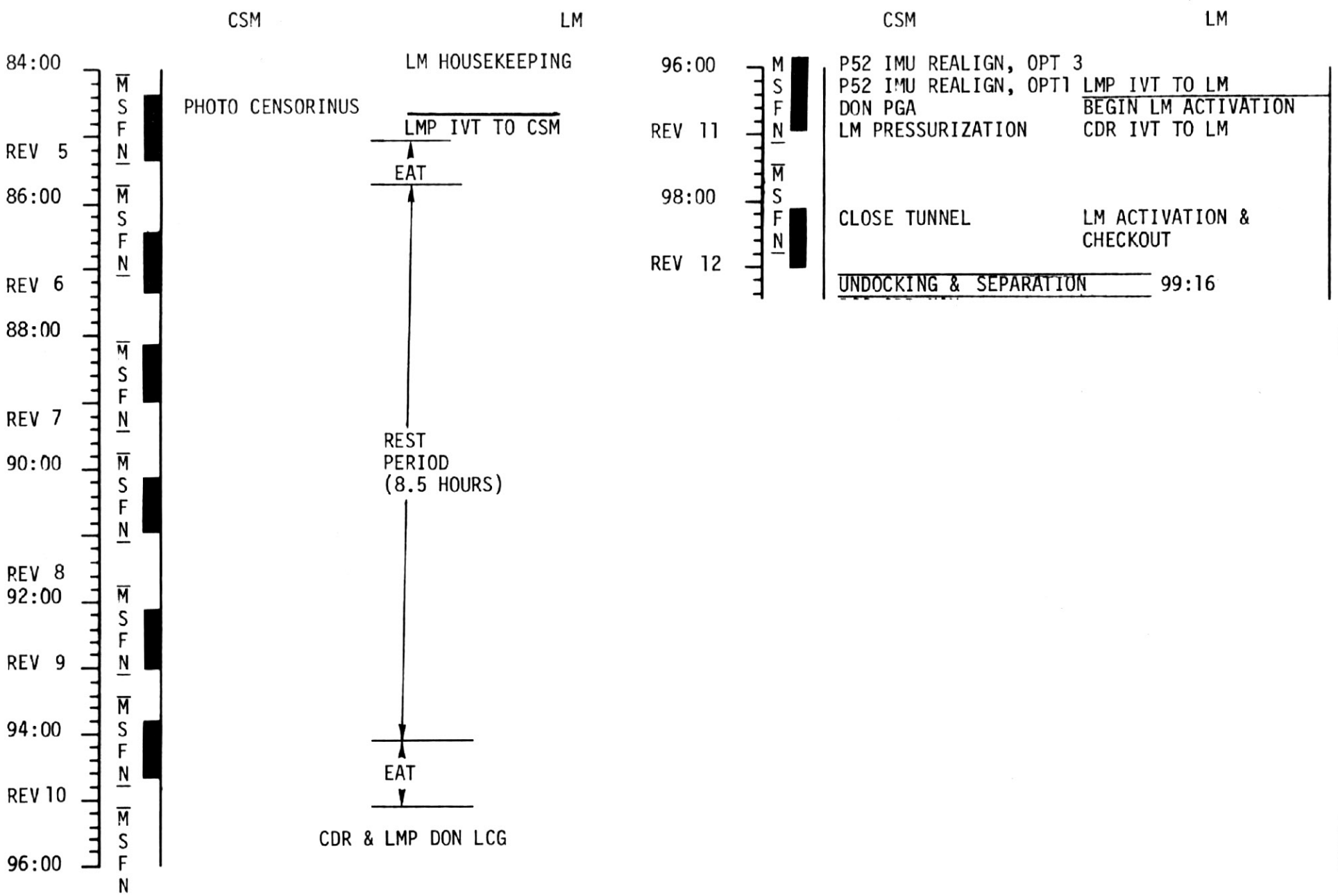
APOLLO 13	
LM TIMELINE BOOK	
PART NO.	S/N
SKB32100082 – 388	1002

FLIGHT PLAN

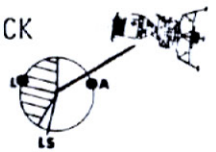

CSM
LM
84:00
M S F N
LM HOUSEKEEPING
PHOTO CENSORINUS
LMP IVT TO CSM
REV 5
EAT
86:00
REV 6
88:00
REV 7
REST
PERIOD
(8.5 HOURS)
90:00
REV 8
92:00
REV 9
94:00
EAT
REV 10
CDR & LMP DON LCG
96:00
CSM
LM
96:00
P52 IMU REALIGN, OPT 3
P52 IMU REALIGN, OPT1
LMP IVT TO LM
DON PGA
BEGIN LM ACTIVATION
REV 11
LM PRESSURIZATION
CDR IVT TO LM
98:00
CLOSE TUNNEL
LM ACTIVATION &
CHECKOUT
REV 12
UNDOCKING & SEPARATION
99:16

UNDOCK & SEPARATION TO REV12 LS TCA

99:00

PREP FOR UNDOCKING

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



+50 CHECK ATT (0, 150/282,060)
(-10) V62
V48 21002
LM WT _____ (33,731)
PRO, V34
HELMETS AND GLOVES - ON
*S-BD ANT - AFT, VERIFY COMM *
*√S-BD P ____(+130) *
* Y ____(+40) *
*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-48)
*TAPE RECORDER - ON *
+59 P47
(-1) *ZERO 404, 405, 406 *
*470R *
INSERT V77 (DO NOT ENTR)

AOS
99
+10

UNDOCK & SEPARATION ___:___:___ (99:16:21)
ENTR V77
DEADBAND - MIN
P00, V60
YAW LT 60°
PITCH UP 90°

f11/250/∞/6 fps
*SEQUENCE CAMERA - ON (1 MIN) *
+3 FDAI (0, 280/012,0)
*VERIFY TRACKING LT-ON,THEN OFF *
*VHF ANT - FWD *
*SEQUENCE CAMERA - OFF *
*TAPE RECORDER - OFF *
*S-BD P+94, Y-45 *
HELMETS & GLOVES - OFF (OPT)

UPDATE FROM MSFN

*COPY REV 12 LS TCA ___:___:___ *

99:30

21002

DATE MARCH 16, 1970

99:30

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

AGS INITIALIZE AND ALIGN

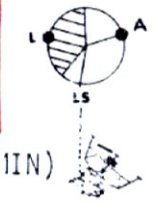
*V47, 414+1, 400+3 *
V83, SET ORDEAL ON LMP FDAI
*317R,440R, 277R
*400+2, 507+0 *
*CAMERA SETTINGS *
LM3/DAC/10/CEX-ULC (f2.8,250,∞)
* 1 FPS, .05 MAG, (5 MIN) *
*LM_/DC/60/HCEX-(f2.8,500,∞)5 *

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-MIN)

+32 REV 12 LANDING SITE TCA ___:___:___ (99:48)

