



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 17

ALL LAUNCH DATES

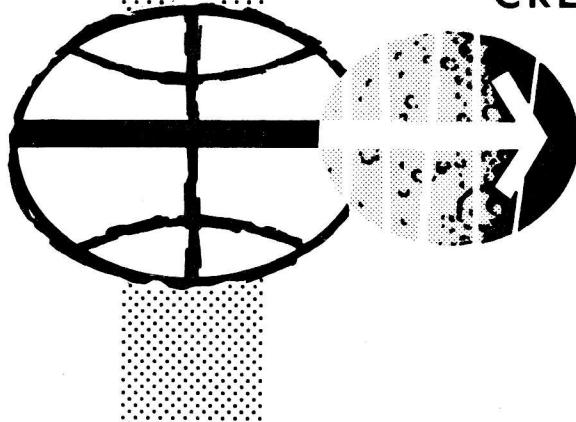
BASIC

CSM

RESCUE BOOK

PREPARED BY

**FLIGHT PROCEDURES BRANCH
CREW PROCEDURES DIVISION**



**MANNED SPACECRAFT CENTER
HOUSTON, TEXAS**

SEPTEMBER 18, 1972

Apollo 17

CSM RESCUE BOOK

SEPTEMBER 18, 1972

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CSM RESCUE BOOK

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LM ABORT POINTS

SEPARATION

CIRCULARIZATION

PDI

NO PDI+12

DATE 9/18/72

IF NO GO FOR CIRC BURN	
CSM BURNS AS DIRECTED	
N/A	MINI-FOOTBALL RNDZ

IF NO GO FOR PDI	
ABORT AT 12 MINUTES AFTER PDI	
NO PDI 1+12	ONE REV RNDZ(1)
NO PDI 2+12	TWO REV RNDZ(1)

PDI

PDI 1
PDI 2

MAXIMUM PHASE ANGLE

PDI 1+ ~10:00
PDI 2+ ~ 6:16

TOUCHDOWN

PDI 1+~12
PDI 2+~12

T1

PDI 1+ ~17:10
PDI 2+ ~15:40

T2

PDI 1+ ~24:45
PDI 2+ ~22:19

IF NO GO FOR LANDING

ABORT AT ANY TIME

PDI 1 EARLY ABORT ONE REV RNDZ(2)

PDI 2 EARLY ABORT TWO REV RNDZ(2)

IF NO GO FOR LANDING/STAY

ABORT AT ANY TIME

PDI 1 LATE ABORT TWO REV RNDZ(2)

PDI 2 LATE ABORT ONE REV RNDZ(2)

IF NO GO FOR STAY

ABORT AT T2 TIME

T2-1 ABORT MODIFIED TWO REV RNDZ(2)

T2-2 ABORT TWO REV RNDZ(2)

T2

T3 TIMES

NOMINAL L/O-1 REV

NOMINAL L/O
-1 REV

NOMINAL L/O
-10 MIN

NOMINAL L/O

INS+5

DOCKING

APS LEAK DURING PRESSURIZATION	
ABORT AT ANY TIME	
EARLY COELLIPTIC SEQ.	ONE REV RNDZ(2)

NO GO FOR DIRECT ASCENT RNDZ	
ABORT AT L/O+~2:30	
COELLIPTIC SEQ.	ONE REV RNDZ(2)

NO GO FOR DIRECT ASCENT RNDZ	
BAILOUT BURN AT INS+5	
LM BAILOUT	ONE REV RNDZ(3)

NO FURTHER ABORT POINTS	
----------------------------	--

LEGEND:

ABORT CONDITION
ABORT POINT/REGION
ABORT NAME RNDZ TECHNIQUE(n)

CSM RESCUE CASES

(n) CSM ACTIVE RESCUE RNDZ

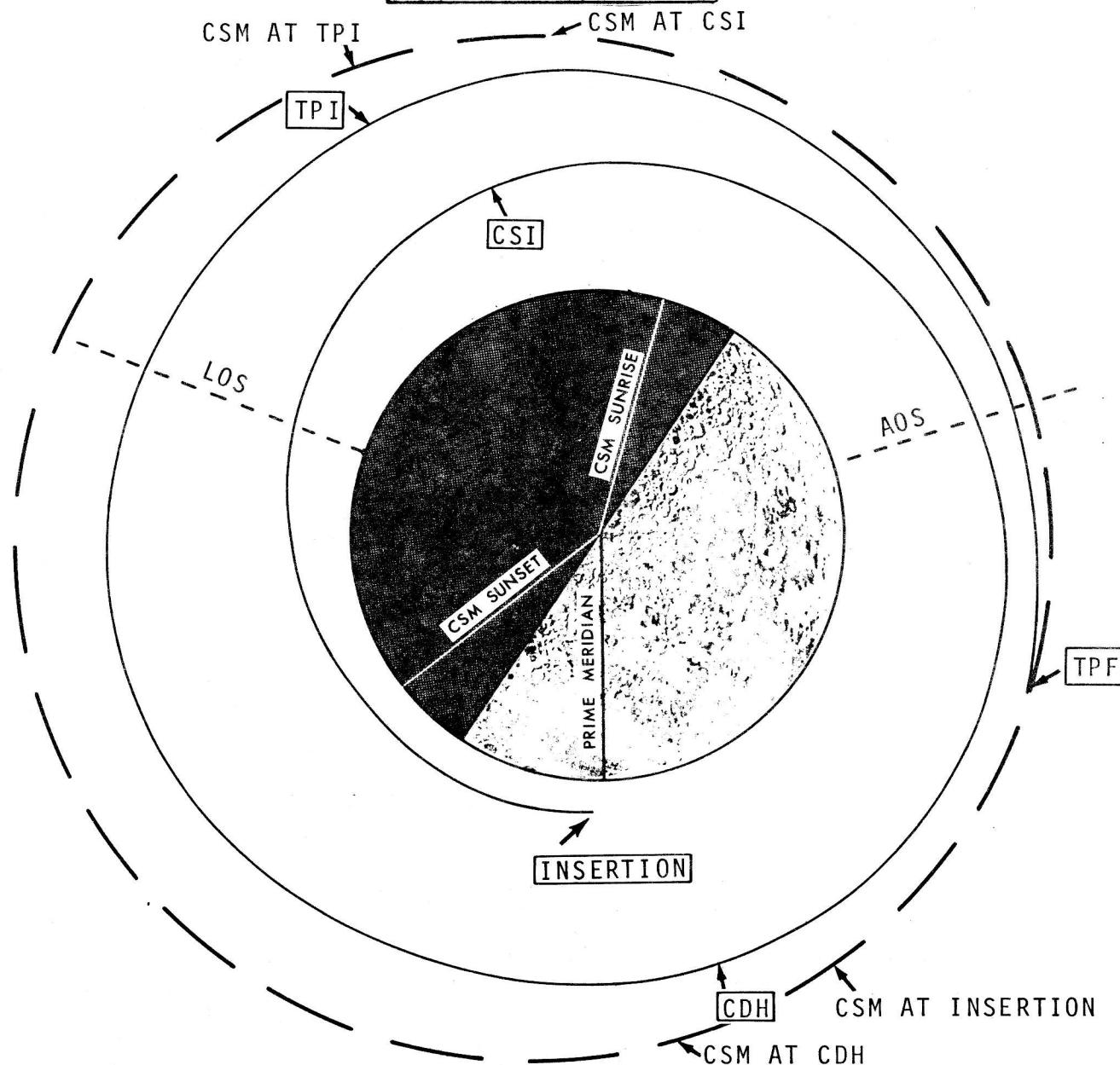
▲ ABORT POINTS

--- ABORT REGIONS

IF THE CSM BECOMES ACTIVE AFTER:

- (1) AN ACCURATE LM ABORT INITIATION MANEUVER COMPLETE THE ONE REV OR TWO REV RENDEZVOUS
A PARTIAL LM ABORT INITIATION MANEUVER INITIATE THE RESCUE TWO RENDEZVOUS
THE LM INSERTS INTO THE DESIRED ORBIT COMPLETE THE EARLY, ONE REV, OR TWO REV
RENDEZVOUS
- (2) THE LM INSERTS WITH AN UNDERSPEED OR OVERSPEED INITIATE A CSM BAILOUT, MANUAL INSERTION,
CSM DWELL, OR RESCUE TWO RNDZ AS DIRECTED
COMPLETE THE ONE REV RENDEZVOUS
- (3) AN ACCURATE LM BAILOUT MANEUVER PERFORM THE P30 CSM BAILOUT BURN AND
A PARTIAL LM BAILOUT MANEUVER COMPLETE THE ONE REV RENDEZVOUS

ONE REV
ORBITAL MOTION PLOT



DATE 9/18/72

ONE REV
RELATIVE MOTION PLOT

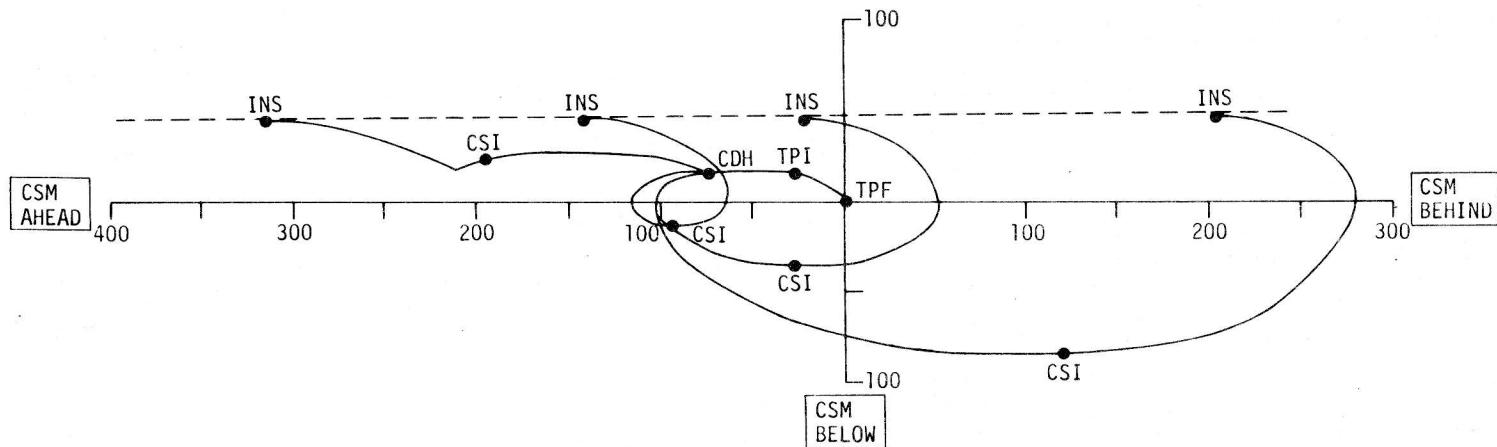
LM CENTERED

NOMINAL COELL IPTIC SEQ

BAILOUT

NO PDI 1+12

PDI 1+	9	8	7	6	5	4	3	2	1
PDI 2+	15	14	13	12	11	10	9	8	



ONE REV
BURN TIMES

NO PDI 1+12 ABORT

CSI AT PDT TIME+67 MIN

PDI 1, EARLY ABORT

CSI AT INS +55 MIN

NOMINAL COELIPTIC SEQUENCE

CSI AT INS +50 MIN

LM BAILOUT

CSI AT INS +55 MIN

PDI 2. LATE ABORT

CST AT TNS +55 MIN

EARLY COELLIPTIC SEQ.
FOR APS LEAK

CST AT INS +60 MIN

CSM BAILOUT

CSI AT INS +55 MIN

ONE REV
RENDEZVOUS

ONE REV
TIMELINE

POWER DOWN SIM (SEE EXP/EVA CHECKLIST)
POO; V48 (11102,X1111)

INSERTION OR A.I.M.

MSFN UPLINK: LM S.V.

OBTAİN LM CSI AND TPI GETI'S (COPY)

P32 (SEE INPUT)

BEFORE STEADY STATE
N49>(+00200,+00120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

SXT / VHF

RECYCLE(COPY)

FINAL COMP(COPY); OBTAIN LM CSI DV(COPY); P40m

CSI BURN

SXT / VHF

P76m; OBTAIN LM PC GETI(COPY); P36m WITH LM GETI

BEFORE STEADY STATE
N49>(+00080,+00050):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

FINAL COMP (COPY) TO BYPASS P52m AND P4Xm, ZERO DVY
OBTAIN LM PC DV (COPY)

P52m; P4Xm

TO BYPASS GYRO TORQUE: ENTER ON F 50 25
TO GYRO TORQUE: SEE P. 38

PLANE CHANGE

SXT / VHF

P76m
OBTAIN LM CDH GETI(COPY); P33m WITH LM GETI

RECYCLE(COPY)

FINAL COMP(COPY); OBTAIN LM CDH DV(COPY); P40m

CDH BURN

P76m

INSERTION		LM INSERTION TIME	:	:	:
A.I.M.	33	LM A.I.M.GETI	:	:	:
	84	LM A.I.M.DV-LV	:	:	:

CSI COMPUTATION					
	INPUT	LM CSI GETI	:	:	:
INPUT	11		:	:	:
	55	+00001	ELEVATION +208.30	180° OPT +130.00	
	37	LM TPI GETI	:	:	:
RECYCLE	90	Y	Y DOT	LM Y DOT	
	81	CSI DV-LV	.	.	+0000.0
FINAL COMP	90	Y	Y DOT	LM Y DOT	
	81	CSI DV-LV	.	.	+0000.0
P76	84	LM CSI DV-LV	.	.	.

