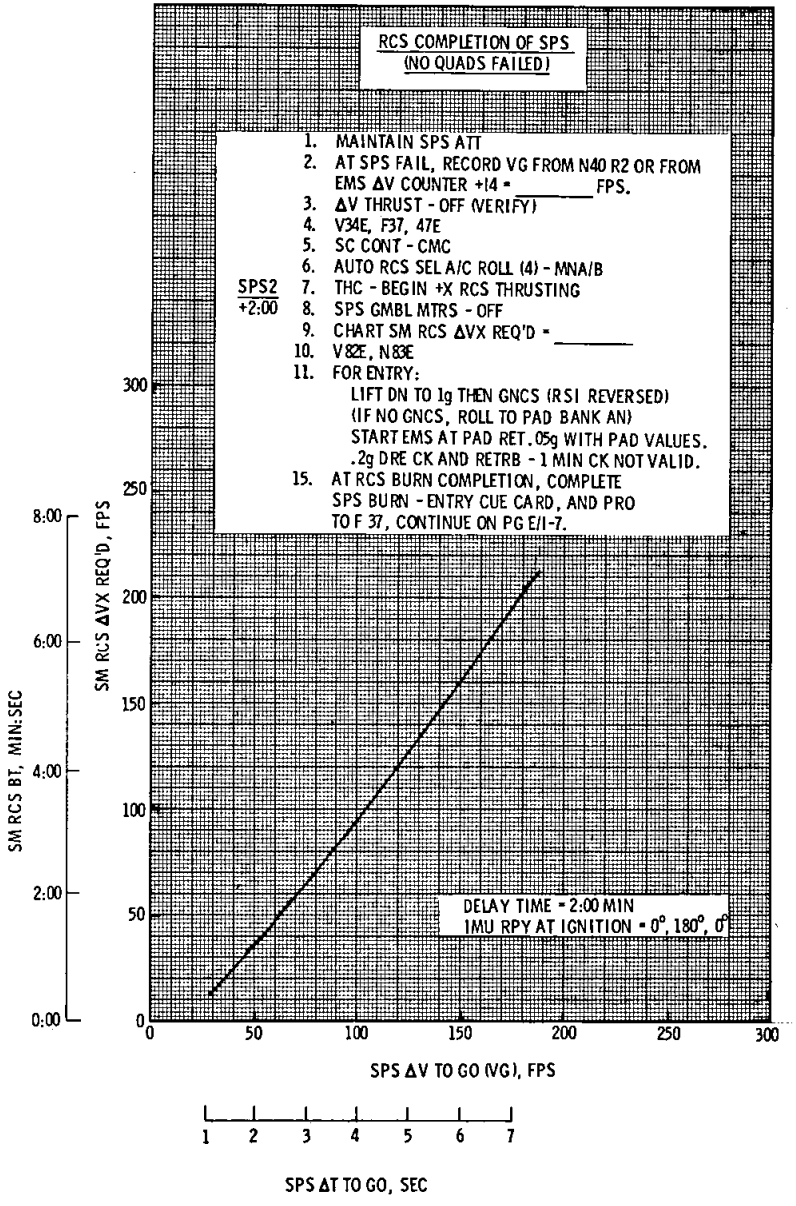
2nd - Egress

3rd - Before egress disconnect green lanyard from foot strut. After egress attach green lanyard to sea anchor attach fitting on CM.

LOW POWER CHECKLIST

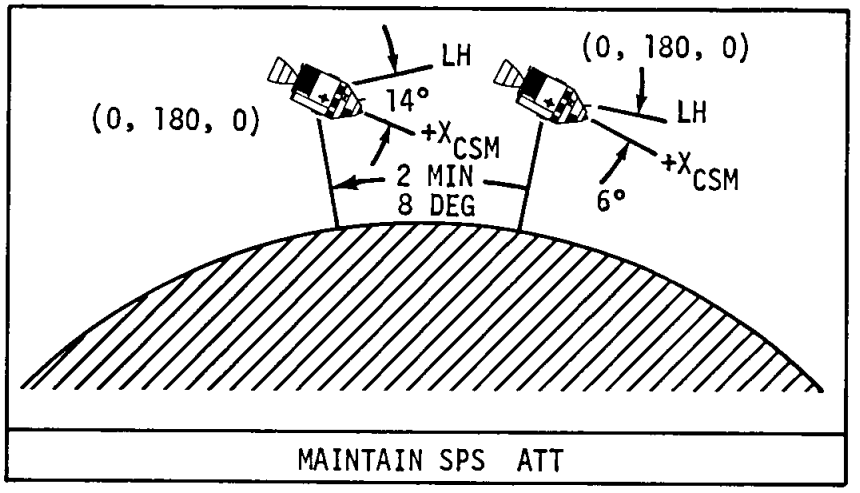
VHF BCN - OFF
VHF AM (3) - RCV
FLOOD LTS - OFF
VHF AM A & B - off (ctr)
VHF AM RCV ONLY - A (verify)
POST LANDING VENT SYS: minimize use (Min. of 5 minutes/hour to scrub cabin air of CO2)
SURV RADIO - plug into VHF BCN ANT cable conn P112 behind VHF ant access pnl & turn radio on in BCN mode

CONTINGENCY
PROCEDURES



COMPLETION

CHARTS



Option:

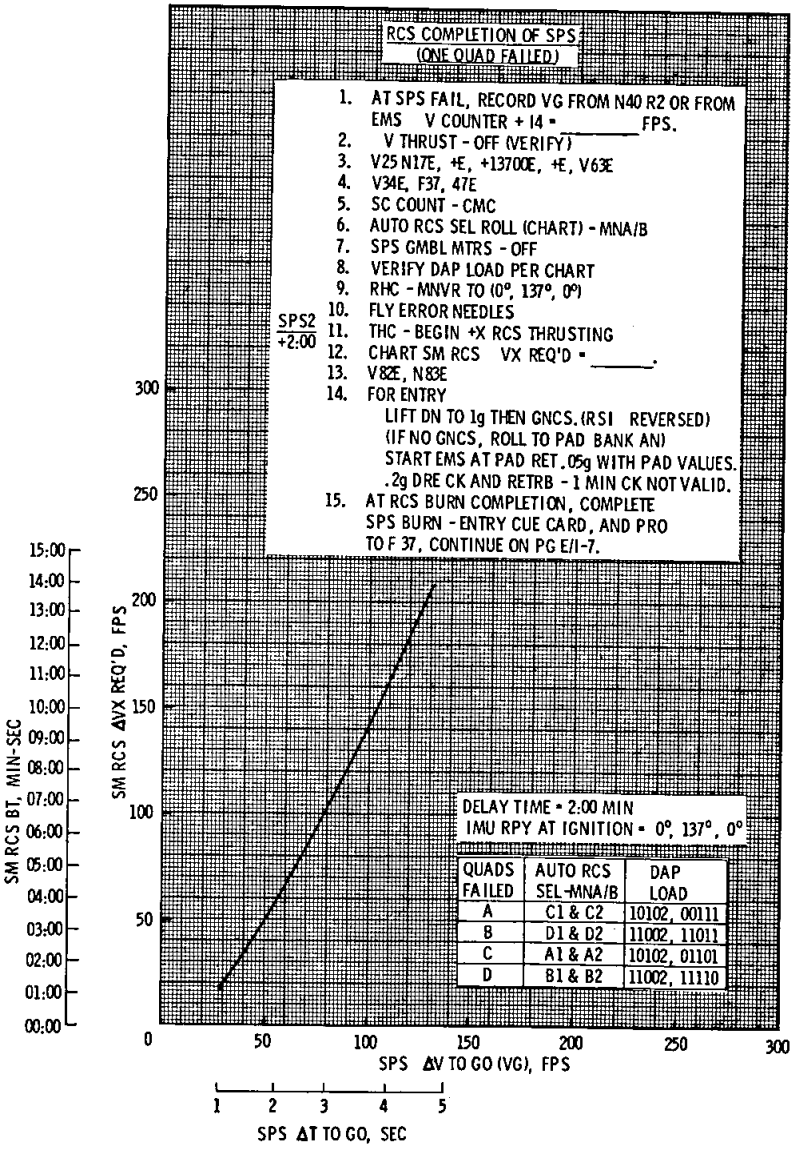
Use of P47 is specified, but if desired, a four quad completion burn can be made by monitoring P40 (V16 N85).