99:50

LM TIMELINE BOOK 21002

REV 12 LS TCA TO CSM CIRCULARIZATION

99:50

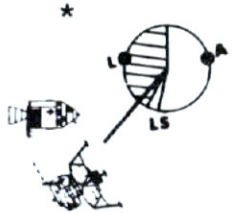
REV 12 LANDING SITE TCA

+33 *SEQUENCE CAMERA - OFF *

RENDEZVOUS RADAR CHECKOUT

+35 MNVR TO FDAI (0,342/331,0)
CB RR(2) CLOSE, ✓TEMP (10°-75°)
RR-SLEW, MANUAL LOCK-ON
RR-LGC
V63, TM-R/Ṙ
AGS-AUTO, ✓ERROR NEEDLE, -ATT HOLD
*VHF A XMTR - VOICE/RNG *
COMPARE V63, TM, V83, AGS
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 UP TO CSM CIRC *
*CAMERA SETTINGS FOR CSM CIR *
*LM3/DAC/10/CEX-ULC (∫8 ,250,∞) *
6 FPS, .03 MAG, (30 SEC) *
*LM1/DC/60/HCEX-(∫11 ,250,∞)2 *



MAX Δ	R .27 N M	Ṙ 7 FPS
V63		
TM		
V83		
317-440		

SS
99
+53

LOS
100
+15

100:20

IMU FINE ALIGN

V76
P52 OPT3
CB AOT LAMP CLOSE
AOT - DETENT F/0.0°
PGNS MODE CONT - AUTO
1ST STAR SPICA (#226)
PRO, RCD GET ___:___:___
2ND STAR ANTARES (#233)
N05 ANGLE DIFF_____
PRO
N93 TORQUING ANG
X_____
Y_____
Z_____
PRO

DO NOT PICAPAIR

21002

CONFIGURE COMM FOR LOS

*MATCH INDICATED ANGLES *
*TRACK MODE - SLEW *
*SET P ____ (+14) *
* Y ____ (-14) *
*S-BD ANT - AFT *
*VHF B XMTR - DATA *
*BIOMED - OFF, PCM - LO *
UPLINK SQUELCH - ENABLE
S-BD ANT-FWD(AFTER LOS)

100:20

LPD CALIBRATION

CHECK ROLL-0°

PRO, ENTR
N70, ENTR 022 (REGULUS), PRO BIAS AZ____
N87, (+35580,+32040) PRO,PRO EL____
*DETENT CL *
*CB AOT LAMP - OPEN *
V34, P00
PGNS MODE CONT - AUTO
*400+3 *

AGS CALIBRATION

+44 V49, +33750 OGA YAW + 21
+24750 IGA PITCH +239 } FDAI
+02250 MGA ROLL + 24
*READ AND RECORD INITIAL VALUES *
*V40N20E *
*WAIT 20 SEC *
*V48,21022,PRO,V34 *
*PGNCS MODE CONT - ATT HOLD *
*V76, V60 *
*RATES < 0.1°/SEC *
*400+6 *

	INIT	CAL	Δ LIM
540			± .039
541			± .039
542			± .039
544			2
545			2
546			2

*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 *
✓MSFN BEFORE *RE-LOAD INITIAL VALUES *

TRACKING ATTITUDE FOR CSM CIR

+55 MNVR TO (0, XXX/234, 0) TO TRACK CSM
(-5) *V48, 21012, PRO, V34 *
*SEQUENCE CAMERA-ON *

0 CSM CIRCULARIZATION ___:___:___ (100:35:05.2)
*SEQUENCE CAMERA-OFF

100:40

21012

REV 12 LS TCA
TO CSM CIRC.

CSM CIRCULARIZATION TO PDI$_0$

100:40

SR
100
+42

AOS
101 +27
+04

101:20

CSM CIRCULARIZATION

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

P00
*410+0 *
*VHF A XMTR - VOICE/RANGE *
* B XMTR - OFF, PCM-HI *
*V47,414+1,400+3,PCM-LO *
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 UP TO PDI$_0$ *
*S-BD ANT - FWD, VERIFY COMM *
*✓S-BD P ____(+14) *
* Y ____(-14) *
*S-BD ANT - SLEW (>3.0) *
*TRACK MODE - AUTO (>4.0) *
*VHF A XMTR - VOICE *
*BIOMED - RIGHT, PCM-HI *
*UPLINK SQUELCH - OFF *
VOICE N93, GET, AND LPD BIAS TO MSFN

+31 DPS PRESS + C. O. — WAIT FOR AOS
PRPLNT TEMP/PRESS MON - DES 1 & 2
FUEL 50-90°F 70-160 PSI
OXID 50-90°F 39-254 PSI
HELIUM MON: AMB PRESS 1495-1750
: SUPCRIT PRESS 700-1275
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
HELIUM MON: AMB PRESS 200-1110
: SUPCRIT PRESS 700-1275

101:20

21012

DATE MARCH 25, 1970

101:20

LANDING RADAR CHECKOUT

+37 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 8286 ± 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

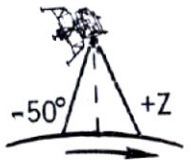
UPDATE FROM MSFN

*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

+45 MNVR TO AND MAINTAIN FDAI (0,295/XXX,0)

+55 BEGIN LPD ALT MARKS (IF DESIRED)
PDI LMK LPD ALT CHECK



PDI$_0$ ____:___:___ (101:36:53.4)
PITCH TO OBSERVE LS

101:40

LM TIMELINE BOOK 21012

101:40

+8 START PITCH TO P52 ATT (0,XXX/325, 0)

SS
101
+47

*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 ON WEDGE BRKT

IMU FINE ALIGN

+30 P52 OPT3
CB AOT LAMP CLOSE
AOT - DETENT F/0.0°
PGNS MODE CONT - AUTO
1ST STAR SPICA (#226)
PRO, RCD GET ____ : ____ : ____
2ND STAR REGULUS (#222)
ALT STAR ARCTURUS (#231)
NO5 ANG DIFF_____
PRO
N93 TORQUING MAX
X _____ (.370)
Y _____ (.830)
Z _____ (3.000)
PRO
N25

*DETENT CL *
*CB AOT LAMP-OPEN *

V34, P00
PGNS MODE CONT - ATT HOLD
START MNVR TO PDI ATT
FDAI (0, XXX/110, 0)

DO NOT PICAPAIR

LOS
102
+09

CONFIGURE COMM FOR LOS

*MATCH INDICATED ANGLES *
*TRACK MODE - SLEW *
*SET P ____ (-2) *
* Y ____ (+2) *
*S-BD ANT - AFT *
*VHF B XMTR - DATA *
*BIOMED - OFF, PCM - LO *
*UPLINK SQUELCH - ENABLE *
*S-BD ANT-FWD(AFTER LOS) *

