APOLLO 14

L M TIMELINE BOOK

PART NO.	S/N
SKB32100083-388	1002

APOLLO 14

LM TIMELINE

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UNDOCK & SEPARATION TO REV12 LS TCA

104:10

AOS 104 +19

PREP FOR UNDOCKING

USE ACTIVATION & C.O.
C/L TO 10 MIN BEFORE UNDOCK

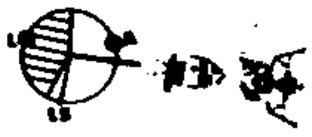
-10 CHECK ATT (0, 150/282,060)

V48 21002
LM WT _____ (34,150)
PRO, V34
HELMETS AND GLOVES - ON
*S-BD ANT - AFT, VERIFY COMM *
*S-BD P ____(+132) *
* Y ____(+47) *
*S-BD ANT - SLEW (>3.0) *
*TRACK MODE - AUTO (>4.0) *
*VHF B XMTR - OFF *
*BIOMED - LEFT, PCM-HI *
*UPLINK SQUELCH - OFF *
GO/NO GO FOR UNDOCKING
VOICE DRIFT ✓ GIMBAL ANGLES TO MSFN (ACT:2-34)
*TAPE RECORDER - ON *

-1 P47
*ZERO 404, 405, 406 *
*47OR *
INSERT V77 (DO NOT ENTR)

UNDOCK & SEPARATION ___:___:___ (104:27:31)

ENTR V77
DEADBAND - MIN



P00, V60
YAW LT 60°
PITCH UP 90°
*SEQUENCE CAMERA - ON (1 MIN) *
+3 FDAI (0,280/014,0)
*VERIFY TRACKING LT-ON,THEN OFF *
*VHF ANT - FWD *
*SEQUENCE CAMERA - OFF *
*TAPE RECORDER - OFF *
*S-BD P +100, Y -42 *
HELMETS & GLOVES - OFF (OPT)

UPDATE FROM MSFN

*COPY REV 12 LS TCA 104:59:38 *

104:40

104:40

*UPDATA LINK - DATA *
*UPLINK CSM S.V., PIPA BIAS, *
* GYRO DRIFT COMP *
*UPDATA LINK - OFF *

AGS INITIALIZE AND ALIGN

*V47, 414+1, 400+3 *
V83, SET ORDEAL ON LMP FDAI
*317R,440R, 277R
*400+2, 507+0 *
*CAMERA SETTINGS *
LM3/DAC/10/CEX-ULC (f2.8,250,∞)
* 1 FPS, .05 MAG, (5 MIN) *
*LM_/DC/60/HCEX-(f2.8,500,∞)5 *

DPS THROTTLE CHECK

THROT CONT - MAN/CDR
TTCA (BOTH) - THROTTLE (MIN)
(SET FRICTION)
*VERIFY MSFN CONTACT *
ENG STOP - PUSH
ENG ARM - DES (DES REG LT - ON)
TTCA MIN (6.6% - 13.4%)
THEN SOFT STOP (46.2% - 59.2%)
THEN MAX (93.6% - 100+%)
THEN MIN
ADJUST FRICTION
MAN THROT- LMP
*REPEAT TEST FOR LMP TTCA *
ENG ARM - OFF
CYCLE CWEA (DES REG LT - OFF)
ENG STOP - RESET
THROT CONT - AUTO/CDR
TTCA (BOTH) - JETS

APPROACH TO LANDING SITE

PITCH TO OBSERVE LS
FDAI (0, 325/XXX, 0)

+28 SEQUENCE CAMERA - ON(5-11IN)

+32 **REV 12 LANDING SITE TCA** ___:___:___ (104:59)

105:00

REV 12 LS TCA TO CSM CIRCULARIZATION

105:00

REV 12 LANDING SITE TCA

+33 *SEQUENCE CAMERA - OFF *

RENDEZVOUS RADAR CHECKOUT

+35 MNVR TO FDAI (0,342/329,0)
CB RR(2) CLOSE,√TEMP (10°-75°)
RT/ERR MON-RR
RR-SLEW, MANUAL LOCK-ON, RR-LGC
V63, TM-R/Ṙ
RT/ERR MON-LDG RDR/CMPTR
*AGS-AUTO,√ERROR NEEDLE,-ATT HOLD *
*VHF A XMTR - VOICE/RNG *
COMPARE V63, TM, VHF RANGE
V34
*VHF A XMTR - VOICE *
*400+0 *
V41N72E (+00000TRUN,+28300 SHFT)
CB RR(2)-OPEN,V44
COPY CSM CIRC P76 & PDI$_0$ ABORT PADS
*SET DET TO COUNT DN TO CSM CIRC *
*CAMERA SETTINGS FOR CSM CIR *
*LM3/DAC/10/CEX-ULC (ƒ8 ,250,∞) *
6 FPS, .03 MAG, (30 SEC) *
*LM1/DC/60/HCEX-(ƒ11 ,250,∞)2 *

	R	Ṙ
MAX Δ	.27 NM	
V63		
VHF		XX
TM		

-38 **IMU FINE ALIGN**
V76
P52 OPT3
CB AOT LAMP CLOSE
AOT - DETENT F/0.0°
PGNS MODE CONT - AUTO
1ST STAR REGULUS (222)
PRO, RCD GET ___:___:___
2ND STAR SPICA (226)
N05 ANGLE DIFF_____
PRO
N93 TORQUING ANG
X_____
Y_____
Z_____
PRO
N25

CONFIGURE COMM FOR LOS
*MATCH INDICATED ANGLES *
*TRACK MODE - SLEW *
*S-BD ANT - AFT *
*SET P____ (+14) *
* Y____ (-10) *
*VHF B XMTR - DATA *
*BIOMED - OFF, PCM - LO *
UPLINK SQUELCH - ENABLE
S-BD ANT-FWD(AFTER LOS)

LOS 105 +25

105:30

105:30 **LPD CALIBRATION**
PRO, ENTR
N70, ENTR 013 (CAPELLA), PRO BIAS AZ____
N87, (+35954,+32041) PRO,PRO EL____
*DETENT CL *
*CB AOT LAMP - OPEN *
V34, P00
PGNS MODE CONT - AUTO
*400+3 *

AGS CALIBRATION

-16 V49, +33750 OGA ROLL + 24
+24750 IGA PITCH +239 } FDAI
+02250 MGA YAW + 21
*READ AND RECORD INITIAL VALUES *
*V40N20E *
*WAIT 20 SEC *
*V48, 21012, PRO, V34 *
*PGNS MODE CONT - ATT HOLD *
*V76, V60 *
*RATES < 0.1°/SEC *
*400+6 *

	INIT	CAL	Δ LIM
540	-10	-10	± .039
541	+00	-1	± .039
542	+02	+2	± .039
544	-06	-07	±2.00
545	-25	+00	±2.00
546	-187	-161	±2.00

*WAIT 35 SEC, THEN V77 *
*WAIT 2 MIN, THEN V76 *
*CHECK DPS, APS, RCS, EPS *
*CYCLE CWEA CB *
*400R+0 *
*READ AND RECORD CAL VALUES *
*

TRACKING ATTITUDE FOR CSM CIR

-5 MNVR TO (0,XXX/236,0) TO TRACK CSM *
*SEQUENCE CAMERA-ON *

0 **CSM CIRCULARIZATION** ___:___:___ (105:46:48)
*SEQUENCE CAMERA-OFF

105:50

105:50

SR
105
+53

AOS
106 -33
+13

106:30

CSM CIRCULARIZATION

*SEQUENCE CAMERA - OFF
P76,(UPDATE CSM S.V.)

P00

*VHF B XMTR - OFF, PCM-HI
*V47,414+1,400+3
V83, SET ORDEAL
*317R, 440R, 277R
MNVR TO (0, 325/XXX, 0)
ESTABLISH ORBITAL RATE
TO OBSERVE GROUND TRACK
V82, N12-00002, PRO
✓CSM HA/HP
*RESET DET TO COUNT DN TO PDI_0
*S-BD ANT - FWD, VERIFY COMM
*✓S-BD P ____(+14)
* Y ____(-10)
*S-BD ANT - SLEW (>3.0)
*TRACK MODE - AUTO (>4.0)
*BIOMED - RIGHT
*UPLINK SQUELCH - OFF

VOICE N93, GET, AND LPD BIAS TO MSFN

-29 DPS PRESS + C. O.
PRPLNT TEMP/PRESS MON - DES 1 & 2
FUEL ~~50-90°F 70-160 PSI~~ 50-75°F 70-122 PSI
OXID ~~50-90°F 39-254 PSI~~ 50-75°F 41-78 PSI
HELIUM MON: AMB PRESS 1495-1750
: SUPCRIT PRESS ~~725-1320~~ 900-1170
DES HE REG 1 tb-gray, REG 2 tb-bp
MASTER ARM - ON
DES PRPLNT ISOL VLV - FIRE
HE PRESS/DES START - FIRE
MASTER ARM - OFF
PRPLNT TEMP/PRESS MON: DES 1&2
FUEL & OXID 50-90°F ~~242-253 PSI~~ 200-250 PSI
HELIUM MON: AMB PRESS 200-1110
: SUPCRIT PRESS ~~725-1320~~ 900-1170

106:30

106:30

LANDING RADAR CHECKOUT

-23 CB LR CLOSE, CK TEMP (60° - 95°)
RATE ERR MON-LDG RDR/CMPTR
X-PNTRS-HI MULT, TM SW-H/H
LDG ANT-AUTO, MODE SEL-LR
RDR TEST - LDG
TEST MON-ALT/VEL XMTR (2.1 - 5.0), AGC
TM (8000 ± 100)/H (-480 ±2)
V63, N12 OPT 2, PRO
N66 8296 ± 10, ANT POS 1 (00001), PRO
N67 V_x (-00495 ±2), V_y (+01862 ±2)
V_z (+01331 ±2)
V34, RDR TEST OFF
CB LR - OPEN

UPDATE FROM MSFN

*UPDATA LINK - DATA
*UPLINK CSM/LM S. V., PIPA BIAS,
* DESCENT TARGETING, LPD BIAS
* (IF Δ>2° IN AZ OR 1° IN EL)
*COPY PADS FOR
* NO PDI + 12 ABORT,
* PDI,
* PDI EARLY ABORT,
* PDI LATE ABORT,
* T2 ABORT
* T3 TIG
* UPDATA LINK - OFF
*V47, 414+1, 400+3
V83, SET ORDEAL
*317R, 440R, 277R
VERIFY NO PDI_0 ABORT WITH MSFN

LPD ALT CHECK

-15 MNVR TO AND MAINTAIN FDAI (0,295/XXX,0)

-5 BEGIN LPD ALT MARKS (IF DESIRED)
PDI LMK LPD ALT CHECK

PDI_0 ____:___:___ (106:48:19)

PITCH TO OBSERVE LS

CIRCULARIZATION
TO PDI_0

106:50

106:50

+8 START PITCH TO P52 ATT (0,XXX/320,0)

*CAMERA SETTINGS (PDI) *
*LM3/DAC/10/CEX- *
*(f2.8, 500, ∞) 12 FPS, *
* 0.75 MAG, (6 MIN) *
*LM3/DC/60/HCEX-(f5.6, 250, ∞)10 *
*RELOCATE CAMERA *

SS
106
+59

IMU FINE ALIGN
+12 V76
P52 OPT3
CB AOT LAMP CLOSE
AOT - DETENT F/0.0°
PGNS MODE CONT - AUTO
1ST STAR REGULUS (222)
PRO, RCD GET ___:___:___
2ND STAR SPICA (226)

N05 ANG DIFF _____
PRO
N93 TORQUING (MAX)
X_____(.370)
Y_____(.830)
Z_____(3.000)
PRO
N25

COAS CALIBRATION
PRO, ENTR
N70, ENTR 026 (SPICA), PRO BIAS AZ_____
N87, (+00000,+00000)PRO, PRO EL_____
*DETENT CL *
*CB AOT LAMP - OPEN *
V34,P00
PGNS MODE CONT - ATT HOLD
*400+3 *

107:15

107:15 CONFIGURE COMM FOR LOS
*MATCH INDICATED ANGLES *
*TRACK MODE - SLEW *
*S-BD ANT - AFT *
*SET P___(+2) *
* Y___(+2) *
*VHF B XMTR - DATA *
*BIOMED - OFF, PCM - LO *
*UPLINK SQUELCH - ENABLE *
LOS *S-BD ANT-FWD (AFTER LOS) *
107
+19

START MNVR TO PDI ATT
FDAI (0,XXX/113,0)

COAS TO OVERHEAD WINDOW
*VERIFY LOOSE GEAR STOWED *
*RESTRAINTS ATTACHED *
VERIFY FDAI'S INERTIAL
V48,22112,PRO,V34

P63 IGNITION ALGORITHM TEST
P63
*RESET DET TO COUNT DN TO PDI *
ENTR-BYPASS ALIGN, PGNS MODE CONT - AUTO
N18 R, P, Y (0,113,0)PRO
P00, PGNS MODE CONT - ATT HOLD, V77
SR P30 TGT PGNS FOR NO PDI+12 ABORT
107 P00
+47

PRE-PDI ECS CHECKOUT
-45 *HELMETS AND GLOVES ON *
*CABIN REPRESS - CLOSE *
*SUIT GAS DIVERTER - EGRESS *
*CABIN GAS RETURN - EGRESS *
*PRESS REGS A&B - EGRESS *

108:00

108:00

PRE-PDI SWITCH SETTING CHECK

*VHF ANT - FWD *

CB INV 1 - CLOSED

*SELECT INV 1 *

-40 CB AELD (2) - CLOSE

CB ABORT STAGE (2) - CLOSE

*CYCLE CWEA CB *

*BATS 5&6 NORM FEED - ON *

*RECORD GET 108:01:45 *

RESET ENG STOP PB

SET WINDOW BARS

*S-BD ANT - FWD, VERIFY COMM

AOS 108 +06 */S-BD P ______ (+2) *

* Y ______ (+2) *

*S-BD ANT - SLEW (>3.0) *

*TRACK MODE - AUTO (>4.0) *

*VHF B XMTR - OFF *

*VHF A XMTR - VOICE/RNG *

*BIOMED - LEFT, PCM - HI *

*UPLINK SQUELCH - OFF *

VOICE N93, GET, AND ASC BATT
ON TIME TO MSFN

THROT CONT - [redacted] AUTO

CDR TTCA - THROTTLE - MIN

LMP TTCA - THROTTLE - SOFT STOP

*ACA PROP (LMP) - ENABLE *

*ACA/4JET (LMP) - ENABLE *

*TTCA/TRANSL (LMP) - ENABLE *

*CHECK DPS, APS, RCS, ECS, EPS *

UPDATE FROM MSFN

-30 *UPDATA LINK - DATA *

*UPLINK LM S.V., RLS, *

* MSFN GYRO DRIFT COMP *

*UPDATA LINK - VOICE BU *

*COPY AGS RLS (231) *

PRPLNT QTY MON - DES 1

MODE SEL - PGNS [redacted]

PGNS MODE CONT - [redacted]

AGS MODE CONT - AUTO

V77

√BURN ABORT RULES

108:20

108:20

*AUDIO MODE (BOTH) - VOX *

*TAPE RECORDER - ON *

AGS INITIALIZE

-18 *V47, 414+1 *

*V83, 317R, 440R, 277R *

*240 + (231 RLS PAD) *

*254+05428 *

*261+00037 *

*262-00147 *

*404-12345 *

POWERED DESCENT INITIATION

-10 CB LR - CLOSE

√ALT XMTR

P63

√DPS CONFIG CARD

-8 *RESET DET *

ENTR-BYPASS ALIGN

N18 R, P, Y (0, 113, 0)

VERIFY FDAI

*V40N20E, 400+3, 410+0 *

*400+1, 433R VI *

-4 PRO-FINAL TRIM [redacted]

[redacted] ENTR, √DET [redacted]

GO/NO-GO FOR PDI [redacted]

COMM CHECK WITH CSM — V21 N1E 1010E 107E

RESET WATCH

-1:00 MASTER ARM - ON

-0:30 ENG ARM - DES

-0:07.5 ULLAGE

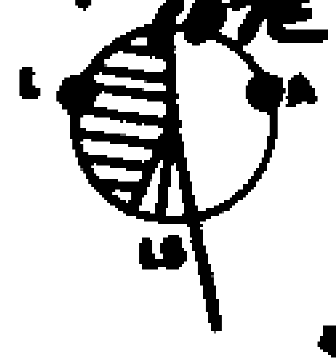
-0:05 PRO

0:00 PDI ____:____:____ (108:42:01)

+0:02 (NO IGN) - START PB - PUSH

+0:05 DES ENG CMD OVRD - ON

MASTER ARM - OFF



RESET WATCH
-1:00 MASTER ARM-ON
- :30 ENG ARM-DES
- :07.5 ULLAGE
- :05 PRO
+ :00 PDI
+ :02 (NO IGN) - START PB - PUSH

+ :05 DES ENG OVRD -ON
MASTER ARM-OFF
+0:26 THROTTLE UP
√T/W > 1.6

V21N69

V57E - (+) LR HIGHER THAN LGC PRO TO PERMIT LR DATA

√ED BATTS

N68
223+00120 (DO NOT ENTR)

SEQ CAMR - ON

EVAL MAN CONT

223E @ 12K

PDI THRU TD+3 MIN

TFI	θ	VI	(-ḢMAX) -HDOT	(ΔHMAX) H	DPS	SBD
0:00	113	6560.0	2.0	50000	95	2/1
0:30	112	5490.0	7.0	49900	95	
1:00	106	5210.0	37.0	49300	91	7/-3
1:30	100	4910.0	59.0	47800	86	
2:00	95	4610.0	73.0	45800	80	15/-11
2:30	90	4310.0	82.0	43500	75	
3:00	86	3990.0	87.0	40900	70	22/-16
3:30	83	3670.0	89.0	38300	65	
4:00	80	3330.0	91.0	(+17000) 35700	60	26/-20
4:30	78	2990.0	91.0	(+17000) 32700	54	
5:00	77	2640.0	93.0	(+15800) 30500	49	29/-22
5:30	74	2270.0	92.0	(+12800) 26400	44	
6:00	73	1890.0	86.0	(+11400) 24700	39	32/-25
6:30	70	1490.0	(432.0) 69.0	(+9200) 21800	33	
7:00	66	1230.0	(401.0) 95.0	(+8200) 18900	30	39/-29
7:30	65	980.0	(367.0) 119.0	(+6900) 16100	27	
8:00	65	730.0	(323.0) 139.0	(+5600) 12800	23	40/-29
8:30	59	480.0	(252.0) 154.0	(+2400) 8300	20	

P64

P64 + 15 SEC:
NO THROTTLE DN
- ABORT

PGNS MODE CONT-
ATT HOLD
P66

X-PNTR-LO MULT

BINGO FUEL
DES QTY LT+1+34
TOUCHDOWN

ENG STOP - PUSH
PRO
MODE CONTROL (BOTH) - AUTO
DES ENG CMD OVRD - OFF
ENG ARM - OFF
413 + 1

RECYCLE PARKER VALVES

H	(-ḢMAX) -HDOT	DPS	VH (362)
7000	(228.0) 151.0	19	392.0
6000	(208.0) 134.0	19	367.0
5000	(187.0) 113.0	18	335.0
4000	(163.0) 93.0	17	296.0
3000	(136.0) 71.0	16	249.0
2000	(105.0) 48.0	15	185.0
1000	(64.0) 27.0	13	103.0
500	(36.0) 17.0	11	48.0
400	(29.0) 14.0	11	32.0
300	(21.0) 12.0	11	21.0
200	(12.0) 9.0	10	7.0

ABORT STAGE - PUSH
ENG ARM - ASC
ENG STOP - RESET
ENG START - PUSH
MODE CONTROL(2) - AUTO

TD +3 THRU T2 ABORT

RECYCLE PARKER VALVES

DES HE REG 1-CLOSE tb(2)-BP
OXID AND FUEL VENT-OPEN tb(2)-GREY
MASTER ARM - ON
DES VENT - FIRE
MASTER ARM - OFF

PRPLNT TEMP PRESS MON - ASC, THEN DES
ASC HE MON - CYCLE
O2/H2O QTY MON - ASC 1,2, THEN DES
WHEN DES PRESS = 20-40 PSI, OXID VENT-CLOSE
SEQUENCE CAMERA - OFF
VHF A XMTR - VOICE

15:00
NO STAY
ABORT STAGE-PUSH
ENG ARM-ASC
ENG STOP-RESET
ENG START-PUSH
MODE CONT(2)-AUTO

STAY
*414+2 *
*400+4 *

P68
ENG STOP-RESET

PRO
P12
N33 T-2 (109:02:46)

N76 5512.4 V HOR
19.5 V VERT
_____ CROSS RNG (<8.1)
N74 TFI, YAW, PITCH

*IF AGS ALIGNMENT NO GO *
*V47E, 414+1, *
*V40N20E, 400+3 *

*411+1 *
18:45 *410+0 *
NO STAY

-2:00 ASC HE SEL - BOTH
MASTER ARM - ON
ASC HE PRESS - FIRE
ASC HE REGS 1,2, - OPEN
ASC FEED 2 (2) - OPEN
MAIN SOV (2) - CLOSE (UNLESS
CRSFD - CLOSED BUS LOSS)
*BAT 1,3 - OFF *
*BAT 2,4 - OFF *
*CB:ASC ECA CONT - CLOSE *
*DES BAT - DEADFACE *
*SELECT ASC H2O TANK *
*DES O2 - CLOSE *
*ASC 1 O2 - OPEN *
*DES H2O - CLOSE *
*ASC H2O - OPEN *
*400+1 *