PLANE CHANGE COMPUTATION					
	INPUT	LM PC GETI	:	:	:
INPUT	33		:	:	:
	90	Y	Y DOT	LM Y DOT	
	81	PC DV-LV	.	.	+0000.0
P76	84	LM PC DV-LV	.	.	+0000.0

CDH COMPUTATION					
	INPUT	LM CDH GETI	:	:	:
INPUT	13		:	:	:
	90	Y	Y DOT	LM Y DOT	
	81	CDH DV-LV	.	.	.
RECYCLE	90	Y	Y DOT	LM Y DOT	
	81	CDH DV-LV	.	.	.
FINAL COMP	90	Y	Y DOT	LM Y DOT	
	81	CDH DV-LV	.	.	.
P76	84	LM CDH DV-LV	.	.	.

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P34m, OVERWRITE N55 R2.

BEFORE STEADY STATE
N49>(+00080,+00050):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

SXT AND VHF

RECYCLE(COPY)

-20

OBTAIN LM TPI GETI AND DV(COPY); FINAL COMP, OVERWRITE N37 WITH LM TPI GETI

P40m

TPI BURN

0

P76m; P35m

FINAL COMP(COPY); OBTAIN LM MCC1 DV(COPY); P41m

+12

MCC1

+15

P76m; P35m

FINAL COMP(COPY); OBTAIN LM MCC2 DV(COPY); P41m

+27

MCC2

+30

GO TO TPF ACTIVITIES(PAGE 36)

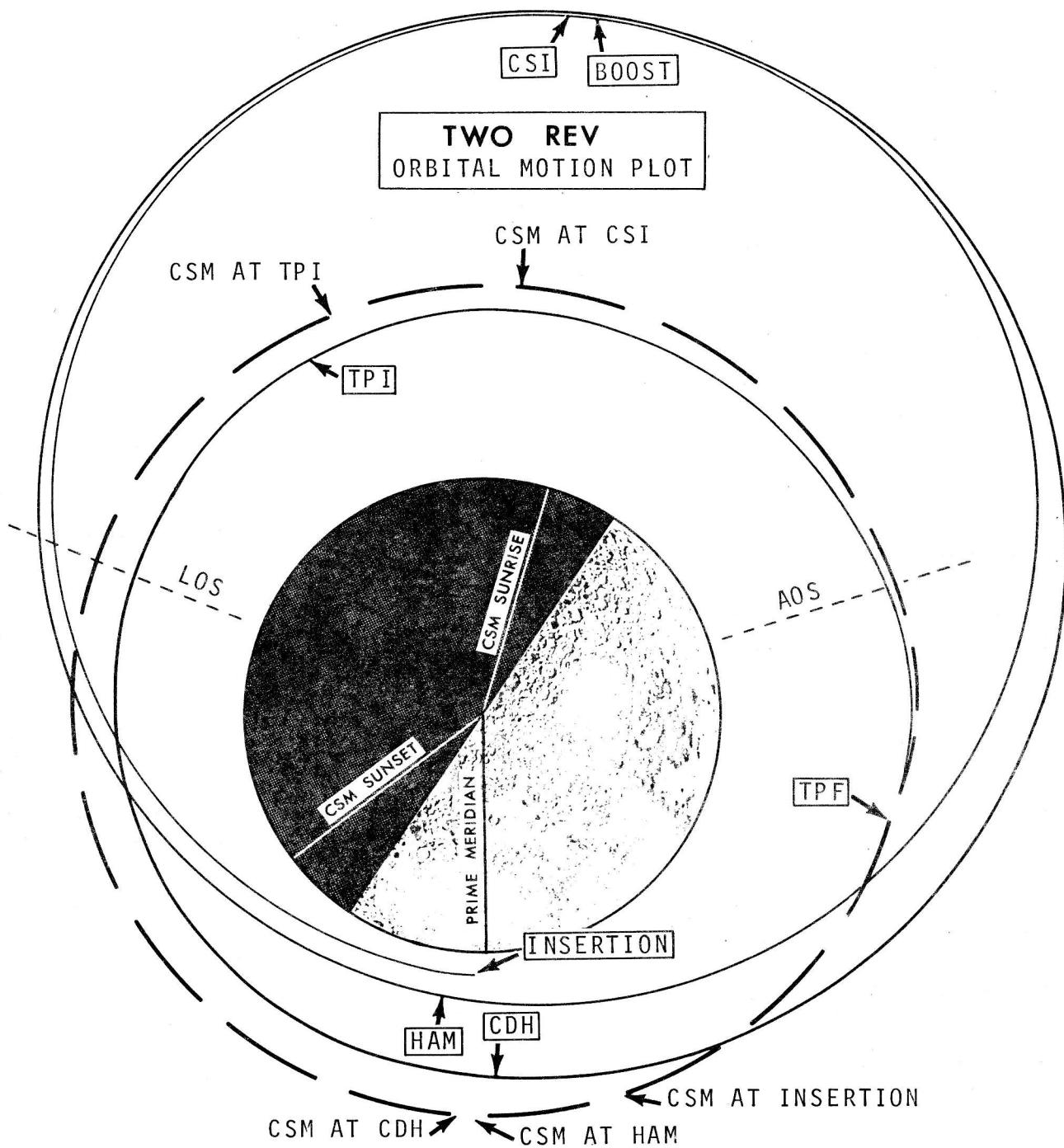
+42

TPF

TPI-ELEVATION OPTION			
INPUT	TPI GETI		
	INTEG OPT	ELEVATION	TRANSFER
RECYCLE	37	TPI GETI	PROCEED ON DISPLAYED GETI
	55	+00000	+208.30
	37	PERILUNE ALT	TPI ΔV
FINAL COMP	58	.	TPF ΔV
	81	TPI ΔV-LV	.
	37	LM TPI GETI	.
P76	55	INTEG OPT	TRANSFER
	33	+00000	+130.00
	84	PERILUNE ALT	TPF ΔV
P76	58	TPI ΔV-LV	.
	33	LM TPI GETI	.
	84	LM TPI ΔV-LV	.

MCC COMPUTATION			
FIN COMP	MCC1 ΔV-LV		
	MCC1 ΔV-LV	.	.
P76	81	LM MCC1 ΔV-LV	.
	84	.	.

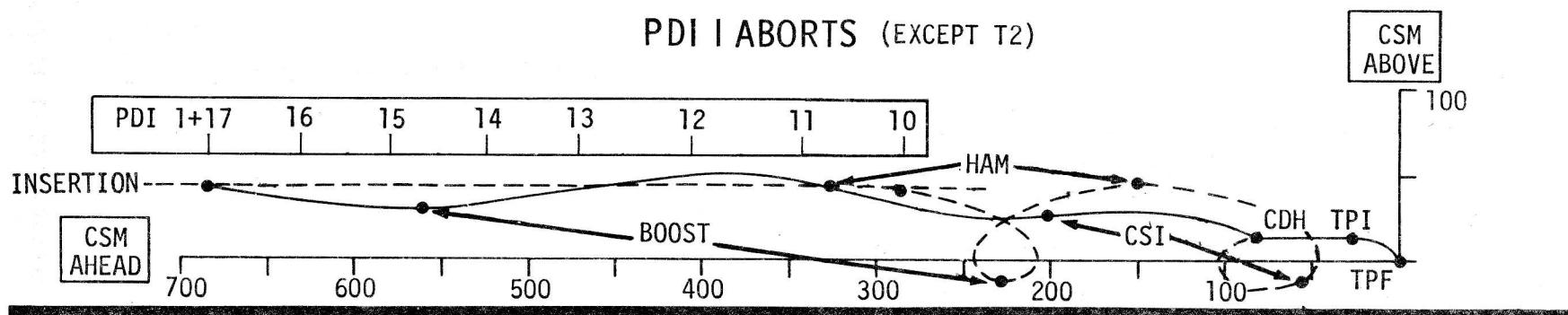
MCC COMPUTATION			
FIN COMP	MCC2 ΔV-LV		
	MCC2 ΔV-LV	.	.
P76	81	LM MCC2 ΔV-LV	.
	84	.	.



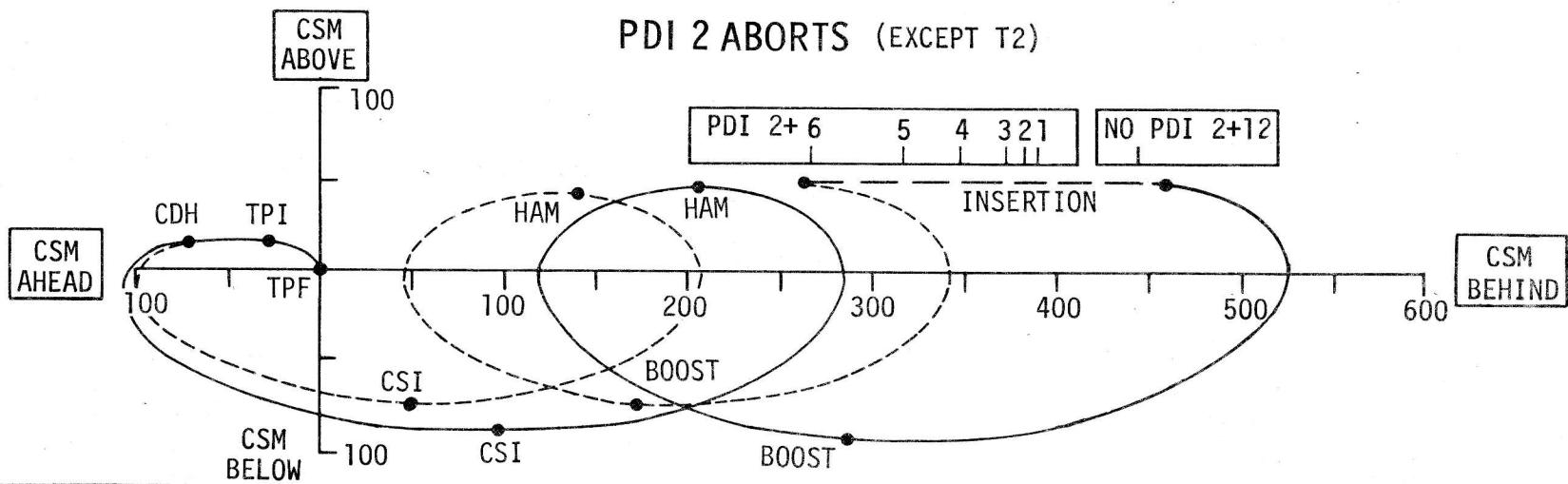
**TWO REV
RELATIVE MOTION PLOT**

LM CENTERED

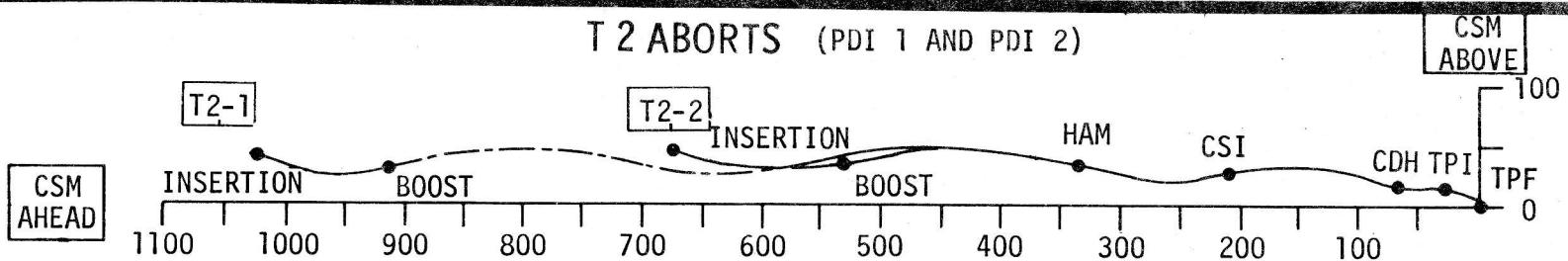
PDI 1 ABORTS (EXCEPT T2)



PDI 2 ABORTS (EXCEPT T2)



T 2 ABORTS (PDI 1 AND PDI 2)



NOTE: (—) INDICATES THE ADDITIONAL REV
NECESSARY TO MODIFY THE TWO REV TECHNIQUE FOR A T2-1
ABORT.

**TWO REV
BURN TIMES**

PDI 1, LATE ABORT

BOOST AT INS + 50 MIN
HAM AT BOOST + 60 MIN
CSI AT HAM + 50 MIN

T2 ABORT, 1ST OPP

BOOST AT INS +50 MIN
HAM AT BOOST +180 MIN
CSI AT HAM + 50 MIN

NO PDI 2+12 ABORT

BOOST AT PDI TIME +72 MIN
HAM AT BOOST +60 MIN
CSI AT HAM +60 MIN

PDI 2, EARLY ABORT

BOOST AT INS +60 MIN
HAM AT BOOST +60 MIN
CSI AT HAM +60 MIN

T2 ABORT, 2ND OPP

BOOST AT INS +50 MIN
HAM AT BOOST +60 MIN
CSI AT HAM +50 MIN

**TWO REV
TIMELINE**

POWER DOWN SIM (SEE EXPs/EVA CHECKLIST)
POO; V48(11102,X1111)

INSERTION OR A. I. M.