102:20

21012

PDI$_0$ TO BACKSIDE

102:20

AGS ALIGN

*400+3 *
P30 TGT PGNS FOR NO PDI+12 ABORT

P00

*VERIFY LOOSE GEAR STOWED *
*RESTRAINTS ATTACHED **
VERIFY FDAI'S INERTIAL
V48,21112,PRO
V34

P63 IGNITION ALGORITHM TEST

P63

*RESET DET TO COUNT UP TO PDI *
ENTR-BYPASS ALIGN, PGNS MODE CONT - AUTO
N18 R, P, Y (0, 110, 0) PRO
P00, PGNS MODE CONT - ATT HOLD,V77
COAS TO OVERHEAD WINDOW

SR
102
+36

PRE-PDI ECS CHECKOUT

*HELMETS AND GLOVES ON *
+15 *CABIN REPRESS-CLOSE **
*SUIT GAS DIVERTER - EGRESS **
*CABIN GAS RETURN - EGRESS **
*PRESS REGS A&B - EGRESS *

102:50

21112

PDI$_0$ TO BACKSIDE

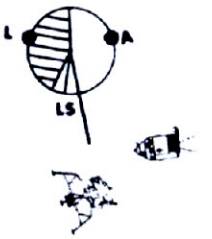
BACKSIDE TO PDI

102:50

PRE-PDI SWITCH SETTING CHECK
*VHF ANT - FWD *
CB INV 1 - CLOSED
*SELECT INV 1 *
+20 CB AELD (2) - CLOSE
CB ABORT STAGE (2) - CLOSE
*CYCLE CWEA CB *
TIME CRITICAL → *BATS 5&6 NORM FEED - ON *
*RECORD GET ____:____:____ *
RESET ENG STOP PB
SET WINDOW BARS
AOS *S-BD ANT - FWD, VERIFY COMM
102 *✓S-BD P _____ (-2) *
+57 * 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 - 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
PGNS MODE CONT - AUTO
AGS MODE CONT - AUTO
V77
✓BURN ABORT RULES
103:10

103:10

*AUDIO MODE (BOTH) - VOX *
*TAPE RECORDER - ON *
AGS INITIALIZE
+42 *V47, 414+1 *
(-18) *V83, 317R, 440R, 277R *
*240 + (231 RLS PAD) *
*254+08313 *
*261-00013 *
*262-00151 *
*404-12345 *
POWERED DESCENT INITIATION
+50 CB LR - CLOSE
(-10) ✓ALT XMTR
P63
✓DPS CONFIG CARD
+52 *RESET DET UP *
(-8) ENTR-BYPASS ALIGN
N18 R, P, Y (0, 110, 0)
VERIFY FDAI
*V40N20E, 400+3 *
*400+1, 433R VI *
+56 PRO-FINAL TRIM
(-4) ENTR, ✓DET
GO/NO-GO FOR PDI
COMM CHECK WITH CSM
RESET WATCH
-1:00 MASTER ARM - ON
-0:30 ENG ARM - DES
-0:07.5 ULLAGE
-0:05 PRO
0:00 PDI ____:____:____ (103:30:35.3)
+0:02 (NO IGN) - START PB - PUSH
+0:05 DES ENG CMD OVRD - ON
MASTER ARM - OFF



PDI THRU TD+3 MIN

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+00060 (DO NOT ENTR)

SEQ CAMR - ON

EVAL MAN CONT

θ	TFI	VI	(-Ḣ MAX) -HDOT	(ΔH) H	DPS	SBD P/Y
110	0:00	5558.5	3.5	51488	100	-2/2
110	0:30	5488.3	5.7	51393	98	
104	1:00	5202.1	26.0	50906	93	2/-2
99	1:30	4907.3	41.6	49880	88	
94	2:00	4604.5	53.3	48449	82	9/-9
90	2:30	4293.7	62.5	46707	77	
86	3:00	3974.7	70.2	44713	72	15/-14
83	3:30	3646.8	77.4	42498	66	
81	4:00	3309.4	84.5	40071	61	19/-18
79	4:30	2961.3	92.4	37143 (+17500)	56	
77	5:00	2601.6	100.4	34544	50	22/-20
74	5:30	2229.1	107.7	(+15200) 29786 (+12500)	45	
72	6:00	1846.1	101.4	26194	39	27/-24
70	6:30	1449.4	85.4 (429.9)	(+10900) 23800 (+9500)	34	
67	7:00	1200.5	125.6	21531	31	31/-27
65	7:30	962.3	(389.0) 158.3 (328.1)	(+7600) 17943 (+ 6000)	28	
62	8:00	722.1	179.7	13209	24	35/-30

P64

223E @ 6K

P64 + 15 SEC:
NO THROTTLE DN
- ABORT

523 ALARM
V58
LDG ANT-HOVER
RESET
WAIT 2 SEC.
PRO

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 VALVE

H	(Ḣ MAX) -H DOT)	DPS
7000	(228.2) 180.4	21
5000	(186.9) 143.8	19
4000	(163.2) 123.4	19
3000	(136.3) 100.4	18
2000	(104.6) 73.2	17
1000	(63.8) 30.6	15
500	(35.7) 13.5	12
400	(28.7) 12.6	12
300	(21.0) 11.5	11
200	(12.2) 9.6	11

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

TD +3 THRU T2 ABORT

THRUSTER PAIR ISOL VLV(8) - OPEN
MAIN SOV (2) - OPEN
CRSFD - CLOSE
ASC FEED 1 (2) - OPEN, 2 (2)-CLOSE
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 (103:51:20)

N76 5511.7 V HOR
19.5 V VERT
0.0 CROSS RNG
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 H_E SEL - BOTH
MASTER ARM - ON
ASC H_E PRESS - FIRE
ASC H_E REGS 1,2 - OPEN
ASC FEED 2 (2) - OPEN
MAIN SOV(2)-CLOSE
CRSFD - OPEN
BAT 1,3 - OFF
SELECT ASC H2O TANK
DES O2 - CLOSE
ASC 1 O2 - OPEN
DES H2O - CLOSE
ASC H2O - OPEN

-1:00 *400+1 *
*BAT 2,4 - OFF *
CB:ASC ECA CONT-CLOSE
DES BAT - DEADFACE

- :30 ABORT STAGE-PUSH(AT T=0
ENG ARM-ASC FOR AGS)