- :10 ABORT STAGE - PUSH (AT T=0
ENG ARM - ASC FOR AGS)
- :05 PRO
:00 *DET - RESET, RELEASE *
+ :01 ENG START - PUSH

STAY
*TAPE RECORDER - OFF *
*AUDIO MODE - ICS/PTT *

P00

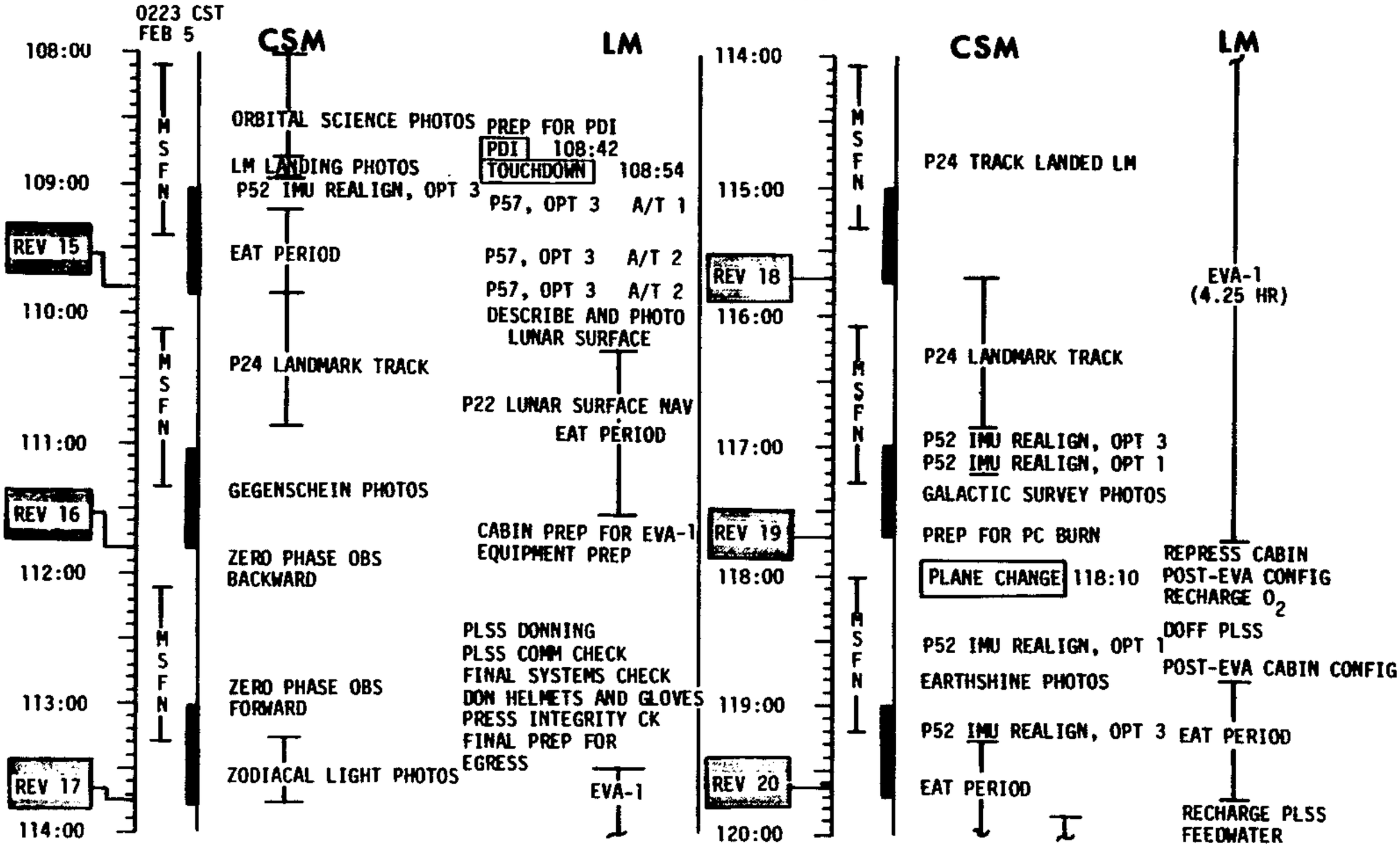
TD+3 THRU
T2 ABORT

FDAI AND OVERHEAD WINDOW ANGLES FOR MANUAL DESCENT ABORT

TIME OF ABORT	DPS/APS				APS			
	FDAI		OVERHEAD WINDOW		FDAI		OVERHEAD WINDOW	
PDI+ (→LV)	ABORT + 0:20 (→300°)		ABORT + 0:20 (→37°)		ABORT + 0:20 (→300°)		ABORT + 0:20 (→37°)	
	T_1 (→270°)	T_2 (SHUTDOWN)	T_1 (→ α_2)	T_2 (SHUTDOWN)	T_1 (→270°)	T_2 (SHUTDOWN)	T_1 (→ α_2)	T_2 (SHUTDOWN)
0:30	NA	2:00	NA	2:00	NA	1:55	NA	2:00
1:00	NA	2:40	NA	2:40	NA	2:35	NA	2:40
1:30	NA	3:20	NA	3:25	NA	3:15	NA	3:25
2:00	2:40	4:15	2:40(0°)	4:20	2:40	4:20	2:30(1°)	4:10
2:30	3:15	5:05	3:15(4°)	5:05	3:20	5:15	3:10(5°)	5:10
3:00	3:50	5:55	3:50(7°)	5:55	4:00	6:10	3:55(7°)	6:10
3:30	4:30	6:45	4:25(8°)	6:40	4:40	7:00	4:40(8°)	7:05
4:00	5:10	7:35	5:05(9°)	7:35	5:35	8:05	5:30(9°)	8:05
4:30	5:50	8:15	5:45(9°)	8:15	6:30	9:05	6:25(9°)	9:00
5:00	6:30	9:00	6:25(9°)	9:00	7:20	10:00	7:25(9°)	10:00
5:30	7:10	9:55	7:10(9°)	9:40	8:20	11:05	8:25(8°)	11:00
6:00	7:40	11:00	7:35(10°)	11:05	9:10	12:00	9:20(8°)	11:55
6:30	8:10	12:10	8:05(12°)	12:10	10:05	13:00	10:15(7°)	12:50
7:00	8:45	13:05	8:35(13°)	13:05	10:50	13:40	11:05(7°)	13:40
7:30	9:20	14:00	9:10(14°)	14:00	11:35	14:25	11:50(7°)	14:25
8:00	10:00	14:55	9:40(15°)	14:50	12:15	15:15	12:25(7°)	15:10
8:30	10:35	15:45	10:05(17°)	15:35	12:45	16:00	13:00(8°)	15:55
9:00	11:10	16:20	10:25(17°)	16:35	13:00	16:35	13:20(11°)	16:35
9:30	11:45	16:55	10:50(18°)	17:05	13:20	17:10	13:35(12°)	17:10
10:00	12:20	17:30	11:25(18°)	17:45	13:40	17:40	13:55(13°)	17:40

Notes:
1. All pitch rates are 5° per second
2. Begin pitch at specified time to indicated attitude ( )
3. T_1 and T_2 are measured with respect to PDI
4. Aborts on the APS after ten minutes, use the Manual Ascent Angles

FLIGHT PLAN

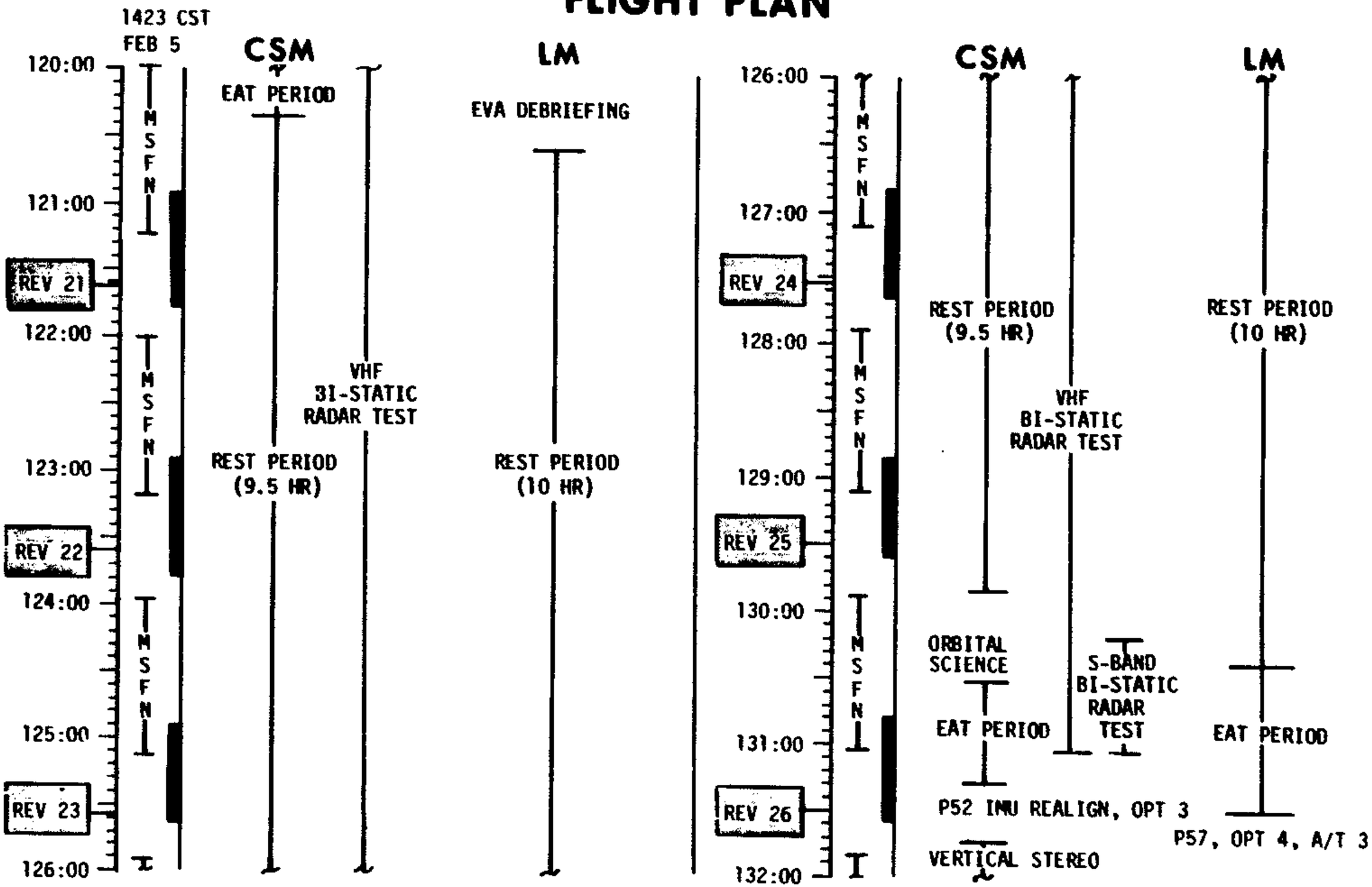


MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 14	FINAL (JAN)	DECEMBER 2, 1970	108:00 - 120:00	5/14-20	5-10

MSC Form 1[illegible] OT (Mar 6[illegible]) FLIGHT PLANNING BRANCH

LUNAR SURFACE
FLT PLAN

FLIGHT PLAN



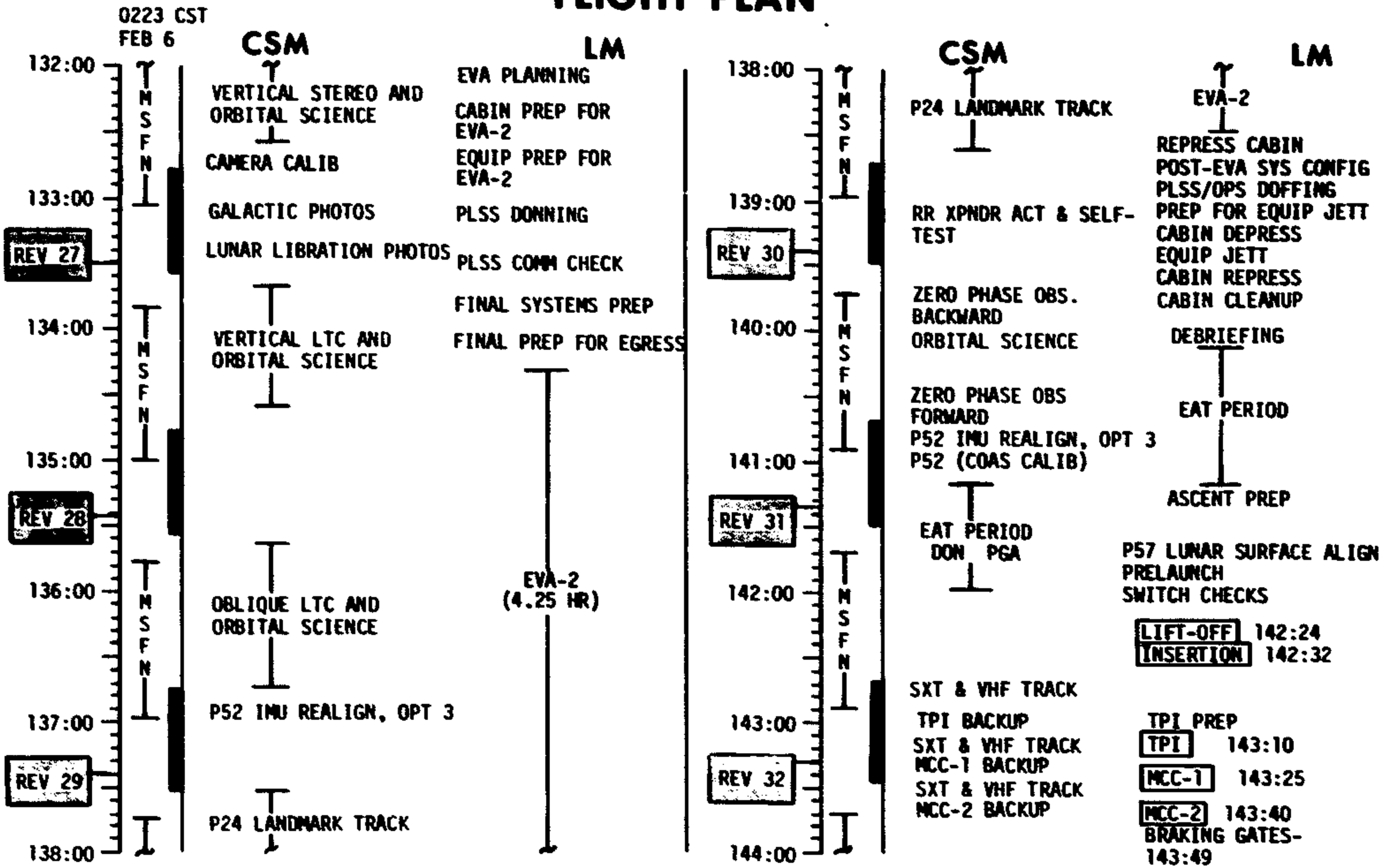
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 14	FINAL (JAN)	DECEMBER 2, 1970	120:00 - 132:00	5-6/20-26	5-11

FLIGHT PLANNING BRANCH

DATE 12/18/70

LM TIMELINE BOOK

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 14	FINAL (JAN)	DECEMBER 2, 1970	132:00 - 144:00	6/26-32	5-12

FLIGHT PLANNING BRANCH

LUNAR SURFACE
FLT PLAN

ASCENT MONITOR

TIG-2 AUDIO MODE (BOTH)-VOX
400+1E GUID STEERING
RESET WATCH
TIG-1 MASTER ARM - ON
367R
START CAMERA
-:10 ABORT STAGE-PUSH(AT T=0 FOR AGS)
ENG ARM-ASC
-:05 PRO
+:01 ENG START-PUSH (IF AUTO IGN)

CHECK S-BD ANT
+1:00 YAW RIGHT 30°
623+1
N76E (VH, Vv, ΔR)
V16 N77E (Tgo, VY)
+5:00 STOP CAMERA
N85 E, 500R
500 FPS MAIN SOV(2)-OPEN
ASC FEED 2(2)-CLOSE

COPY GET

200 FPS ENG ARM-OFF (IF IGN WAS AUTO)

0 FPS ABORT STAGE-RESET
ENG STOP-PUSH
KEY RELEASE
PRO NULL RESIDUALS
PRO
STOP DET, RESTART WATCH
ENG STOP RESET
POO
,MCC FOR TRIM OR TWEAK

FOR NO VOICE
PGNS,AGS DIFFER - 10 FPS,
TRIM ACTIVE SYSTEM
PGNS,AGS DIFFER - 10 FPS,
TRIM SYSTEM THAT AGREES
WITH RR
(10° IN OHW) (0° YAW)

V82

ASCENT

TFI	g	OHW (0° YAW)	VI	H DOT	H	SBD
0:00			15.1	0	0	120/-38
0:10			60.0	54.0	300	
0:30	308	39	170.0	93.0	1900	
1:00	305	38	440.0	127.0	5200	148/14
1:30	302	35	730.0	153.0	9400	
2:00	299	33	1049.0	173.0	14300	152/19
2:30	295	31	1370.0	185.0	19700	
3:00	292	29	1710.0	192.0	25400	156/24
3:30	288	27	2080.0	192.0	31100	
4:00	285	24	2470.0	185.0	36800	161/29
4:30	281	22	2890.0	173.0	42200	
5:00	277	19	3320.0	156.0	47100	168/35
5:30	273	16	3780.0	134.0	51500	
6:00	269	13	4270.0	107.0	55100	176/41
6:30	264	10	4790.0	77.0	57900	
7:00	259	7	5340.0	45.0	59700	186/46
7:11	257	6	5540.6	32.2	60107	188/47

NO AUTO IGNITION
WITHIN 10 SEC:
1. GUID CONT-AGS
STILL NO IGNITION
1. GUID CONT-PGNS
2. ENG START-PUSH

MANUAL ASCENT (WILL NOMINALLY BE TARGETED 9 MIN LATE)
CONFIGURATION NOMINAL EXCEPT:
MODE CONT-ATT HOLD
PROFILE NOMINAL EXCEPT:
7-STEP FOR DIRECT MODE

TFI	FDAI	OHW
0:00	0	
0:15	305	38
2:00	295	31
3:00	290	28
4:00	280	20
5:00	275	18
6:00	265	11
7:00	260	8

MSFN WILL CALL 2° PITCH AND ROLL BIAS COMMANDS FROM GROUND TRACKING AT ABOUT 7 MIN

ASC QTY LITE-MAIN SOV(2)-OPEN
ASC FEED 2 (2)-CLOSE

SHUTDOWN
ENGINE ARM OFF
STANDBY TO RESET ABORT STAGE Pb
AND DEPRESS ENGINE STOP Pb ON
CALL FROM MSFN.

TIME	RANGE	RDOT
INS	146	-447
1+00	142	-445
2+00	137	-441
3+00	133	-437
4+00	129	-433
5+00	124	-428
6+00	120	-422
7+00	116	-416
8+00	112	-410
9+00	108	-403
10+00	104	-396

INSERTION | 142:31:40

MODE CONT(2)-ATT HOLD
CB PGNS RNDZ RDR-CLOSED *
RR MODE-AUTO TRACK *
RNG/ALT MON-RNG/RNG RT *
✓PGNS/AGS,RR,V82
ATT/TRANSL-4 JETS
*VHF ANT-FWD

ATT CONT-PULSE
MODE CONT-AUTO

*400+0 *
RATE/ERR MON(2)-RNDZ RDR *
AUDIO MODE(2)-ICS/PTT *
✓INV 2, CB INV 1-OPEN *
SHFT/TRUN ±5 *
CB(11) & (16) ED: LOGIC PWR-OPEN
CB(11) ECS CABIN FAN1-CLOSE
+2 GO/NO FOR TWEAK
P47
*404+0, 405+0, 406+0 *
*MONITOR 470, 471, 472 *

FDAI (0,258,30)
+3 TWEAK
ΔV'S
FDAI (0,244,0)
+5 LM BAILOUT

INSERTION
THRU TPI

INSERTION THRU TPI

V76
PERFORM YAW (RIGHT) MANEUVER

*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-BEST OMNI *
SET P ____ (+228) *
Y ____ (+33) *
*S-BD ANT-SLEW (>3.0) *
*TRACK MODE-AUTO (>4.0) *

RR MODE-LGC
P20, AUTO MNVR (AFTER 30° PITCH)
V80, MAX N49(2.0,12.0)

P34 TGT TPI
*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*41/+1 *
*410+4 TPI EXECUTE *
*310R SET DET *
*303R θ TPI *
*EXT LTG-TRACK *

V83 SET ORDEAL (35NM)
*317R, 440R, 277R *
30 CHART R/RDOT $R
V48, 11002
LM WT ____

27 RDOT $R

26 CSM BAILOUT | GET P76 PAD

24 RDOT $R
*COMPARE VHF/RR *
*POLAR PLOT @ 75 NM *
21 RDOT $R

18 RDOT $R
*CHECK RCS, EPS, ECS *

SS

LOS

15 RDOT $R
*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-AFT *
SET P ____ (+114) *
Y ____ (-46) *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *
12 RDOT $R
*514+0 *
*515+4 *
*516+0 *
*411+1 ASCENT *
*616+00005 ULLAGE *
*623+1 *
10 CHART R/RDOT/θ
9 RDOT $R
8 PRO-FINAL COMP

373R TPI TIME
267R ΔV
371R TPI+TPF ΔV

V48, 12012
6 *COMPARE CMC, AGS *
CHECK TIG OF CSM
*✓DET & APS BURN CARD *
P42 N86
*404+0, 405+0, 406+0 *
*400+1 GUID STEER
*410+5 LOAD ΔV
*407+0 *
*500R *

ATT CONT-MODE CONT

1:00 AGS MODE CONT-AUTO
:10 ABORT STAGE PB-PUSH
MANUAL ULLAGE
:05 PRO
EOO TPI 143:09:40
ABORT STAGE PB-RESET

NO IGNITION
ENG ARM-ASC
MANUAL START
MANUAL STOP 3 SEC
ENG ARM-OFF
NULL RESIDUALS

0 TPI 143:09:40
V76, AGS MODE CONT-ATT HOLD
P35 TGT MCC 1 — ATT CONT-PULSE, MODE CONT-AUTO
V67 (+02000,+00020,+00005)
*400+0 *
417+1 $R
2
*410+4 *
*373+TPI TIME +15 MIN *
*307+028.00 *
SR
4 RDOT $R 19
6 RDOT $R 21
8 RDOT $R 23
9 CHART θ *
10 RDOT $R 25
12 PRO FINAL COMP RDOT $R 27 PRO-FINAL COMP RDOT $R
13 CHART R/RDOT/θ 28 CHART R/RDOT/θ
267R TOTAL VEL MCC1
371R ΔV MCC1 + ΔV TPF
267R TOTAL VEL MCC2
371R ΔV MCC2 + ΔV TPF
*404+0, 405+0, 406+0 *
P41
*410+5 LOAD ΔV — ATT CONT-MODE CONT
*407+0
*502R _____
:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 472R/502R *A/H
15 MCC1
NULL RESIDUALS
30 MCC2
NULL RESIDUALS

TPI THRU DOCKING

V76, MODE CONT-AUTO
P35 TGT MCC 2 — ATT CONT-PULSE, MODE CONT-AUTO
V93
*VERIFY PGNS (PCM-HI) *
*V47, 414+1, 400+3 *
417+1 $R AOS
*410+4 *
*373+TPI TIME +30 MIN *
*307+013.00 *
RDOT $R
*EXTERIOR LTG-OFF *
RDOT $R
RDOT $R
*A/H

MISSION APOLLO 14, DECEMBER 10, 1970

P00
V48, 11002
P47
V63
*404+0, 405+0, 406+0 *
S-BD ANT-AFT, VERIFY COMM
*S-BD P _____ (+114) *
Y _____ (-46) *
*S-BD ANT-SLEW (>3.0) *
*TRACK MODE-AUTO (>4.0) *
*BIOMED-RT, PCM-HI *
*UPLINK SQUELCH-OFF *
TPI BURN REPORT
40 INITIATE BRAKING
30 FPS - 6000 FT
20 FPS - 3000 FT
10 FPS - 1500 FT
5 FPS - 600 FT
*SETUP CAMERA FOR *
* DOCKING: *
*LM3/DC/60/HCEX *
* (f11,250,FOCUS) 5 *
*LM3/DAC/10/CEX-ULC *
* (T8/250/10) 6FPS *
*MAG(BB)_____FR#_____ *
50 INITIATE DOCKING
V34, P00
V76 — ATT CONT-PULSE
COAS TO OVHD WINDOW
*EXT LTG-DOCK *
SHFT/TRUN ±50 *
V41N72 (+000,+320)
CB RR(2)-OPEN, V44
PITCH DOWN 90°, YAW RIGHT TO ALIGN
V77 — ATT CONT-MODE CONT
60 CONTACT
CONFIRM ~~DOCKING WITH~~ CSM
MODE CONT (BOTH)-OFF

TTCA ((DPS) - +X AT contact w/ -Z, CSM
confirms docking, capture or fin 10 sec,
w/ MICHEUD occurs flight.