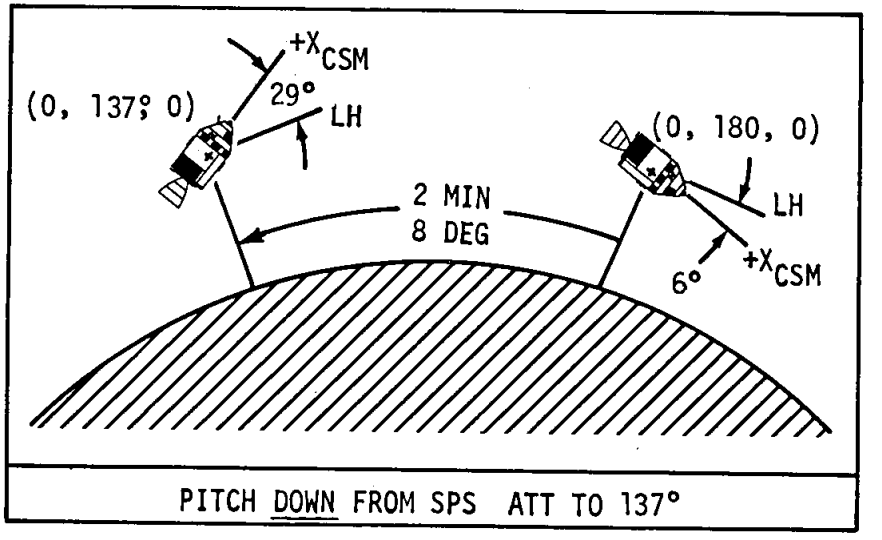
Procedure:

ENTR from F 99 40 to F 16 85, omit step 4, and burn SM RCS ΔVX REQ'D.

Equation:

ΔV (R1 FINAL) = ΔV (R1 INITIAL) - CHART ΔVX REQ'D


RCS COMPLETION OF SPS
(ONE QUAD FAILED)
1. AT SPS FAIL, RECORD VG FROM N40 R2 OR FROM EMS V COUNTER + 14 = _____ FPS.
2. V THRUST - OFF (VERIFY)
3. V25 N17E, +E, +13700E, +E, V63E
4. V34E, F37, 47E
5. SC COUNT - CMC
6. AUTO RCS SEL ROLL (CHART) - MNA/B
7. SPS GMBL MTRS - OFF
8. VERIFY DAP LOAD PER CHART
9. RHC - MNVR TO (0°, 137°, 0°)
10. FLY ERROR NEEDLES
SPS2 +2:00
11. THC - BEGIN +X RCS THRUSTING
12. CHART SM RCS VX REQ'D = _____.
13. V82E, N83E
14. FOR ENTRY
LIFT DN TO 1g THEN GNCS. (RSI REVERSED)
(IF NO GNCS, ROLL TO PAD BANK AN)
START EMS AT PAD RET .05g WITH PAD VALUES.
.2g DRE CK AND RETRB - 1 MIN CK NOT VALID.
15. AT RCS BURN COMPLETION, COMPLETE SPS BURN - ENTRY CUE CARD, AND PRO TO F 37, CONTINUE ON PG E/I-7.
SM RCS BT, MIN-SEC
15:00
14:00
13:00
12:00
11:00
10:00
09:00
08:00
07:00
06:00
05:00
04:00
03:00
02:00
01:00
00:00
SM RCS ΔVX REQ'D, FPS
300
250
200
150
100
50
0
50
100
150
200
250
300
SPS ΔV TO GO (VG), FPS
1
2
3
4
5
SPS ΔT TO GO, SEC
DELAY TIME = 2:00 MIN
IMU RPY AT IGNITION = 0°, 137°, 0°
QUADS FAILED | AUTO RCS SEL-MNA/B | DAP LOAD
A | C1 & C2 | 10102, 00111
B | D1 & D2 | 11002, 11011
C | A1 & A2 | 10102, 01101
D | B1 & B2 | 11002, 11110


+X CSM
(0, 137, 0)
29°
LH
(0, 180, 0)
2 MIN
8 DEG
LH
6°
+X CSM
PITCH DOWN FROM SPS ATT TO 137°

99+30
(11112)
(01111)
(11102)
(01111)

IF PLANNED HYBRID PERFORM
* CM RCS CK *
* * * * * * * * * * * * * * *

CYCLE CMC MODE SWITCH - FREE - AUTO
V48E, LOAD .5° DBD, N47 FROM DEORBIT BURN PAD
P30, LOAD N33 AND N81 FROM DEORBIT BURN PAD
SET DET COUNTING UP TO DEORBIT BURN TIG
P00, V62E
V49E, MNVR TO DEORBIT BURN PAD ATT

SXT BORESIGHT STAR CK, V41 N91E(Pg G/2-4)
(LIMIT:SXT FOV,GNCS GO/NO-GO)

*IF GNCS NO-GO, SET TM TO * *
* PAD BURN ATT *
* SC CONT - SCS *
* TRACK HORIZ WITH __°(27°)*
* WINDOW MK (HDS DN) *
* *
* AT TIG - 1 MIN, *
* HOLD ATT *
* GDC ALIGN PB - PUSH *
* BURN SCS ON __°(23°) MK *
* * * * * * * * * * * * * * *

99+40

VHF AM A & B - OFF (CTR)
CB SPS P & Y - OPEN
STOW OPTICS EYPIECES
CREW STRAPPED IN & SEATS LOCKED
STOW COAS & DIM LIGHTS
AUTO RCS SEL (16) - AS REQ'D
FDAI SCALE - 5/1
MAN ATT (3) - RATE CMD
ATT DBD/RATE - MIN/LOW
BMAG MODE (3) - RATE 2
SC CONT - CMC/AUTO
FDAI (2) - INRTL
GDC ALIGN
RHC (2) - ARMED
RHC PWR NORMAL (2) - AC/DC
RHC PWR DIRECT (2) - MNA/B
SET EMS ΔV TO PAD ΔVC (SM ΔV)
LOAD CM BURN ATT FROM PAD
REMARKS INTO N17
P41, PRO, ENTR
BMAG MODE (3) - ATT 1/RATE 2
TAPE RCDR-HBR/RCD/FWD/CMD RESET
THC - ARMED
AT 59:30;EMS MODE - NORMAL
THC PWR - ON

99+50

SM RCS DEORBIT BURN INITIATION

NOMINAL
NULL N85 VG'S TO +.2
POST BURN CK LIST

PLANNED HYBRID
BURN EMS TO ZERO
CONTINUE NEXT PAGE

* * * * * * * * * * * * * * * * * * *
*IF LOSS OF SM RCS TRANSLATION *
* CAPABILITY OCCURS *
*V82E *
*IF HP>70, GO AROUND 6 REVS *
*IF 70 NM>HP>38 NM, GO TO *
* NEXT PAGE, DO HYBRID ASAP. *
*IF HP<38 NM, DO POST BURN *
* CK LIST *
* * * * * * * * * * * * * * * * * * *

100+00

RCS DEORBIT BURN PAD

		PRELIMINARY	FINAL	FINAL UPDATE
N33	HR	+	+	+
	MIN	+	+	+
	SEC	+	+	+
N81	ΔVX			
	ΔVY			
	ΔVZ			
N22	R	+ 0 0	+ 0 0	+ 0 0
	P	+ 0 0	+ 0 0	+ 0 0
	Y	+ 0 0	+ 0 0	+ 0 0
	ΔVC			
	BT			
	ΔV_{70}			
N47	WT	+	+	+
	STAR			
	SFT	+ 0	+ 0	+ 0
	TRN	+ 0 0	+ 0 0	+ 0 0