- :05 PRO
:00 * DET-RESET, RELEASE *
+ :01 ENG START - PUSH

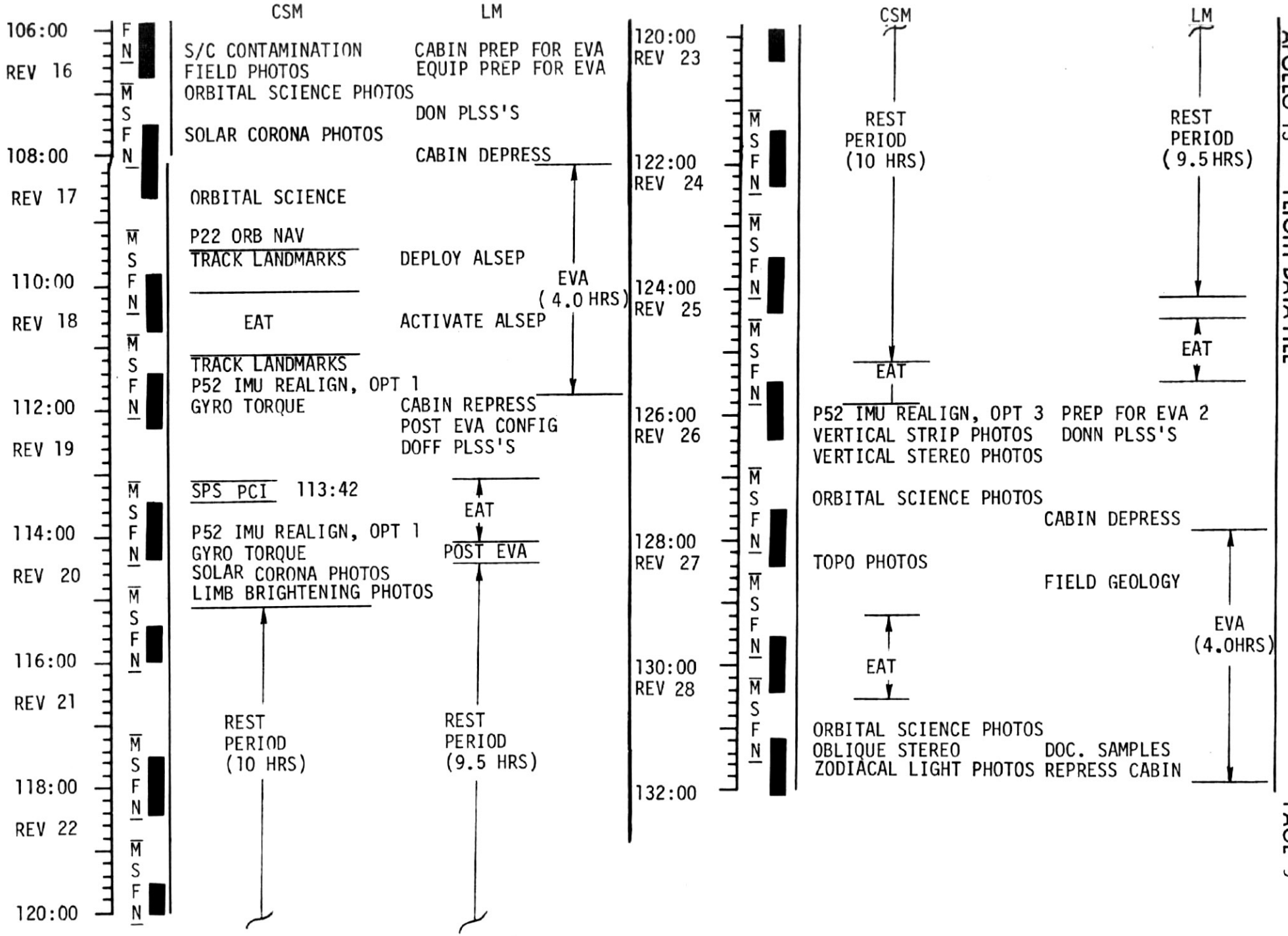
STAY
*TAPE RECORDER - OFF *
*AUDIO MODE - ICS/PTT *

P00

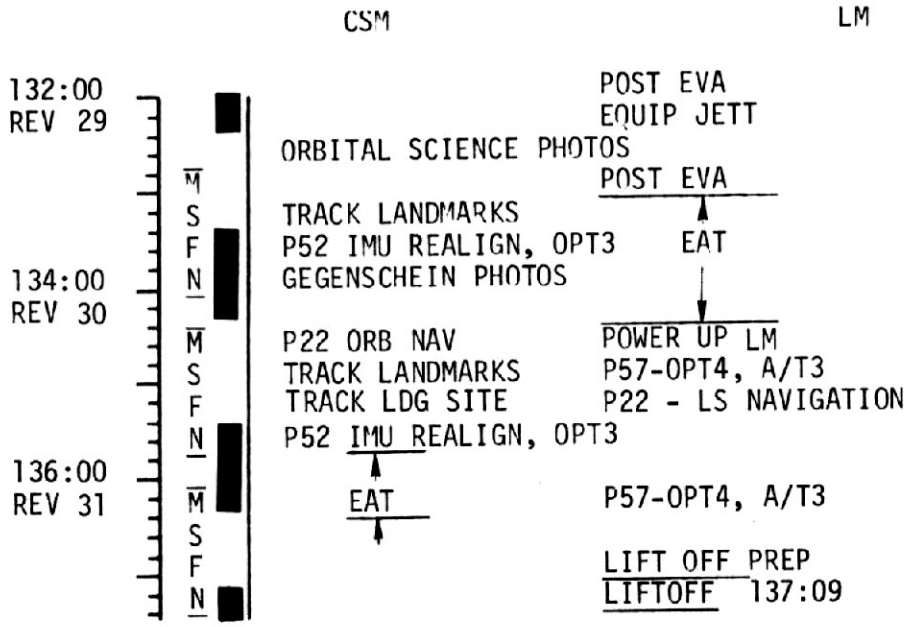
DATE MARCH 16, 1970

LM TIMELINE BOOK

LUNAR SURFACE ACTIVITY



LUNAR SURFACE
FLT PLAN



LIFT OFF TABLE			
TIME	REV	NEW TIG	EST TIG
T3	15		105:44:28
T4	16		107:42:45
T5	17		109:40:55
T6	18		111:39:05
T7	19		113:37:15
T8	20		115:35:27
T9	21		117:33:37
T10	22		119:31:47
T11	23		121:29:57
T12	24		123:28:07
T13	25		125:26:18
T14	26		127:24:28
T15	27		129:22:38
T16	28		131:20:48
T17	29		133:18:58
T18	30		135:17:08

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

CHECK S-BD ANT
+1:00 YAW RIGHT 30°
623+1

N76E (VH,Vv,ΔR)
V16 N77E (Tgo, VY)

N85 E, 500R
500 FPS MAIN SOV(2)-OPEN↓
ASC FEED 2(2)-CLOSE↓
CROSS FEED-CLOSE↓
COPY GET

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

0 fps ABORT STAGE-RESET
ENG STOP-PUSH
KEY RELEASE
PRO NULL X RESIDUAL
PRO
STOP DET, RESTART WATCH
ENG STOP RESET
P00
✓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)

V82

ASCENT MONITOR

ASCENT

PITCH	OHW	TFI	VI	H DOT	H	SBD
		0:00	15.1	0.0	0	110/-41
		0:10	55.7	54.1	269	
308	39	0:30	168.9	92.7	1859	
305	38	1:00	434.9	125.8	5154	143/7
302	35	1:30	725.8	152.2	9346	145/10
299	33	2:00	1036.3	171.5	14225	147/12
296	31	2:30	1366.0	184.2	19585	149/15
292	29	3:00	1715.4	190.4	25229	151/18
289	27	3:30	2085.4	190.4	30967	153/20
285	24	4:00	2476.7	184.4	36617	156/23
281	22	4:30	2890.5	172.8	42003	159/26
277	19	5:00	3327.8	155.7	46958	162/29
273	16	5:30	3789.7	133.5	51327	165/32
269	13	6:00	4277.8	107.2	54965	169/35
265	10	6:30	4794.4	78.6	57779	173/38
260	7	7:00	5341.5	47.5	59704	177/41
258	6	7:10	5530.1	35.9	60129	179/42