MSFN UPLINK: LM S.V.

INSERTION	LM INSERTION TIME		
	LM AIM GETI	LM AIM ΔV-LV	ΔV-LV
A.I.M.	33		
P76	84		

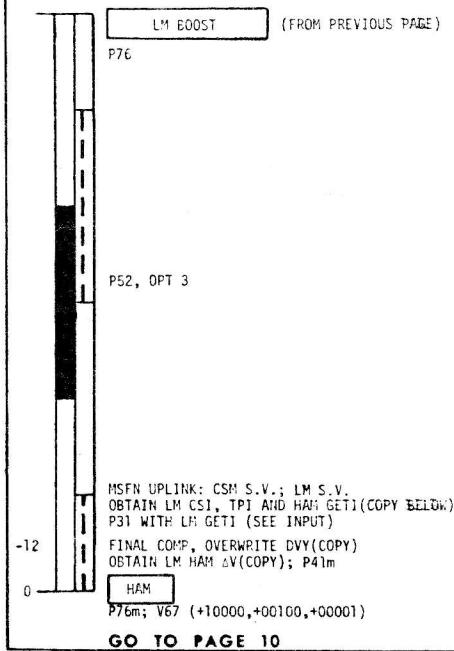
LM	LM BOOST GETI		
	LM BOOST GETI	LM BOOST ΔV-LV	ΔV-LV
LM	33		
BOOST	84	+0000.0	+0000.0
P76			

OBTAİN LM BOOST GETI AND DV(COPY)

LM BOOST

P76

MODIFIED TWO REV RNDZ (FOR T2-1 ABORT ONLY)



MSFN UPLINK: CSM S.V.; LM S.V.
OBTAIN LM CSI, TPI AND HAM GETI (COPY)
P31 WITH LM GETI

IF 15 VHF MARKS CAN NOT
BE TAKEN PRIOR TO FINAL
COMP:
V88

BEFORE STEADY STATE
N49>(+00200,+00120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

RECYCLE (COPY)

FINAL COMP, OVERWRITE DVY (COPY);
OBTAIN LM HAM ΔV (COPY)
P41m

HAM

P76m; V67(+10000,+00100,+00001) IF NO MARKS HAVE BEEN TAKEN:
V87

HAM COMPUTATION			
	LM CSI GETI	:	:
INPUT	11	:	:
	55	ELEVATION +208.30	180° OPT +130.00
	37	LM TPI GETI	:
	33	LM HAM GETI	:
RECYCLE	90	Y	Y DOT
	81	HM ΔV -LV	+0000.0
FINAL COMP	90	Y	LM Y DOT
	81	HM ΔV -LV	+0000.0 +0000.0
P76	84	LM HAM ΔV -LV	+0000.0

P32m

SXT / VHF

-20

RECYCLE(COPY)

-12

FINAL COMP(COPY); OBTAIN LM CSI DV(COPY); P40m

0

CSI BURN

SXT / VHF

P76m; OBTAIN LM PC GETI(COPY); P36m WITH LM GETI

-9

FINAL COMP (COPY) TO BYPASS P52m AND P4Xm, ZERO DVY
OBTAIN LM PC DV(COPY)

P52m;P4Xm

0

PLANE CHANGE

TO BYPASS GYRO TORQUE: ENTER ON F 50 25
TO GYRO TORQUE: SEE P. 38

-20

P76m
OBTAIN LM CDH GETI(COPY); P33m WITH LM GETI
RECYCLE (COPY)

-12

FINAL COMP (COPY); OBTAIN LM CDH DV (COPY); P40m

0

CDH BURN

P76m

BEFORE STEADY STATE
N49>(+00200,+00120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

CSI COMPUTATION					
INPUT	LM CSI GETI	PROCEED ON DISPLAYED GETI	•	•	•
	11	ELEVATION	9	180° OPT	
	55	+00001	+208.30	+130.00	
RECYCLE	LM TPI GETI	•	•	•	•
	37	Y	Y DOT	LM Y DOT	
FINAL COMP	90	CSI ΔV-LV	.	.	+0000.0
	81	.	.	.	
P76	90	Y	Y DOT	LM Y DOT	
	81	CSI ΔV-LV	.	.	+0000.0
P76	84	LM CSI ΔV-LV	.	.	.

PLANE CHANGE COMPUTATION					
INPUT	LM PC GETI	•	•	•	•
	33	Y	Y DOT	LM Y DOT	
	90	.	.	.	
FINAL COMP	PC ΔV-LV	.	.	.	+0000.0
	81	+0000.0	.	.	+0000.0
P76	LM PC ΔV-LV	.	.	.	+0000.0
	84	+0000.0	.	.	+0000.0

CDH COMPUTATION					
INPUT	LM CDH GETI	•	•	•	•
	13	Y	Y DOT	LM Y DOT	
	90	.	.	.	
RECYCLE	CDH ΔV-LV	.	.	.	
	81	.	.	.	
FINAL COMP	Y	Y DOT	LM Y DOT	.	
	90	.	.	.	
P76	CDH ΔV-LV	.	.	.	
	81	.	.	.	
P76	LM CDH ΔV-LV	.	.	.	
	84	.	.	.	

P34m, OVERWRITE N55 R2

BEFORE STEADY STATE N49>(+00080,+00050):REJECT/REPEAT
AFTER STEADY STATE N49>(+00030,+00020):REJECT/REPEAT

-20

RECYLE(COPY)

-12

OBTAİN LM TPI GETI AND DV(COPY); FINAL COMP, OVERWRITE N37 WITH LM TPI GETI
P40m

0

TPI BURN

+12

P76m; P35m

+15

FINAL COMP(COPY); OBTAIN LM MCC1 DV(COPY); P41m

MCC1

+27

P76m; P35m

+30

FINAL COMP(COPY); OBTAIN LM MCC2 DV(COPY); P41m

MCC2

+42

GO TO TPF ACTIVITIES(PAGE 36)

TPF



SXT/VHF

S/V

S/V

S/V

TPI-ELEVATION OPTION

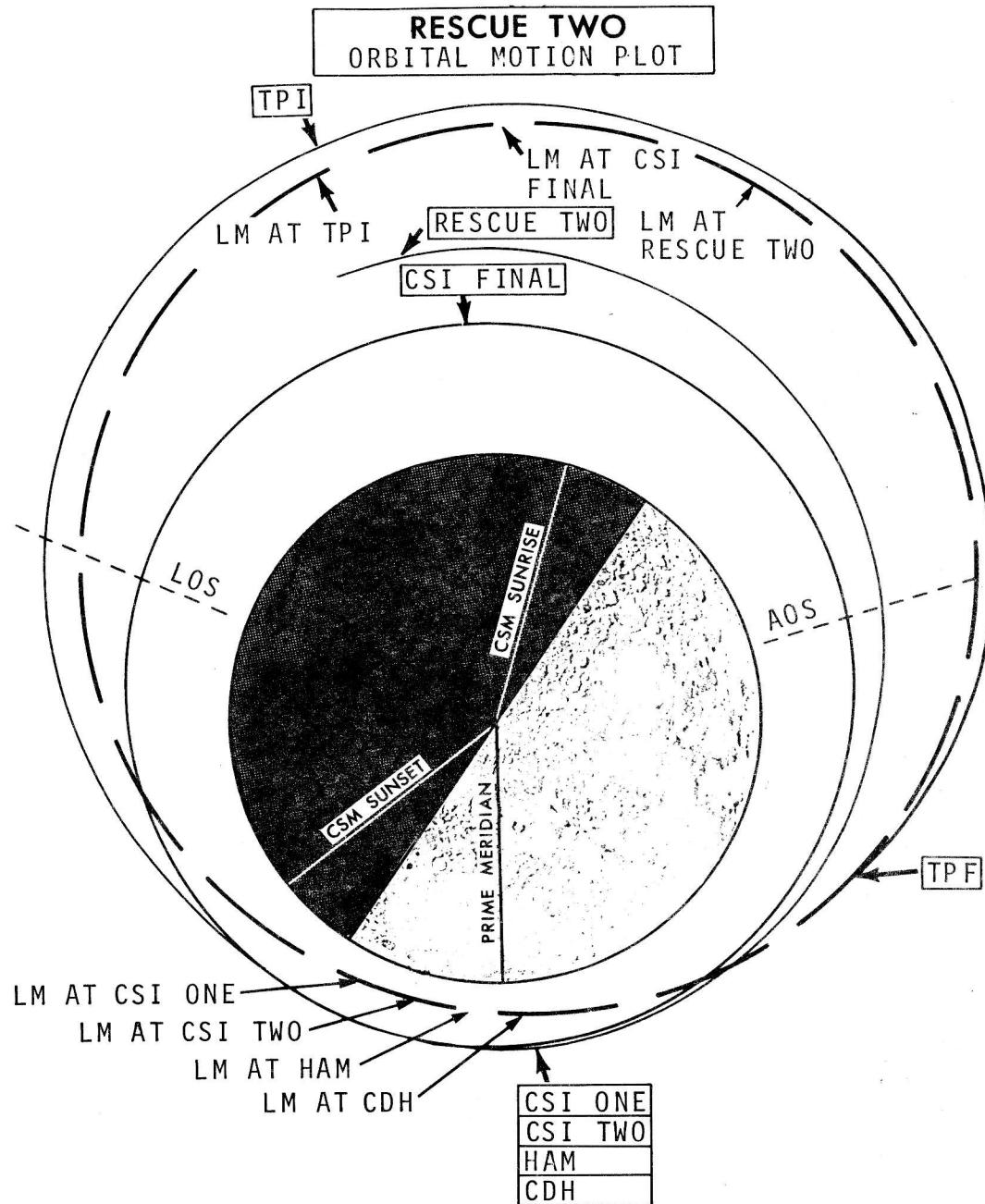
INPUT	37	TPI GETI	PROCEED ON DISPLAYED GETI	.
	55	INTEG OPT +00000	ELEVATION +208.30	TRANSFER +130.00
RECYCLE	37	TPI GETI	PROCEED ON DISPLAYED GETI	.
	58	PERILUNE ALT	TPI ΔV	TPF ΔV
	81	TPI ΔV-LV	.	.
FINAL COMP	37	LM TPI GETI	.	.
	55	INTEG OPT +00000	ELEVATION	TRANSFER
	58	PERILUNE ALT	TPI ΔV	TPF ΔV
P76	81	TPI ΔV-LV	.	.
	33	LM TPI GETI	.	.
	84	LM TPI ΔV-LV	.	.

MCC COMPUTATION

FIN COMP	81	MCC1 ΔV-LV	.	.	.
P76	84	LM MCC1 ΔV-LV	.	.	.

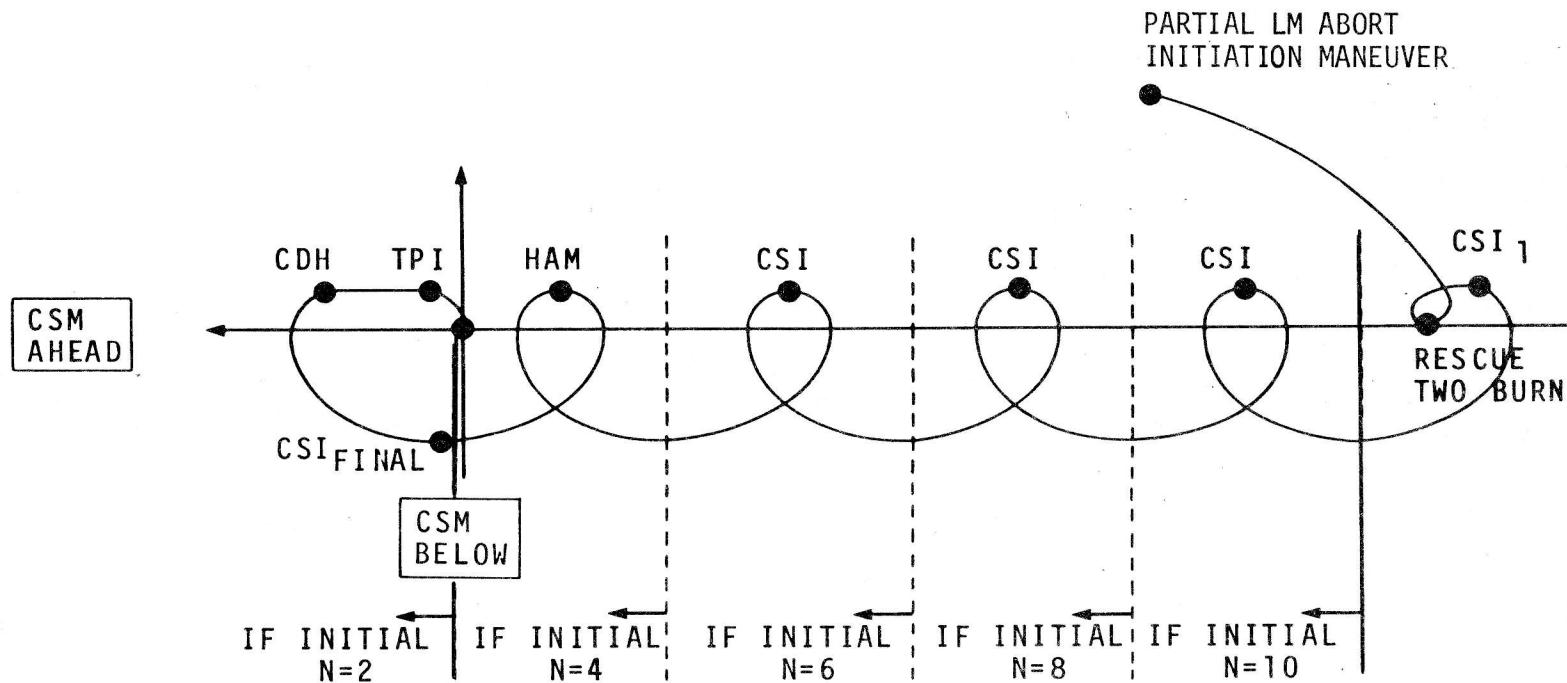
MCC COMPUTATION

FIN COMP	81	MCC2 ΔV-LV	.	.	.
P76	84	LM MCC2 ΔV-LV	.	.	.