IF RICOCHET TRY WIDE DB in DAP
DAP: 13002

FROM CAPTURE REPORT

POST DOCKING

144:12

CONFIGURE PGNS

1 Verify FWD Dump VLV - AUTO

2 V48, 12021, PRO
N47 5103 LM WT
54929 CSM WT (From MSFN)
PRO

3 UPDATA LINK - DATA
MSFN Uplinks LM State Vector (TIG-10),
P30 EXT ΔV Load And P99 Eraseable Loads (3)
Copy Burn Pad
CB(11): ECS CABIN FAN 1 - OPEN

144:17

PREP FOR TRANSFER

1 Window Shades Up (3)
Install Crash Bars
Verify Tunnel Pressurized From CSM
OVHD DUMP VLV - OPEN

2 Doff Helmets And Gloves
Empty PGA Pockets Into Accessory Bag (Flt Data File)
Place LEVA Bags On Floor, Right Side - Forward

3 When Tunnel/LM Pressures Equal, OVHD DUMP VLV - AUTO
Verify PRESS REGS A And B - EGRESS
Unstow Purse (ISA Bottom Pkt), Install
Stow 70mm Camera with Mag In ISA Bottom Pkt
Stow 16mm Mag (OVHD Window Camr) In ISA Top Pkt (Bag)
Unstow PPK & Flag Kit From LHSSC, Stow In Purse
Unstow LHSSC Sample Bag, Temporarily Stow In Aft Cabin Under Netting

4 Open Hatch
~~Receive Probe From CMP, And Stow On Left Hand Side Using Outboard (Double) Restraint Cable~~
Receive Drogue From CMP ~~And Stow Over Probe~~ Using Inboard (Single) Restraining Cables Through Drogue Handles

5 Receive Decontamination Bags, Helmet Bags And Accessory Bags, And Vacuum Cleaner Assembly From CSM

6 Unstow, Vacuum/Wet Wipe, Bag, And Transfer to CSM:

70mm Magazine Bag (RHSSC, 3 Mags)

Surface 16mm Mag Bag (RHSSC, 6 Mags)

Sample Bag (LHSSC)

Sample Bag (+Z27)

Helmets (With IV Gloves)

ISA

7 Unstow SRC's, Vacuum And Bag
Transfer To CSM

8 Receive B5 & B6 From CMP And Stow In SRC Rack

9 Vacuum PGA's

10 Transfer Vacuum Cleaner To CSM (Leave Bag In LM)

145:32

CSM MNVR To LM Jett Att

POST DOCKING

145:38

CONFIGURE S-BAND

1 Verify: Jettison Attitude (~~000~~/011,XXX/175,~~011~~/000)
CSM In Narrow Deadband, Attitude Hold

2 S-BAND - PM,PRIM,PRIM,VOICE,PCM,RANGE,OFF, HI
VHF A: XMTR - VOICE/RANGE
: RCVR - OFF
VHF B: XMTR - OFF
: RCVR - ON
S-BD ANT FWD, VERIFY COMM
TRACK MODE - SLEW
SBD P _____ (-40)
Y _____ (+49)
S-BD ANT - SLEW "(Peak Until >3.9)"
(DO NOT PLACE TRACK MODE - AUTO)

3 V47E, 414+1

4 400+3

145:40

CDR IVT TO CSM

1 TAPE RECORDER - OFF
CB(11) COMM: CDR AUDIO - Open
CB(16) COMM: SE AUDIO - Open
SUIT ISOL (BOTH) - SUIT DISC

2 CDR & LMP Disconnect LM Hoses And Stow
CDR & LMP Doff Suits
CDR Transfer To CSM With Suits
Stow CSM Jet Bag Behind LMP Restraint Cables

TARGET PGNS

1 P30 Target Impact Burn
N45 VOICE TFI TO CSM
PRO, P00

DATE 1/18/71 ~~12/18/70~~

TARGET AGS

1 400+1
410+5
450 _____ E
451 _____ E
452 _____ E
407+0

2 500R

@ 5,6 ~ 10k feet

145:50

CONFIGURE LM FOR JETTISON

1 VERIFY CSM MIN DB/ATT HOLD
GUID CONT - PGNS
MODE CONT: (Both) - AUTO
ATT CONT (3): MODE CONT
Verify DEDA 400+1
V62E - Verify FDAI Showing Total Errors
Verify INV-2

2 ASC FEED (4) - tb-bp
SYS A&B QUADS (8) - tb-gray
CRSFD - tb-bp
SYS A&B MAIN SOV (2)- tb - gray

3 SUIT CIRCUIT RELIEF - AUTO

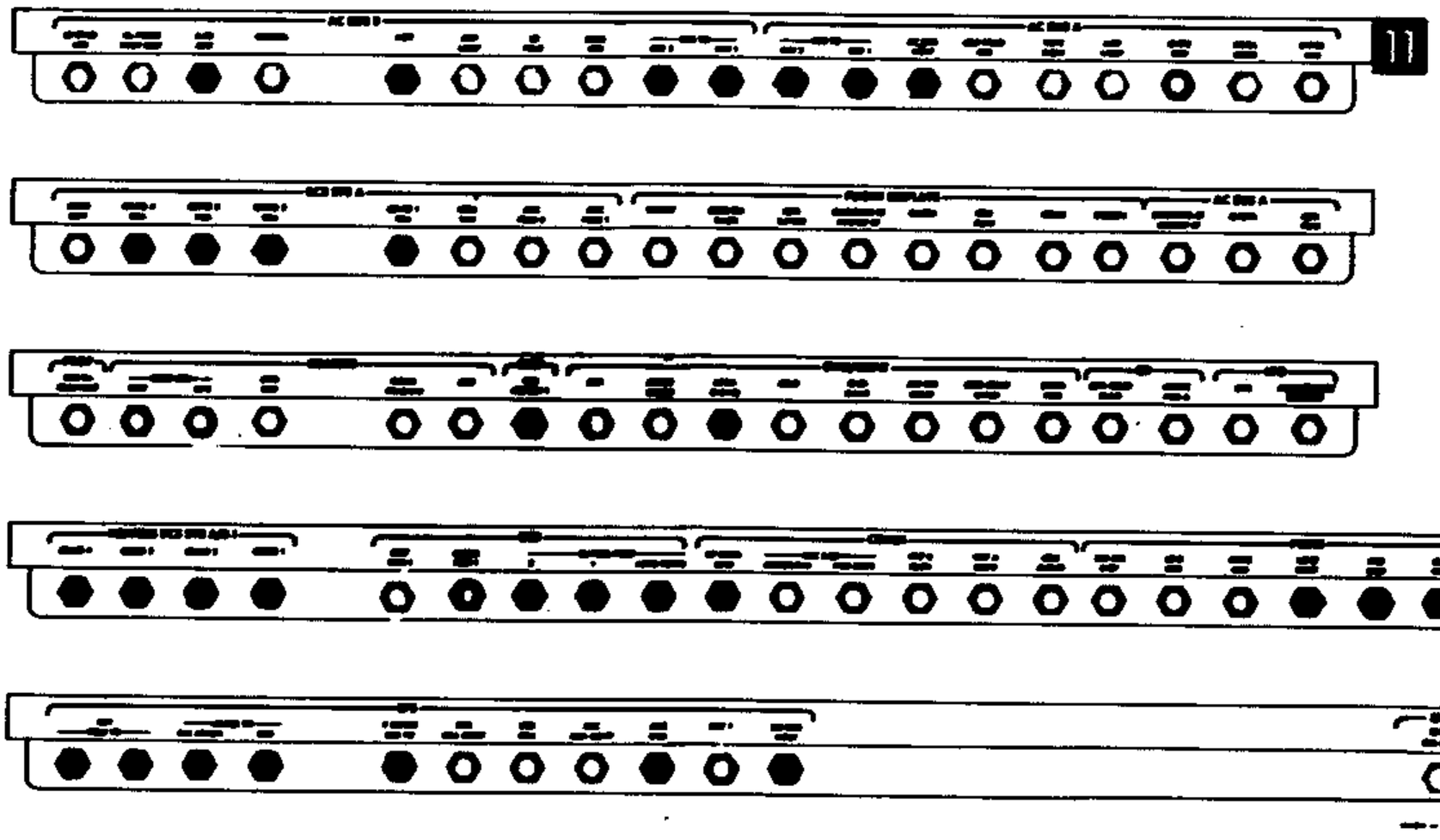
4 Configure CB's Per Chart

5 S-BAND VOICE - OFF

6 Verify UPDATA LINK - DATA

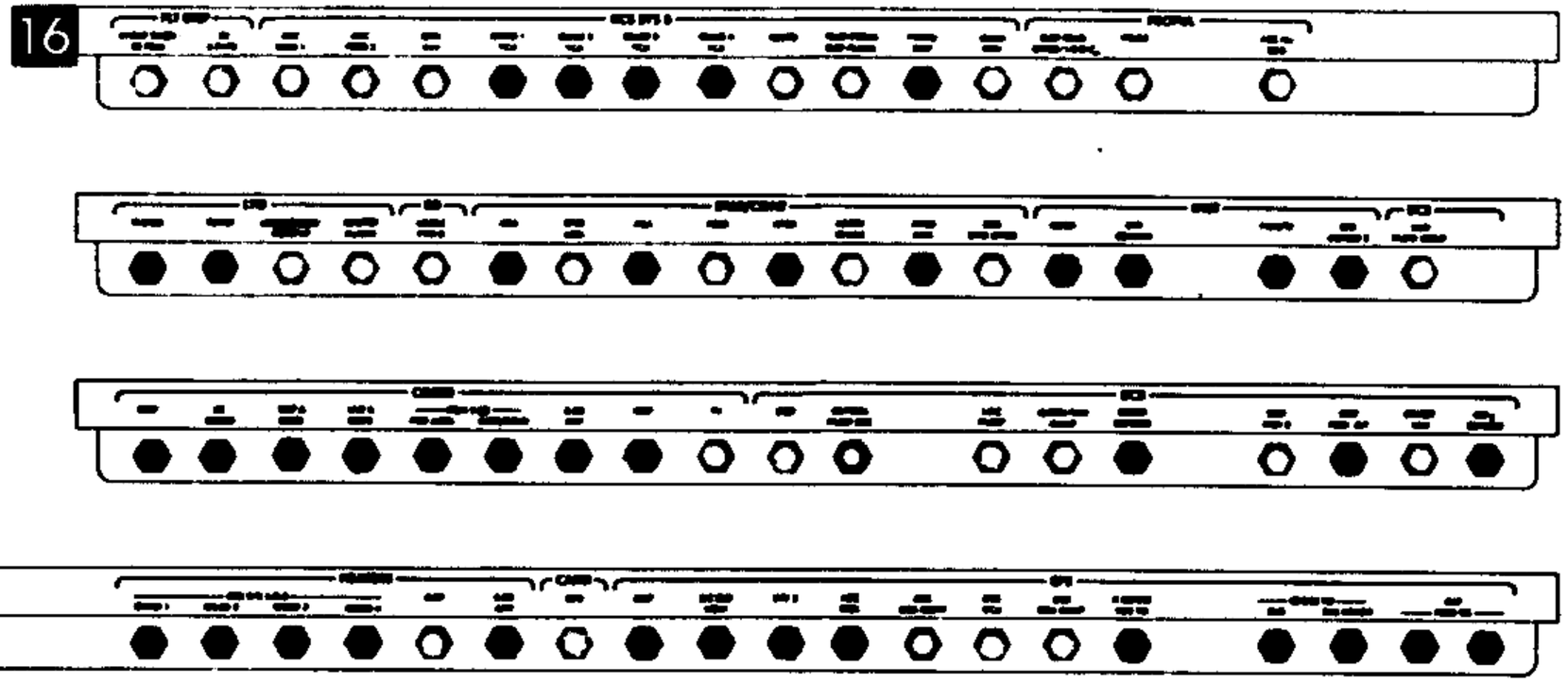
7 Verify 500R

POST DOCKING



POST
DOCKING

POST DOCKING



145:55

LMP IVT TO CSM

1 Stow LEVA Bags On Floor (1 Left, 1 Right)

2 EXTERIOR LTG - TRACK
BAT 5&6 BACK UP FEED-ON,
tb(2) Gray
FLOOD Lt - OFF
MCC-H GO/NO-GO For LM Closeout
Verify OVHD Dump VLV-AUTO

3 Transfer To CSM

LM TO CM TRANSFER LIST

Suits And Ancillary Eqpt:
IV Gloves
Helmet
Comm Cap
Watches (2)
Sunglasses In Pouch
Pens & Pencil
Penlights
Scissors (Data File)
Tissue Dispenser (RHSSC)

All Documents In Flight Data File
PPK's (2 RHSSC, 1 LHSSC)
Flag Kit (LHSSC)
DSEA
SRC (2)
Unopened Food Bags
Used Urine Bags
Used Fecal Bags

LM TO CM TRANSFER LIST (CONTD)

ISA And Contents:
Weigh Bag (2)
Solar Wind Composition Experiment
Thermal Samples In Bag (2)
Contaminated Sample, SESC
Magnetic Sample Container
70mm Camera
CSRC
CSC Cassette

16mm Mags, 2 ISA, 6 In Bag
70mm Mags, 2 ISA, 3 In Bag
Sample Bag, LHSSC
Sample Bag, +Z27

POST DOCKING
LM/CM
XFER LIST

RENDEZVOUS TIMELINES

RELATIVE MOTION TRAJECTORIES

INERTIAL PLOTS

AND

ABORT CHARTS

PDI SUMMARY DATA

11/10/70

PAGE	ABORT	INS			BOOST	HAM	CSI		CDH			TPI	AIM		
	TIME PDI+	TIME PDI+	N76	HA/HINS	TIME INS+	TIME INS+	TIME INS+	ΔVX	TIME INS+	ΔVX	ΔVZ	TIME PDI+	TIME PDI+	ΔVX	ΔVZ
A-3	PDIO	NA	NA	NA	NA	NA	1+00+00*	49.0	2+02+10*	-120.8	8.9	2+45+46	00+00	101.0	2.7
A-1	NO1+12	NA	NA	NA	1+07+00*	2+07+00*	3+07+00*	37.8	4+09+32*	-128.4	-12.5	4+49+16	12+00	111.4	-50.0
	1+00	2+05	5669.2	145.3/52249.	1+00+00	2+00+00	3+00+00	38.7	4+02+32	-128.5	-25.6	4+49+42	NA	NA	NA
	2+00	3+57	5665.3	144.3/55929.	↓	↓	↓	37.6	4+02+28	-126.7	-23.6	↓	↓	↓	↓
A-2	3+00	5+41	5659.2	141.8/60020.				36.4	4+02+21	-123.7	-18.1				
	4+00	7+15	5655.4	138.7/60024.				36.3	4+02+12	-119.9	-10.0				
	5+00	8+41	5650.3	134.5/60030.				36.3	4+02+01	-114.8	.8				
	6+00	10+42	5669.8	151.8/62345.	NA	NA	0+55+00	42.4	1+57+42	-132.1	-88.4	2+51+04			
A-3	7+00	12+50	5645.9	137.1/70613.	↓	↓	↓	41.7	1+57+04	-115.5	-64.8	↓	↓	↓	↓
	8+00	14+40	5619.8	120.0/77315.				41.2	1+56+20	-95.7	-40.5				
	9+00	16+06	5599.2	104.4/78447.				41.8	1+55+39	-76.7	-20.8				
	10+00	17+15	5585.0	91.0/74090.				43.2	1+55+03	-59.9	-6.4				
	11+00	18+19	5576.1	79.0/64618.				45.7	1+54+31	-44.4	4.7				
A-4	12+00	19+27	5558.7	63.7/60261.				46.9	1+53+50	-24.2	16.5				
	13+00	20+27	5543.8	52.8/60258.				46.9	1+53+21	-9.4	23.0				
	14+00	21+26	5528.8	41.8/60255.				46.8	1+52+51	5.7	28.3				
	15+00	22+25	5513.4	30.8/60251.	↓	↓	↓	46.7	1+52+22	21.2	31.7	↓	↓	↓	↓
A-5	T2-1	7+14†	5512.4	31.5/60154.	50+00	1+50+00	2+40+00	39.5	3+37+31	18.1	11.6	4+49+06			
A-1	NO2+12	NA	NA	NA	1+12+00*	2+12+00*	3+12+00*	36.0	4+15+40	-159.4	-7.9	4+53+04	12+00	142.9	-50.0
	1+00	2+09	5698.3	169.6/52247.	1+00+00	2+00+00	3+00+00	34.7	4+03+30	-153.0	-108.1	4+54+32	NA	NA	NA
	2+00	4+01	5693.9	168.5/56643.	↓	↓	↓	33.6	4+03+26	-151.4	-104.7	↓	↓	↓	↓
A-6	3+00	5+44	5688.5	166.0/60021.				33.0	4+03+20	-148.9	-96.8				
	4+00	7+18	5684.7	162.8/60025.				33.5	4+03+13	-145.9	-85.9				
	5+00	8+44	5679.6	158.6/60032.				34.2	4+03+03	-141.6	-71.4				
	6+00	10+44	5670.7	152.6/62432.				34.4	4+02+48	-135.3	-53.1				
	7+00	12+53	5654.9	144.6/70907.				33.0	4+02+27	-126.3	-31.7				
A-7	8+00	14+43	5639.3	135.7/77441.				31.9	4+02+04	-116.0	-9.6				
	9+00	16+08	5628.9	128.0/78539.	↓	↓	↓	31.9	4+01+43	-106.5	9.2	↓	↓	↓	↓
	10+00	17+20	5647.0	140.1/74203.	NA	NA	55+00	40.6	1+57+12	-119.0	-70.4	2+55+53			
A-3	11+00	18+23	5638.8	128.0/64749.	↓	↓	↓	43.7	1+56+41	-105.2	-52.6	↓	↓	↓	↓
	12+00	19+31	5622.8	112.7/60282.				45.8	1+56+01	-87.0	-32.1				
	13+00	20+30	5608.9	101.8/60279				46.2	1+55+32	-73.7	-19.1				
A-4	14+00	21+30	5594.9	91.0/60276.				46.6	1+55+03	-60.0	-7.4				
	15+00	22+29	5580.6	80.1/60272.				46.8	1+54+34	-46.0	2.7				
	T2-2	7+14†	5512.4	31.5/60154	↓	↓	50+00	49.0	1+57+30	18.4	16.7	2+55+28.6	↓	↓	↓

* INDICATES TIME IS REFERENCED TO LIFT-OFF.

* INDICATES TIME IS REFERENCED TO PDI.