IF NO IGNITION (WITHIN 90 SEC)
1. CHECK CB(11)-AELD, CB(16)-ENG ARM, AELD, ATCA
2. IF CB'S CLOSED-SELECT AGS
3. NO IGNITION-SELECT PGNCS

4. ENG START-PUSH

MANUAL ASCENT (Will Nominally Be Targeted 9 Min Late)
CONFIGURATION NOMINAL EXCEPT:
MODE CONT-ATT HOLD
PROFILE NOMINAL EXCEPT:
4-STEP FOR DIRECT MODE

8-BALL 4-STEP	
:20 PITCH DN TO	300°
3:15	285
5:15	270
7:00	255

OHW 4-STEP	
:15 PITCH DN TO	37
1:14	32
3:26	25
5:24	11

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

INSERTION THRU CSI

TIME CRITICAL

TIME	RANGE	RDOT
INS	267.4	-448.7
1+00	263.0	-444.7
2+00	258.6	-440.2
3+00	254.3	-435.2
4+00	250.0	-429.7
5+00	245.8	-423.6
6+00	241.6	-417.0
7+00	237.5	-410.0
8+00	233.5	-402.5
9+00	229.6	-394.6
10+00	225.7	-386.3

INSERTION (137:16:23)
MODE CONT(2)-ATT HOLD
ATT/TRANSL-2 JETS
ATT CONT-PULSE
MODE CONT-AUTO
*BAL CPL-ON
*VHF ANT-FWD
*SEQUENCE CAMERA-OFF *
*TTCA & ACA-DISABLE *
*400+2 *
*410+1 TGT CSI *
*411+0 RCS *
*616+00007 ULLAGE *
*623+0 *
*310R SET DET *
*COPY AGS DATA(450R) *
*RATE/ERR MON-RNDZ RDR *
AUDIO MODE-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
V48, 11002
CB RR(2)-CLOSE *
V41N72 (+000, +283)
CB RR(2)-OPEN, V44
RR-AUTO TRACK
P52 OPT 3
*CB AOT LAMP-CLOSE *
*AOT DETENT F/0° *

SS 137 +24

V76
1st STAR SPICA (26)
2nd STAR ANTARES (33)
45
*EXT LTG-TRACK *
42 RDOT ∮R
*VHF VOICE CHECK *
39 RDOT ∮R
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 — ✗ STOP P52 HERE IF CSI SOLUTION DESIRED RDOT ∮R
V48, 11012
CB RR(2)-CLOSE
RATE/ERR MON-RNDZ RDR
V93
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
*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
SET P ______ (-12) *
Y ______ (+15) *
*S-BD ANT-AFT *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *

LOS 137 +36 417+1 ∮R

30 CHART RDOT RDOT ∮R
27 RDOT ∮R
24 RDOT ∮R
M=10, V32
21 RDOT ∮R
20 CHART RDOT
*COMPARE CMC *
18 RDOT ∮R
*CHECK RCS, EPS, ECS *
15 RDOT ∮R
V90 OBTAIN CSM YDOT
12 RDOT ∮R
10 CHART RDOT/R *
PRO-FINAL COMP
HALT → N81 LOAD CSM YDOT(IF>5fps) STOP! TILL VOTE
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 (138:06:01)
NULL RESIDUALS

58 CSI (138:06:01)
V76, MODE CONT-AUTO
*507+0 *
V67, (+02000, +00020, +00005)
P33 TGT CDH
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 138 +13
51 M=7,V32 RDOT $R

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

45 RDOT $R

M=15, V32

42 RDOT $R

11012

CSI THRU CDH

AOS 138 +28

39 V34, P30 RDOT $R

S-BD ANT-FWD,VERIFY COMM
*✓S-BD P _____ (-12) *
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 CSM 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 (138:34:14)

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

11012

24 RDOT $R

23 CHART RDOT

21 RDOT $R
M=7, V32
*COMPARE CMC, AGS *

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

15 RDOT $R

V90 OBTAIN CSM YDOT

12 RDOT $R

10 CHART RDOT *
PRO-FINAL COMP
HAC N81 LOAD CSM YDOT STOP! TILL VOTE
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 (139:04:14)
NULL RESIDUALS

11012

MISSION APOLLO 13, MARCH 12, 1970

CDH THRU TPI

42 CDH (139:04:14)
V76, MODE CONT-AUTO
V93 — ATT CONT-PULSE, MODE CONT-AUTO
P34 TGT TPI
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 139 +22 — 24 RDOT ↕R

21 RDOT ↕R

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

18 RDOT ↕R

*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 *

10 PRO-FINAL COMP
HALT @N81 → TIG TO CSM
*SET DET STOP! TILL VOTE *
*MATCH INDICATED ANGLES *
*TRACK MODE-SLEW *
SET P ______ (+190) *
Y ______ (+60) *
*S-BD ANT-AFT *
*BIOMED-OFF, PCM-LO *
*UPLINK SQUELCH-ENABLE *
*TAPE RECORDER-ON *