RESCUE TWO
RELATIVE MOTION PLOT

LM CENTERED



RESCUE TWO
RENDEZVOUS

RESCUE TWO
TIMELINE

POWER DOWN SIM (SEE EXP/EVA CHECKLIST)
POO; V48 (11102,X1111)

INSERTION OR A.I.M.

MSFN UPLINK: LM S.V.

MSFN UPDATE: RESCUE TWO P30 PAD
P32 INITIALIZATION PAD

-12

P30; P40

0

RESCUE TWO BURN

POO

RESCUE TWO P30 PAD

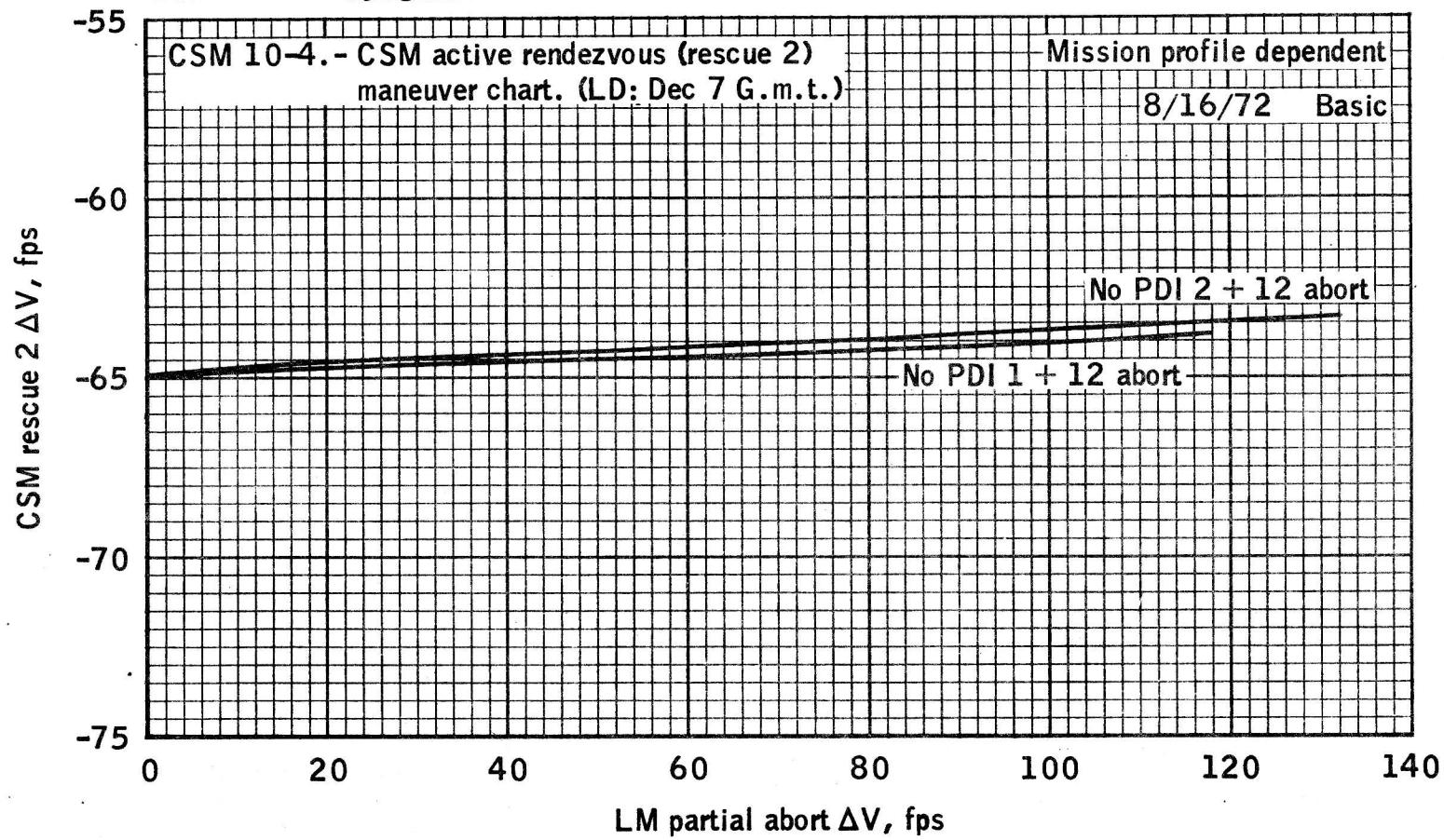
	R	2	N	=			PURPOSE
SET STARS	S	P	S	G	&	N	PROP/GUID
R ALIGN	+						WT N47
P ALIGN	0	0					P TRIM N48
Y ALIGN	0	0					Y TRIM
	+	0	0	0			HRS GETI
	+	0					MIN N33
							SEC
ULLAGE							ΔV_X N81
	+	0	0	0	0	0	ΔV_Y
	+	0	0	0	0	0	ΔV_Z
	X	X	X				R
	X	X	X				P
OTHER	X	X	X				Y
	+						H_A N44
							H_P
	+						ΔV_T
	X	X	X				BT
	X						ΔV_C

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	.	.
N55	N	+	0	0	0	
	ELEV \neq	+	2	0	8	30
	180° OPT	+	1	3	0	00
N37	TPI GETI	+	:	:	.	.

RESCUE TWO BURN INFORMATION

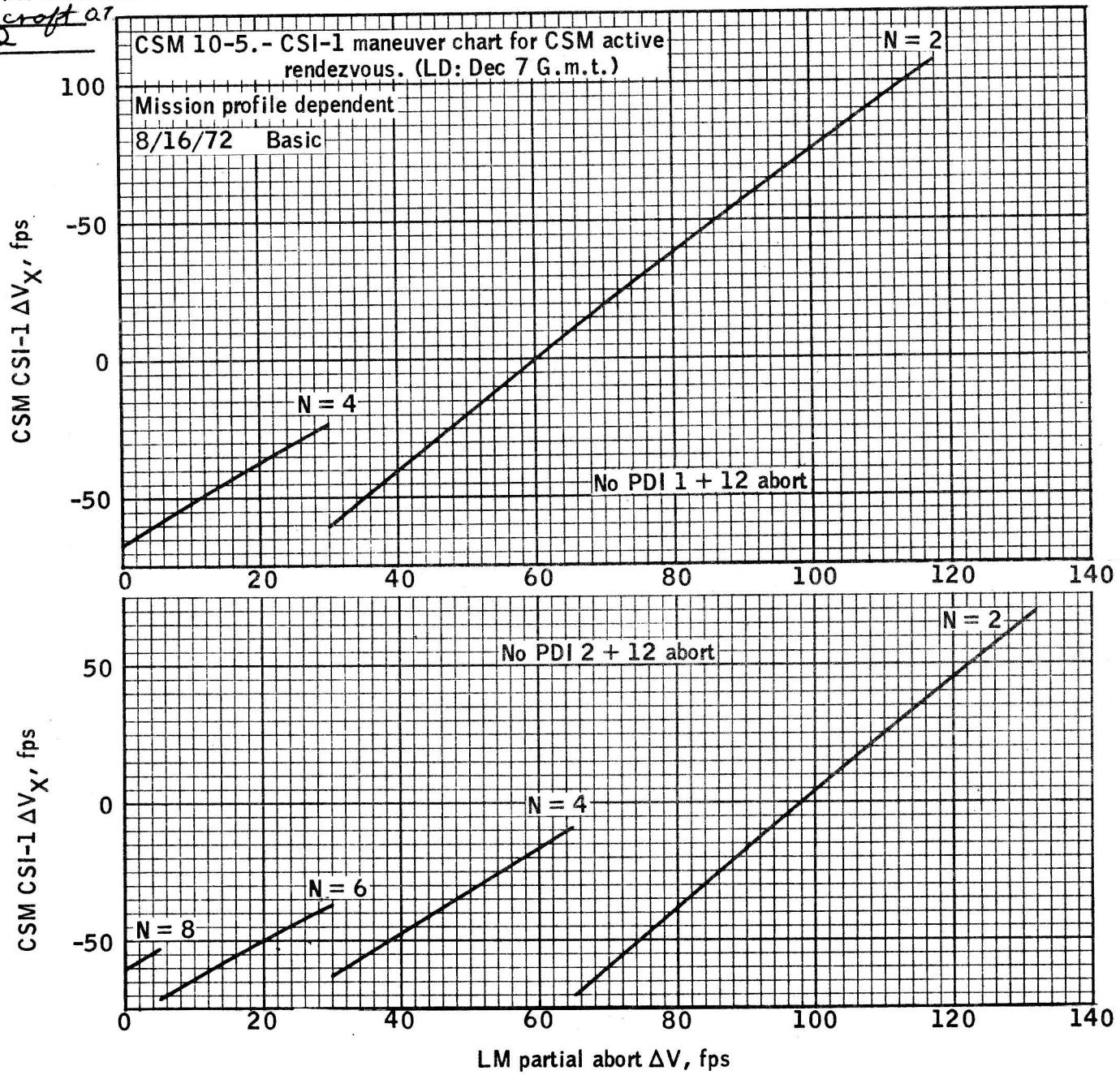
DuPont/MAB/MPAD (for CSM Rescue)

Data source Spacecraft O.T.Data confirmed WHD

DuPont/MAB/MPAD (for CSM Rescue)
Data source Spacecraft 07
Data confirmed 0722

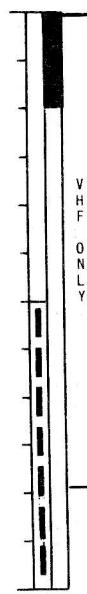
CSI ONE BURN INFORMATION

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P32 (LOAD P32 INITIALIZATION PAD ON PAGE 14)



BEFORE STEADY STATE
N49>(+00200,+00120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

-12

FINAL COMP, OVERWRITE DVY(COPY); P40m

0

CSI ONE BURN

P76m; V67(+10000,+00100,+00001)

IF INITIAL N>4, CONTINUE ON PAGE 18
IF INITIAL N=4, CONTINUE ON PAGE 19
IF INITIAL N=2, CONTINUE ON PAGE 20

P32	90	Y	Y DOT	L M Y DOT
FINAL COMP	81	CSI ΔV-LV	.	+0000.0 +0000.0

GROUND
ΔV X



COMPARISON
LIMIT=±3 FPS

(A)

P32m, [REDUCE PREVIOUS N BY 2], OVERWRITE N55 R1(COPY)

VHF ONLY

P52,OPT 3; P32

BEFORE STEADY STATE
N49>(+00200,+00120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

VHF ONLY

IF NECESSARY: MSFN UPLINK-LM S.V.
CSM S.V.

-9
0
FINAL COMP, OVERWRITE DVY(COPY);
P41m

CSI BURN

P76m; V67(+10000,+00100,+00001)

RECYCLE TO (A) UNTIL
N=4 WAS INPUT FOR THE
PREVIOUS CSI BURN,
THEN CONTINUE TO PAGE 19.