RCS TARGET HP = _____NM
CAPTURE HP = _____NM
CM RCS PITCH ATTITUDE = _____°
TIG - 1 MIN SM RCS HORIZ CK WINDOW MK = _____°

POST BURN CK LIST

V82E, PRO
RCS BURN STATUS
PRO
P00
EMS - OFF/STBY
MAN ATT (3) - MIN IMP
RHC #1 - LOCKED
RHC PWR NORMAL #1 - OFF
RHC PWR DIRECT #1 - OFF
THC - LOCKED
THC PWR - OFF
BMAG MODE (3) - RATE 2
GO TO Pg E/1-7

RCS BURN STATUS

ΔVC							
FDAI (IF ATTITUDE NOT NOMINAL)	R	+					
	P	+					
	Y	+					
N85 (IF VG >.2)	VGX		0	0			
	VGY		0	0			
	VGZ		0	0			

CM RCS CK

AUTO RCS SEL A/C ROLL (4) - OFF (VERIFY)
CB RCS LOGIC (2) - CLOSE (VERIFY)
SC CONT - SCS/MIN IMP
RCS TRNFR - CM
AUTO RCS SEL (RING 1) - OFF
AUTO RCS SEL (RING 2) - MNB
TEST RING 2 THRUSTERS (MIN IMP MAY NOT PRODUCE AUDIBLE JET FIRING. USE 3 CYCLES)
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

SM RCS/
HYBRID

HYBRID

RATE-HIGH
FDAI SCALE - 5/5
SC CONT - SCS
AUTO RCS A/C ROLL (4) - OFF

cb ELS/CM - SM SEP (2) - CLOSE
CM RCS LOGIC - ON
SECS PYRO ARM (2) - ON
CM/SM SEP (2) - ON

C/W MODE - CM

2 MIN or ASAP
RCS TRNFR - CM
CM RCS LOGIC - OFF
CM RCS MANF PRESS - 287-302
V MNA/B >25
* IF <25V - CM LO PWR, PG E/7-8 *

MAN ATT PITCH - ACCEL CMD
V63 E (CM BURN ATT)
* IF GNCS NO-GO *
* SET TW TO CM BURN ATT *
* FROM BURN PAD REMARKS *
* FDAI - ATT SET, 1 or 2, GDC *

PITCH UP TO CM BURN ATT (NULL NEEDLES)
(110° > SM BURN ATT)

CM RCS BURN

RHC #1 - CONTINUOUS PITCH DOWN
RHC #2 - MODULATE PITCH TO NULL NEEDLES
* IF ONLY 1 RHC *
* PULSE +P = 5° FROM BURN ATT *
* MAINTAIN RATES <3°/SEC *

BURN RULES

UNPLANNED HYBRID

BURN CM RCS FOR 100 SEC
V82 E, IF Hp >38 NM - BURN Hp = 38 NM

PLANNED HYBRID

BURN VGZ TO ±.2
V82E, IF Hp ≥ PAD TARGET - BURN Hp = PAD
* IF HE TK PRESS <2000, BURN Hp = 38 NM *

PRO

RECORD BURN STATUS

RCS BURN STATUS

		AFTER BURN				
FDAI(ONLY IF NOT AT BURN ATT)	R	+				
	P	+				
	Y	+				
N85	VGX		0	0		
	VGY		0	0		
	VGZ		0	0		
EMS	ΔVC					

PRO
00E

SECS PYRO ARM (2) - SAFE
EMS - OFF/STBY
MAN ATT (3) - MIN IMP
RHC #1 - LOCKED
RHC PWR NORMAL #1 - OFF
RHC PWR DIRECT #1 - OFF
THC - LOCKED
THC PWR - OFF
BMAG MODE (3) - RATE 2

V66 E
CONFIGURE CM RCS
FOR SINGLE RING ENTRY (AUTO RCS SEL (RING 1 OR 2) (6)- OFF
FOR RING WITH LOWEST He PRESS)
V37E 62E (AVE G ON)
05 09 01427 - ROLL REVERSED
*05 09 01426 - IMU UNSAT *

F 50 25 00041 REQUEST CM/SM SEP
PRO

F 06 61 IMPACT LAT,LONG,LIFT UP/DN (-/+)
(.01°,∓00001)
Verify LAT, LONG from PAD (Pg E/1-7)
Load R3 = +1 (lift dn)
PRO
POSS 06 22 FINAL ATT DISP, RPY (.01°)
(Only if angle of attack >45°)

P63 - ENTRY - INIT

06 64 G, VI, RTOGO (.01G,fps,.1nm)
EMS INITIALIZATION
EMS FUNC - TEST 5
Verify scroll on 37K fps
EMS FUNC - RNG SET
Set RNG to PAD DATA RTOGO
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
Verify correct RSI alignment
lift dn = 180°

DIM LIGHTS

ROLL TO 180° AND TRACK HORIZ ON
9° WINDOW MK (LIFT DN)

GO TO ENTRY, Pg E/2-1 *If Unplanned Hybrid* *
* Lift dn to lg, then*
* 90° bank, no RB *
* * * * * * * * * * * * *

LAUNCH CHKLST ITEMS

OPTICS DUST COVER JETTISON

INSTALL OPTICS EYEPIECES
G/N PWR OPTICS - ON (UP)
OPT ZERO - OFF, then ZERO (15 SEC)
OPT ZERO - OFF
OPT MODE - MAN
OPT COUPLING CONT - DIRECT
OPT SPEED CONT - HI
OHC - MAX RIGHT (OBS EJECT THRU SCT)
(SXT 40 DEG, SCT 150 DEG SHAFT ANGLE)

21:30 SIVB MNVR TO RETROGRADE LOCAL HORIZONTAL

ECS POST INSERTION CONFIG

(MUST BE PERFORMED BETWEEN +20:00M & +55:00M)
(352) POT TK IN VLV - OPEN (CCW)
(326) GLY RSVR BYPASS VLV - OPEN (CCW)
GLY RSVR OUT VLV - CLOSE (CW)
GLY RSVR IN VLV - CLOSE (CW)
PRIM GLY ACCUM QTY 30-65%
(379) PRIM ACCUM FILL VLV - ON (CCW) UNTIL 40-55%
ECS RAD FLOW CONT - PWR
PRIM GLY TO RAD VLV - NORMAL (PUSH)
ECS RAD TEMP PRIM OUT below PRIM IN
* AFTER 5 MIN, IF OUTLET TEMP > INLET: *
* PRIM GLY TO RAD VLV - BYPASS(PULL) *
* Recheck in 10 min *

ECS RAD TB - GRAY
GLY EVAP TEMP IN - AUTO
POT H2O HTR - MNA
cb WASTE H2O/URINE DUMP HTR (2) - CLOSE

CSM/LV SEPARATION PREP

AUTO RCS SELECT (16) - MNA/B
Set ΔVC to -100.0
EMS FUNC - ΔV
FDAI SCALE -5/1
MAN ATT (3) - RATE CMD (VERIFY)
ATT DB - MIN/HIGH (VERIFY)
THC PWR - ON (UP)
RHC PWR NORMAL #2 - AC/DC (VERIFY)
RHC PWR DIRECT #2 - MNA/MNB
BMAG MODE (3) - RATE 2 (VERIFY)
RCS TRNFR - SM (VERIFY)
SM RCS PRPLNT tb (8) - GRAY (VERIFY)
*IF LV GUID - CMC: *
* DO NOT RELOAD DAP *
* MNVR TO SEP ATT (. .)*
LOAD RCS DAP 11103,01111
V46E
Load N17 (SEP)
V63E (Monitor SIVB Mnvr)