LOS 139 +37 — 9 CHART θ | RDOT ↕R

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

*404+0, 405+0, 406+0 *
*COPY AGS DATA *

5 CHART θ/R/RDOT			

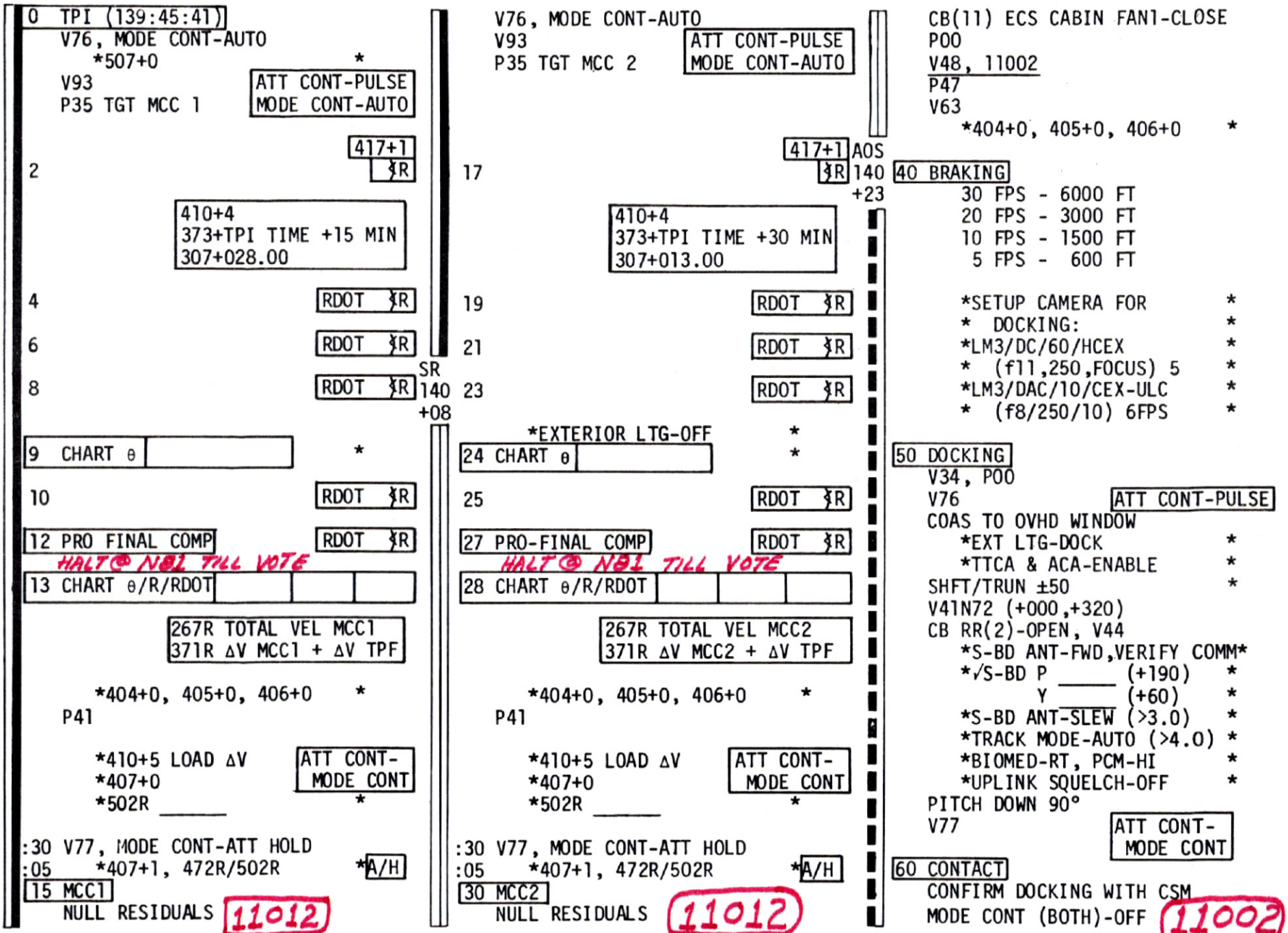
P41 N86

*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 (139:45:41)
NULL RESIDUALS

11012

TPI THRU DOCKING



POST DOCKING

140:51

CONFIGURE PGNS

1 Verify FWD DUMP VLV - AUTO

2 V48, 12021, PRO
N47 _____ LM WT
_____ CSM WT
PRO

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

140:56

PREP FOR TRANSFER

1 Window Shades Up (3)
Install Crash Bars
Verify: SUIT GAS DIVERTER VLV - EGRESS
CABIN GAS RETURN VLV - EGRESS
SUIT CIRCUIT RELIEF VLV - CLOSE

2 Doff Gloves
Disconnect CDR O2 Red Hose from PGA
And Attach To 3 ft. Vacuum Hose & Brush.
Disconnect LMP O2 Red Hose and Connect
To Suit Hose Interconnect.

3 Place HSB's on Deck, Right Side - Forward
Unstow CSRC and CSC Cassette From Upper
Lunar Boot Compt, Vacuum, and Place in Purse

4 Unstow, Vacuum/Wet Wipe, and LMP Temporarily Stow or Hold:
Lunar Surface Hasselblad Camera
70 mm Magazine Bag (2)
Tote Bag
ISA
Surface 16 mm Mag bag (6 Mags)

5 Unstow, Vacuum, and Restow SRC's

6 Doff Helmets and Vacuum/Wet Wipe, LMP Temporarily Stow or Hold

7 Vacuum PGA's

8 CDR Disconnect & Stow Vacuum Brush And 3 ft Hose
LMP Disconnect & Stow Suit Hose Interconnect

9 Verify Tunnel Pressurized From CSM
OVHD DUMP VLV - OPEN
WHEN Tunnel/LM Pressures Equal,
OVHD DUMP VLV - AUTO
Verify PRESS REG A & B - EGRESS

10 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

11 Receive bags from CSM, bag items, and
transfer bags to CSM (Pack CSRC, CSC Cassette,
2-16 mm Mags, and Misc. Items In B1 bag)

12 Transfer SRC's to CSM and
Receive B5 & B6 From CMP and Stow in
SRC Rack

142:15

13 CSM Mnvr to LM Jett Att

POST DOCKING

142:21

CONFIGURE S-BAND

1 Verify: Jettison Attitude (014,XXX/180,345)
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 _____ (-51)
Y _____ (+61)
S-BD ANT - SLEW (>3.0)
(DO NOT PLACE TRACK MODE - AUTO)
VERIFY UPDATA LINK - DATA

3 V47E, 414+1

4 400+3

142:26

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

TARGET PGNS

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

TARGET AGS

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

2 500R

142:36

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
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