PDI DATA SUMMARY

RANGE AND RANGE RATE AT INS AND 10 MINUTES PRIOR TO SUBSEQUENT BURNS

11/10/70

PAGE	ABORT TIME PDI+	INS RANGE	INS RANGE RATE	BOOST RANGE	BOOST RANGE RATE	HAM RANGE	HAM RANGE RATE	CSI RANGE	CSI RANGE RATE	CDH RANGE	CDH RANGE RATE
A-3	PDIO	NA	NA	NA	NA	NA	NA	150.2	-533.2	106.8	-176.3
A-1	NO 1+12	NA	NA	380.4	-690.8	151.1	445.0	196.1	-594.6	100.2	-119.9
A-2	01+00	368.0	598.2	372.6	-675.4	137.8	444.6	194.3	-580.6	102.9	-154.2
	02+00	363.8	589.1	367.8	-666.3	137.3	437.9	191.8	-573.6	99.5	-153.9
	03+00	346.4	566.1	348.7	-642.7	130.4	423.7	179.6	-551.5	95.8	-156.6
	04+00	317.0	558.9	320.4	-621.0	116.9	427.7	164.6	-529.5	96.0	-152.3
	05+00	273.1	548.5	278.7	-587.4	97.5	431.5	143.5	-494.7	93.6	-162.5
A-3	06+00	208.1	557.1	NA	NA	NA	NA	228.0	-556.2	101.3	-95.2
	07+00	138.0	513.2					164.3	-459.5	99.8	-101.3
	08+00	70.4	372.8					99.1	-336.6	96.9	-121.5
A-4	09+00	50.9	-226.7					44.0	-146.6	95.4	-126.4
	10+00	88.5	-439.9					27.0	232.6	94.4	-129.4
	11+00	139.3	-462.2					60.6	187.6	91.8	-138.3
	12+00	188.3	-454.9					98.9	91.0	89.6	-143.3
	13+00	238.6	-440.7					137.9	-2.8	88.6	-145.7
	14+00	289.2	-423.9					176.5	-95.4	86.4	-143.8
	15+00	339.8	-405.8					214.3	-188.9	85.6	-149.7
A-5	T2-1	618.6	-382.3	509.0	-193.8	343.3	-360.9	201.3	-202.9	85.5	-110.7
A-1	NO 2+12	NA	NA	565.0	-901.0	272.2	462.5	279.4	-779.3	98.0	-197.7
A-6	01+00	592.0	623.6	591.2	-801.4	245.3	358.5	314.5	-690.2	105.3	-106.4
	02+00	588.2	613.6	586.2	-792.5	245.7	353.2	311.7	-683.9	101.0	-106.4
	03+00	571.4	592.8	566.6	-773.8	239.0	345.9	298.5	-668.6	98.6	-93.6
	04+00	542.7	588.4	537.7	-759.2	223.7	356.2	281.1	-665.7	99.9	-104.9
	05+00	499.6	582.7	495.2	-735.3	202.3	372.1	257.1	-635.5	99.7	-119.4
	06+00	434.9	574.2	432.4	-697.4	171.1	394.4	222.6	-602.1	99.9	-123.3
A-7	07+00	363.5	563.9	363.9	-652.3	141.3	430.7	180.2	-569.2	97.4	-157.9
	08+00	288.3	550.7	292.6	-599.9	102.5	429.0	148.8	-504.6	96.8	-163.4
	09+00	219.2	534.1	227.6	-546.0	72.4	425.3	116.3	-441.6	94.6	-178.2
A-3	10+00	165.5	533.4	NA	NA	NA	NA	189.6	-497.8	97.7	-106.1
	11+00	112.9	485.3					141.4	-418.9	96.0	-120.2
	12+00	69.7	368.4					98.5	-334.5	93.9	-130.5
A-4	13+00	47.3	-44.7					57.4	-215.9	93.3	-129.8
	14+00	70.7	-399.5					26.4	72.7	91.2	-137.4
	15+00	114.5	-459.0					41.5	234.0	90.2	-137.5
	T2-2	319.4	-406.9					202.8	-196.2	89.7	-134.1

60 INSERTION

SS

MODE CONT(2)-ATT HOLD
ATT/TRANSL-2 JETS
*VHF ANT-FWD
*SEQUENCE CAMERA-OFF
*TTCA & ACA-DISABLE *
*EXT LTG-TRACK *
*400+2 *
*411+0 RCS *
*616+00007 ULLAGE *
*623+0 *
*RATE/ERR MON-RNDZ RDR *
AUDIO MODE(2)-ICS/PTT *
/INV 2, CB INV 1-OPEN *
SHFT/TRUN +5 *
RNG/ALT MON-RNG/RT *
RATE/ERR MON-LDG RDR/CMPTR
CB(11) & (16) ED: LOGIC PWR-OPEN

ATT CONT-
PULSE
MODE CONT-
AUTO

V48, 1 (2) 1002
CB RR(2)-CLOSE
V41N72 (+000, +283)
CB RR(2)-OPEN, V44
P52 OPT 3
*CB AOT LAMP-CLOSE *
*AOT DETENT F/O° *
V76
1st STAR _____
2nd STAR _____
N05 ANG DIFF
PRO
N93 TORQUING ANG
X _____
Y _____
Z _____
PRO N25(R1=14) GET
PRO N25(R1=15)
PRO TO PICAPAIR
*DETENT CL *
*CB AOT LAMP-OPEN *

40 V34

LOS

INSERTION THRU BOOST

40 P00
*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *

V48, 1 (2) 1022

*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-AFT *
SET P _____ *
Y _____ *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *

MISSION APOLLO 14, DECEMBER 10, 1970

20

18
*CHECK RCS, EPS, ECS *

30

10
*VERIFY PGNS (PCM-HI) *
*V47, 414+1, 400+3 *
*400+2 *

SR
*EXT LTG-OFF *

P30
N33 TIG BOOST (INS + ΔT)

P41
*404+0, 405+0, 406+0 *
*410+5 LOAD ΔV
*400+1 → *407+0
*500R _____

ATT CONT-
MODE CONT
*

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 500R *A/H

STAGE AT BOOST IGNITION
0 BOOST

20

INSERTION
THRU BOOST

60 BOOST

V76, MODE CONT-AUTO
P00
*416+1
*410+1
*373+_____
*275+_____
*310R
*402R_____

ATT CONT-
PULSE
MODE CONT-
AUTO
*
*
*
*

V48, 11022 (IF STAGED @ BOOST)

50

AOS

S-BD ANT-FWD,VERIFY COMM
*/S-BD P _____ *
Y _____ *
*S-BD ANT-SLEW (>3.0) *
*TRACK MODE-AUTO (>4.0) *
*BIOMED-RT, PCM-HI *
*UPLINK SQUELCH-OFF *
*TAPE RECORDER-OFF *

40

BOOST THRU HAM

40

V48, 11012
(IF R <400)
CB RR(2)-CLOSE *
RATE/ERR MON-RNDZ RDR
P20, AUTO MNVR
V80, MAX N49(2.0,12.0)

RR-AUTO
TRACK

P32, TGT CSI
N11 TIG CSI (INS + ΔT)
N37 TIG TPI (PDI + ΔT)
*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *
*417+1 *

V83 SET ORDEAL
*317R, 440R, 277R *
*COMPARE VHF/RR *

36 $R

$R

33 RDOT $R

30 RDOT $R

27 RDOT $R

N=10,V32

24 RDOT $R

21 RDOT $R

18 RDOT $R
*CHECK RCS, EPS, ECS *

15 RDOT $R
V90 OBTAIN CMC LM YDOT

12 RDOT $R
*402R _____ *

TO PRO-FINAL COMP

*USE HAM CHART *
*COMPARE CSI BIAS CHART *

V83, SET ORDEAL
*317R, 440R, 277R *

P30
N33 TIG HAM (INS + ΔT)

P41 N86
*410+5 LOAD ΔV
*507+1
*407+0
*267R _____
*502R _____

ATT CONT-
MODE CONT
*
*
*

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 502R *A/H

0 HAM
P00

TIME	RANGE	RDOT
INS	269	-450
1+00	264	-446
2+00	260	-441
3+00	255	-436
4+00	251	-430
5+00	247	-424
6+00	243	-418
7+00	239	-410
8+00	235	-403
9+00	231	-395
10+00	227	-386

NOM COELLIPTIC/ONE REV ABORTS

INSERTION

MODE CONT(2)-ATT HOLD
ATT/TRANSL-2 JETS
*VHF ANT-FWD
*SEQUENCE CAMERA-OFF
*TTCA & ACA-DISABLE *
*400+2 *
*411+0 RCS *
*616+00007 ULLAGE *
*623+0 *
*RATE/ERR MON-RNDZ RDR *
AUDIO MODE(2)-ICS/PTT *
✓INV 2, CB INV 1-OPEN *
SHFT/TRUN ±5 *
RNG/ALT MON-RNG/RNG RT *
RATE/ERR MON-LDG RDR/CMPTR
CB(11) & (16) ED: LOGIC PWR-OPEN
CB(11) ECS CABIN FAN1-CLOSE

ATT CONT-PULSE
MODE CONT-AUTO

*507+0 *
*410+1 TGT CSI *
*373+_____ TIG CSI *
*275+_____ TIG TPI *
*605+00777 COT *
*416+1 1/2 PERIOD *
*310R SET DET *
*COPY AGS DATA(450R) *

INSERTION
THRU CSI

SS

INS/HAM THRU CSI

V48, 11002
CB RR(2)-CLOSE
V41N72 (+000, +283)
CB RR(2)-OPEN, V44
P52 OPT 3
*CB AOT LAMP-CLOSE *
*AOT DETENT F/0° *
V76
1st STAR REGULUS (22)
2nd STAR SPICA (26)

45
*EXT LTG-TRACK *

42
*VHF VOICE CHECK *

39
N05 ANG DIFF
PRO
N93 TORQUING ANG
X_____
Y_____
Z_____
PRO N25(R1=14) GET
PRO N25(R1=15)
PRO TO PICAPAIR
*DETENT CL *
*CB AOT LAMP-OPEN *

36 V34
V48, 11012
CB RR(2)-CLOSE
RATE/ERR MON-RNDZ RDR
P20, AUTO MNVR
V80, MAX N49(2.0,12.0)

P32, TGT CSI
*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *
*417+1 *

V83 SET ORDEAL (35NM)
*317R, 440R, 277R *

33

*
RR-AUTO TRACK
*
*
417+1 $R
*
RDOT $R
*
RDOT $R
RDOT $R
RDOT $R
RDOT $R

LOS

*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-AFT *
SET P_____ (-11) *
Y_____ (+15) *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *

30 CHART RDOT _____ RDOT $R

27 RDOT $R

24 RDOT $R
M=10, V32

21 RDOT $R

20 CHART RDOT _____
*COMPARE CMC, VHF/RR *

18 RDOT $R

*CHECK RCS, EPS, ECS *

15 RDOT $R

V90 OBTAIN CMC LM YDOT

12 RDOT $R
*

10 CHART R/RDOT _____ _____
PRO-FINAL COMP
N81 LOAD CMC LM YDOT(IF>5fps)

9 RDOT $R
*COPY AGS DATA *
CB(11) ECS CABIN FAN1-OPEN
V83 SET ORDEAL
*317R, 440R, 277R *
P41 N86
*410+5 LOAD ΔV
*507+1
*407+0 *
*267R *
*ΔV's TO CSM *
*502R *
:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 502R *A/H
:00 CSI _____
NULL RESIDUALS

ATT CONT-MODE CONT

58 CSI

V76, MODE CONT-AUTO
*507+0 *
P33 TGT CDH
V67, (+02000, +00020, +00005)
ATT CONT-PULSE
MODE CONT-AUTO

417+1

*410+2 TGT CDH *
*373R TM CDH *
*310R SET DET *
*COPY AGS DATA *

V82
CDH TIME TO CSM

V83 SET ORDEAL (45NM)
*317R, 440R, 277R *

54 §R

*EXT LTG-OFF *

SR 51 M=7, V32 RDOT §R

48 V90, LOAD CDH-30 RDOT §R
*COMPARE CMC,AGS,VHF/RR *

45 RDOT §R

M=15, V32

42 RDOT §R

AOS

39 V34, P30 RDOT §R

S-BD ANT-FWD,VERIFY COMM
*S-BD P _____ (-11) *
Y _____ (+15) *
*S-BD ANT-SLEW (>3.0) *
*TRACK MODE-AUTO (>4.0) *
*BIOMED-RT, PCM-HI *
*UPLINK SQUELCH-OFF *
*TAPE RECORDER-OFF *

CSI BURN REPORT
TIG,ΔV'S, RESIDUALS

V90 LOAD CDH-30
OBTAIN CMC LM YDOT

36 CHART RDOT RDOT §R

P41

*410+5 LOAD ΔV ATT CONT
*407+0 MODE CONT
*270R _____ *
*501R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 270 (YDOT NOW) *A/H
30 PLANE CHANGE

V76, MODE CONT-AUTO
P33 TGT CDH ATT CONT-PULSE
V93 MODE CONT-AUTO

*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *
*410+2 *
*451+0 *

COPY-AGS DATA
417+1
§R

27

24 RDOT §R

23 CHART RDOT

21 RDOT §R

M=7, V32
*COMPARE CMC,AGS,VHF/RR *

18 RDOT §R

*CHECK RCS, EPS, ECS *

15 RDOT §R

V90 OBTAIN CMC LM YDOT

12 RDOT §R

10 CHART RDOT *
PRO-FINAL COMP
N81 LOAD CMC LM YDOT

9 RDOT §R

*VERIFY PGNS *
*V47, 414+1, 400+3 *
*400+2 *
*COPY AGS DATA *
V83, SET ORDEAL
*317R, 440R, 277R *

P41 N86

5 *410+5 LOAD ΔV ATT CONT-
*407+0 MODE CONT
*267R _____ *
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 502R *A/H
:00 CDH
NULL RESIDUALS

CDH THRU TPI

42 CDH
V76, MODE CONT-AUTO
P34 TGT TPI — ATT CONT-PULSE
V93 — MODE CONT-AUTO

417+1

*SET DET *

V82
*410+3 TPI SRCH *
*307+043.00 ΔT TRNFR *
*310+TIME TO TPI *
*303R θ TPI *
*410+4 (When 303=26.6) *
*POLAR PLOT @ 75 NM *

310R

33 $R

M=7, V32
*COMPARE TPI TIME *
30 RDOT $R

27 RDOT $R

*EXT LTG-TRACK *

SS 24 RDOT $R

21 RDOT $R

M=15, V32
*COMPARE CMC,AGS,VHF/RR *
*VOICE LM TPI TIME *
* TO CSM *

18 RDOT $R

LOS

*CHECK RCS, EPS, ECS *
15 RDOT $R
*MONITOR 303R θ TPI AND *
*RETARGET IF REQ *
*COPY AGS DATA *
12 RDOT $R
*VERIFY PGNS *
*V47, 414+1, 400+3 *
*400+2 *
*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-AFT *
SET P _____ (+173) *
Y _____ (+62) *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *
*TAPE RECORDER-ON *

10 PRO-FINAL COMP
TIG TO CSM
*SET DET *
9 CHART θ — RDOT $R

410+3
310+TIME TO TPI
303R θ TPI
410+4 (WHEN 303=26.6)
310R SET DET

*COPY AGS DATA *

5 CHART R/RDOT/θ

P41 N86
*404+0, 405+0, 406+0 *
*410+5 LOAD ΔV — ATT CONT-
MODE CONT
*507+1 *
*407+0 *
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 472R/502R *A/H
:00 TPI
NULL RESIDUALS

APOLLO 14 FLIGHT DATA FILE

TPI THRU DOCKING

MISSION APOLLO 14, DECEMBER 10, 1970

0 TPI
V76, MODE CONT-AUTO
*507+0 *
P35 TGT MCC 1 ATT CONT-PULSE
V93 MODE CONT-AUTO

417+1
2 $R

*410+4 *
*373+TPI TIME +15 MIN *
*307+028.00 *

4 RDOT $R

6 RDOT $R

SR

8 RDOT $R

9 CHART e *

10 RDOT $R

12 PRO FINAL COMP RDOT $R

13 CHART R/RDOT/e

267R TOTAL VEL MCC1
371R ΔV MCC1 + ΔV TPF

*404+0, 405+0, 406+0 *
P41

*410+5 LOAD ΔV ATT CONT-
*407+0 MODE CONT
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 472R/502R *A/H
15 MCC1
NULL RESIDUALS

V76, MODE CONT-AUTO
P35 TGT MCC 2 ATT CONT-PULSE
V93 MODE CONT-AUTO
*VERIFY PGNS (PCM-HI) *
*V47,414+1,400+3 *
*400+2 *

417+1
17 $R

*410+4 *
*373+TPI TIME +30 MIN *
*307+013.00 *

19 RDOT $R

21 RDOT $R

23 RDOT $R

*EXTERIOR LTG-OFF *
24 CHART e *

25 RDOT $R

27 PRO-FINAL COMP RDOT $R

28 CHART R/RDOT/e

267R TOTAL VEL MCC2
371R ΔV MCC2 + ΔV TPF

*404+0, 405+0, 406+0 *
P41

*410+5 LOAD ΔV ATT CONT-
*407+0 MODE CONT
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 472R/502R *A/H
30 MCC2
NULL RESIDUALS

AOS

CB(11) ECS CABIN FAN1-CLOSE
P00
V48, 11002
P47
V63
*404+0, 405+0, 406+00 *
40 INITIATE BRAKING
30 FPS - 6000 FT
20 FPS - 3000 FT
10 FPS - 1500 FT
5 FPS - 600 FT

*SETUP CAMERA FOR *
* DOCKING: *
*LM3/DC/60/HCEX *
* (f11,250,FOCUS) 5 *
*LM3/DAC/10/CEX-ULC *
* (T8/250/10) 6FPS *
*MAG(BB)_____FR=_____ *
50 INITIATE DOCKING
V34, P00
V76 ATT CONT-PULSE
COAS TO OVHD WINDOW
*EXT LTG-DOCK *
*TTCA & ACA-ENABLE *
SHFT/TRUN ±50 *
V41N72 (+000,+320)
CB RR(2)-OPEN, V44
S-BD ANT-FWD,VERIFY COMM
*S-BD P _____ (+173) *
Y _____ (+62) *
*S-BD ANT-SLEW (>3.0) *
*TRACK MODE-AUTO (>4.0) *
*BIOMED-RT, PCM-HI *
*UPLINK SQUELCH-OFF *
PITCH DOWN 90°, YAW LEFT TO ALIGN
V77 ATT CONT-
MODE CONT
60 CONTACT
CONFIRM Ddocking WITH CSM
MODE CONT (BOTH)-OFF
POST DOCKING PROCEDURES

PDI SUMMARY DATA

11/10/70

PAGE	ABORT TIME PDI+	INS TIME PDI+	INS N76	INS HA/HINS	BOOST TIME INS+	HAM TIME INS+	CSI TIME INS+	CSI ΔVX	CDH TIME INS+	CDH ΔVX	CDH ΔVZ	TPI TIME PDI+	AIM TIME PDI+	AIM ΔVX	AIM ΔVZ
A-3	PDIO	NA	NA	NA	NA	NA	1+00+00*	49.0	2+02+10*	-120.8	8.9	2+45+46	00+00	101.0	2.7
A-1	NOI+12	NA	NA	NA	1+07+00*	2+07+00*	3+07+00*	37.8	4+09+32*	-128.4	-12.5	4+49+16	12+00	111.4	-50.0
A-2	1+00	2+05	5669.2	145.3/52249.	1+00+00	2+00+00	3+00+00	38.7	4+02+32	-128.5	-25.6	4+49+42	NA	NA	NA
	2+00	3+57	5665.3	144.3/55929.	↓	↓	↓	37.6	4+02+28	-126.7	-23.6	↓	↓	↓	↓
	3+00	5+41	5659.2	141.8/60020.				36.4	4+02+21	-123.7	-18.1				
	4+00	7+15	5655.4	138.7/60024.				36.3	4+02+12	-119.9	-10.0				
	5+00	8+41	5650.3	134.5/60030.				36.3	4+02+01	-114.8	.8				
A-3	6+00	10+42	5669.8	151.8/62345.	NA	NA	0+55+00	42.4	1+57+42	-132.1	-88.4	2+51+04			
	7+00	12+50	5645.9	137.1/70613.	↓	↓	↓	41.7	1+57+04	-115.5	-64.8	↓	↓	↓	↓
	8+00	14+40	5619.8	120.0/77315.				41.2	1+56+20	-95.7	-40.5				
A-4	9+00	16+06	5599.2	104.4/78447.				41.8	1+55+39	-76.7	-20.8				
	10+00	17+15	5585.0	91.0/74090.				43.2	1+55+03	-59.9	-6.4				
	11+00	18+19	5576.1	79.0/64618.				45.7	1+54+31	-44.4	4.7				
	12+00	19+27	5558.7	63.7/60261.				46.9	1+53+50	-24.2	16.5				
	13+00	20+27	5543.8	52.8/60258.				46.9	1+53+21	-9.4	23.0				
	14+00	21+26	5528.8	41.8/60255.				46.8	1+52+51	5.7	28.3				
	15+00	22+25	5513.4	30.8/60251.	↓	↓	↓	46.7	1+52+22	21.2	31.7	↓	↓	↓	↓
A-5	T2-1	7+14†	5512.4	31.5/60154.	50+00	1+50+00	2+40+00	39.5	3+37+31	18.1	11.6	4+49+06			
A-1	NO2+12	NA	NA	NA	1+12+00*	2+12+00*	3+12+00*	36.0	4+15+40	-159.4	-7.9	4+53+04	12+00	142.9	-50.0
A-6	1+00	2+09	5698.3	169.6/52247.	1+00+00	2+00+00	3+00+00	34.7	4+03+30	-153.0	-108.1	4+54+32	NA	NA	NA
	2+00	4+01	5693.9	168.5/56643.	↓	↓	↓	33.6	4+03+26	-151.4	-104.7	↓	↓	↓	↓
	3+00	5+44	5688.5	166.0/60021.				33.0	4+03+20	-148.9	-96.8				
	4+00	7+18	5684.7	162.8/60025.				33.5	4+03+13	-145.9	-85.9				
	5+00	8+44	5679.6	158.6/60032.				34.2	4+03+03	-141.6	-71.4				
	6+00	10+44	5670.7	152.6/62432.				34.4	4+02+48	-135.3	-53.1				
A-7	7+00	12+53	5654.9	144.6/70907.				33.0	4+02+27	-126.3	-31.7				
	8+00	14+43	5639.3	135.7/77441.				31.9	4+02+04	-116.0	-9.6				
	9+00	16+08	5628.9	128.0/78539.	↓	↓	↓	31.9	4+01+43	-106.5	9.2	↓	↓	↓	↓
A-3	10+00	17+20	5647.0	140.1/74203.	NA	NA	55+00	40.6	1+57+12	-119.0	-70.4	2+55+53			
	11+00	18+23	5638.8	128.0/64749.	↓	↓	↓	43.7	1+56+41	-105.2	-52.6	↓	↓	↓	↓
	12+00	19+31	5622.8	112.7/60282.				45.8	1+56+01	-87.0	-32.1				
A-4	13+00	20+30	5608.9	101.8/60279				46.2	1+55+32	-73.7	-19.1				
	14+00	21+30	5594.9	91.0/60276.				46.6	1+55+03	-60.0	-7.4				
	15+00	22+29	5580.6	80.1/60272.				46.8	1+54+34	-46.0	2.7				
	T2-2	7+14†	5512.4	31.5/60154	↓	↓	50+00	49.0	1+57+30	18.4	16.7	2+55+28.6	↓	↓	↓

INDICATES TIME IS REFERENCED TO LIFT-OFF.

* INDICATES TIME IS REFERENCED TO PDI.