50:00 SIVB MNVR TO SEP ATTITUDE

CSM SEPARATION

ATT SET TM - R=0,P=180,Y=0
CB RCS LOGIC (2) - OPEN
CB SECS LOGIC (2) - CLOSE (VERIFY)
CB SECS ARM (2) - CLOSE
SECS LOGIC (2) - ON (UP)
SECS PYRO ARM (2) - ARM
TVC SERVO PWR #1 - ACT/MNA
RHC & THC - ARMED
SET DET - 59:30
RCS CMD - ON
FC REAC VLV - LATCH

TAPE RCDR - HBR/RCD/FWD/CMD RESET
*IF LV GUID - CMC: *
* INSURE RATES NULLED AND *
* YAW DRIFTING TOWARDS 0*
*LOAD DAP 11103,01111 *
*V46E, V60E, V63E *
GDC ALIGN (0,180,0)
V62E

1+10:30 START DET

59:30 EMS MODE - NORMAL
59:58 THRUST +X AND HOLD
00:00 CSM/LV SEP pb - PUSH, HOLD, AND RELEASE
LV TANK PRESS - FULL SCALE LOW (SEP IND)
*IF NO SEPARATION: *
* CB RCS LOGIC (2) - CLOSE *
* THC - CCW (4 SEC MIN) *
* DET RESET AND COUNTING UP (AUTO) *
* LV TK PRESS - FULL SCALE LOW *

~00:02 THC - RELEASE (ΔV=0.5 FPS)
SM RCS PRPLNT tb (8) - GRAY (VERIFY)
SM RCS QUAD He tb (4) - GRAY (VERIFY)
FC REAC vlv - Norm

00:30 THRUST +Z 10 SEC(ΔV=2.0 FPS)
EMS - OFF/STBY
THC PWR - OFF
THC - LOCKED
RHC PWR DIRECT #2 - OFF
TAPE RCDR - LBR
SECS PYRO ARM (2) - SAFE
SECS LOGIC (2) - OFF
EDS PWR - OFF
CB EDS (3) - OPEN
COAS PWR - OFF
TVC SERVO PWR #1 - OFF
CB SECS ARM (2) - OPEN
LV/SPS IND - GPI
AC ROLL (4) - OFF

BLOCK DATA		2-2 DEORBIT						3-4 DEORBIT					
N33	HRS	+	0	0				+	0	0			
	MIN	+	0	0	0			+	0	0	0		
	SEC	+	0			0	0	+	0			0	0
N81 LOCAL VERT	ΔVX		0						0				
	ΔVY		0						0				
	ΔVZ		0						0				
N22	R	+				0	0	+				0	0
	P	+				0	0	+				0	0
	Y	+				0	0	+				0	0
	ΔVC	X	X					X	X				
	BT	X	X					X	X				
	P .05G	X				0	0	X				0	0
	RTOGO .05G	+						+					
	VIO .05G	+						+					
	RET .05G	X	X					X	X				
	RET .2G	X	X					X	X				
N66	DRE												
	BANK AN	R			/			R			/		
	RET RB	X	X					X	X				
	RET DROG	X	X					X	X				
N61	LAT		0						0				
	LONG												

REMARKS:

2-2
3-4

GET

00+40
03+15

00+50
03+25
(11103)
(01111)

25:00

01+00
03+35

2-2/3-4 DEORBIT

ASSUMPTIONS:
1. NOMINAL INSERTION ORBIT
2. NO RENDEZVOUS MANEUVERS HAVE BEEN PERFORMED
3. SUITS MAY BE DOFFED AT CREW'S DISCRETION IF TIME PERMITS (Pg E/6-5)
4. PRE-BURN PROCEDURES MARKED BY "*" ARE NECESSARY TO ENSURE A SAFE RETURN AND MUST BE PERFORMED BY THE CREW
   THESE PROCEDURES CAN NOMINALLY BE PERFORMED IN ~20 MINUTES
5. PROCEDURES NOT MARKED BY "*" SHOULD BE PERFORMED AT THE CREW'S DISCRETION AS TIME PERMITS
6. THE DEORBIT BURN IS PERFORMED WITH THE G&N (N81 ΔV'S FROM BLOCK DATA PAD)
7. THIS CK LIST MAY BE ENTERED FROM EITHER THE LAUNCH OR RNDZ CK LISTS
8. TIMES AT TOP OF BOXES ARE FOR 2-2 DEORBIT. TIMES AT BOTTOM OF BOXES ARE FOR 3-4 DEORBIT.

* SET DET COUNTING UP TO DEORBIT BURN TIG
* VERIFY LAUNCH CHECKLIST ITEMS (Pg E/6-1, 2) COMPLETE
* V48E, VERIFY CSM DAP, 4 JET, .5° DBD, AND 2°/SEC
* V46E
* CM RCS PREHEAT CK LIST
* VERIFY ORDEAL STOWED
LOGIC SEQUENCER CK (IF IN STDN CONTACT)

UNSTOW & DON LIFE VESTS (F1)
& HEEL RESTRAINTS (B1)
UNSTOW HEADRESTS (B1)
INSTALL ENTRY CUE CARDS (R3)

SET UP CAMERA FOR FIREBALL PHOTOGRAPHY
CM4/DAC/T8/CX03 - BRKT, MIR
(T11,1/500, 7) 12 FPS
* PYRO BAT CK

CM RCS PREHEAT CH LIST

NOTES:
1. IF SYS TEST MTR 5C, 5D, 6A, 6B, 6C, & 6D ALL READ ≥4.0 VDC, OMIT PREHEAT
   SYS TEST MTR - 5B (BAT RLY BUS)
2. IF PREHEAT REQ'D, PREHEAT UNTIL ALL JETS READ ≥4.0 VDC, OR 20 MINUTES, WHICHEVER OCCURS FIRST
3. CHECKS CM RCS 24, 25, 12, 14, 16, & 21 JET INJECTOR VALVE TEMPERATURES, RESP.
4. DIRECT COILS UTILIZED FOR PREHEATING JETS

(8) CB RCS LOGIC (2) - CLOSE
(1) CM RCS LOGIC - ON (UP)
(ENERGIZES RCS LOGIC BUS)
(8) CB CM RCS HTRS (2) - CLOSE
(101) CM RCS HTRS - ON (UP)
SET DET COUNTING UP

RSI ALIGNMENT

NOTE: RSI ALIGNMENT IS PERFORMED EVEN IF RSI ALIGNMENT IS CORRECT IN ORDER TO CHECK OPERATION OF RSI
FDAI SOURCE - ATT SET
ATT SET - GDC
EMS ROLL - ON (UP)
GDC ALIGN PB - PUSH & HOLD
YAW TM - POSITION RSI THRU 45° & SET TO LIFT UP (HDS ON) OR TO LIFT DN (HDS UP) ATT PER BLOCK DATA REMARKS
GDC ALIGN PB - RELEASE
EMS ROLL - OFF

LOGIC SEQUENCER CK

NOTE: CHECKS STATUS OF ELS PUSHBUTTONS, CM/SM SEP SWITCHES, AND 24K' BARO SWITCHES
SECS PYRO ARM (2) - SAFE (VERIFY)
SECS LOGIC (2) - OFF (VERIFY)
(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 STDN
SECS LOGIC (2) - ON (UP)
ARM & SAFE PYROS PER STDN COMMAND
SECS LOGIC (2) - OFF
CB SECS ARM (2) - OPEN
ELS LOGIC - OFF
ELS - MAN
CB ELS/CM-SM SEP (2) - OPEN