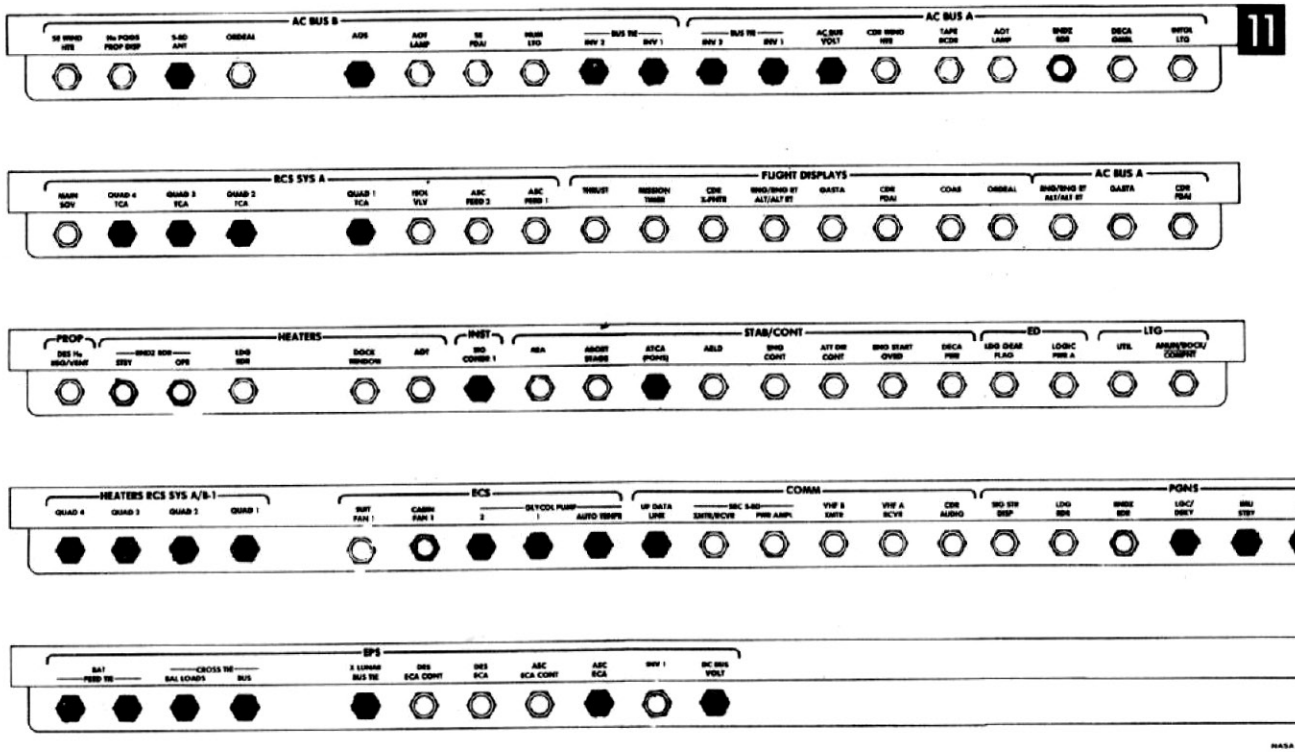
4 Configure CB's Per Chart

5 S-BAND VOICE - OFF

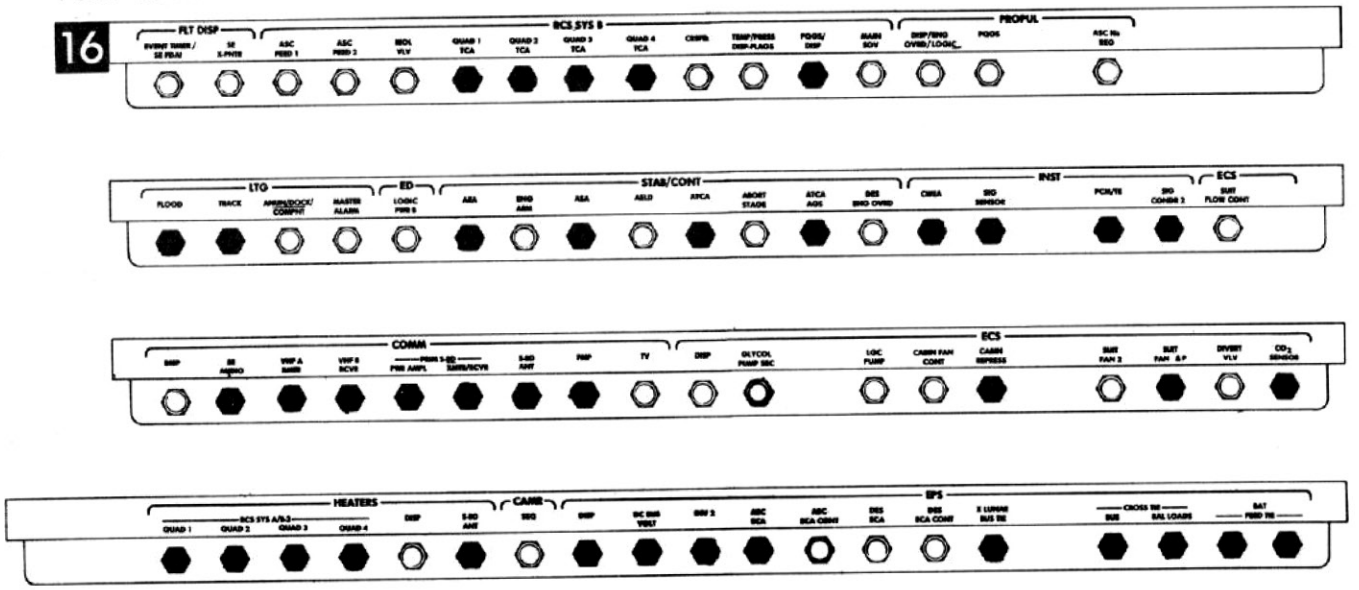
6 REVERIFY UPDATA LINK - DATA

7 REVERIFY 500R

POST DOCKING



POST DOCKING



T42:38

LMP IVT TO CSM

1 Stow HSB's On Floor

2 EXTERIOR LTG - TRACK
BAT 5&6 BACK UP FEED-ON,
tb(2) gray
FLOOD Lt - OFF
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
Tissue Dispenser
16mm Magazines (8)
70mm Magazines (5)
Lunar Surface Hasselblad Camera
All Documents in Flight Data File
PPK's (3)
DSEA
CSRC
CSC Cassette
Tote Bags (2)
SRC (2)
Unopened Food Bags
Used Urine Bags
Used Fecal Bags
ISA

LM TO CM TRANSFER LIST (CONTD)

Flag Kit
Lens Brush
Dust Cover, Tote Bag
Weigh Bag (2)
Solar Wind Composition Experiment
Thermal Samples in Bag (2)