FOR N=8

CSI COMPUTATION			
INPUT	11	CSI GETI	PROCEED ON DISPLAYED GETI
	55	N +00008	ELEVATION 4 180° OPT +208.30 +130.00
	37	TPI GETI	PROCEED ON DISPLAYED GETI
FINAL COMP	90	Y Y DOT	LM Y DOT
	81	CSI ΔV-LV +0000.0	+0000.0

FOR N=6

CSI COMPUTATION			
INPUT	11	CSI GETI	PROCEED ON DISPLAYED GETI
	55	N +00006	ELEVATION 4 180° OPT +208.30 +130.00
	37	TPI GETI	PROCEED ON DISPLAYED GETI
FINAL COMP	90	Y Y DOT	LM Y DOT
	81	CSI ΔV-LV +0000.0	+0000.0

FOR N=4

CSI COMPUTATION			
INPUT	11	CSI GETI	PROCEED ON DISPLAYED GETI
	55	N +00004	ELEVATION 4 180° OPT +208.30 +130.00
	37	TPI GETI	PROCEED ON DISPLAYED GETI
FINAL COMP	90	Y Y DOT	LM Y DOT
	81	CSI ΔV-LV +0000.0	+0000.0

DATE 9/18/72

P31m (COPY), LOAD ΔH = 10.0

V24 N1E
2367E
0E
22062E

VHF
ONLY

VHF
ONLY

VHF
ONLY

BEFORE STEADY STATE
N49>(+000200,+000120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+000020):REJECT/REPEAT

-20
RECYCLE (COPY)

-9

FINAL COMP, OVERWRITE DVY(COPY); P41m

0
HAM

P76m; V67(+10000,+00100,+00001)

HAM COMPUTATION			
INPUT	11	CSI GETI	PROCEED ON DISPLAYED GETI
	55	N +00001	ELEVATION ↑ 180° OPT +208.30 +130.00
	37	TPI GETI	•
	33	HAM GETI	PROCEED ON DISPLAYED GETI
RECYCLE	90	Y	Y DOT LM Y DOT
	81	HAM ΔV-LV	• +0000.0
FINAL COMP	90	Y	Y DOT LM Y DOT
	81	HAM ΔV-LV	+0000.0 +0000.0

P32m(COPY)

IF P36 IN MODE LITES:
OBTAIN CSI GETI FROM GRND(COPY)
P32 WITH GRND GETI

BEFORE STEADY STATE
N49>(+00200,+00020):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

SXT / VHF

RECYCLE(COPY)

-20

-9

FINAL COMP(COPY); P41m

0

CSI FINAL BURN

P76m; P36m (COPY)

SXT / VHF

FINAL COMP (COPY) TO BYPASS P52m AND P4Xm, ZERO DVY
P52m; P4Xm

TO BYPASS GYRO TORQUE: ENTER ON F 50 25
TO GYRO TORQUE: SEE P. 38

PLANE CHANGE

P76m

P33m(COPY)

RECYCLE(COPY)

FINAL COMP(COPY); P40m

CDH BURN

P76m

SXT / VHF

CSI COMPUTATION

INPUT	11	CSI GETI		
		PROCEED ON DISPLAYED GETI		
	55	N +00001	ELEVATION	180° OPT +208.30 +130.00
	37	TPI GETI	PROCEED ON DISPLAYED GETI	
RECYCLE	90	Y	Y DOT	LM Y DOT
	81	CSI ΔV-LV	.	+0000.0
FINAL COMP	90	Y	Y DOT	LM Y DOT
	81	CSI ΔV-LV	.	+0000.0

PLANE CHANGE COMPUTATION

INPUT	33	PC GETI		
		PROCEED ON DISPLAYED GETI		
FINAL COMP	90	Y	Y DOT	LM Y DOT
	81	PC ΔV-LV +0000.0	.	+0000.0

CDH COMPUTATION

INPUT	13	LM CDH GETI		
		PROCEED ON DISPLAYED GETI		
RECYCLE	90	Y	Y DOT	LM Y DOT
	81	CDH ΔV-LV	.	.
FINAL COMP	90	Y	Y DOT	LM Y DOT
	81	CDH ΔV-LV	.	.

DATE 9/18/72

PAGE 21

P34m, OVERWRITE N55 R2

S X T / V H F

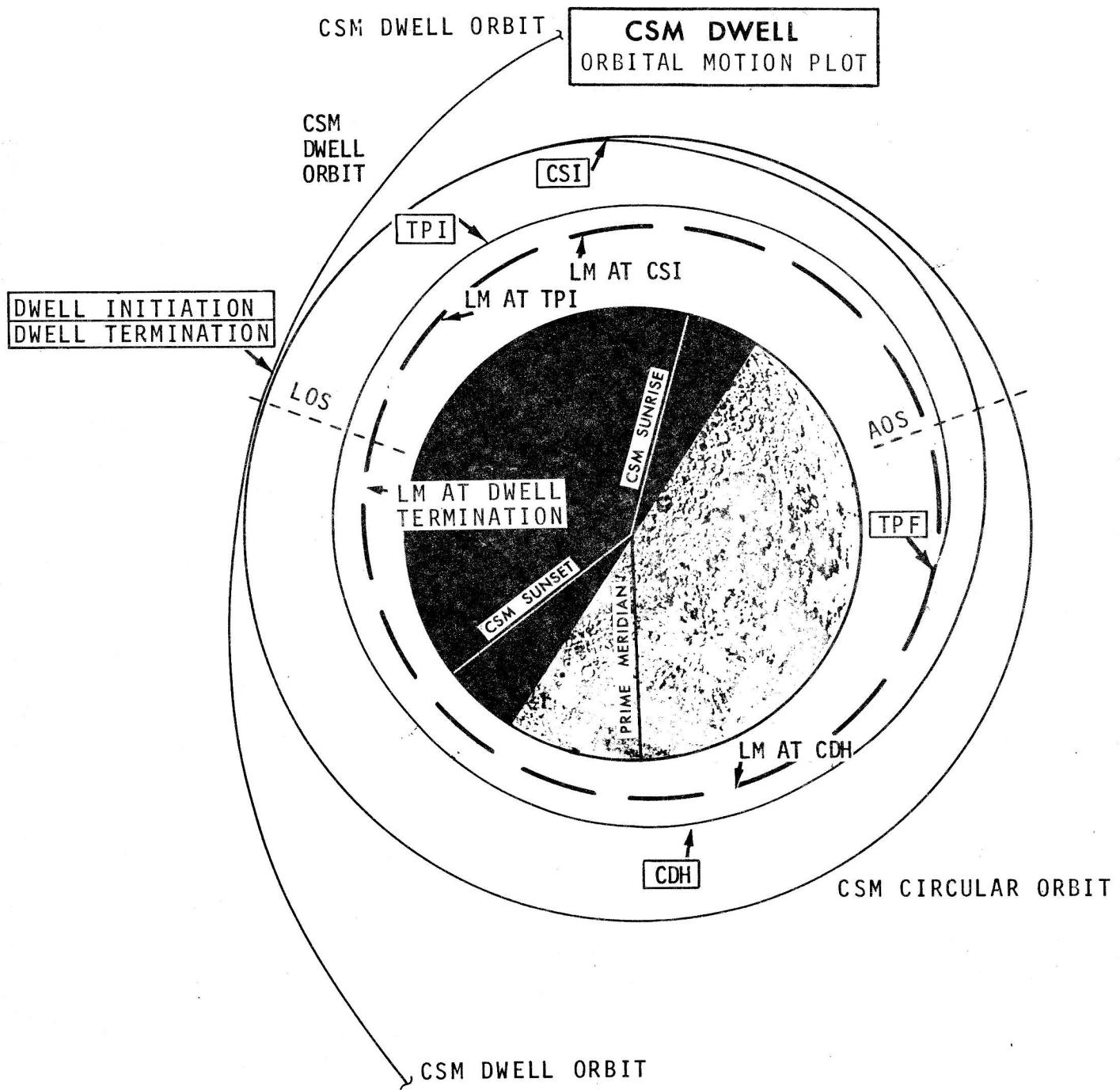
- 20 RECYCLE (COPY)
- 12 FINAL COMP (COPY); P40m
- 0 TPI BURN
- S / V P76m; P35m
- +12 P35 FINAL COMP (COPY); P41m
- +15 MCC1
- S / V P76m, P35m
- +27 P35 FINAL COMP (COPY); P41m
- +30 MCC2
- +42 GO TO TPF ACTIVITIES (PAGE 36)
- TPF

BEFORE STEADY STATE
 N49>(+00080,+00050):REJECT/REPEAT
 AFTER STEADY STATE
 N49>(+00030,+00020):REJECT/REPEAT

TPI-ELEVATION OPTION			
INPUT	37	TPI GETI	PROCEED ON DISPLAYED GETI
	55	INTEG OPT +00000	ELEVATION +208.30 TRANSFER +130.00
RECYCLE	37	TPI GETI	PROCEED ON DISPLAYED GETI
	58	PERILUNE ALT	TPI ΔV
	81	TPI ΔV-LV	TPF ΔV
FINAL COMP	37	TPI GETI	PROCEED ON DISPLAYED GETI
	55	INTEG OPT +00000	ELEVATION +208.30 TRANSFER +130.00
	58	PERILUNE ALT	TPI ΔV
	81	TPI ΔV-LV	TPF ΔV

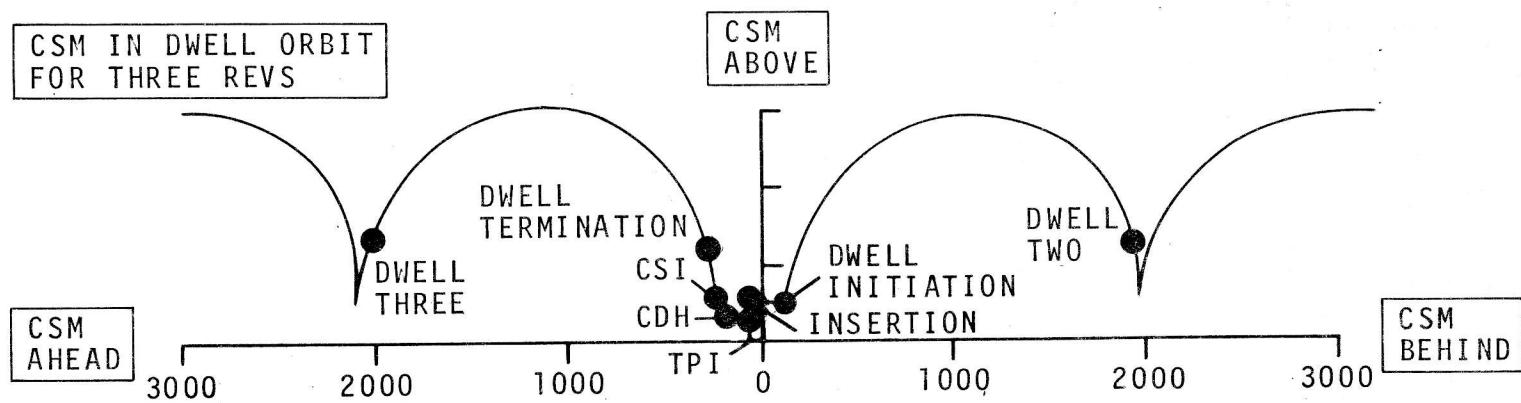
MCC COMPUTATION			
FIN COMP	81	MCC1 ΔV-LV	.

MCC COMPUTATION			
FIN COMP	81	MCC2 ΔV-LV	.



CSM DWELL
RELATIVE MOTION PLOT

LM CENTERED



**CSM DWELL
TIMELINE**

POWER DOWN SIM (SEE EXPs/EVA CHECKLIST)

INSERTION

MSFN UPLINK: LM S.V.

MSFN UPDATE: DWELL INITIATION P30 PAD (COPY)
P32 INITIALIZATION PAD (COPY)

-15

P30; P40

0

DWELL INITIATION BURN

P00

DWELL INITIATION P30 PAD

	D	W	E	L	L	I	PURPOSE
SET STARS	S	P	S	G	&	N	PROP/GUID
R ALIGN	+						WT N47
P ALIGN			0	0			P TRIM N48
Y ALIGN			0	0			Y TRIM
			+	0	0		HRS GETI
			+	0	0	0	MIN N33
			+	0			SEC
ULLAGE							ΔV_X N81
							ΔV_Y
							ΔV_Z
			X	X	X		R
			X	X	X		P
OTHER			X	X	X		Y
REMAIN IN	+						H_A N44
THE DWELL							H_P
ORBIT FOR	+						ΔV_T
REVS			X	X	X		BT
			X				ΔV_C

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	:	.
N55	N ELEV \downarrow	+	0	0	0	1
	180° OPT	+	2	0	8	3
N37	TPI GETI	+	1	3	0	0

DATE 9/18/72

PAGE 25

DWELL TWO P30 PAD

	D	W	E	L	L	2	PURPOSE
SET STARS				G	&	N	PROP/GUID
R ALIGN	+						WT N47
P ALIGN		0	0				P TRIM N48
Y ALIGN		0	0				Y TRIM
ULLAGE		+	0	0			HRS GETI
		+	0	0	0		MIN N33
		+	0				SEC
							ΔV_x N81
							ΔV_y
							ΔV_z
		X	X	X			R
		X	X	X			P
		X	X	X			Y
		+					H _A N44
							H _P
		+					ΔV_t
		X	X	X			BT
		X					ΔV_c

MSFN UPDATE: DWELL TWO P30 PAD (COPY)
P32 INITIALIZATION PAD (COPY)

P52, OPT 3
P00

-9

P30; P41

0

DWELL TWO BURN
P00

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	:	.
N55	N	+	0	0	0	1
	ELEV 4	+	2	0	8	3
	180° OPT	+	1	3	0	0
N37	TPI GETI	+		:	:	.

THIS PAGE IS FOR A
THREE REV DWELL
ONLY.

IF DWELL TERMINATION
IS THE NEXT BURN,
GO TO PAGE 27.