PDI DATA
SUMMARY

RANGE AND RANGE RATE AT INS AND 10 MINUTES PRIOR TO SUBSEQUENT BURNS

11/10/70

PAGE	ABORT TIME PDI+	INS RANGE	INS RANGE RATE	BOOST RANGE	BOOST RANGE RATE	HAM RANGE	HAM RANGE RATE	CSI RANGE	CSI RANGE RATE	CDH RANGE	CDH RANGE RATE
A-3	PDIO	NA	NA	NA	NA	NA	NA	150.2	-533.2	106.8	-176.3
A-1	NO 1+12	NA	NA	380.4	-690.8	151.1	445.0	196.1	-594.6	100.2	-119.9
A-2	01+00	368.0	598.2	372.6	-675.4	137.8	444.6	194.3	-580.6	102.9	-154.2
	02+00	363.8	589.1	367.8	-666.3	137.3	437.9	191.8	-573.6	99.5	-153.9
	03+00	346.4	566.1	348.7	-642.7	130.4	423.7	179.6	-551.5	95.8	-156.6
	04+00	317.0	558.9	320.4	-621.0	116.9	427.7	164.6	-529.5	96.0	-152.3
	05+00	273.1	548.5	278.7	-587.4	97.5	431.5	143.5	-494.7	93.6	-162.5
A-3	06+00	208.1	557.1	NA	NA	NA	NA	228.0	-556.2	101.3	-95.2
	07+00	138.0	513.2					164.3	-459.5	99.8	-101.3
	08+00	70.4	372.8					99.1	-336.6	96.9	-121.5
A-4	09+00	50.9	-226.7					44.0	-146.6	95.4	-126.4
	10+00	88.5	-439.9					27.0	232.6	94.4	-129.4
	11+00	139.3	-462.2					60.6	187.6	91.8	-138.3
	12+00	188.3	-454.9					98.9	91.0	89.6	-143.3
	13+00	238.6	-440.7					137.9	-2.8	88.6	-145.7
	14+00	289.2	-423.9					176.5	-95.4	86.4	-143.8
	15+00	339.8	-405.8					214.3	-188.9	85.6	-149.7
A-5	T2-1	618.6	-382.3	509.0	-193.8	343.3	-360.9	201.3	-202.9	85.5	-110.7
A-1	NO 2+12	NA	NA	565.0	-901.0	272.2	462.5	279.4	-779.3	98.0	-197.7
A-6	01+00	592.0	623.6	591.2	-801.4	245.3	358.5	314.5	-690.2	105.3	-106.4
	02+00	588.2	613.6	586.2	-792.5	245.7	353.2	311.7	-683.9	101.0	-106.4
	03+00	571.4	592.8	566.6	-773.8	239.0	345.9	298.5	-668.6	98.6	-93.6
	04+00	542.7	588.4	537.7	-759.2	223.7	356.2	281.1	-665.7	99.9	-104.9
	05+00	499.6	582.7	495.2	-735.3	202.3	372.1	257.1	-635.5	99.7	-119.4
	06+00	434.9	574.2	432.4	-697.4	171.1	394.4	222.6	-602.1	99.9	-123.3
A-7	07+00	363.5	563.9	363.9	-652.3	141.3	430.7	180.2	-569.2	97.4	-157.9
	08+00	288.3	550.7	292.6	-599.9	102.5	429.0	148.8	-504.6	96.8	-163.4
	09+00	219.2	534.1	227.6	-546.0	72.4	425.3	116.3	-441.6	94.6	-178.2
A-3	10+00	165.5	533.4	NA	NA	NA	NA	189.6	-497.8	97.7	-106.1
	11+00	112.9	485.3					141.4	-418.9	96.0	-120.2
	12+00	69.7	368.4					98.5	-334.5	93.9	-130.5
A-4	13+00	47.3	-44.7					57.4	-215.9	93.3	-129.8
	14+00	70.7	-399.5					26.4	72.7	91.2	-137.4
	15+00	114.5	-459.0					41.5	234.0	90.2	-137.5
	T2-2	319.4	-406.9					202.8	-196.2	89.7	-134.1

60 INSERTION

SS

MODE CONT(2)-ATT HOLD
ATT/TRANSL-2 JETS
*VHF ANT-FWD
*SEQUENCE CAMERA-OFF
*TTCA & ACA-DISABLE *
*EXT LTG-TRACK *
*400+2 *
*411+0 RCS *
*616+00007 ULLAGE *
*623+0 *
*RATE/ERR MON-RNDZ RDR *
AUDIO MODE(2)-ICS/PTT *
/INV 2, CB INV 1-OPEN *
SHFT/TRUN +5 *
RNG/ALT MON-RNG/RT *
RATE/ERR MON-LDG RDR/CMPTR
CB(11) & (16) ED: LOGIC PWR-OPEN

ATT CONT-PULSE
MODE CONT-AUTO

V48, 1 (2) 1002
CB RR(2)-CLOSE
V41N72 (+000, +283)
CB RR(2)-OPEN, V44
P52 OPT 3
*CB AOT LAMP-CLOSE *
*AOT DETENT F/0° *
V76
1st STAR _____
2nd STAR _____
N05 ANG DIFF
PRO
N93 TORQUING ANG
X _____
Y _____
Z _____
PRO N25(R1=14) GET
PRO N25(R1=15)
PRO TO PICAPAIR
*DETENT CL *
*CB AOT LAMP-OPEN *

40 V34

LOS

30

20

INSERTION THRU BOOST

40 P00

*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *

V48, 1 (2) 1022

*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-AFT *
SET P _____ *
Y _____ *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *

MISSION APOLLO 14, DECEMBER 10, 1970

20

18

*CHECK RCS, EPS, ECS *

10

*VERIFY PGNS (PCM-HI) *
*V47, 414+1, 400+3 *
*400+2 *

SR

*EXT LTG-OFF *

P30
N33 TIG BOOST (INS + ΔT)

P41
*404+0, 405+0, 406+0 *
*410+5 LOAD ΔV
*407+0
*500R _____

ATT CONT-MODE CONT *

*400+1→

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 500R

A/H

STAGE AT BOOST IGNITION
0 BOOST

60 BOOST

V76, MODE CONT-AUTO
P00
*416+1
*410+1
*373+
*275+
*310R
*402R

ATT CONT-PULSE MODE CONT-AUTO

V48, 11022 (IF STAGED @ BOOST)

50

AOS

S-BD ANT-FWD,VERIFY COMM
*/S-BD P
Y
*S-BD ANT-SLEW (>3.0)
*TRACK MODE-AUTO (>4.0)
*BIOMED-RT, PCM-HI
*UPLINK SQUELCH-OFF
*TAPE RECORDER-OFF

40

BOOST THRU HAM

40

V48, 11012
(IF R <400)
CB RR(2)-CLOSE *
RATE/ERR MON-RNDZ RDR
P20, AUTO MNVR
V80, MAX N49(2.0,12.0)

RR-AUTO TRACK

P32, TGT CSI
N11 TIG CSI (INS + ΔT)
N37 TIG TPI (PDI + ΔT)
*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *
*417+1 *

V83 SET ORDEAL
*317R, 440R, 277R *
*COMPARE VHF/RR *

36 ∦R

33 RDOT ∦R

30 RDOT ∦R

27 RDOT ∦R

M=10,V32

24 RDOT ∦R

MISSION APOLLO 14, DECEMBER 10, 1970

21 RDOT ∦R

18 RDOT ∦R
*CHECK RCS, EPS, ECS *

15 RDOT ∦R
V90 OBTAIN CMC LM YDOT

12 RDOT ∦R
*402R *

10 PRO-FINAL COMP

*USE HAM CHART *
*COMPARE CSI BIAS CHART *

V83, SET ORDEAL
*317R, 440R, 277R *

P30
N33 TIG HAM (INS + ΔT)

P41 N86
*410+5 LOAD ΔV
*507+1
*407+0
*267R
*502R

ATT CONT-MODE CONT

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 502R *A/H

0 HAM
P00

TIME	RANGE	RDOT
INS	269	-450
1+00	264	-446
2+00	260	-441
3+00	255	-436
4+00	251	-430
5+00	247	-424
6+00	243	-418
7+00	239	-410
8+00	235	-403
9+00	231	-395
10+00	227	-386

NOM COELLIPTIC/ONE REV ABORTS

INSERTION

MODE CONT(2)-ATT HOLD | ATT CONT-PULSE
ATT/TRANSL-2 JETS | MODE CONT-AUTO
*VHF ANT-FWD
*SEQUENCE CAMERA-OFF
*TTCA & ACA-DISABLE *
*400+2 *
*411+0 RCS *
*616+00007 ULLAGE *
*623+0 *
*RATE/ERR MON-RNDZ RDR *
AUDIO MODE(2)-ICS/PTT *
✓INV 2, CB INV 1-OPEN *
SHFT/TRUN ±5 *
RNG/ALT MON-RNG/RNG RT *
RATE/ERR MON-LDG RDR/CMPTR
CB(11) & (16) ED: LOGIC PWR-OPEN
CB(11) ECS CABIN FAN1-CLOSE

*507+0 *
*410+1 TGT CSI *
*373+_____ TIG CSI *
*275+_____ TIG TPI *
*605+00777 COT *
*416+1 1/2 PERIOD *
*310R SET DET *
*COPY AGS DATA(450R) *

INSERTION
THRU CSI

SS

INS/HAM THRU CSI

V48, 11002
CB RR(2)-CLOSE
V41N72 (+000, +283)
CB RR(2)-OPEN, V44
P52 OPT 3
*CB AOT LAMP-CLOSE
*AOT DETENT F/0°
V76
1st STAR REGULUS (22)
2nd STAR SPICA (26)
45
*EXT LTG-TRACK
42
*VHF VOICE CHECK
39
N05 ANG DIFF
PRO
N93 TORQUING ANG
X_____
Y_____
Z_____
PRO N25(R1=14) GET
PRO N25(R1=15)
PRO TO PICAPAIR
*DETENT CL *
*CB AOT LAMP-OPEN *
36 V34 RDOT ↕R
V48, 11012
CB RR(2)-CLOSE
RATE/ERR MON-RNDZ RDR
P20, AUTO MNVR
V80, MAX N49(2.0,12.0)

P32, TGT CSI
*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *
*417+1 *

V83 SET ORDEAL (35NM)
*317R, 440R, 277R *
33 RDOT ↕R

LOS

* RR-AUTO TRACK
*
*
417+1 ↕R
*
RDOT ↕R
*
RDOT ↕R

*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-AFT *
SET P_____ (-11) *
Y_____ (+15) *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *
30 CHART RDOT | RDOT ↕R
27 RDOT ↕R
24 RDOT ↕R
M=10, V32
21 RDOT ↕R
20 CHART RDOT |
*COMPARE CMC, VHF/RR *
18 RDOT ↕R
*CHECK RCS, EPS, ECS *
15 RDOT ↕R

V90 OBTAIN CMC LM YDOT
12 RDOT ↕R *
10 CHART R/RDOT | |
PRO-FINAL COMP
N81 LOAD CMC LM YDOT(IF>5fps)
9 RDOT ↕R *
*COPY AGS DATA
CB(11) ECS CABIN FAN1-OPEN
V83 SET ORDEAL
*317R, 440R, 277R *
P41 N86
*410+5 LOAD ΔV | ATT CONT-MODE CONT
*507+1
*407+0 *
*267R *
*ΔV's TO CSM *
*502R *
:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 502R *A/H
:00 CSI |
NULL RESIDUALS

58 CSI

V76, MODE CONT-AUTO
*507+0 *
P33 TGT CDH
V67, (+02000, +00020, +00005)
ATT CONT-PULSE
MODE CONT-AUTO

417+1

*410+2 TGT CDH *
*373R TM CDH *
*310R SET DET *
*COPY AGS DATA *

V82
CDH TIME TO CSM

V83 SET ORDEAL (45NM)
*317R, 440R, 277R *

54 $R

*EXT LTG-OFF *

SR 51 M=7, V32 RDOT $R

48 V90, LOAD CDH-30 RDOT $R
*COMPARE CMC,AGS,VHF/RR *

45 RDOT $R

M=15, V32

42 RDOT $R

AOS

39 V34, P30 RDOT $R

S-BD ANT-FWD,VERIFY COMM
*/S-BD P _____ (-11) *
Y _____ (+15) *
*S-BD ANT-SLEW (>3.0) *
*TRACK MODE-AUTO (>4.0) *
*BIOMED-RT, PCM-HI *
*UPLINK SQUELCH-OFF *
*TAPE RECORDER-OFF *

CSI BURN REPORT
TIG,ΔV'S, RESIDUALS

V90 LOAD CDH-30
OBTAIN CMC LM YDOT

36 CHART RDOT RDOT $R

P41

*410+5 LOAD ΔV ATT CONT
*407+0 MODE CONT
*270R _____ *
*501R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 270 (YDOT NOW) *A/H

30 PLANE CHANGE

V76, MODE CONT-AUTO
P33 TGT CDH ATT CONT-PULSE
V93 MODE CONT-AUTO

*VERIFY PGNS WITH MSFN *
*V47, 414+1, 400+3 *
*400+2 *
*410+2 *
*451+0 *

COPY-AGS DATA
417+1
$R

27

24 RDOT $R

23 CHART RDOT

21 RDOT $R

M=7, V32
*COMPARE CMC,AGS,VHF/RR *

18 RDOT $R

*CHECK RCS, EPS, ECS *

15 RDOT $R

V90 OBTAIN CMC LM YDOT

12 RDOT $R

10 CHART RDOT *
PRO-FINAL COMP
N81 LOAD CMC LM YDOT

9 RDOT $R

*VERIFY PGNS *
*V47, 414+1, 400+3 *
*400+2 *
*COPY AGS DATA *

V83, SET ORDEAL
*317R, 440R, 277R *

P41 N86

5 *410+5 LOAD ΔV ATT CONT-
*407+0 MODE CONT
*267R _____ *
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 502R *A/H

:00 CDH

NULL RESIDUALS

CDH THRU TPI

42 CDH

V76, MODE CONT-AUTO
P34 TGT TPI — ATT CONT-PULSE, MODE CONT-AUTO
V93

417+1

*SET DET *

V82
*410+3 TPI SRCH *
*307+043.00 ΔT TRNFR *
*310+TIME TO TPI *
*303R θ TPI *
*410+4 (When 303=26.6) *
*POLAR PLOT @ 75 NM *

3 OR

33 R

M=7, V32
*COMPARE TPI TIME *

30 RDOT R

27 RDOT R

*EXT LTG-TRACK *

SS 24 RDOT R

21 RDOT R

M=15, V32
*COMPARE CMC,AGS,VHF/RR *
*VOICE LM TPI TIME *
* TO CSM *

18 RDOT R

LOS

*CHECK RCS, EPS, ECS *

15 RDOT R

*MONITOR 303R θ TPI AND *
*RETARGET IF REQ *
*COPY AGS DATA *

12 RDOT R

*VERIFY PGNS *
*V47, 414+1, 400+3 *
*400+2 *
*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
*S-BD ANT-AFT *
SET P _____ (+173) *
Y _____ (+62) *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *
*TAPE RECORDER-ON *

10 PRO-FINAL COMP
TIG TO CSM
*SET DET *

9 CHART θ — RDOT R

410+3
310+TIME TO TPI
303R θ TPI
410+4 (WHEN 303=26.6)
310R SET DET

*COPY AGS DATA *

5 CHART R/RDOT/θ

P41 N86
*404+0, 405+0, 406+0 *
*410+5 LOAD ΔV — ATT CONT-MODE CONT
*507+1 *
*407+0 *
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 472R/502R * A/H

:00 TPI
NULL RESIDUALS

0 TPI

V76, MODE CONT-AUTO
*507+0 *
P35 TGT MCC 1 ATT CONT-PULSE
V93 MODE CONT-AUTO

417+1
2 $R

*410+4 *
*373+TPI TIME +15 MIN *
*307+028.00 *

4 RDOT $R

6 RDOT $R

8 RDOT $R

9 CHART θ *

10 RDOT $R

12 PRO FINAL COMP RDOT $R

13 CHART R/RDOT/θ

267R TOTAL VEL MCC1
371R ΔV MCC1 + ΔV TPF

*404+0, 405+0, 406+0 *
P41

*410+5 LOAD ΔV ATT CONT-
*407+0 MODE CONT
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 472R/502R *A/H

15 MCC1
NULL RESIDUALS

SR

V76, MODE CONT-AUTO
P35 TGT MCC 2 ATT CONT-PULSE
V93 MODE CONT-AUTO
*VERIFY PGNS (PCM-HI) *
*V47,414+1,400+3 *
*400+2 *

417+1
17 $R

*410+4 *
*373+TPI TIME +30 MIN *
*307+013.00 *

19 RDOT $R

21 RDOT $R

23 RDOT $R

*EXTERIOR LTG-OFF *
24 CHART θ *

25 RDOT $R

27 PRO-FINAL COMP RDOT $R

28 CHART R/RDOT/θ

267R TOTAL VEL MCC2
371R ΔV MCC2 + ΔV TPF

*404+0, 405+0, 406+0 *
P41

*410+5 LOAD ΔV ATT CONT-
*407+0 MODE CONT
*502R _____ *

:30 V77, MODE CONT-ATT HOLD
:05 *407+1, 472R/502R *A/H

30 MCC2
NULL RESIDUALS

AOS

CB(11) ECS CABIN FAN1-CLOSE
P00
V48, 11002
P47
V63
*404+0, 405+0, 406+00 *

40 INITIATE BRAKING
30 FPS - 6000 FT
20 FPS - 3000 FT
10 FPS - 1500 FT
5 FPS - 600 FT

*SETUP CAMERA FOR *
* DOCKING: *
*LM3/DC/60/HCEX *
* (f11,250,FOCUS) 5 *
*LM3/DAC/10/CEX-ULC *
* (T8/250/10) 6FPS *
*MAG(BB)_____FR#_____ *

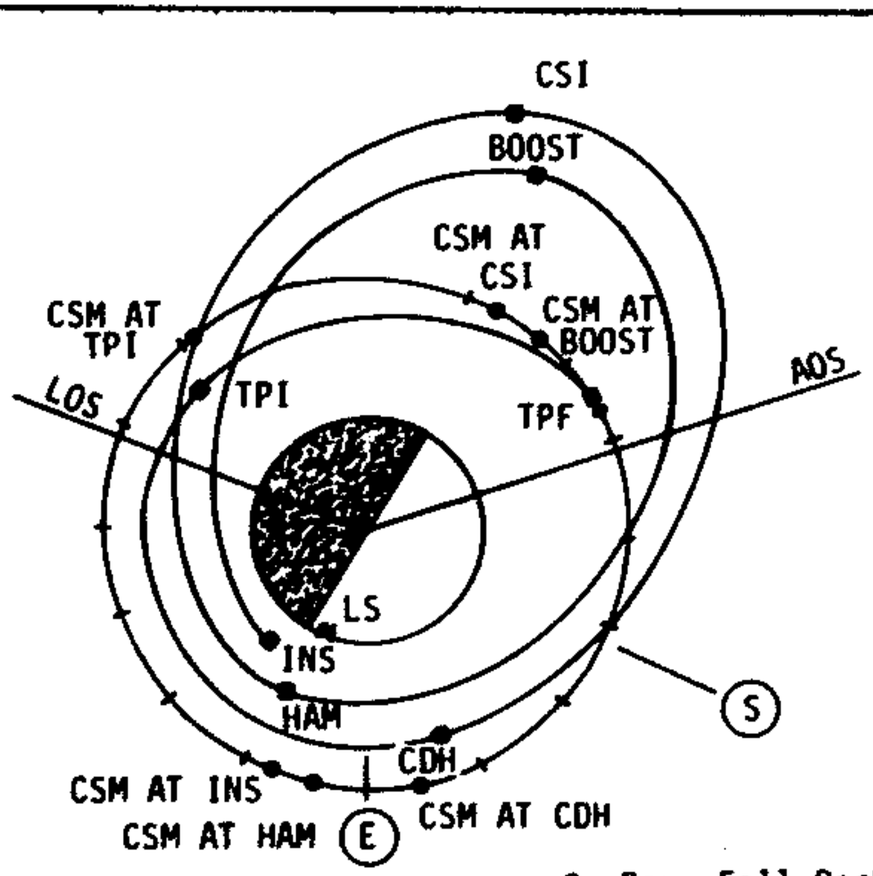
50 INITIATE DOCKING
V34, P00
V76 ATT CONT-PULSE
COAS TO OVHD WINDOW
*EXT LTG-DOCK *
*TTCA & ACA-ENABLE *
SHFT/TRUN ±50 *
V41N72 (+000,+320)
CB RR(2)-OPEN, V44
S-BD ANT-FWD,VERIFY COMM
*/S-BD P _____ (+173) *
Y _____ (+62) *
*S-BD ANT-SLEW (>3.0) *
*TRACK MODE-AUTO (>4.0) *
*BIOMED-RT, PCM-HI *
*UPLINK SQUELCH-OFF *
PITCH DOWN 90°, YAW LEFT TO ALIGN
V77 ATT CONT-
MODE CONT