EMS ENTRY CK

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 LTS - OUT
RANGE IND - 0.0
SLEW HAIRLINE OVER NOTCH IN SELF-TEST PATTERN
EMS FUNC - EMS TEST 2
.05G LT - ON (ALL OTHERS OUT)
WAIT 10 SEC
EMS FUNC - EMS TEST 3
.05G LT - ON
RSI LOWER LT - ON (10 SEC LATER)
SET RANGE COUNTER TO 58 NM ±0.0
EMS FUNC - EMS TEST 4
.05G LT - ON (ALL OTHERS OUT)
G-V TRACE WITHIN PATTERN TO LWR RT CORNER @9G
RANGE IND COUNTS DOWN TO 0.0 ±0.2 NM
EMS FUNC - EMS TEST 5
.05G LT - ON
RSI UPPER LT - ON (10 SEC LATER)
RANGE IND - 0.0
SCRIBE TRACES VERTICAL LINE 9G TO 0.28 +0.1G
SET SCROLL TO 37K FPS
EMS - OFF/STBY

PYRO BAT CK

(250) CB PYRO A SEQ A - CLOSE (VERIFY)
CB PYRO B SEQ B - CLOSE (VERIFY)
DC IND - PYRO BAT A, THEN B
*IF PYRO BAT A(B) <35 VDC (REPLACES FAILED PYRO BAT WITH ENTRY BAT):
*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 (APPLIES ENTRY BAT C TO BOTH MAIN BUSES WHEN MN BUS TIE SWITCHES ARE ON)
DC IND - MNB

01+00
03+35
(11103)
(01111)

RSI ALIGNMENT (Pg E/6-3)

ALIGN GDC

EMS ENTRY CK (Pg E/6-3)

35:00

EMS ΔV TEST AND NULL BIAS CK

* P00, V62E
* V49E, MNVR TO DEORBIT BURN PAD ATT (BLOCK DATA PAD)

SECONDARY WATER EVAP ACTIVATION

01+10
03+45

* CM RCS PREHEAT TERMINATION CK LIST
* CONFIGURE PANEL 8 CB'S (NOT SWITCHES)
* ACTIVATE CM RCS

* P30, LOAD N33 AND N81 FROM BLOCK DATA PAD

* PRE-SEP CK LIST

45:00

P52 (OPT 3) (__,__) AUTO OPTICS TO STAR
(LIMIT: SXT FOV, GNCS GO/NO-GO)
EXIT 06 92, V37E 40E

* DEORBIT BURN PREP CK LIST
* GO TO SPS BURN-ENTRY CUE CARD
(SINGLE BANK)

*IF GNCS NO-GO, SET TW TO (0,180,0)
* SC CONT - SCS
* TRACK HORIZ WITH 17° WINDOW MK (HDS ON)
* AT TIG -2 MIN, HOLD ATT
* GDC ALIGN PB - PUSH
* BURN SCS ON 9° MK

01+20
03+55

55:00

01+30
04+05

DEORBIT BURN

TAKEOVER RULES

P OR Y RATES	ATT DEVIATION	CO TIME
+5°/SEC TAKEOVER COMPLETE	+5° TAKEOVER COMPLETE	@BT +1 SEC

EMS ΔV TEST AND NULL BIAS CK

EMS MODE - STBY (VERIFY)
EMS FUNC - ΔV SET/VHF RNG
SET ΔV IND TO 1586.8 FPS
SET MODE - NORMAL
EMS FUNC - ΔV TEST
SPS THRUST LT - ON/OFF (10 SEC)
ΔV IND STOPS AT -0.1 TO -41.5
EMS MODE - STBY
EMS FUNC - ΔV SET/VHF RNG
SET ΔV IND TO -100.0 FPS
CMC MODE - FREE (UNTIL MEAS COMPLETE)
OR BMAG MODE (3) - RATE 2
EMS FUNC - ΔV (WAIT 5 SEC)
START DET
00:00 EMS MODE - NORM
01:40 EMS MODE - OFF/STBY
If ΔV <1 FPS, DO NOT BIAS
If ΔV ≥1 FPS BUT <10 FPS
STDN PROVIDE BIAS IN PAD ΔVC
If ΔV >10 FPS, EMS IS NO-GO

PRE-SEP CK LIST

DC INDICATOR - BAT C
REQUEST STDN MONITOR NEXT STEP (IF POSS)
MN BUS TIE (2) - ON (UP)
CONNECTION WILL BE VERIFIED BY BAT C VOLTAGE DROP OF 0.5-5.0 VOLTS TO WITHIN 0.5 VOLTS OF MAIN BUS VOLTAGE
SECOND CONNECTION MAY BE LESS OBVIOUS
PRIM GLY TO RAD - BYPASS (PULL)
REPRESS PKG VLV - ON
O2 SM SUPPLY VLV - OFF
SURGE TK - ON (VERIFY)
CAB PRESS REL VLV (2) - NORM
(5) CB WASTE H2O/URINE DUMP HTR (2) - OPEN
CB ECS RAD CONT/HTRS MNA/B (2) - OPEN
CB ECS RAD HTRS OVLD (2) - OPEN
POT H2O HTR - OFF
GLY EVAP TEMP IN - MAN (REMOVES POWER FROM GLYCOL MIXER TO CONSERVE BATTERY POWER)
ABORT SYS PRPLNT - RCS CMD (VERIFY)

SEC WATER EVAP ACTIVATION

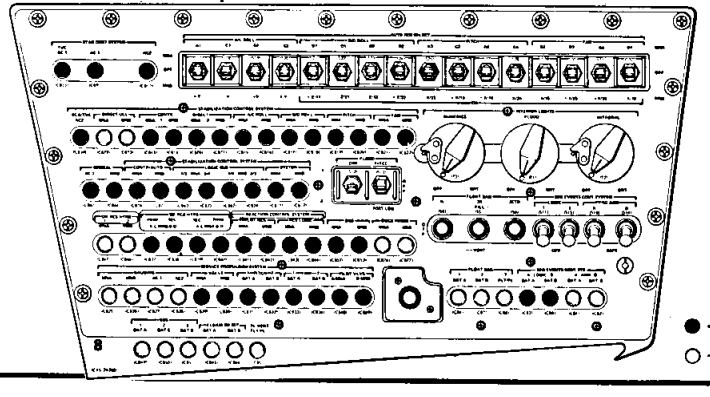
(165) ELECTROPHORESIS COOLING VLV - BYPASS (VERIFY)
ECS IND SEL - SEC
SEC COOL LOOP PUMP - AC2
GLY DISCH SEC PRESS - 40-52 PSIG
SEC COOL LOOP EVAP - EVAP
SEC GLY EVAP OUT TEMP - 38-50.5°F
ECS IND SEL - PRIM

CM RCS PREHEAT TERMINATION CK LIST

(101) CM RCS HTRS - OFF
(1) CM RCS LOGIC - OFF
(8) CB CM RCS HTRS (2) - OPEN
SYS TEST MTR - 5B (BAT RLY BUS)

CM RCS ACTIVATION

CB SECS ARM (2) - CLOSE
CUE STDN
SECS LOGIC (2) - ON (UP)
STDN CONFIRM GO FOR PYRO ARM (IF POSS)
SECS PYRO ARM (2) - ON (UP)
CM RCS PRPLNT 1 & 2
TB (2) - GRAY (VERIFY) (INDICATES FUEL AND OXIDIZER ISOLATION VALVES OPEN)
CM RCS PRESS - ON (UP)
RCS IND SEL - CM1, THEN 2
HE PRESS STABILIZES AT 3600-3800 PSIA AFTER 15 MINUTES
MANF PRESS 287-302 PSIA
SECS PYRO ARM (2) - SAFE



● - CLOSE
○ - OPEN

DEORBIT BURN PREP CK LIST

STOW OPTICS EYEPIECES
INSTALL OPTICS COVERS
CREW STRAPPED IN
SEAT PANS LOCKED
STOW COAS & LOCK IN MOUNT
SET ASCP TW TO DEORBIT BURN PAD ATTITUDE
DIM LIGHTS FOR HORIZ CK

01+30
04+05
(11103)
(01111)

WARNING: WAIT UNTIL COMP ACTY LT - OUT
V66E
CM RCS CK
BMAG MODE (3) - ATT 1/RATE 2
YAW TO CM/SM SEP ATT
PER BLOCK DATA PAD