MSFN UPDATE: DWELL THREE P30 PAD(COPY)
P32 INITIALIZATION PAD(COPY)

P52, OPT 3
P00

P30; P41

DWELL THREE BURN

P00

DWELL THREE P30 PAD

	D	W	E	L	L	3	PURPOSE
SET STARS					G	&	N
R ALIGN	+						PROP/GUID
P ALIGN		0	0				WT N47
Y ALIGN		0	0				P TRIM N48
		0	0	0			Y TRIM
		0					HRS GETI
ULLAGE							MIN N33
							SEC
							ΔV_x N81
							ΔV_y
							ΔV_z
	X	X	X				R
	X	X	X				P
	X	X	X				Y
							H_A N44
							H_p
							ΔV_t
	X	X	X				BT
	X						ΔV_c

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	:
N55	N ELEV 4 180° OPT	+	0	0	0 1
		+	2	0	8 3 0
N37	TPI GETI	+	1	3	0 0 0

DWELL TERMINATION PAD

SET STARS	D	W	E	L	L	T	PURPOSE
	S	P	S	G	&	N	PROP/GUID
	+						WT N47
R ALIGN			0	0			P TRIM N48
P ALIGN			0	0			Y TRIM
Y ALIGN			+	0	0		HRS GETI
			+	0	0	0	MIN N33
			+	0			SEC
ULLAGE							ΔV_x N81
							ΔV_y
							ΔV_z
	X	X	X				R
	X	X	X				P
OTHER	X	X	X				Y
BURN INCLUDES	+						H_A N44
PLANE CHANGE							H_P
COMPONENT	+						ΔV_T
	X	X	X				BT
	X						ΔV_C

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	.
N55	N	+	0	0	0 1
	ELEV α	+	2	0	8 3 0
	180° OPT	+	1	3	0 0 0
N37	TPI GETI	+	:	:	.

MSFN UPDATE: DWELL TERMINATION
 P30 PAD INCLUDING
 OUT OF PLANE COMPONENT (COPY)
 P32 INITIALIZATION PAD (COPY)

P52, OPT 3
 P00

V48(11102,X1111)
 P30; P40

-15

0

DWELL TERMINATION BURN

P32 (LOAD P32 INITIALIZATION PAD)

BEFORE STEADY STATE
N49>(+00200,+00120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

FINAL COMP(COPY); P40m

CSI BURN
P76m; P36m(COPY)

FINAL COMP(COPY), **TO BYPASS P52m AND P4Xm, ZERO DVY**
P52m; P4Xm

TO BYPASS GYRO TORQUE: ENTER ON F 50 25
TO GYRO TORQUE: SEE P. 38

PLANE CHANGE

P76m
P33m(COPY)

RECYCLE(COPY)

FINAL COMP(COPY); P40m

CDH BURN
P76m

CSI COMPUTATION

FINAL COMP	90	Y .	Y DOT .	LM Y DOT .
	81	CSI ΔV-LV	.	.
				+0000.0

PLANE CHANGE COMPUTATION

INPUT	33	PC GETI .	PROCEED ON DISPLAYED GETI .	
	90	Y .	Y DOT .	LM Y DOT .
	81	PC ΔV-LV	.	.
				+0000.0

CDH COMPUTATION

INPUT	13	CDH GETI .	PROCEED ON DISPLAYED GETI .	
	90	Y .	Y DOT .	LM Y DOT .
	81	CDH ΔV-LV	.	.
				.
RECYCLE	90	Y .	Y DOT .	LM Y DOT .
	81	CDH ΔV-LV	.	.
				.
FINAL COMP	90	Y .	Y DOT .	LM Y DOT .
	81	CDH ΔV-LV	.	.
				.

DATE 9/18/72

PAGE 29

P34m, OVERWRITE N55 R2

BEFORE STEADY STATE
N49>(+000080,+000050):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

-20 RECYLE(COPY)

-12 FINAL COMP(COPY); P40m

0 TPI BURN

+12 S/V P76m; P35m

+15 FINAL COMP (COPY); P41m

MCC1

P76m, P35m

+27 FINAL COMP(COPY); P41m

MCC2

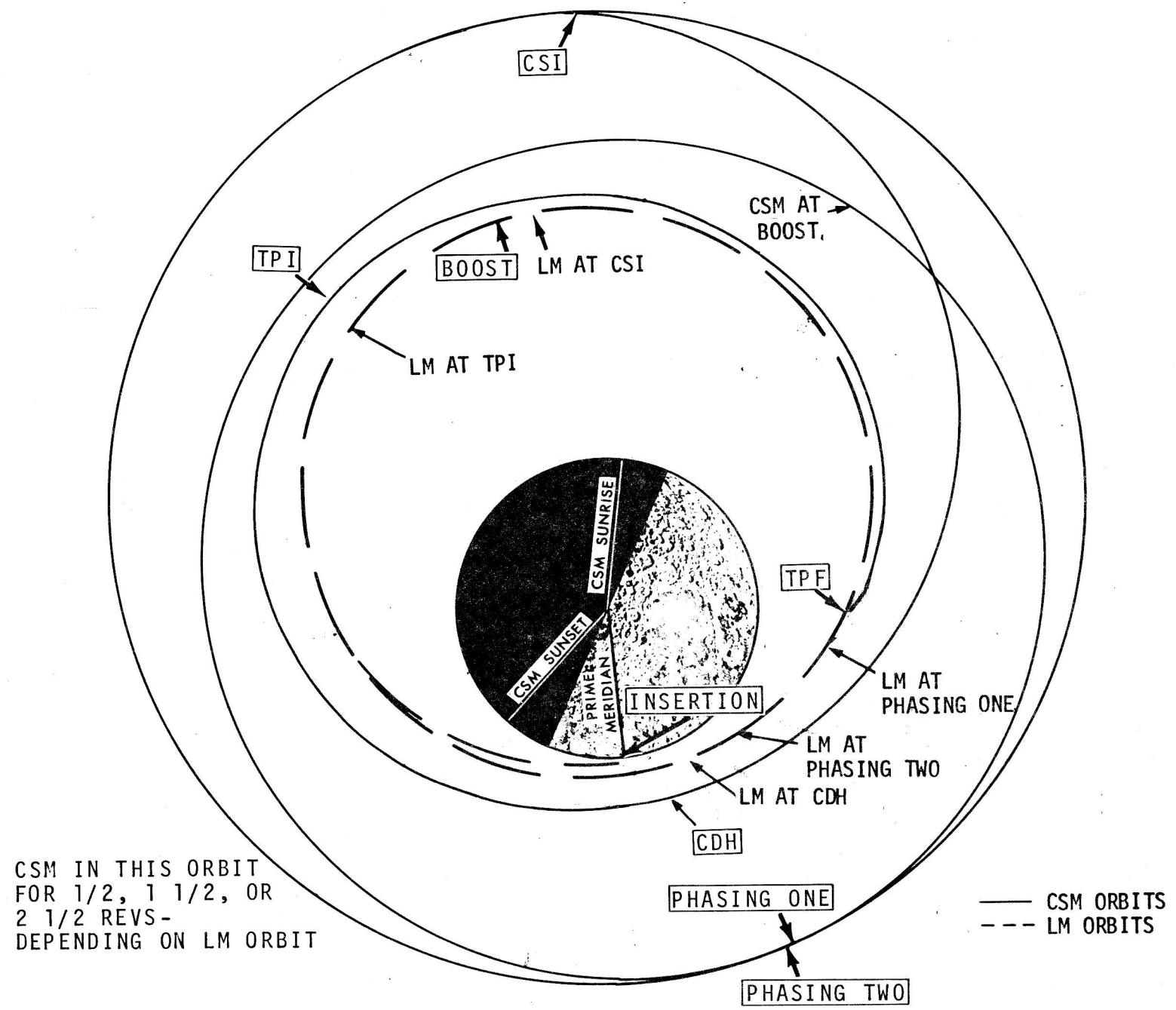
GO TO TPF ACTIVITIES (PAGE 36)

+42 TPF

TPI ELEVATION OPTION			
INPUT	37	TPI GETI	PROCEED ON DISPLAYED GETI
	55	INTEG OPT +000000	ELEVATION +208.30
	37	TPI GETI	TRANSFER +130.00
RECYLE	58	PERILUNE ALT	TPI ΔV
	81	TPI ΔV-LV	TPF ΔV
	37	TPI GETI	PROCEED ON DISPLAYED GETI
FINAL COMP	55	INTEG OPT +000000	ELEVATION +130.00
	58	PERILUNE ALT	TRANSFER +130.00
	81	TPI ΔV-LV	TPF ΔV

MCC COMPUTATION			
FIN COMP	81	MCC1 ΔV-LV	.

MCC COMPUTATION			
FIN COMP	81	MCC2 ΔV-LV	.

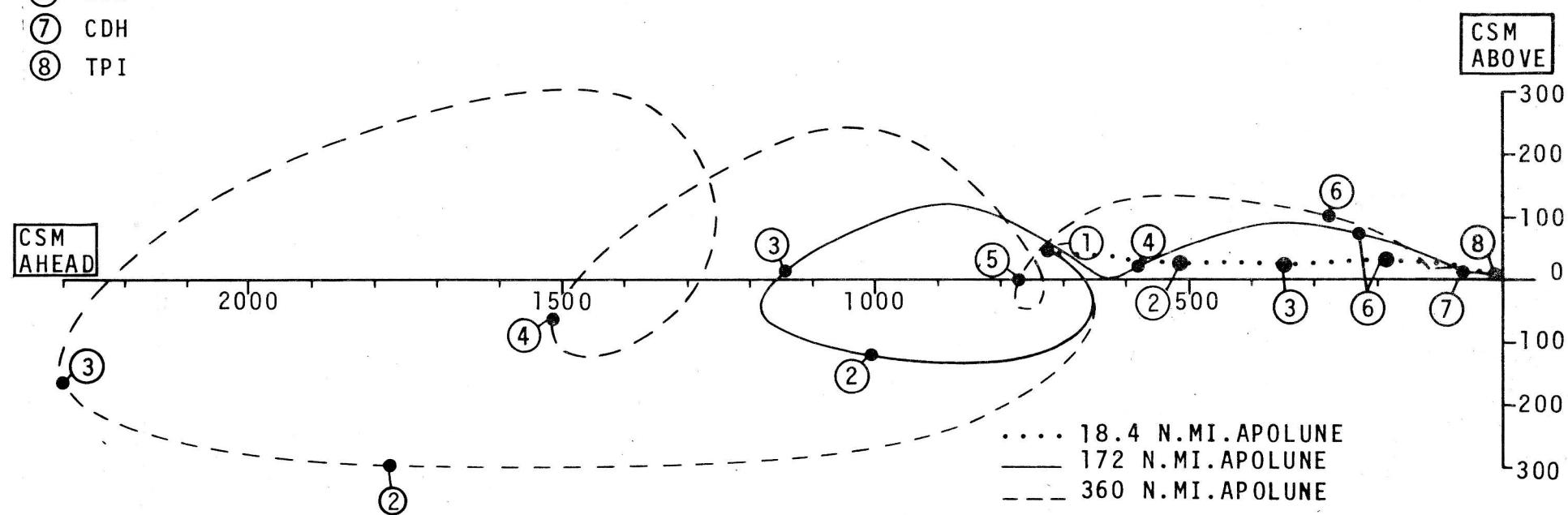
**MANUAL INSERTION
ORBITAL MOTION PLOT**

DATE 9/18/72

MANUAL INSERTION
RELATIVE MOTION PLOTS

LM CENTERED

- (1) INSERTION
- (2) LM BOOST
- (3) PHASING ONE
- (4) PHASING TWO (NOMINALLY ZERO)
- (5) PHASING THREE (NOMINALLY ZERO)
- (6) CSI
- (7) CDH
- (8) TPI



**MANUAL INSERTION
TIMELINE**

POWER DOWN SIM (SEE EXP/EVA CHECKLIST)

INSERTION

MSFN UPLINK: LM S.V.

P52, OPT 3

P00

LM BOOST P76	33 84	LM GETI-BOOST LM BOOST ΔV-LV	:	:	:
		+0010.0	+0000.0	+0000.0	

LM BOOST

VERIFY LM BOOST BURN
P76

MSFN UPDATE: PHASING P30 PAD (COPY)
P32 INITIALIZATION PAD (COPY)

-15

P30; P40

PHASING ONE

PHASING P30 PAD

SET STARS	P	H	A	S	E	I	PURPOSE
	S	P	S	G	&	N	
R ALIGN	+						WT N47
P ALIGN		0	0				P TRIM N48
Y ALIGN		0	0				Y TRIM
		+	0	0			HRS GETI
		+	0	0	0		MIN N33
		+	0				SEC
ULLAGE							ΔV _X N81
							ΔV _Y
							ΔV _Z
OTHER		X	X	X			R
		X	X	X			P
		X	X	X			Y
	+						H _A N44
							H _P
		+					ΔVT
		X	X	X			BT
		X					ΔVC

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	.
N55	N	+	0	0	0
	ELEV ↗	+	2	0	8
	180° OPT	+	1	3	0
N37	TPI GETI	+	:	:	.

(A)

P52, OPT 3
POO

MSFN UPDATE:
 PHASING P30 PAD
 (COPY)
 P32 INITIALIZATION
 PAD (COPY)

P30; P41

PHASING

POO

IF THE NEXT BURN IS NOT CSI,
 RETURN TO (A)

PHASING TWO P30 PAD

SET STARS	PHASE 2				PURPOSE
		G	&	N	
R ALIGN	+				WT N47
P ALIGN		0	0		P TRIM N48
Y ALIGN		0	0		Y TRIM
ULLAGE	+	0	0		HRS GETI
	+	0	0	0	MIN N33
	+	0			SEC
					ΔV_X N81
					ΔV_Y
					ΔV_Z
	X	X	X		R
	X	X	X		P
	X	X	X		Y
	+				H_A N44
					H_P
	+				ΔV_T
	X	X	X		BT
	X				ΔV_C

PHASING THREE P30 PAD

SET STARS	PHASE 3				PURPOSE
		G	&	N	
R ALIGN	+				WT N47
P ALIGN		0	0		P TRIM N48
Y ALIGN		0	0	0	Y TRIM
ULLAGE	+	0	0		HRS GETI
	+	0	0	0	MIN N33
	+	0			SEC
					ΔV_X N81
					ΔV_Y
					ΔV_Z
	X	X	X		R
	X	X	X		P
	X	X	X		Y
	+				H_A N44
					H_P
	+				ΔV_T
	X	X	X		BT
	X				ΔV_C

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	.
N55	N	+	0	0	0
	ELEV	+	2	0	8
	180° OPT	+	3	0	0

N37 TPI GETI + : : .