60 CONTACT
CONFIRM Ddocking WITH CSM
MODE CONT (BOTH)-OFF
POST DOCKING PROCEDURES

DATE 11/20/70

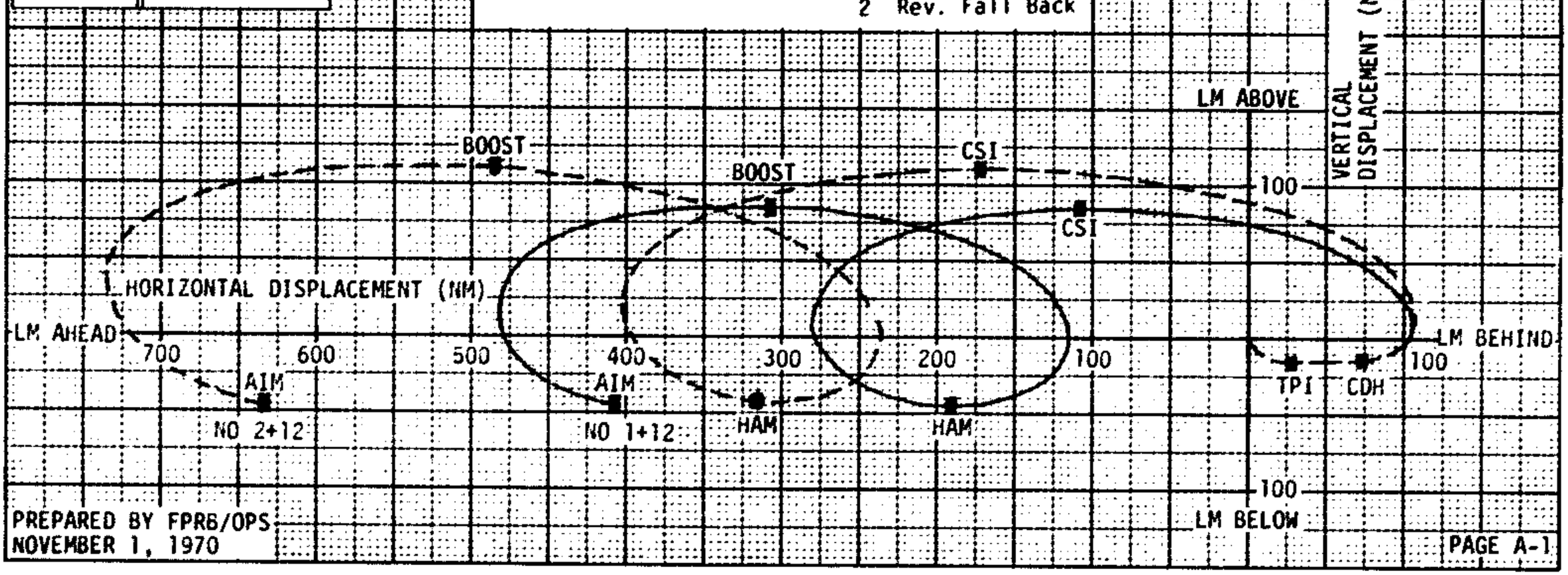
LM TIMELINE BOOK

EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	



APOLLO 14
INERTIAL AND RELATIVE PLOTS

1. NO PDI 1 + 12
2. NO PDI 2 + 12



PREPARED BY FPRB/OPS
NOVEMBER 1, 1970

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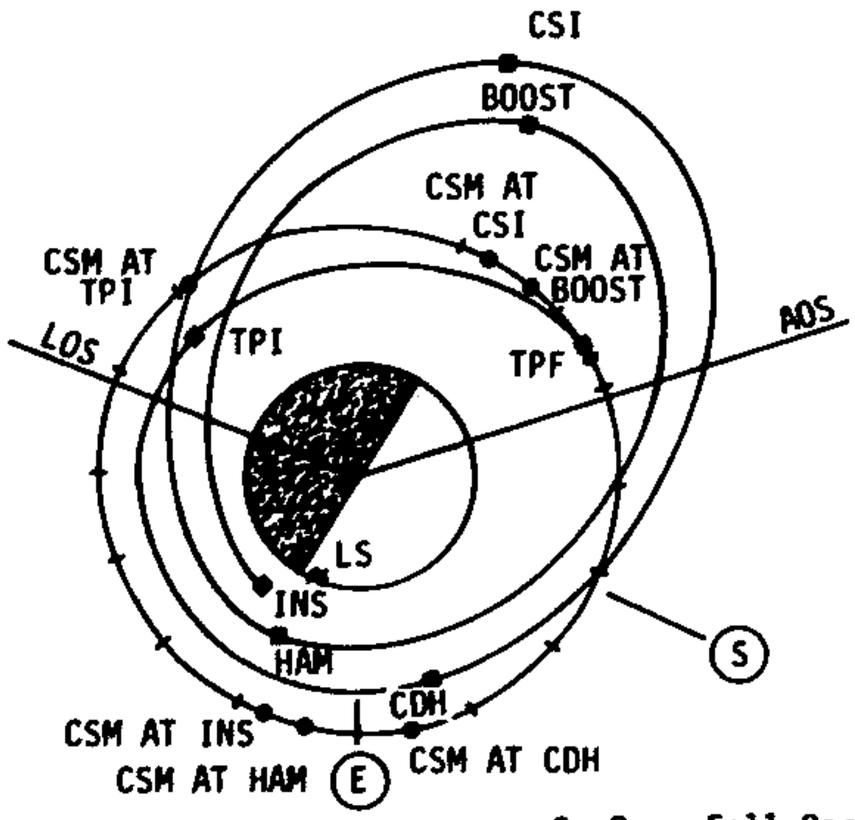
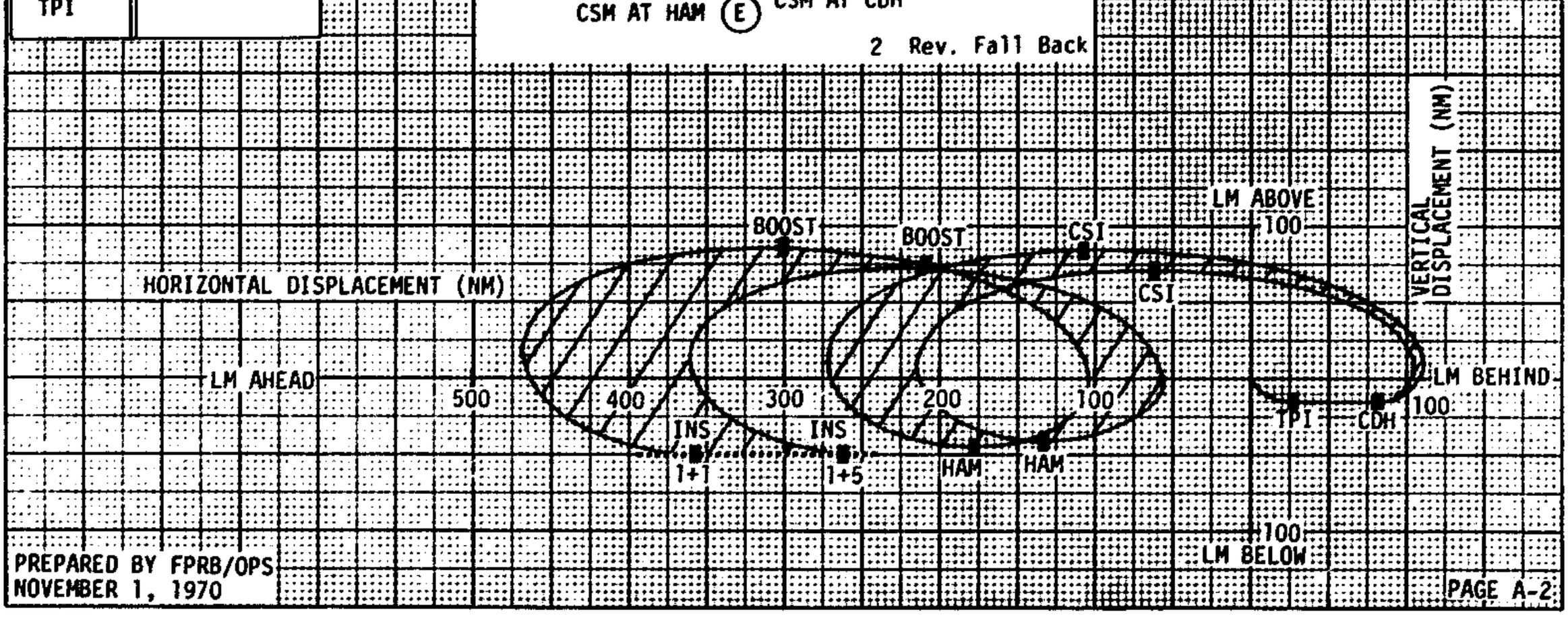
EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	



APOLLO 14
INERTIAL AND RELATIVE PLOTS

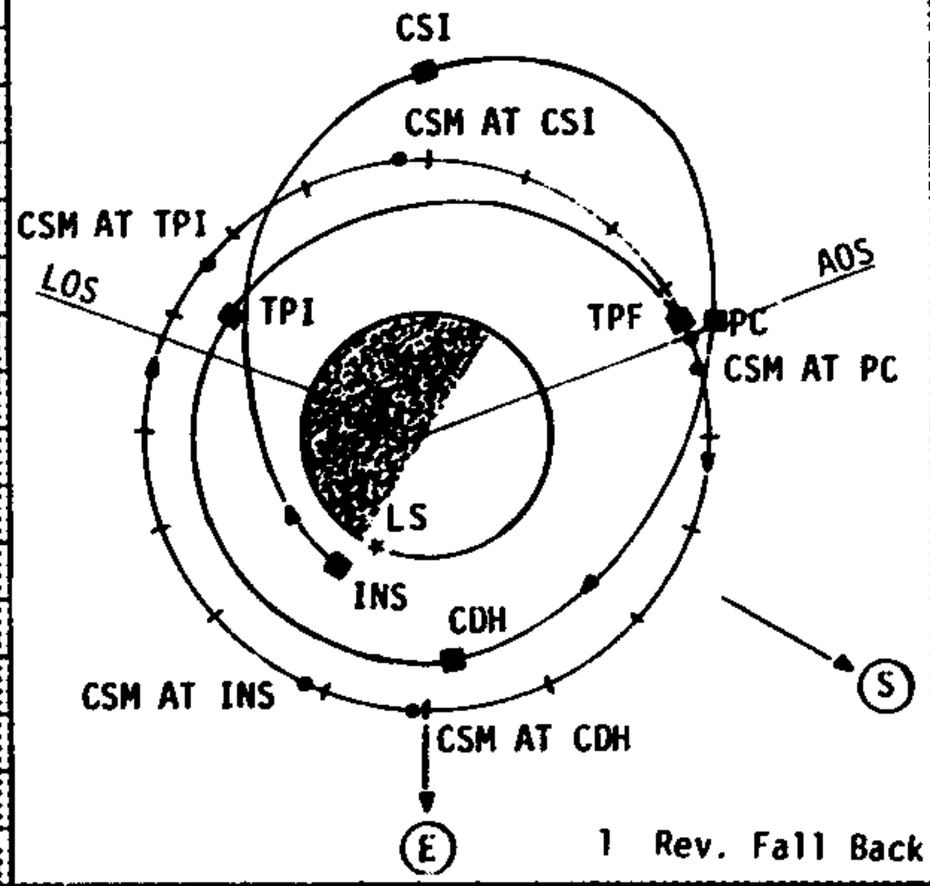
1. $1 \leq PDI\ 1 \leq 5$

2 Rev. Fall Back



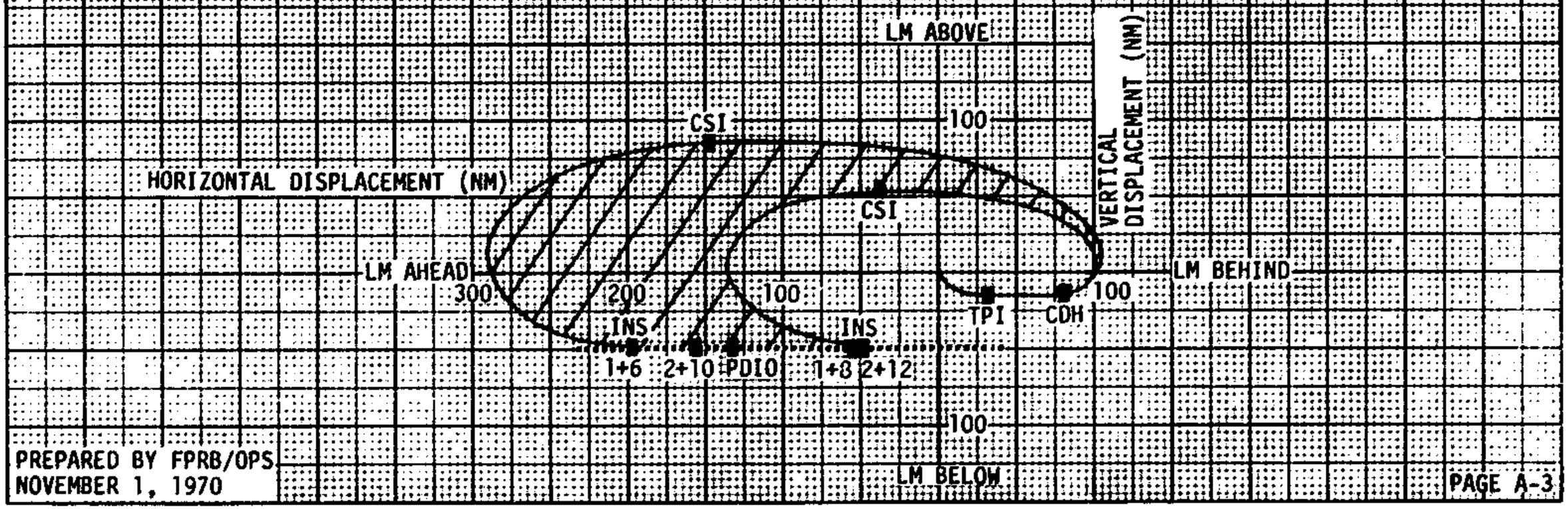
PREPARED BY FPRB/OPS
NOVEMBER 1, 1970

EVENT	GET TIG
INS	
CSI	
PC	
CDH	
TPI	



APOLLO 14
INERTIAL AND RELATIVE PLOTS

1. PDIO
2. $6 \leq$ PDI 1 ≤ 8
3. $10 \leq$ PDI 2 ≤ 12



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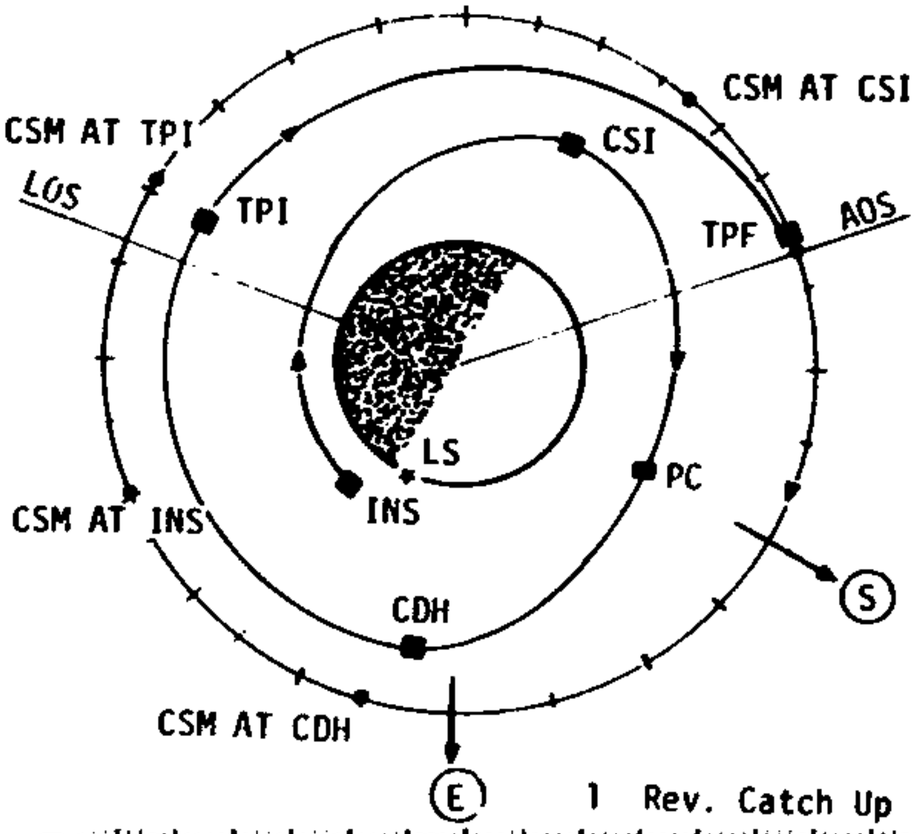
NOVEMBER 1, 1970

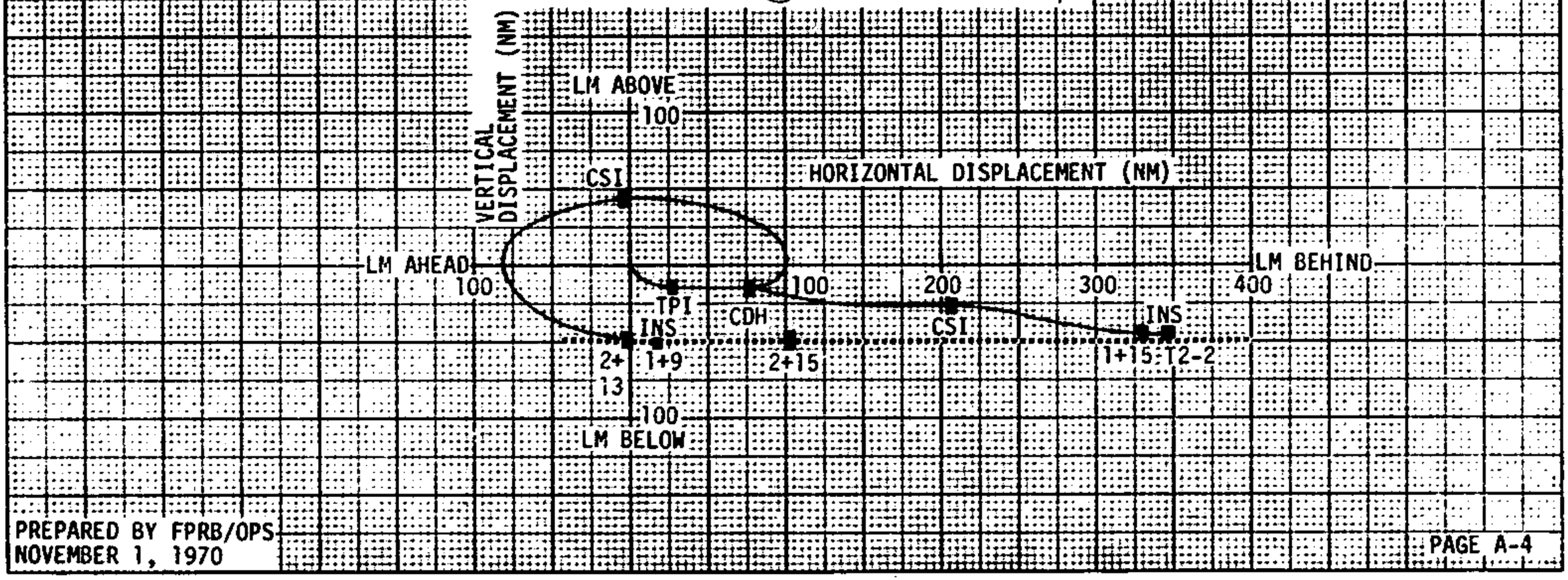
PAGE A-3

EVENT	GET TIG
INS	
CSI	
PC	
CDH	
TPI	



APOLLO 14
INERTIAL AND RELATIVE PLOTS

1. 9 ≤ PDI 1 ≤ 15
2. 13 ≤ PDI 2 ≤ 15
3. T2-2



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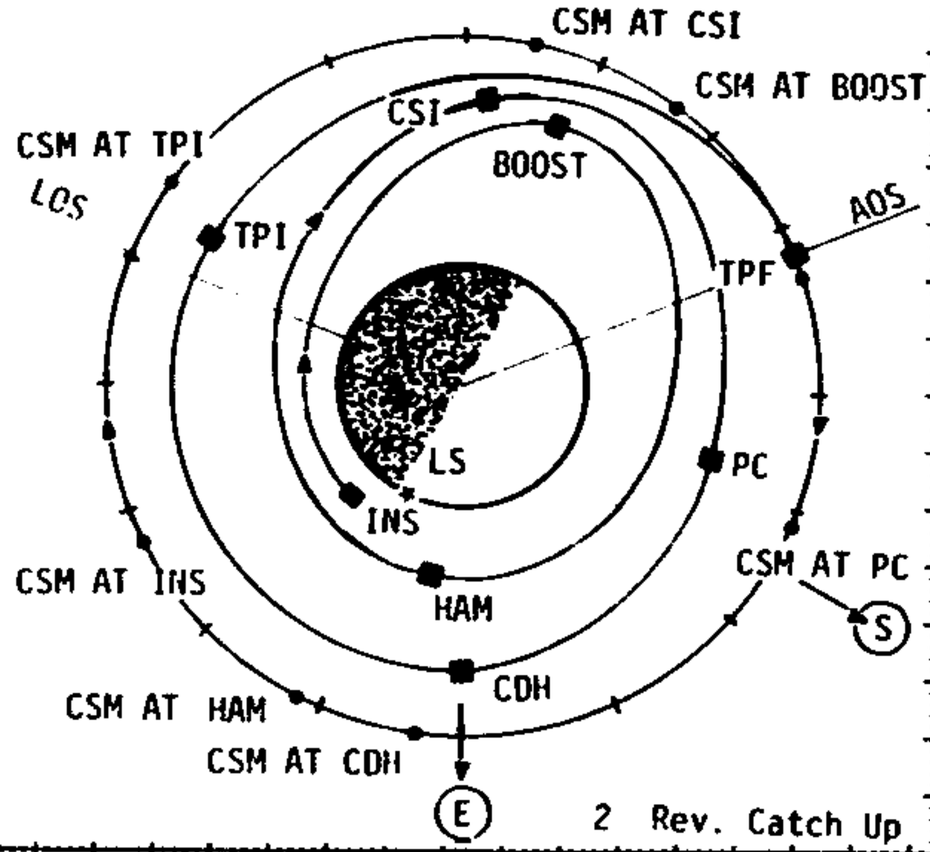
PAGE A-4