*IF BOTH RINGS FAILED *
PERFORM ROLLING ENTRY
* CK LIST *
* * * * * * * * * * * * *

V37E 62E
CM/SM SEP CK LIST

P62
F 50 25

POSSIBLE ALARMS * * *
* 01427-ROLL REVERSED*
* 01436-IMU UNSAT *
* * * * * * * * * * * * *

CM/SM SEP

MONITOR V MNA/B
YAW BACK TO 0°
PRO
VERIFY LAT, LONG FROM PAD
LOAD R3 = -1 (LIFT UP);
+1 (LIFT DN)
PRO
(POSSIBLE 06 22 IF ANGLE
OF ATTACK >045°)
EMS INITIALIZATION

IF <25 VDC, PERFORM CM LO *
* PWR RECONFIG, Pg E/7-8 *
* * * * * * * * * * * * * * *

F 06 61

P63
06 64

01+40
04+15

DIM LIGHTS
PITCH TO PAD P.05G

*IF LIFT DN * * * * * * *
*ROLL TO 180° AND TRACK *
* HORIZ ON 9° WINDOW MK*
* * * * * * * * * * * * * *

GO TO ENTRY (Pg E/2-1)

SPS BURN STATUS

ΔTIG		X	X			
AFTER TRIM						
ΔVC			X			
FDAI (IF ATTITUDE NOT NOMINAL)	R	+			X	X
	P	+			X	X
	Y	+			X	X
N85 (IF VG >.2)	VGX		0	0		
	VGY		0	0		
	VGZ		0	0		

COMPLETION RULES

SITUATION	COMPLETION RULE
VG < 22 FPS	TRIM VG TO ±.2
VG > 22 FPS	RESTART SPS SCS
HP < 75, NO RESTART	USE RCS COMPLETION, CHARTS (4 OR 3 QUAD) AS APPLICABLE
HP > 75, NO RESTART, 4 QUAD CAPABILITY	USE RCS 4 QUAD COMPLETION CHART

CM/SM SEP CK LIST

CB SPS P & Y (4) - OPEN
CB ELS/CM-SM SEP (2) - CLOSE
CB CSM/DM FINAL SEP (2) - CLOSE
VHF AM (A & B) - OFF (CTR)
CM RCS LOGIC - ON (UP)
CUE STDN IF IN CONTACT
STDN CONFIRM GO FOR PYRO ARM (IF POSS)
SECS PYRO ARM (2) - ON (UP)
VERIFY CORRECT SEP ATT PER BLOCK DATA PAD REMARKS, Pg E/6-2
CSM/DM FINAL SEP (2) - ON (UP)
CM/SM 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
SECS PYRO ARM (2) - SAFE
CM RCS LOGIC - OFF

CM RCS CK

AUTO RCS SEL A/C ROLL (4) - OFF (VERIFY)
CB RCS LOGIC (2) - CLOSE (VERIFY)
SC CONT - SCS/MIN IMP
RCS TRNFR - CM
AUTO RCS SEL (RING 1) - OFF
AUTO RCS SEL (RING 2) - MNB
TEST RING 2 THRUSTERS (MIN IMP MAY NOT PRODUCE AUDIBLE JET FIRING. USE 3 CYCLES)
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

EMS INITIALIZATION

EMS FUNC - TEST 5
VERIFY SCROLL ON 37K FPS
EMS FUNC - RNG SET
SET RNG TO PAD DATA RTOGO
EMS FUNC - VO SET
SLEW SCROLL TO PAD DATA VIO
EMS MODE - STBY (VERIFY)
EMS FUNC - ENTRY
VERIFY .05G 1T FILTER IS DOWN

ROLLING ENTRY CK LIST

* * * * * * * * * * * * * * * * * * * *
* BMAG MODE (3) - ATT 1/RATE 2 *
* MAN ATT (3) - RATE CMD (VERIFY) *
* SC CONT - SCS *
* MNVR TO 0° , . 0° *
* (PITCH FROM BLOCK DATA REMARKS) *
* DRO/RATE - MIN/LOW *
* AT RET .05G -90 SEC, JUST *
* BEFORE CM/SM SEP: *
* MAN ATT ROLL - ACCEL CMD *
* ROLL RIGHT ~20°/SEC *
* *
* CAUTION: ATT HOLD IN PITCH AND *
* YAW MUST BE MAINTAINED UNTIL *
* CM/SM SEP *
* *
* * * * * * * * * * * * * * * * * * * *

01+50
04+25

PGA DOFFING AND STOWAGE CK LIST

INSTALL HOSE SCREENS (B2)
ON RETURN HOSES
PWR - OFF
SUIT PWR - OFF FOR DISCONNECT
AUDIO CONT - NORM
SUIT FLOW VLV - CABIN FLOW
(FOR UNSUITED CREWMAN)
(FULL FLOW FOR 3 UNSUITED)
DOFF PGA'S

(PGA bag C, aft bkh) DON BOOTS, JACKETS, COUNTER PRESSURE GARMENTS, AND CWG HARNESS (W/O CONN COVER)
SNAP BIO-BELTS TO GARMENTS
(U2) UNSTOW PGA BAG L AND R
STOW PGA'S, HELMETS, HELMET BAGS, AND ACCESSORY BAGS IN PGA BAGS, AND REMOVE THE PGA POCKET ASSEMBLIES, WRIST DAMS, AND NECK DAMS FROM F2 AND STOW ON TOP OF A1, A4, & A6
SECURE BAGS WITH TIE DOWN STRAPS ATTACHED TO LOCKERS
(R11) UNSTOW UCTA CLAMPS, ATTACH TO UCTA'S, AND STOW IN PORTABLE WASTE STOWAGE CONTAINER (U1)

02+00
04+35

SYSTEMS FAILED PROCEDURES

IMU FAILURE

WHEN IMU FAILURE OCCURS

1.) PERFORM IMU FAILURE SWITCH LIST
SC CONT - SCS
IMU PWR - OFF
DBD/RATE - MIN/HIGH
BMAG MODE (3) - ATT 1/RATE 2
MAN ATT (3) - RATE CMD
FDAI SELECT - 1
FDAI SOURCE - ATT SET
ATT SET - GDC
LIMIT CYCLE - OFF

2.) SET REFSMMAT FLAG
KEY V37E00E
V25N7E, 77E, 10000E, 1E

3.) INITIALIZE NO-DAP CONFIG
(VERIFY CSM DAP ACTIVATED
PRIOR TO NO-DAP CONFIG)
KEY V48E, V21E, 0E, PRO, PRO
V24E AND LOAD PT & YT REQ'D FOR
DEORBIT, PRO, V46E

4.) EMP SL-50
REQUEST UPLINK AT 1ST
AVAILABLE OPPORTUNITY
(MANUAL LOAD ON Pg E/7-3)

5.) PROCEED TO APPROPRIATE POINT IN TIMELINE
AND AT NEXT STDN SITE -
REPORT TRANSFER TO IMU FAILURE
SYSTEM FAILED PROCEDURES

NOTES

1.) N20 NEED NOT AGREE WITH CURRENT SC ATT EXCEPT FOR P52 CALC OF N22, EMP SL-50 CALC OF N22, AND V83 CALC OF THETA.

2.) EMP SL-50 CONVERTS GYRO TORQUE ANGLES (N93) INTO RESULTANT ACTUAL CDU ANGLES (N22) AND SETS N20=N22.