P32 INITIALIZATION PAD

N11	CSI GETI	+	:	:	.
N55	N	+	0	0	0
	ELEV	+	2	0	8
	180° OPT	+	3	0	0

N37 TPI GETI + : : .

V48(11102,X1111)
P32(LOAD P32 INITIALIZATION PAD)

BEFORE STEADY STATE
N49>(+00200,+00120):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

SXT / VHF

-20
RECYLE(COPY)

-12
FINAL COMP(COPY); P40m

0
CSI BURN

P76m; P36m(COPY)

SXT / VHF

-9
FINAL COMP(COPY), TO BYPASS P52m AND P4Xm, ZERO DVY
P52m; P4Xm

BEFORE STEADY STATE
N49>(+00080,+00050):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

0
PLANE CHANGE

P76m

P33m(COPY)

RECYCLE(COPY)

TO BYPASS GYRO TORQUE: ENTER ON F 50 25
TO GYRO TORQUE: SEE P. 38

-20
FINAL COMP(COPY); P40m

0
CDH BURN

P76m

SXT / VHF

PAGE 34

DATE 9/18/72

CSI COMPUTATION			
RECYCLE	90	Y	Y DOT
	81	CSI ΔV-LV	.
FINAL COMP	90	Y	Y DOT
	81	CSI ΔV-LV	.
			+0000.0
			.
FINAL COMP	90	Y	Y DOT
	81	CSI ΔV-LV	.
			+0000.0

PLANE CHANGE COMPUTATION			
INPUT	33	PC GETI	*
			PROCEED ON DISPLAYED GETI
FINAL COMP	90	Y	Y DOT LM Y DOT
	81	PC ΔV-LV	.
		+0000.0	.
			+0000.0

CDH COMPUTATION			
INPUT	13	CDH GETI	*
			PROCEED ON DISPLAYED GETI
RECYCLE	90	Y	Y DOT LM Y DOT
	81	CDH ΔV-LV	.
FINAL COMP	90	Y	Y DOT LM Y DOT
	81	CDH ΔV-LV	.
			.

DATE 9/18/72

P34m, OVERWRITE N55 R2

SXT
/VHF

RECYCLE (COPY)

-20

-12

FINAL COMP (COPY); P40m

0

TPI BURN

S/V

P76m; P35m

+12

FINAL COMP(COPY); P41m

MCC1

+15

P76m; P35m

+27

FINAL COMP(COPY); P41m

MCC2

+30

GO TO TPF ACTIVITIES (PAGE 36)

+42

TPF

BEFORE STEADY STATE
N49>(+000080,+00050):REJECT/REPEAT
AFTER STEADY STATE
N49>(+00030,+00020):REJECT/REPEAT

TPI-ELEVATION OPTION			
INPUT	37	TPI GETI	PROCEED ON DISPLAYED GETI
	55	INTEG OPT +000000	ELEVATION +208.30 TRANSFER +130.00
RECYCLE	37	TPI GETI	PROCEED ON DISPLAYED GETI
	58	PERILUNE ALT	TPI ΔV TPF ΔV
	81	TPI ΔV-LV	.
FINAL COMP	37	TPI GETI	PROCEED ON DISPLAYED GETI
	55	INTEG OPT +000000	ELEVATION +130.00
	58	PERILUNE ALT	TPI ΔV TPF ΔV
	81	TPI ΔV-LV	.

MCC COMPUTATION			
FIN COMP	81	MCC1 ΔV-LV	.

MCC COMPUTATION			
FIN COMP	81	MCC2 ΔV-LV	.

TPF ACTIVITIES

+30

(11102)
(X1111)

MCC2

P76m; P79m; P00
V49 MNVR TO X-AXIS TRACK ATTITUDE
ACQ MSFN

PERFORM PRE-DOCK CHECKLIST

 IF CSM ACTIVE
 P47 AT 1.25 N.M.
 SEC PRPLNT FUEL PRESS(4)-OPEN
 V83E ←
 N83E
 KEY REL -----

UTILITY PWR-ON (VERIFY)
 TV-ON
 DAC-ON
 LM PHOTOS WITH DAC/TV

+42

TPF

EMS MODE-STBY
 EMS FUNC-OFF
 EXT RNDZ LT-OFF
 LM STATION KEEP

DAC/TV-OFF

PRE-DOCK CHECKLIST

MAN ATT(3)-RATE CMD(VERIFY)
 LIMIT CYCLE-OFF(VERIFY)
 ATT DB-MIN
 RATE-LOW(VERIFY)
 TRANS CONTR PWR-ON(UP)
 ROT CONTR PWR DIRECT(BOTH)-MNA/MNB
 SC CONT-CMC(VERIFY)

AUTO RCS SEL(16)-MNA/MNB
 CB DOCK PROBE(2)-CLOSED
 PROBE RETR(2)-OFF(VERIFY)
 PROBE EXTD/REL-RETR
 PROBE EXTD/REL TB(2)-GRAY(VERIFY)
 (IF TB NOT GRAY, GO TO PG S/2-13,E)
 CB SECS LOGIC(2)-CLOSED(VERIFY)
 CB SECS ARM(2)-CLOSED
 EXT LIGHTS RUN/EVA-ON(UP)(VERIFY)
 COAS PWR-ON(UP)(VERIFY)

BRAKING GATES

R,NM	R,FPS	RETICLE ANG,DEG	R,FT
1.50	45	.08	9000
1.00	30	.13	6000
.50	20	.26	3000
.25	10	.54	1500
.08	5	1.60	500
.05		2.70	300
.03		4.00	200
.02		8.50	100.

V49 MNVR TO SIM BAY INSPECTION ATTITUDE (319,254,000)

V49 MNVR TO DOCKING ATTITUDE (180,285,0)

DOCKING ATTITUDE
VERIFY HGA

CUE MSFN FOR LOGIC ARM
SECS LOGIC (BOTH)-ON(UP)
MSFN GO FOR PYRO ARM
SECS PYRO ARM (2)-ON(UP)

P47
DAC/TV-ON
LM MNVR TO DOCKING ATTITUDE
TRANSLATE TO CAPTURE LATCH
PERFORM DOCKING CHECKLIST

DOCKING
DAC/TV-OFF
POO
V48 (61111)
(X1111)

CMC MODE-AUTO
RNDZ XPONDER-OFF
GO TO VOLUME II OF THE FLIGHT PLAN

(61111)
(X1111)

DOCKING CHECKLIST

AT CAPTURE

PROBE EXTD/REL TB(2)-BP(VERIFY)
(IF TB NOT BP, GO TO PG S/2-11, A)
REPORT CAPTURE TO LM
SC CONT-CMC(VERIFY)
CMC MODE-FREE
ALLOW PROBE TO DAMP S/C MOTION(10 SEC)
WHEN WITHIN $\pm 3^\circ$ OF DOCKING ATTITUDE
PROBE RETRACT SEC-1 (PRIM-2 IF REQ)

AT DOCK LATCH

PROBE EXTD/REL TB(2)-GRAY

AT HARD DOCK

SECS PYRO ARM (2) - SAFE
SECS LOGIC (BOTH) - OFF
CB SECS ARM (2) - OPEN
CB DOCK PROBE (2) - OPEN
THC - LOCKED
RHC - LOCKED
BMAG MODE (3) - RATE 2(VERIFY)
PROBE EXTD/REL - OFF
PROBE RETRACT (2) - OFF
EXT RUN/EVA LIGHT - OFF
EXT RNDZ LIGHT - OFF
COAS PWR - OFF
AUTO RCS SEL ROLL (4)-OFF
TRANS CONTR PWR-OFF
ROT CONTR PWR DIRECT (BOTH)-OFF
VHF RANGING OFF

**SPS PLANE CHANGE
(G&C CHECKLIST P. G/4-2)**

36.1 P52 F 06 22
 PRO
 F 50 25 (00020)
 ALIGN GDC TO 90° OR 270° ROLL
 0° OR 180° PITCH
 0° YAW
 LIMIT CYCLE-ON
 ATT DB-MIN
 RATE LOW
 BMAG MODE(3)-ATT1/RATE2
 SC CONT-SCS
 PRO
 16 20
 MONITOR TORQUING
 * * * * * * * * * * * * * * * *
 IF RESTART OCCURS: CONTINUE
 ON P. 39
 * * * * * * * * * * * * * * * *
 P40 F 50 18
 BMAG MODE(3)-RATE2
 SC CONT-CMC
 PRO
 06 18
 MONITOR MNVR
 PERFORM P40, STARTING AT STEP 5

36.2 P76 F 06 33
 PRO
 F 06 84
 PRO
 36.4 P20 F 50 18
 SC CONT-CMC
 PRO
 06 18
 MONITOR MNVR
 * * * * * * * * * * * * * * * *
 IF AUTO MNVR INTERRUPTED:
 MNVR TO 0° YAW ON GDC
 V32E
 * * * * * * * * * * * * * * * *
 36.5 P52 F 06 22
 PRO
 F 50 25 (00020)
 SC CONT-SCS
 BMAG MODE(3)-ATT1/RATE2
 PRO
 16 20
 MONITOR TORQUING
 * * * * * * * * * * * * * * * *
 IF RESTART OCCURS: CONTINUE
 ON P. 39
 * * * * * * * * * * * * * * * *
 P33 F 06 13
 BMAG MODE(3)-RATE2
 SC CONT-CMC
 CONTINUE IN P33, STEP 3

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PRE-PLANE CHANGE PULSE TORQUING
RESTART RECOVERY (EMP 518)

P52 F 50 25 (00020)
V41 N20E
F 21 22
V33E
41 NO ATT LITE-ON
F 50 25 (00020)
V40E
NO ATT LITE-OFF
V21 N1E 1214E E
V71E 24E 1733E
V21E 303E 24E
V33E
F 50 25 (00020)
V21 N46E 11103E
V46E
PRO
P40 F 50 18
BMAG MODE(3)-RATE2
SC CONT-CMC
PRO
PERFORM P40, STARTING AT
STEP 5
P76 F 06 33
PRO
F 06 84
PRO
P20 F 50 18
SC CONT-CMC
PRO
06 18
MONITOR MNVR

P52 F 06 22
PRO
F 50 25 (00020)
V37E 52E
MNVR TO ACQUIRE STARS
PERFORM P52, OPT 1,
COURSE ALIGN
F 37
33E
P33 F 50 25 00017
PRO
F 50 18
PRO
06 18
MONITOR MNVR
F 06 13
V21 N46E 11102E
V46E
CONTINUE IN P33, STEP 3

POST-PLANE CHANGE PULSE TORQUING
RESTART RECOVERY (EMP 518)

P52 F 50 25 (00020)
V41 N20E
F 21 22
V33E
41 NO ATT LITE-ON
F 50 25 (00020)
V40E
NO ATT LITE-OFF
V21 N1E 1214E E
V71E 24E 1733E
V21E 303E 24E
V33E
F 50 25 (00020)
BMAG MODE(3)-RATE2
SC CONT-CMC
PRO
P33 06 13
V37E 52E
P52 F 37
PERFORM P52, OPT 3
P33 33E
CONTINUE IN P33

PAGE 39

SPS PLANE
CHANGE BURN

PRE-BRAKING SPS BURN PROCEDURES

+15 MCC-1

COMPUTE PRE-BRAKING BURN GETI AND TRANSFER ANGLE(COPY)

V93
P34(SEE INPUT)

+18

SXT/VHE

FINAL COMP (COPY)

+27

+30

V48(11103,X1111)
P40

GETI-TPI	•	•	•
	•	•	•
ΔT: TPI-PRE-BRAKING	•	+37	• 00.00
GETI- PRE-BRAKING	•	•	•
	•	•	•

TRANSFER & COMPUTATION
OBTAIN TPF & V FROM N58 OF TPI SOLUTION

$$\text{TRANSFER } \} = \frac{\text{TPF } \Delta V}{2}$$

TRANSFER \$ =
LOAD INTO N55 (R3)

PRE-BRAKING BURN COMPUTATION				
INPUT	37	COMPUTED P34 GETI		
	55	INTEG OPT +00000	ELEVATION + +00000.0	COMPUTED TRANSFER
FINAL COMP	55	INTEG OPT +00000	ELEVATION + .	TRANSFER +
	58	PERILUNE ALT .	P34 ΔV	TPF ΔV
	81	P34 ΔV-LV .	.	.