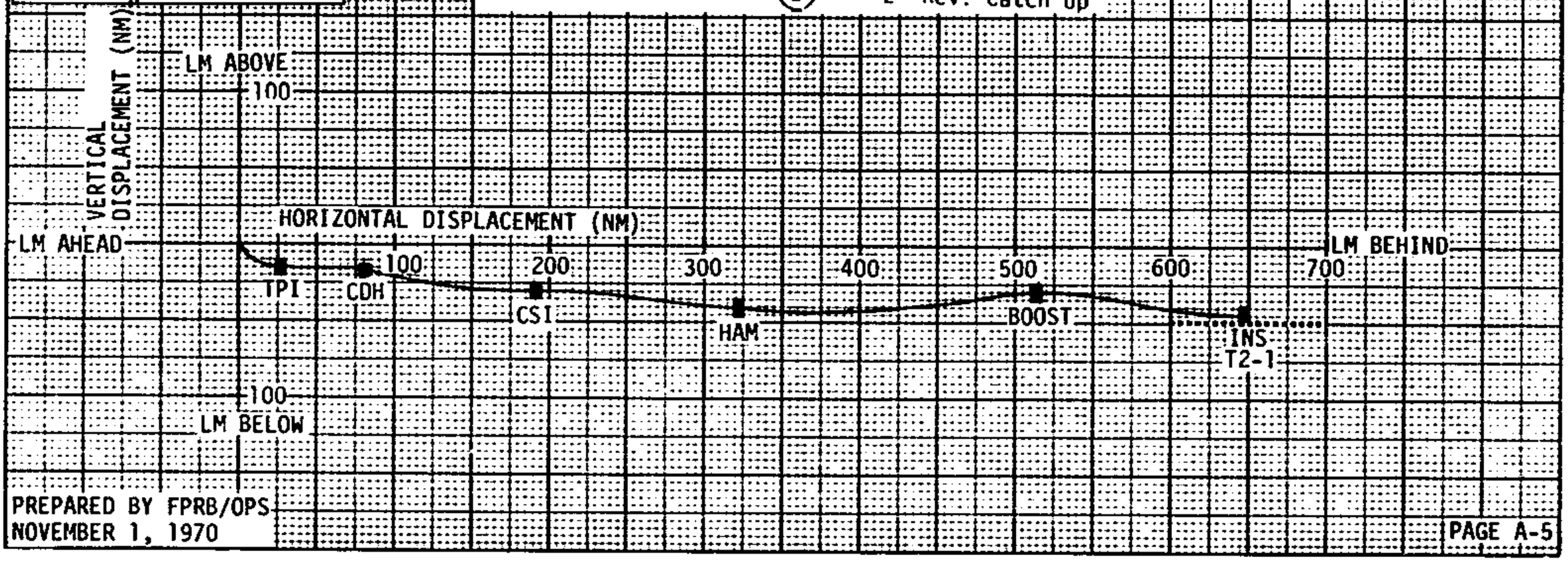
EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	

APOLLO 14
INERTIAL AND RELATIVE PLOTS

1. T2-1



2 Rev. Catch Up



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NOVEMBER 1, 1970

PAGE A-5

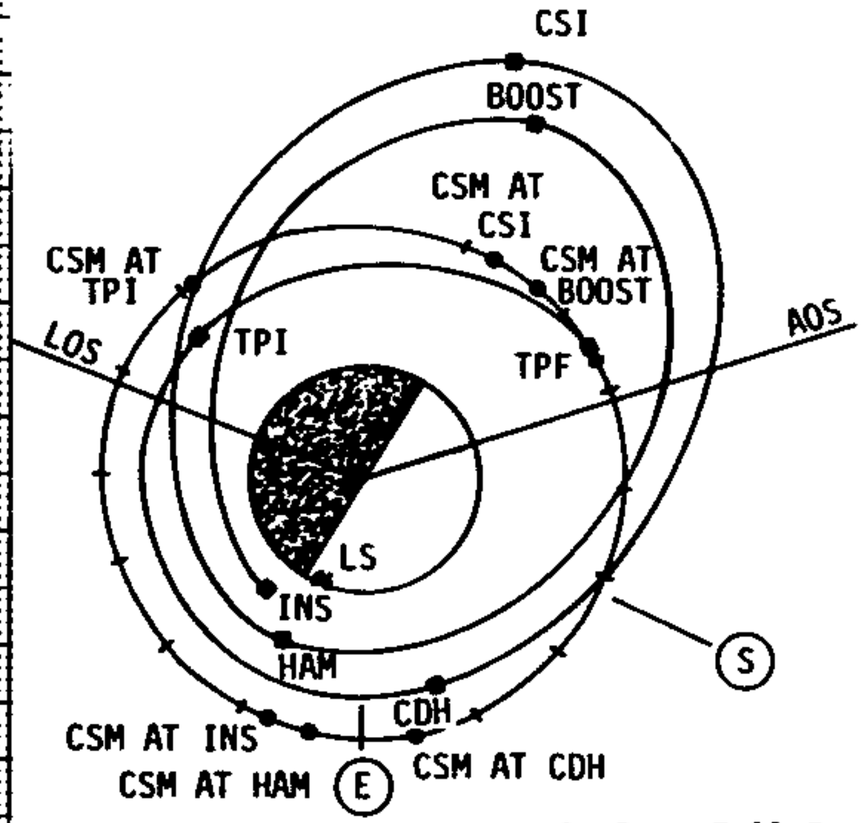
APOLLO 14 FLIGHT DATA FILE

PAGE 33

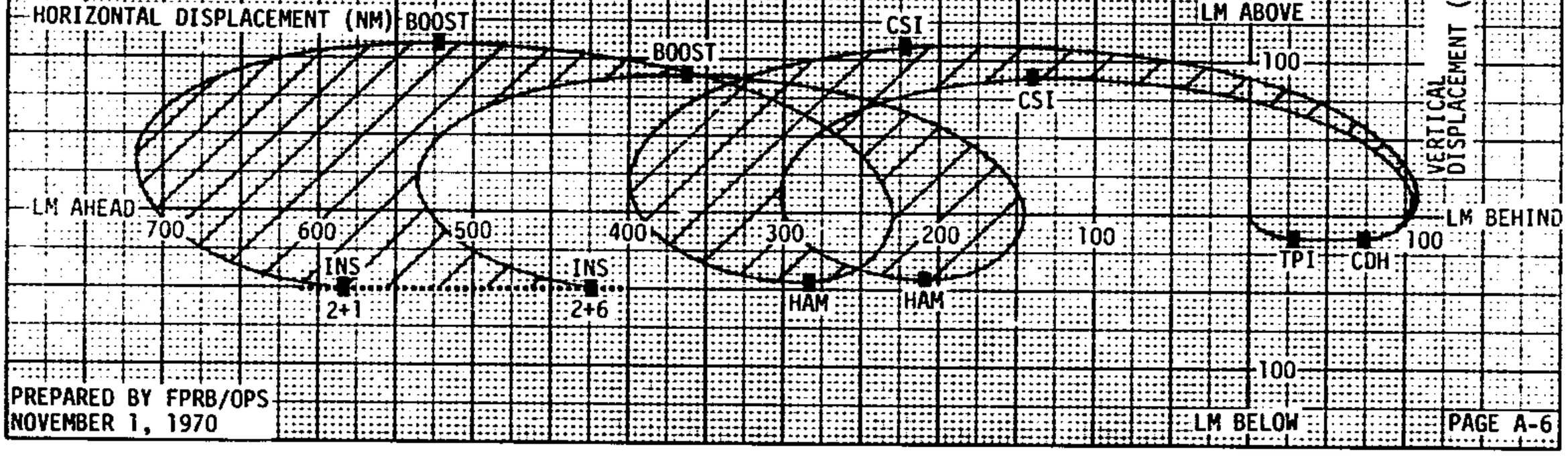
EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	

APOLLO 14
INERTIAL AND RELATIVE PLOTS

1. $1 \leq PDI\ 2 \leq 6$



2 Rev. Fall Back



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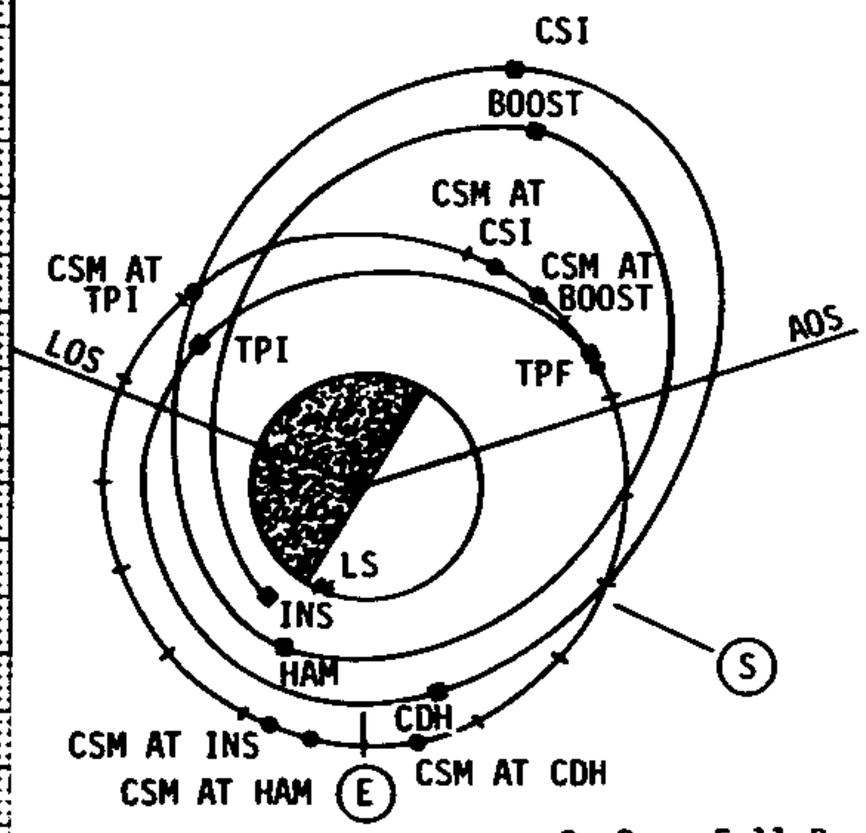
PAGE A-6

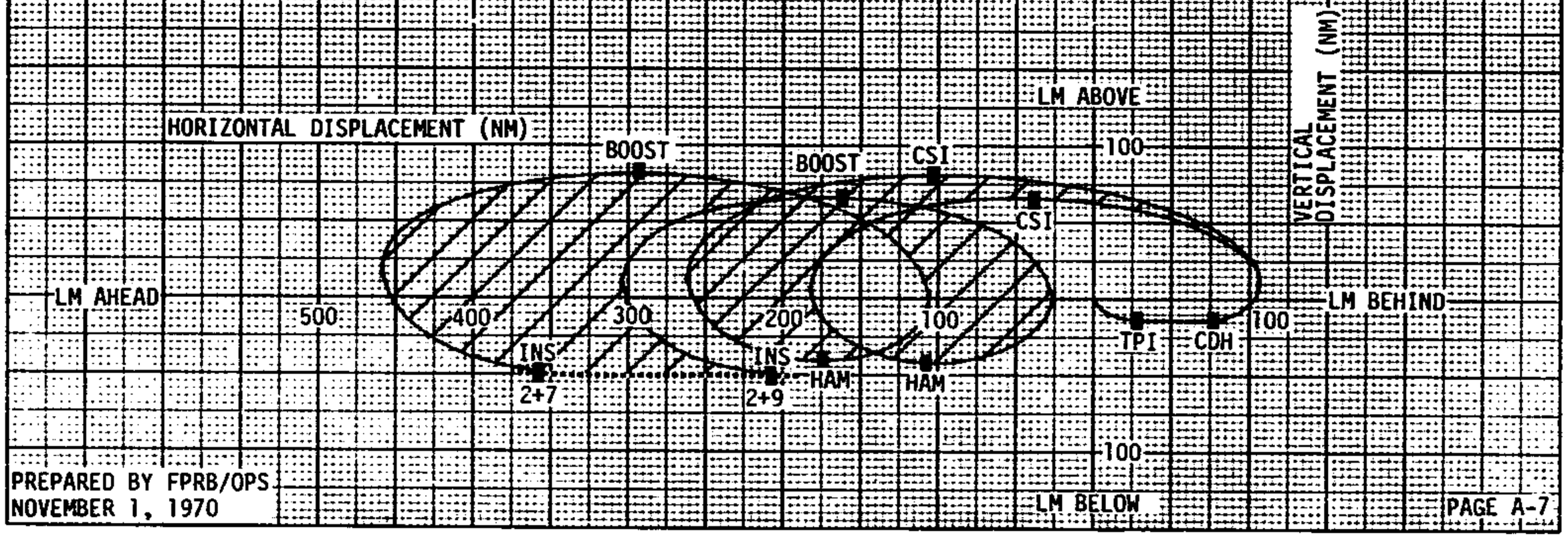
EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	



APOLLO 14
INERTIAL AND RELATIVE PLOTS

1. $7 \leq PDI\ 2 \leq 9$

2 Rev. Fall Back



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NOVEMBER 1, 1970

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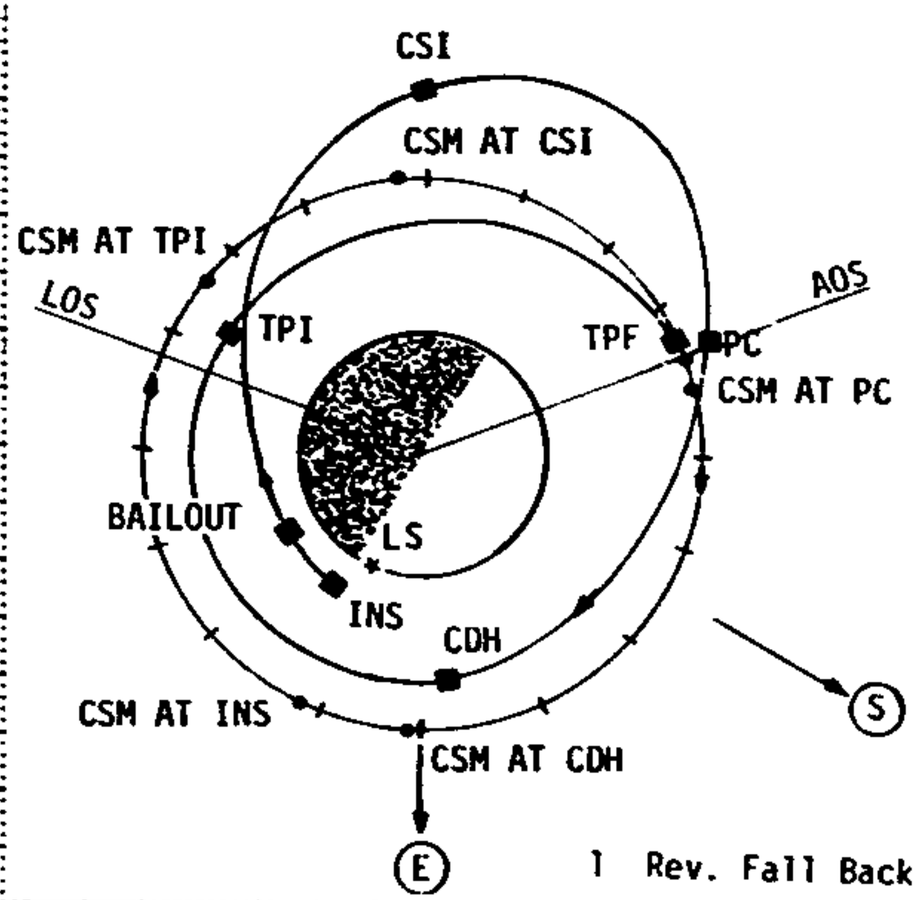
APOLLO 14 FLIGHT DATA FILE

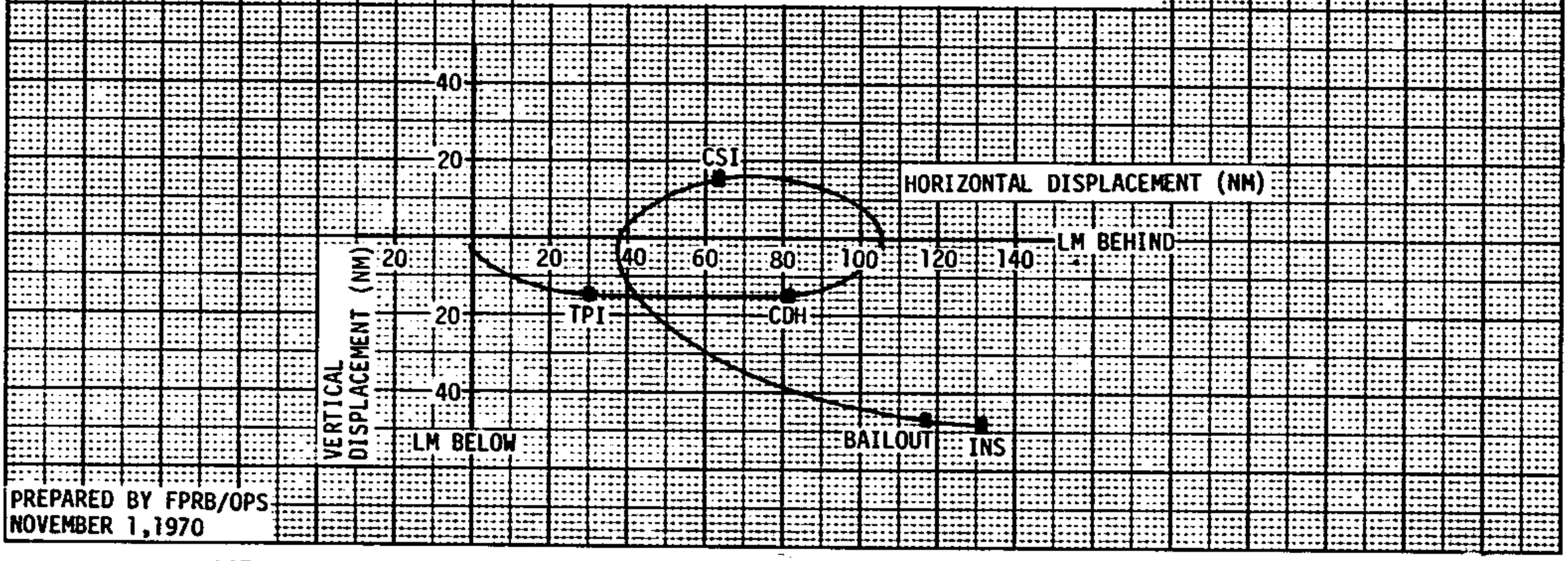
PAGE 35

LM BAILOUT REL TRAJECTORY

EVENT	GET TIG
BAILOUT	
CSI	
PC	
CDH	
TPI	



APOLLO 14
INERTIAL AND RELATIVE PLOTS
BAILOUT



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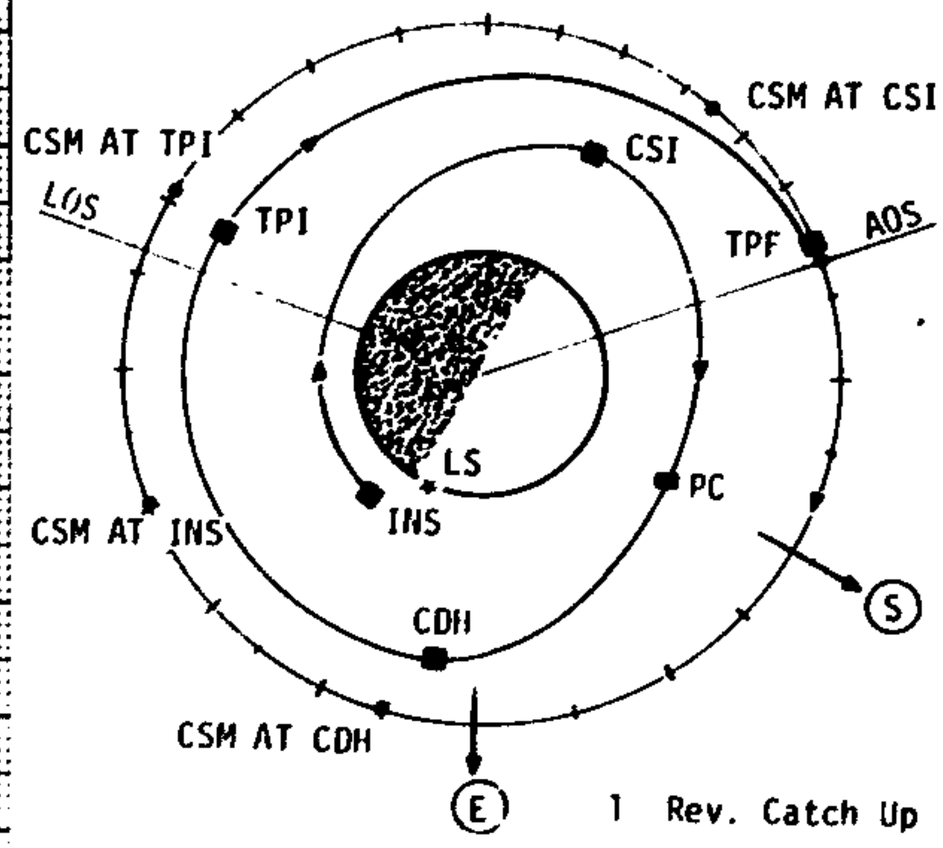
NOVEMBER 1,1970

DATE 11/20/70

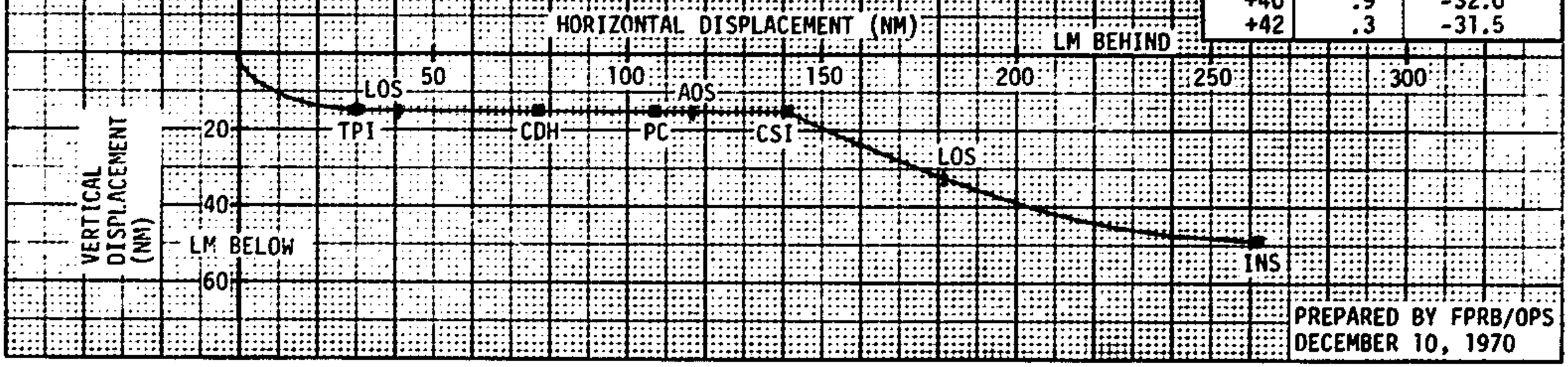
LM TIMELINE BOOK

APOLLO 14 FLIGHT DATA FILE

EVENT	GET TIG
INS	
CSI	
PC	
CDH	
TPI	



APOLLO 14 INERTIAL AND RELATIVE PLOTS NOMINAL COELLIPTIC RNDZ		
ΔT	RANGE	RDOT
INS	268.5	-452.0
-48	264.1	-447.9
-44	246.8	-426.3
-40	230.5	-396.7
-36	215.5	-360.7
-32	202.1	-319.8
-28	190.3	-276.2
-24	180.3	-232.1
-20	172.0	-189.6
-16	165.2	-151.1
-12	159.9	-118.5
-8	155.8	-93.4
-4	152.5	-76.8
CSI	149.6	-69.4
CDH	80.2	-120.5
TPI	33.0	-108.6
+4	27.5	-127.5
+8	22.6	-118.8
+12	18.1	-107.4
+16	14.1	-93.9
+20	10.7	-79.4
+24	7.9	-64.9
+28	5.6	-51.8
+32	3.7	-41.5
+36	2.2	-34.9
+40	.9	-32.0
+42	.3	-31.5