GDC REFSMMAT REALIGN (P52)

NOTES:
1. P51 IS NOT REQUIRED AS-LONG-AS A VALID REFSMMAT IS STORED OR CAN BE OBTAINED VIA STDN UPLINK.
2. IF DAP RELATED EXTENDED VERBS (i.e. V46, V48 LOAD) ARE EXECUTED, EMP SL-50 WILL REQUIRE RELOADING.
3. IT IS DESIRABLE TO MAINTAIN A CONSTANT INERTIAL ATT THROUGHOUT THE ENTIRE P52 OPT 3 (OR P52 OPT 3 & OPT 1) PROCEDURE. IF A MNVR IS REQUIRED, HOWEVER, RELOAD N20 WITH THE NEW ATT.
4. IT IS PROBABLE THAT THE GDC DRIFT RATE WILL BE GREATER THAN THE BMAG'S. AS A RESULT, THE FDAI BALL MAY BE DRIFTING WHEREAS THE SC IS MAINTAINING AN INERTIAL ATT. THEREFORE, THE SC ATT SHOULD NOT BE SLAVED TO THE INITIAL BALL READING, AND N20 SHOULD NOT BE RELOADED UNLESS A MNVR IS ACTUALLY COMMANDED BY THE ASTRONAUT.

ASSUMPTIONS: REFSMMAT FLAG SET; CSM DAP HAS BEEN ACTIVATED, FOLLOWED BY A NO-DAP INITIALIZATION; EMP SL-50 HAS BEEN LOADED.

(P52 OPT 3)

1. BMAG MODE (3) - RATE 2
   DBD/RATE-MIN/LOW
   BMAG MODE (3) - ATT 1/RATE 2
   LIMIT CYCLE - ON (UP)

2. RHC-MNVR TO ACQUIRE STAR PAIR

   ATT SET-GDC (VERIFY)
   ZERO FDAI 1 ERROR NEEDLES WITH ASCP TW.
   V25N20E
   LOAD N20 WITH ASCP TW ANGLES.

3. V37E52E
   PROCEED THRU P52 AND PERFORM STAR MARKS.
   (IF ATT MNVR REQUIRED BETWEEN STAR MARKS RELOAD N20)

4. F 06 05 ACCEPT ANGULAR SEPARATION ERROR (REG 1) UP TO .40 DEG.
   PRO

   F 06 93 TORQUING ANGLES OG, IG, MG (.001 DEG.)
   V5N26E
   VERIFY N26 = 10001, 1642, 50006 (IF NOT: RELOAD N26)
   KEY RLSE
   V30E *F 01 70 (RESTART)*
   *REDO 2ND MARK *

   F 06 22 NEW ICDU ANGLES OG, IG, MG
   SET ASCP TW TO N22 VALUES.
   GDC ALIGN PB-PUSH.
   PRO (SETS N20 = N22)

   F 06 93 TORQUING ANGLES OG, IG, MG (.001 DEG)
   V32E

   F 50 25 00014 ALIGNMENT CHECK
   (PERFORM 3RD STAR CHECK) PRO

5. 00E
   (IF IMMEDIATELY FOLLOWED BY P52 OPT 1, BYPASS REMAINING PROCEDURES)
   LIMIT CYCLE - OFF
   RATE - HIGH

(P52 OPT 1) (IF IMMEDIATELY PRECEDED BY P52 OPT 3, STEPS 1 & 2 MAY NOT BE REQUIRED)

1. BMAG MODE (3) - RATE 2
DPD/RATE - MIN/LOW
BMAG MODE (3) - ATT 1/RATE 2
LIMIT CYCLE - ON (UP)

2. RHC - MNVR TO ACQUIRE STAR PAIR

ATT SET-GDC (VERIFY)
ZERO FDAI 1 ERROR NEEDLES WITH ASCP TW.
V25N20E
LOAD N20 WITH ASCP TW ANGLES.

3. V37E52E
ALIGN GDC TO N22.
RECORD N22 AND
LOAD N20 WITH N22.
PRO ON GYRO TORQUE REQUEST (REG 1 = 00013).
IGNORE PROG ALARM (#'S 211 & 217)
DO NOT TOUCH DSKY UNTIL F 50 25 00015 IS DISPLAYED OR THE NEW REFSMMAT WILL BE LOST. (WILL TAKE ~5 MIN)
CONTINUE IN P52 AND PERFORM STAR CHECK TO VERIFY ALIGNMENT

4. IF STAR CHECK FAILS: CONTINUE IN P52 AND PERFORM STAR MARKS (REF P52 OPT 3 PROCEDURES, STEPS 3, 4 & 5)

5. V37E00E
LIMIT CYCLE - OFF
RATE - HIGH

EMP SL-50 MANUAL LOAD

DSKY LOAD	(REG 3 ADDRESS)
V21 N1E	
3242E	
6006E	(3242)
N15E	
77775E	
E	
2703E	
E	
2661E	
E	
77775E	
E	
2711E	
E	
2667E	(3250)
E	
77775E	
E	
2717E	
E	
2675E	
E	
77634E	
E	
24017E	
E	
47471E	
E	
77634E	
E	
24017E	(3260)
E	
34747E	
E	
77634E	
E	
24017E	
E	
47303E	
E	
77776E	
E	
34124E	
E	
55237E	
E	
35040E	(3270)
E	
4647E	
E	
24000E	
E	
20456E	
E	
5537E	
E	
1677E	
E	
5537E	
E	
4E	
E	
6E	(3300)
E	
31300E	
E	
52033E	
E	
31301E	
E	
54034E	
E	
5537E	(3305)

V25 N26E
10001E
1642E
50006E

EMS ΔV/RANGE DISPLAY BLANK

FOR SCS BURNS, EMS FUNC - OFF, MAKE TIMED BURNS
SPS THRUST - DIRECT ON (TO INITIATE BURN)
ΔV THRUST - OFF (TO TERMINATE BURN)
SPS THRUST - NORMAL

IMU TO GDC ALIGNMENT

FDAI SEL - 1
FDAI SOURCE - ATT SET
ATT SET DIALS - 0,0,0
ATT SET - IMU
MNVR TO 0,0,0 ON FDAI 1 (IMU)

IMU CAGE - ON (UP) & HOLD
ATT SET - GDC
MNVR TO 0,0,0 ON FDAI 1 (GDC) AND NULL
ERROR NEEDLES
IMU CAGE - RELEASE

MARK BUTTON FAILED

FAILED OPEN (BIT 6 CHANNEL 16 REMAINS = ZERO)

NOTE: DSKY OPERATIONS (e.g., V82E, V16 N20E) ARE
PERMITTED DURING ALIGNMENT MARKS.

BEFORE ANY MARKING,
LOAD FOLLOWING EMP (SL-5) (CAN BE LOADED ANYTIME)
V25 N26E
1E (1cs TIME DELAY)
2151E
16067E (FIXED MEMORY ADDRESS OF MARKDIF)

FOR EACH MARK,
KEY V31 (DO NOT KEY ENTR)
ENTR (WHEN STAR CENTERED)
(ENTR MUST BE DONE FROM NAV DSKY)

AFTER MARKING,
KEY V21 N26E, 0E (TO DISABLE EMP SL-5)

FAILED CLOSED (BIT 6 CHANNEL 16 REMAINS = ONE)

NOTE: EMP SL-5 IS NOT REQUIRED.
PERFORM ALL PROGRAM PROCEDURES ON MAIN DSKY.

TO MARK, DEPRESS ANY KEY ON NAV DSKY.