+30

P40

SPS CHECKLIST

+37

PRE-BRAKING BURN

P79; P00; V49 MNVR TO X-AXIS TRACK ATTITUDE
 ACQ MSFN HGA
 V48(11102,X1111)
 PERFORM PRE-DOCK CHECKLIST

P47 AT R=1.25 NM
 SEC PRPLNT FUEL PRESS(4)-OPEN
 V83E KEY REL
 N83E

UTIL PWR-ON (VERIFY)
 DAC/TV-ON
 LM PHOTOS WITH DAC/T V

TPF

EMS MODE-STBY
 EMS FUNC-OFF
 EXT RNDZ LT-OFF
 LM STATION KEEP
 GO TO VOL II OF FLIGHT PLAN

PRE-DOCK CHECKLIST

MAN ATT(3)-RATE CMD(VERIFY)
 LIMIT CYCLE-OFF(VERIFY)
 ATT DB-MIN
 RATE-LOW(VERIFY)
 TRANS CONTR PWR-ON(UP)
 ROT CONTR PWR DIRECT(BOTH)-MNA/MNB
 SC CONT-CMC(VERIFY)

AUTO RCS SEL(16)-MNA/MNB
 CB DOCK PROBE(2)-CLOSED
 PROBE RETR(2)-OFF(VERIFY)
 PROBE EXTD/REL-RETR
 PROBE EXTD/REL TB(2)-GRAY(VERIFY)
 (IF TB NOT GRAY, GO TO PG S/2-13,E)
 CB SECS LOGIC(2)-CLOSED(VERIFY)
 CB SECS ARM(2)-CLOSED
 EXT LIGHTS RUN/EVA-ON(UP)(VERIFY)
 COAS PWR-ON(UP)(VERIFY)

BRAKING GATES

R, NM	R, FPS	RETICLE ANG, DEG	R, FT
1.50	45	.08	9000
1.00	30	.13	6000
.50	20	.26	3000
.25	10	.54	1500
.08	5	1.60	500
.05		2.70	300
.03		4.00	200
.02		8.50	100

IMU FAILURE RENDEZVOUS

WHEN IMU FAILURE KNOWN:
 PERFORM IMU FAILURE SWITCH CHECKLIST
 PERFORM GDC REFSMMAT DETERMINATION PROCEDURE (G/7-13)
 (IF REQD: PERFORM GDC REFSMMAT REALIGN(P52-OPT 4) (G/7-15)

MNVR TO TRACK/STAR FIELD ATT(180,280,0), ACQ HGA
 LOAD N20 AND ATT SET TW'S TO(180,280,0)
 MNVR BY NULLING ERROR NEEDLES

IMU FAILURE SWITCH CHECKLIST

IMU POWER-OFF
FDI SELECT-1
FDI SOURCE-ATT SET
ATT SET-GDC
ATT DB-MIN
RATE-LOW
SC CONT-SCS
BMAG MODE(3)-ATT 1/RATE 2

DIRECT ASCENT RNDZ PAD				UPDATE (IF REQ'D)		
GETI	HRS	+ 0 0			+ 0 0	
LIFT-OFF	MIN	+ 0 0 0			+ 0 0 0	
	SEC	+ 0			+ 0	
GETI	HRS	+ 0 0			+ 0 0	
TPI	MIN	+ 0 0 0			+ 0 0 0	
N37	SEC	+ 0			+ 0	

SET REFSMMAT FLAG(VERIFY)
 V25 N7E,77E,10000E,1E

PRE-SPS BURN SIM PREP (CUE CARD)

COELLIPTIC RNDZ PAD				UPDATE (IF REQ'D)		
GETI	HRS	+ 0 0			+ 0 0	
LIFT-OFF	MIN	+ 0 0 0			+ 0 0 0	
	SEC	+ 0			+ 0	
GETI	HRS	+ 0 0			+ 0 0	
CSI	MIN	+ 0 0 0			+ 0 0 0	
N11	SEC	+ 0			+ 0	
GETI	HRS	+ 0 0			+ 0 0	
TPI	MIN	+ 0 0 0			+ 0 0 0	
N37	SEC	+ 0			+ 0	

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MSFN UPDATE:
GO/NO GO FOR LIFT-OFF

LM LIFT-OFF

VHF RNG-RESET

LM INSERTION

P52(OPTION 3)
RECORD STAR NO. SHAFT TRUNNION

POO

MSFN UPLINK:
LM S.V.

P34(ACCEPT MNKY)(BYPASS MNVR)
V57-LOAD R2=1

BEFORE STEADY STATE
PRE-TPI: N49 > (+00200,+00120) REJECT/REPEAT
POST-TPI:N49 > (+00080,+00050) REJECT/REPEAT
AFTER STEADY STATE
ANYTIME: N49 > (+00030,+00020) REJECT/REPEAT

V
H
F
O
N
L
Y
VERIFY LM TRACKER LT-ON
ALIGN GDC TO N20
PERFORM GDC REFSMMAT DETERMINATION PROCEDURE
V37E00E; V96E; V21 N1E,1214E,63E;
V25 N26E,13001E,3425E,30005E; V30E

SCS BURN MANEUVER

N/A SET STARS	C	S	M	B	/	O	PURPOSE
	S	P	S/G	&	N		PROP/GUID
R ALIGN N / A	+			N	/	A	WT N47
P ALIGN N / A		0	0	N	/	A	P TRIM N48
Y ALIGN N / A		0	0	N	/	A	Y TRIM
ULLAGE _____		0	0	0			HRS GETI
4 JET, 11 SEC		0	0	0			MIN N33
_____		0					SEC
_____							ΔV_x N81
_____							ΔV_y
_____							ΔV_z
AVC _____	X	X	X				R ..
_____	X	X	X				P
_____	X	X	X				Y
_____	+			N	/	A	H_A N44
_____				N	/	A	H_p

*IF LM BAILOUT REQ'D:

* COPY P76 DATA FROM LM

*

*33

*

*84

*

* GO TO RESCUE BOOK PG 4

* *IF CSM BAILOUT REQ'D:

* *

* *MSFN UPDATE:

* * CSM BAILOUT P30 PAD

* *P30

* *P40 ; SET UP EMS

* *SPS BURN CUE CARD

* *CSM BAILOUT BURN

* *GO TO RESCUE BOOK PG 4

P34 INPUT

37	LM GETI-TPI	:	:
55	INTEG OPT +00000	ELEVATION +000.00	TRANSFER +130.00

IMU FAILURE
RENDEZVOUS

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-25

P34 (ACCEPT MNKY)(NO SXT MARKS UNTIL TPI - 17)
V25 N7E,76E,20000E,OE
V21 N1E,301E,3777E
(V86E TO REJECT MARK)

V
H
F
O
N
L
Y

MNVR TO SXT TRACK ATT (180,334,0)
LOAD N20 AND ATT SET TW'S TO(180,334,0)
MNVR BY NULLING ERROR NEEDLES

-17

BEGIN SXT MARKS

V
H
F
A
N
D
S
X
T

*
* IF MARK REJECT BUTTON INADVERTENTLY PUSHED: *
* BEFORE PROCEEDING ON F 51
* V21 N1E,1336E,31264E
* *

VERIFY DSE TAPE MOTION(LBR/RCD/FWD/CMD RESET)

-10

P34 FINAL COMP
COMPARE SOLUTIONS

- 8

P40
LOAD N18 VALUES IN N20 AND ATT SET TW'S
MNVR BY NULLING ERROR NEEDLES

- 6

SPS CHECKLIST

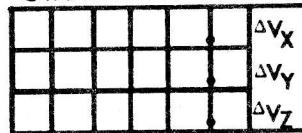
POO

TPI

LM +75.1,-0.5,+14.1
CSM -76.1,+0.5,-12.1
(180,279,0)

0

GROUND TPI FOR LM



P34 FINAL COMP			
	INTEG OPT +00000	ELEVATION \$	TRANSFER \$
55	PERILUNE ALT	TPI ΔV	TPF ΔV
58	•	•	•
81	TPI ΔV-LV	•	•
84	LM TPI ΔV-LV	•	•
84	LM TPI ΔV-LV	•	•

P76

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P76(P77)

P35(ACCEPT MNKY)

CALL N22; LOAD N22 VALUES IN N20 AND ATT SET TW'S
MNVR BY NULLING ERROR NEEDLESV25 N7E,76E,20000E,0E
V21 N1E,301E,37777E

+ 3

V
H
F

A
N
D

S
X
T

+12

P35 FINAL COMP

P41(P40); LOAD N18 VALUES IN N20 AND ATT SET TW'S
MNVR BY NULLING ERROR NEEDLES

POO

MCC-1

P76(P77)

P34(ACCEPT MNKY)

V93

CALL N22; LOAD N22 VALUES IN N20 AND ATT SET TW'S
MNVR BY NULLING ERROR NEEDLESV25 N7E,76E,20000E,0E
V21 N1E,301E, 37777E

+15

V
H
F

A
N
D

S
X
T

+18

P34 FINAL COMP

P41(P40); LOAD N18 VALUES IN N20 AND ATT SET TW'S
MNVR BY NULLING ERROR NEEDLES

POO

MCC-2

+26

+30

P76

P35 FINAL COMP

81	MCC1 ΔV-LV	•	•	•
84	LM MCC1 ΔV-LV	•	•	•
84	LM MCC1 ΔV-LV	•	•	•

P76

P34 INPUT

37	GETI-MCC2	•	•	•
55	INTEG OPT +00000	ELEVATION \$ +000.00	TRANSFER \$ +040.00	

P34 FINAL COMP

55	INTEG OPT +00000	ELEVATION \$ •	TRANSFER \$ +040.00
58	PERILUNE ALT	MCC2 ΔV	TPF ΔV
81	MCC2 ΔV-LV	•	•
84	LM MCC2 ΔV-LV	•	•
84	LM MCC2 ΔV-LV	•	•

P76(P77)

P79

LOAD N22 VALUES IN ATT SET TW'S
MNVR BY NULLING ERROR NEEDLES

ACQ MSFN HGA

PERFORM PRE-DOCK CHECKLIST

CENTER LM IN COAS
CYCLE BMAG MODE SWITCHES-RATE 2/ATT 1 RATE 2
FDAI SOURCE-GDC(VERIFY)

IF CSM ACTIVE:

AT R=1.25 NM; LOAD EMS WITH -(100+TPFΔV)
FOR DSKY DISPLAY OF VHF RANGE:
V25 N7E,75E,100E,1E; V87E; V16 N2E,3703E
SEC PRPLNT FUEL PRESS(4)-OPEN
EMS FUNC-AV
EMS MODE-NORMAL

+42
TPF
: : .
EMS MODE-STBY
EMS FUNC-OFF
EXT RNDZ LT-OFF

LM STATION KEEP

POO

CUE MSFN FOR LOGIC ARM
SECS LOGIC(BOTH)-ON(UP)
MSFN GO FOR PYRO ARM
SECS PYRO ARM(2)-ON(UP)

LM MNVR TO DOCKING ATTITUDE

TRANSLATE TO CAPTURE LATCH
PERFORM DOCKING CHECKLIST

DOCKING
: : .

PRE-DOCK CHECKLIST

FDAI SOURCE-GDC
LIMIT CYCLE-OFF(VERIFY)
TRANS CONTR PWR-ON(UP)
ROT CONTR PWR DIRECT(BOTH)-MNA/MNB
AUTO RCS SEL(16)-MNA/MNB
CB DOCK PROBE(2)-CLOSED
PROBE RETRACT(2)-OFF(VERIFY)

PROBE EXTD/REL - RETR
PROBE EXTD/REL TB (2) - GRAY (VERIFY)
(IF TB NOT GRAY, GO TO PG S/2-13,E)
CB SECS LOGIC (2) - CLOSED (VERIFY)
CB SECS ARM (2) - CLOSED
EXT LIGHTS RUN/EVA - ON (UP) (VERIFY)
COAS PWR - ON (UP) (VERIFY)

BRAKING GATES

R,NM	R,FPS	RETICLE ANG,DEG	R,FT
1.50	45	.08	9000
1.00	30	.13	6000
.50	20	.26	3000
.25	10	.54	1500
.08	5	1.60	500
.05		2.70	300
.03		4.00	200
.02		8.50	100

DOCKING CHECKLIST

AT CAPTURE

PROBE EXTD/REL TB (2) - BP (VERIFY)
(IF TB NOT BP, GO TO PG S/2-11, A)
REPORT CAPTURE TO LM
BMAG MODE (3) - RATE 2
ALLOW PROBE TO DAMP SC MOTION (10 SEC)
WHEN WITHIN $\pm 3^\circ$ OF DOCKING ATTITUDE
PROBE RETRACT SEC - 1 (PRIM - 2 IF REQ'D)

AT DOCK LATCH

PROBE EXTD/REL TB (2) - GRAY.

AT HARD DOCK

SECS PYRO ARM (2) - SAFE	EXT RUN/EVA LIGHT - OFF
SECS LOGIC (BOTH) - OFF	EXT RNDZ LIGHT - OFF
CB SECS ARM (2) - OPEN	COAS PWR - OFF
CB DOCK PROBE (2) - OPEN	LIMIT CYCLE - ON
THC - LOCKED	ATT DB - MAX
RHC - LOCKED	
	BMAG MODE (3) - ATT 1/RATE 2
PROBE EXTD/REL - OFF	AUTO RCS SEL ROLL(4)-OFF
PROBE RETRACT (2) - OFF	THC PWR - OFF
VHF RANGING-OFF	RHC PWR DIR (2) - OFF

SPS RESCUE BURN TABLE

ENGINE LIMITS	P OR Y RATES	ATT DEVIATION	MANUAL START ACTION	RESIDUALS
LOOSE	10°/SEC COMPLETE	±10° COMPLETE	START IF ΔV TO GO >12 FPS	TRIM ALL AXES TO 0.2 FPS

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SPS RESCUE
BURN TABLE

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