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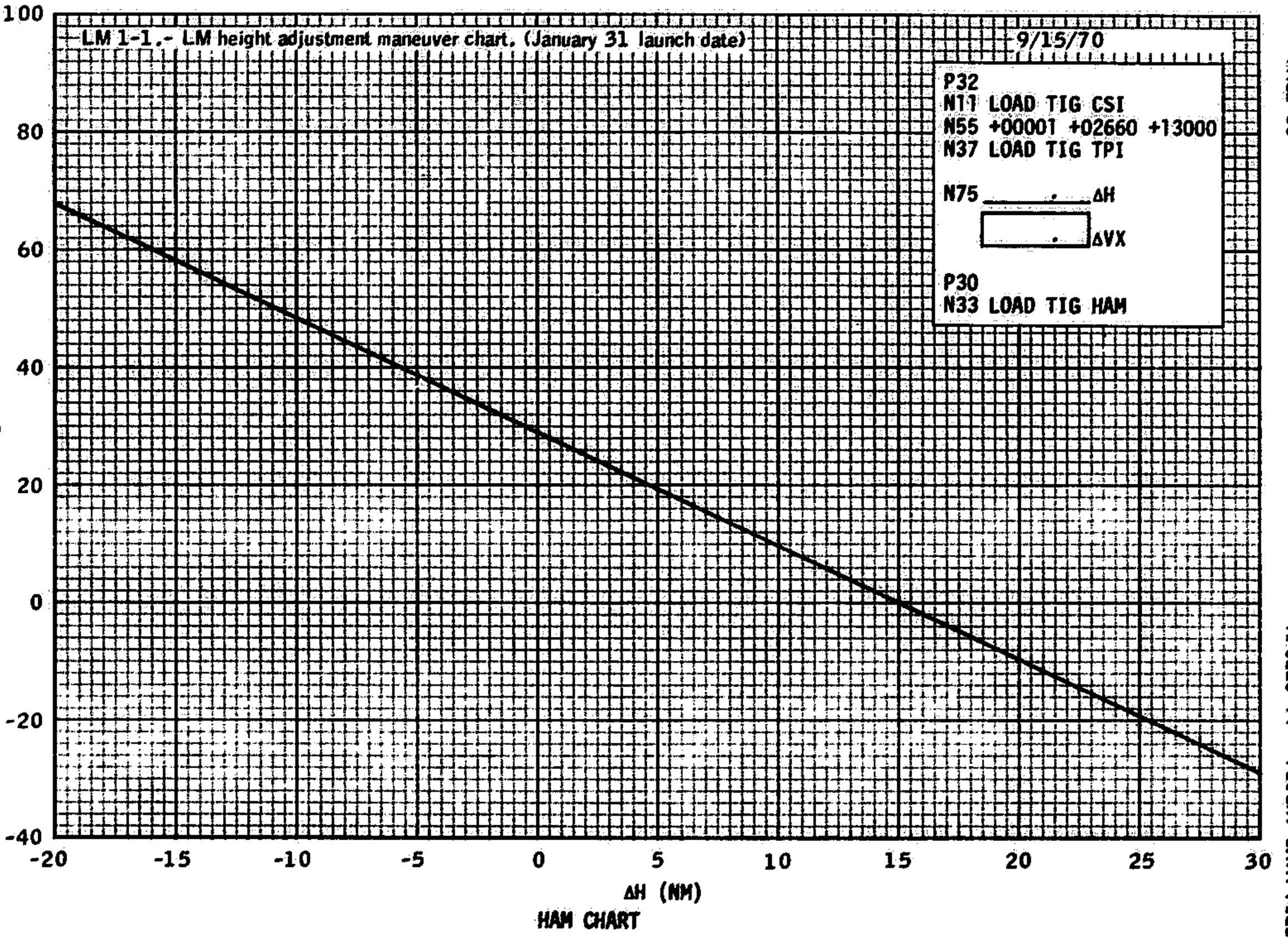
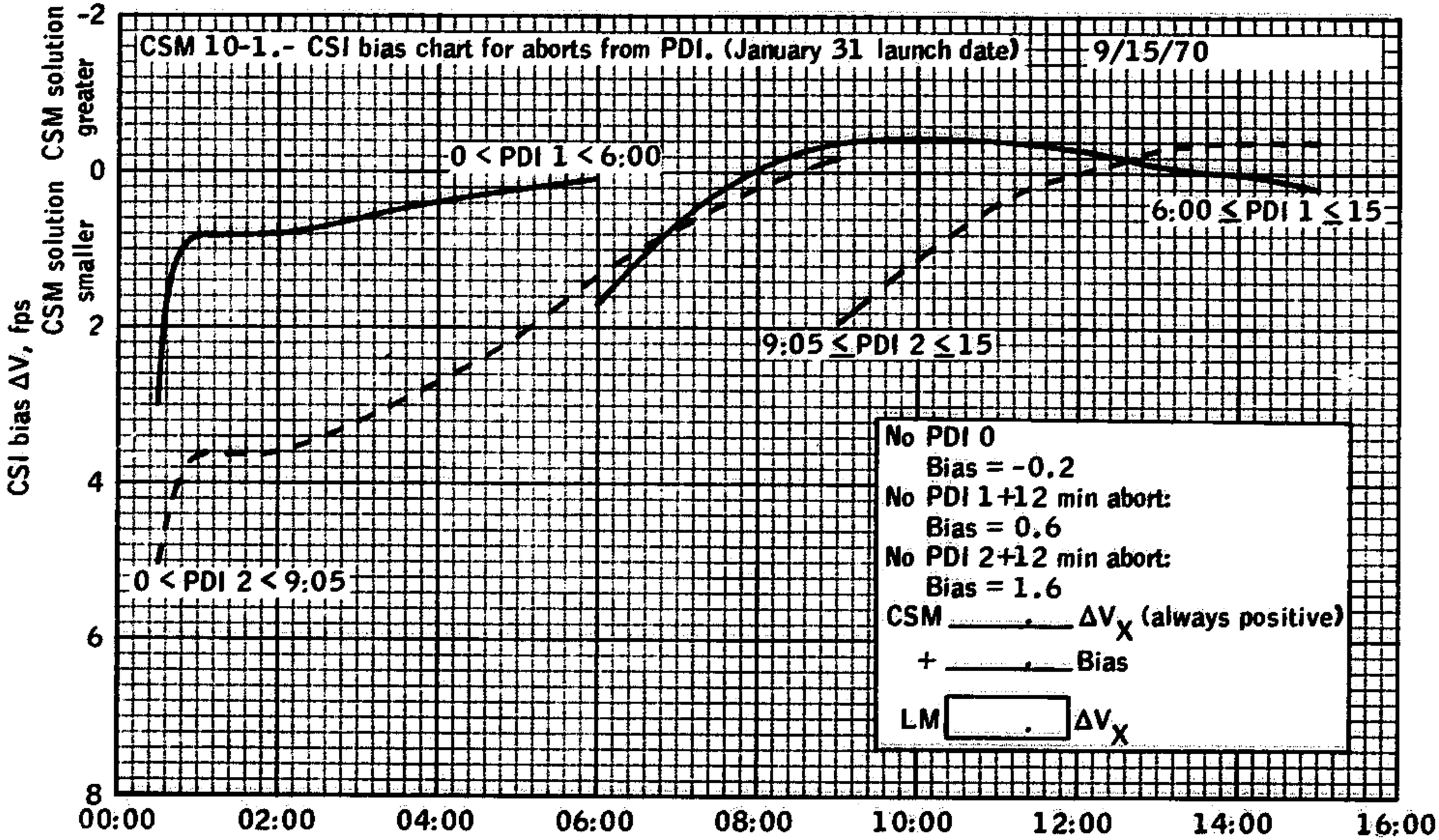
DECEMBER 10, 1970

RELATIVE TRAJ
NOM COEL RNDZ


LM 1-1.- LM height adjustment maneuver chart. (January 31 launch date)
9/15/70
P32
N11 LOAD TIG CSI
N55 +00001 +02660 +13000
N37 LOAD TIG TPI
N75 ____.____ ΔH
____.____ ΔVX
P30
N33 LOAD TIG HAM
100
80
60
40
20
0
-20
-40
ΔVX (fps)
-20
-15
-10
-5
0
5
10
15
20
25
30
ΔH (NM)

HAM CHART



CSI BIAS CHART

CSI BIAS
DELTA V

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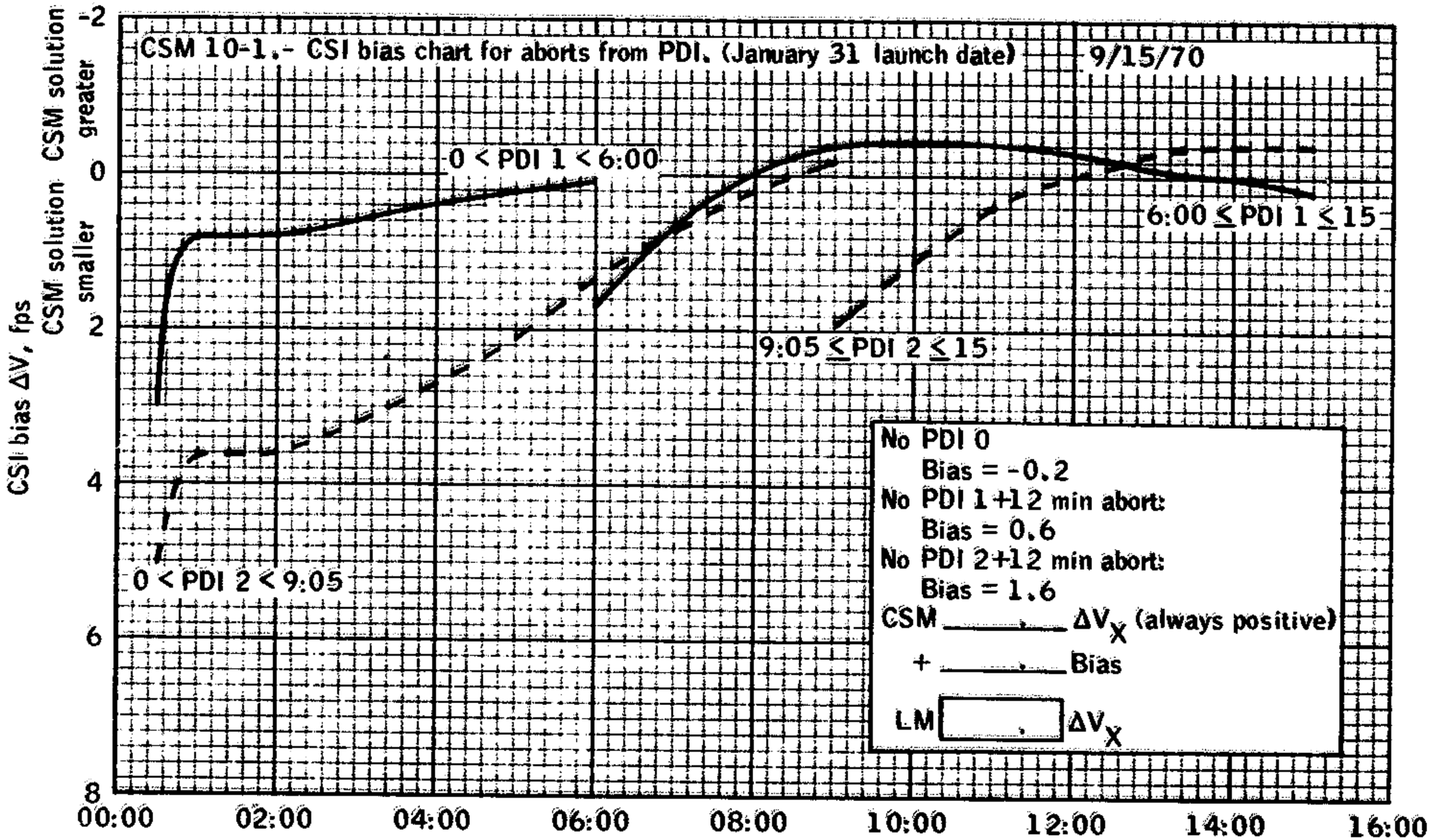
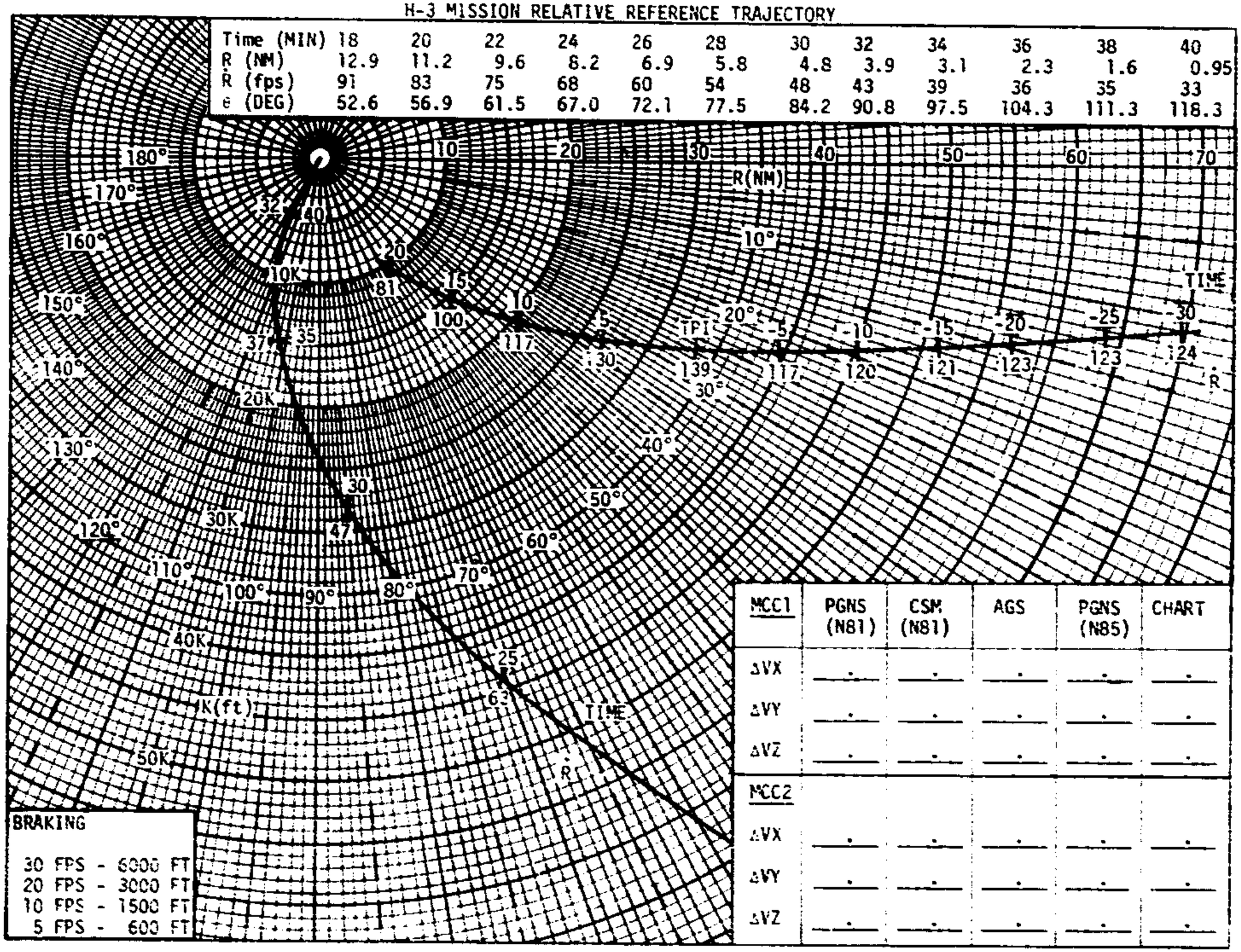


CSI BIAS CHART

CSI BIAS
DELTA V

H-3 MISSION RELATIVE REFERENCE TRAJECTORY



MCC1	PGNS (N81)	CSM (N81)	AGS	PGNS (N85)	CHART
ΔVX	___.___	___.___	___.___	___.___	___.___
ΔVY	___.___	___.___	___.___	___.___	___.___
ΔVZ	___.___	___.___	___.___	___.___	___.___
MCC2					
ΔVX	___.___	___.___	___.___	___.___	___.___
ΔVY	___.___	___.___	___.___	___.___	___.___
ΔVZ	___.___	___.___	___.___	___.___	___.___

Prepared by FPRB/OPS
MISSION APOLLO 14, NOVEMBER 1, 1970

TPF REL TRAJ
NOM COEL RNDZ

H-3 MISSION RELATIVE REFERENCE TRAJECTORY

Time (MIN)	18	20	22	24	26	28	30	32	34	36	38	40
R (NM)	12.56	10.91	9.40	8.03	6.80	5.70	4.72	3.84	3.05	2.53	1.64	.99
R (fps)	87.27	80.02	72.77	65.67	58.90	52.62	47.02	42.23	38.36	35.45	33.47	32.32
e (DEG)	52.27	56.47	61.03	65.99	71.34	77.09	83.18	89.57	96.16	102.84	109.50	116.03

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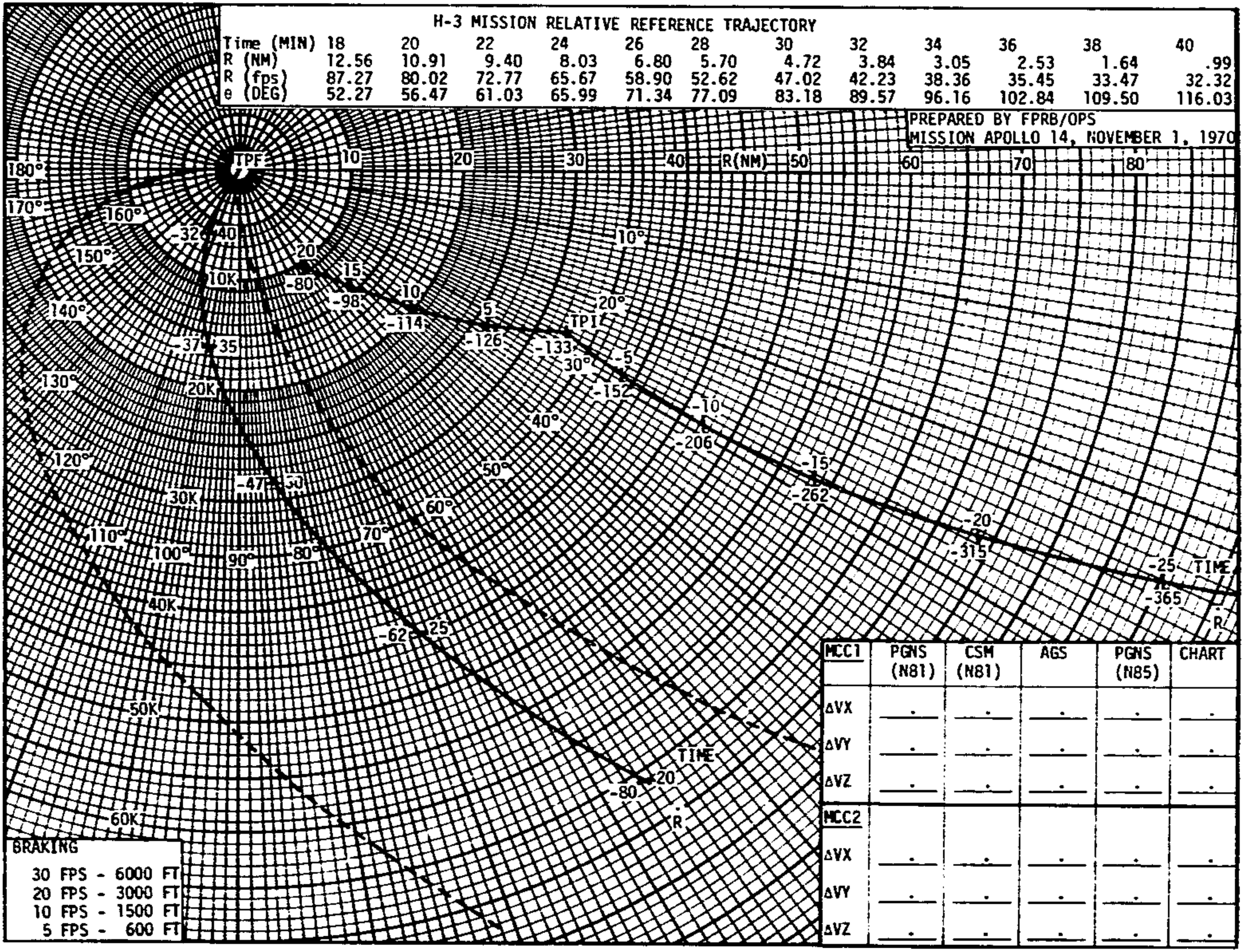
MISSION APOLLO 14, NOVEMBER 1, 1970



BRAKING

30 FPS - 6000 FT
20 FPS - 3000 FT
10 FPS - 1500 FT
5 FPS - 600 FT

MCC1	PGNS (N81)	CSM (N81)	AGS	PGNS (N85)	CHART
ΔVX	____.	____.	____.	____.	____.
ΔVY	____.	____.	____.	____.	____.
ΔVZ	____.	____.	____.	____.	____.
MCC2					
ΔVX	____.	____.	____.	____.	____.
ΔVY	____.	____.	____.	____.	____.
ΔVZ	____.	____.	____.	____.	____.