CANNOT SEE THROUGH OPTICS

FOR IMU ALIGNMENTS

IF COAS NOT CALIBRATED-

1. IF GDC & IMU COMPARE WITHIN 5 DEG-
   PERFORM COAS LOS DETERMINATION PROCEDURES (Pg G/2-19) ASAP.
   IF NOT- VERIFY IMU ALIGNMENT:
   USE P21 (G/4-5) TO OBTAIN ALTITUDE.
   MNVR TO & MAINTAIN +X AXIS TRACK OF HORIZON.
   KEY V83E & VERIFY DEPRESSION ANGLE.
   80 NM ALT = 348 DEG DEP ANG
   120 NM ALT = 345 DEG DEP ANG
   160 NM ALT = 343 DEG DEP ANG
   IF IMU COMPARE WITHIN 5 DEG-
   PERFORM COAS LOS DETERMINATION PROCEDURES (Pg G/2-19) ASAP.
   IF NOT- USE NOMINAL COAS ANGLES (+0, +57470) FOR P54's .
2. IN PLACE OF P52 OPT 3-
   USE P20 OPT 1 TO OBTAIN STAR SIGHTING ATTITUDES:
   LOAD N78 WITH +ZERO'S.
   LOAD 1ST STAR, RECORD N18 AND PERFORM AUTO MNVR TO STAR ATT.
   RECALL P20, LOAD 2ND STAR & RECORD.
   RECALL P20, LOAD 3RD STAR & RECORD.
   PERFORM P54 OPT 3 (Pg G/3-9):
   CENTER STAR IN COAS.
   VERIFY N91 LOADED WITH COAS LOS ANGLES RECORDED (Pg G/2-20).
   MANUALLY MNVR TO 2ND STAR.
   FOR SUBSEQUENT P54's (WITH SAME REFSMMAT), CAN USE V49 MNVR TO 1ST STAR.
3. IN PLACE OF P52 OPT 1 COARSE ALIGN- PERFORM P52 OPT 1 PULSE TORQUE (ENTER ON TORQUE REQUEST)
   (DO NOT PERFORM STAR SIGHTINGS).

IF COAS LOS DETERMINATION HAS BEEN PERFORMED-
REPEAT ABOVE STEPS 2 & 3, AS REQUIRED.

FOR DEORBIT BURN IMU CK (Pgs E/1-6),
PERFORM P20 (OPT 1) MNVR TO CHECK STAR
IMU IS GO IF STAR <5° FROM CENTER OF COAS.

STAR	ROLL	PITCH	YAW
____	____,	____,	____
____	____,	____,	____
____	____,	____,	____

OPTICS FROZEN

BEFORE DOING IMU ALIGN (PERFORM ONE TIME)
1. OPTICS PWR - OFF.
2. KEY V16 N91E AND COMPARE WITH TPAC'S
   IF N91 = TPAC'S +.22°, RECORD N91.
   IF NOT, RECORD TPAC'S
3. KEY V64E, LOAD N94 WITH RECORDED SA & TA.
   PRO, RECORD N78 REG 1 & REG 2.
   PRO
4. GO TO IMU ALIGN

FOR IMU ALIGNMENTS
IN PLACE OF P52 OPT 3-
   USE P20 OPT 1 TO OBTAIN STAR SIGHTING ATTITUDES:
      LOAD N78 WITH VALUES RECORDED ABOVE.
      LOAD 1ST STAR, RECORD N18 AND
         PERFORM AUTO MNVR TO STAR ATT.
      RECALL P20, LOAD 2ND STAR & RECORD.
      RECALL P20, LOAD 3RD STAR & RECORD.
   PERFORM P54 OPT 3 (Pg G/3-9):
      CENTER STAR IN SXT WITH MIC.
      VERIFY N94 LOADED WITH RECORDED SA & TA.
      MANUALLY MNVR TO 2ND STAR.
   FOR SUBSEQUENT P54'S (WITH SAME REFSMMAT),
      CAN USE V49 MNVR TO 1ST STAR.
IN PLACE OF P52 OPT 1 COARSE ALIGN - PERFORM
   P52 OPT 1 PULSE TORQUE (ENTER ON TORQUE REQUEST)
   (DO NOT PERFORM STAR SIGHTINGS).

FOR DEORBIT BURN IMU CK (Pg E/1-6),
   PERFORM P20 (OPT 1) (LOAD N78 = 0)
   MNVR TO CHECK STAR
   IMU IS GO IF STAR <5° FROM CENTER OF COAS.

N91 OR TPAC'S

SA	_____._____
TA	_____._____

N78

R1	_____._____
R2	_____._____

STAR	ROLL	PITCH	YAW
_____	_____,	_____,	_____
_____	_____,	_____,	_____
_____	_____,	_____,	_____

MN BUS A LOST ENTRY

CM RCS CHECK
AUTO RCS SEL A/C ROLL (4) - OFF (VERIFY)
CB RCS LOGIC (2) - CLOSE (VERIFY)
SC CONT - SCS/MIN IMP
RCS TRNFR - CM
AUTO RCS SEL (ALL) - OFF
RHC PWR DIR #2 - MNA/B
TEST RING 1 PITCH & YAW THRUSTERS
  USING DIRECT RCS
AUTO RCS SEL (RING 2) - MNB
TEST RING 2 THRUSTERS (MIN IMP MAY
  NOT PRODUCE AUDIBLE JET FIRING.
 USE 3 CYCLES)
RCS TRNFR - SM

POST CM/SM SEP
AUTO RCS SEL (21, 22) - OFF
TEST RING 1 +ROLL THRUSTERS
  USING DIRECT RCS
AUTO RCS SEL (21, 22) - MNB
RHC PWR DIR #2 - OFF

MN BUS B LOST ENTRY

CM RCS CHECK
AUTO RCS SEL A/C ROLL (4) - OFF (VERIFY)
CB RCS LOGIC (2) - CLOSE (VERIFY)
SC CONT - SCS/MIN IMP
RCS TRNFR - CM
AUTO RCS SEL (ALL) - OFF
RHC PWR DIR #2 - MNA/B
TEST RING 2 PITCH & YAW THRUSTERS
  USING DIRECT RCS
AUTO RCS SEL (RING 1) - MNA
TEST RING 1 THRUSTERS (MIN IMP MAY
  NOT PRODUCE AUDIBLE JET FIRING.
  USE 3 CYCLES)
RCS TRNFR - SM

POST CM/SM SEP
AUTO RCS SEL (11, 12) - OFF
TEST RING 2 +ROLL THRUSTERS
  USING DIRECT RCS
AUTO RCS SEL (11, 12) - MNA
RHC PWR DIR #2 - OFF

CM LO PWR RECONFIG

SYSTEM	SYSTEM LOAD (AMPS)	TOTAL SC LOAD (AMPS)
NOMINAL CM SYSTEMS CONFIGURATION	-	53.0
VERIFY DSE RECORDING	-	53.0
MISC PWR DOWN CB G&N OPTICS MNA/B (2) - OPEN G&N PWR (AC) - OFF LIGHTS - MIN REQ'D MISSION TIMER (PNL 306) - STOP EVENT TIMER (PNL 306) - STOP OPTICS EYEPIECE HTR - UNPLUG	2.0	51.0
ECS PWR DOWN ECS GLY PUMP SEL - OFF ECS RAD FLOW CONT PWR - OFF GLY EVAP TEMP IN - MAN GLY EVAP H2O FLOW - OFF GLY EVAP STEAM PRESS - MAN SEC COOL EVAP - RESET (FOR 58 SEC) SEC COOL EVAP - OFF SEC COOL LOOP PUMP - OFF SUIT COMP - OFF	7.1 3.9	43.9 40.0
CONFIGURE FOR SINGLE INVERTER OPERATION	4.0	36.0
COMM PWR DOWN S BD NORM PWR AMPL - OFF	3.0	33.0
SCS PWR DOWN BMAG POWER 1 - WARMUP BMAG POWER 2 - OFF FDAI/GPI PWR - OFF SCS ELECTRONICS PWR - OFF CB SCS LOGIC BUS (4) - OPEN RHC PWR NORMAL (2) - OFF	10.0	23.0
TOTAL	30.0	23.0

IF CM IN LO PWR CONFIG AND G&N FAILURE

CMC MODE - FREE
SCS PWR UP
  CB SCS LOGIC BUS (4) - CLOSE
  BMAG PWR 1 - ON
  FDAI/GPI PWR - BOTH
  SCS ELECTRONICS PWR - GDC/ECA
  RHC PWR NORMAL #2 - AC/DC
CMC/IMU POWER DOWN
  CB IMU HTR (2) - OPEN
  CB G&N IMU MNA/B (2) - OPEN
  V37E 06E
    F 50 25, 00062, CMC PWR DN
    PRO, HOLD (~5 SEC) UNTIL
      STBY LT - ON

ASTP

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