RENDEZVOUS TIMELINES

RELATIVE MOTION TRAJECTORIES

INERTIAL PLOTS

AND

ABORT CHARTS

ABORT SECTION

PDI SUMMARY DATA

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*	47.4	2+01+26*	-114.3	-22.4	2+48+49	00+00	95.2	1.3
A-1	NO1+12	NA	NA	NA	1+07+00*	2+07+00*	3+07+00*	35.1	4+09+15*	-126.9	.2	4+47+45	12+00	109.8	-48.6
	1+00	2+05	5664.7	142.8/54025.	1+00+00	2+00+00	3+00+00	36.4	4+02+21	-125.9	-14.5	4+48+38	NA	NA	NA
	2+00	3+57	5659.1	141.6/59660.				34.7	4+02+17	-123.6	-12.9				
A-2	3+00	5+39	5656.1	139.4/60019.				34.3	4+02+11	-121.0	-8.0				
	4+00	7+14	5652.3	136.3/60024.				34.1	4+02+02	-117.1	-.1				
	5+00	8+43	5647.0	132.0/60031.				33.9	4+01+50	-111.7	10.0				
	6+00	10+31	5666.8	149.0/61501.	NA	NA	55+00	40.7	1+57+31	-129.2	-79.8	2+50+07			
A-3	7+00	12+52	5641.2	133.2/70027.				39.9	1+56+50	-111.1	-55.2				
	8+00	14+42	5614.5	116.2/77573.				39.0	1+56+05	-91.0	-31.9				
	9+00	16+03	5594.0	101.3/79815.				39.1	1+55+26	-72.8	-14.0				
	10+00	17+12	5578.8	88.1/77011.				40.1	1+54+51	-56.0	-.3				
	11+00	18+19	5565.8	75.1/71393.				41.7	1+54+16	-39.2	11.1				
A-4	12+00	19+27	5553.5	60.0/60257.				44.4	1+53+36	-19.1	21.9				
	13+00	20+26	5538.6	49.1/60254.				44.4	1+53+06	-4.1	28.1				
	14+00	21+25	5523.4	38.1/60251.				44.2	1+52+37	11.2	32.4				
	15+00	22+09	5512.0	29.9/60013.				40.5	1+52+06	19.3	37.6				
A-5	T2-1	7+13+	5515.5	29.9/60013.	50+00	1+50+00	2+40+00	36.9	3+37+00	19.8	20.1	4+47+28			
A-1	NO2+12	NA	NA	NA	1+12+00*	2+12+00*	3+12+00*	33.9	4+14+52*	-156.2	9.9	4+52+26	12+00	140.0	-48.4
	1+00	2+08	5692.5	166.2/54453	1+00+00	2+00+00	3+00+00	33.3	4+03+19	-150.5	-91.6	4+53+20	NA	NA	NA
	2+00	4+00	5686.9	164.8/60017.				31.7	4+03+15	-148.6	-88.4				
A-6	3+00	5+41	5684.3	162.7/60020.				31.8	4+03+10	-146.4	-81.6				
	4+00	7+16	5680.6	159.6/60025.				32.1	4+03+02	-143.0	-70.9				
	5+00	8+44	5675.3	155.2/60032.				32.6	4+02+51	-138.5	-57.1				
	6+00	10+31	5667.6	149.7/61510.				32.8	4+02+37	-132.4	-40.6				
A-7	7+00	12+53	5651.2	141.3/70078.				31.1	4+02+14	-122.7	-19.2				
	8+00	14+44	5634.6	132.2/77632.				29.7	4+01+50	-111.6	2.0				
	9+00	16+07	5653.4	148.8/79888.	NA	NA	55+00	36.3	1+57+30	-128.9	-80.9	2+54+49			
	10+00	17+16	5639.0	135.5/77066.				38.2	1+56+56	-113.9	-59.8				
A-3	11+00	18+23	5627.0	122.6/71488.				40.3	1+56+22	-98.9	-41.5				
	12+00	19+30	5615.9	107.4/60273.				43.8	1+55+43	-80.7	-22.3				
	13+00	20+29	5602.0	96.6/60269.				44.2	1+55+14	-67.2	-9.9				
A-4	14+00	21+29	5587.8	85.7/60266.				44.4	1+54+45	-53.3	.9				
	15+00	22+28	5573.4	74.8/60263.				44.6	1+54+16	-39.0	10.5				
	T2-2	7+13+	5515.5	29.9/60013.			50+00	46.5	1+46+57	20.5	23.9	2+53+44			

PREPARED BY FPRB/OPS
MARCH 12,1970

+INDICATES TIME IS REFERENCED TO LIFT OFF

*INDICATES THE TIME IS REFERENCED TO PDI.

DATE APRIL 2, 1970 ~~MARCH 25, 1970~~

LM TIMELINE BOOK

Range and Range Rate at INS and 10 Minutes Prior to Subsequent Burns

PAGE	ABORT TIME PDI+	INS RANGE	INS RANGE RATE	BOOOST RANGE	BOOOST 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	146.8	-493.5	106.6	-148.5
A-1	NO 1+12	NA	NA	364.6	-685.2	145.3	440.7	180.0	-584.6	97.0	-180.0
	01+00	359.8	580.7	355.2	-677.9	128.8	441.5	173.0	-569.7	112.1	-167.2
	02+00	354.4	565.6	347.5	-669.9	122.2	427.9	163.5	-552.7	117.4	-176.6
A-2	03+00	337.0	547.7	329.2	-649.0	114.5	417.4	152.3	-529.6	115.2	-181.6
	04+00	306.8	539.0	300.5	-624.1	101.4	418.8	138.1	-501.1	114.4	-176.5
	05+00	261.3	527.0	257.9	-586.6	81.9	418.0	117.5	-453.5	111.2	-187.6
	06+00	199.1	534.4	NA	NA	NA	NA	211.1	-552.7	107.7	-131.9
A-3	07+00	119.8	479.0	↓	↓	↓	↓	139.6	-434.3	105.7	-138.0
	08+00	55.5	266.2					75.6	-283.2	103.9	-143.4
	09+00	57.9	-340.6					31.5	48.0	102.6	-147.5
	10+00	102.1	-439.9					43.6	263.5	100.0	-155.7
	11+00	155.1	-442.7					83.1	166.1	99.0	-157.7
A-4	12+00	204.6	-430.6					121.5	71.7	96.6	-161.3
	13+00	255.3	-414.4					160.3	-21.8	95.8	-163.2
	14+00	306.2	-396.4					198.6	-115.7	93.3	-162.7
	15+00	357.0	-378.7	↓	↓	↓	↓	237.0	-204.3	95.6	-169.0
A-5	T2-1	643.9	-365.1	535.3	-213.6	359.7	-352.6	221.6	-216.8	88.0	-119.0
A-1	NO 2+12	NA	NA	542.1	-890.9	264.2	461.7	259.4	-770.3	97.0	-190.0
	01+00	577.4	608.7	566.3	-807.6	231.8	367.8	286.6	-694.7	116.4	-117.3
	02+00	572.4	592.5	559.0	-797.9	227.9	354.4	278.7	-683.6	117.6	-122.5
A-6	03+00	555.7	577.4	540.3	-782.8	219.2	349.4	265.6	-668.9	117.4	-130.8
	04+00	526.2	571.3	511.0	-764.8	204.8	358.3	249.0	-652.5	116.6	-141.9
	05+00	481.5	563.9	467.3	-738.0	182.8	372.1	224.6	-626.8	116.1	-157.4
	06+00	419.6	554.3	407.5	-699.2	153.1	390.3	192.4	-587.6	116.2	-160.5
A-7	07+00	338.8	541.2	330.5	-645.0	115.0	409.4	152.1	-526.0	114.4	-184.2
	08+00	262.3	526.0	258.5	-587.8	80.7	416.2	116.4	-449.4	113.7	-191.3
	09+00	195.1	532.2	NA	NA	NA	NA	207.5	-547.1	108.3	-115.9
	10+00	142.3	500.1	↓	↓	↓	↓	160.0	-470.9	106.4	-131.5
A-3	11+00	90.2	433.5					112.4	-379.2	105.1	-131.8
	12+00	52.4	225.2					71.3	-268.7	103.0	-143.3
	13+00	51.4	-276.5					36.1	-44.9	101.8	-143.6
A-4	14+00	89.2	-431.1					35.2	266.6	99.4	-151.9
	15+00	136.6	-445.2					68.4	199.7	98.4	-153.3
	T2-2	336.1	-391.7	↓	↓	↓	↓	221.4	-212.3	90.0	-142.0

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MARCH 25,1970

RANGE
RANGE RATE

INSERTION THRU BOOST

60 INSERTION

SS
MODE CONT(2)-ATT HOLD
ATT/TRANSL-2 JETS
*BAL CPL-ON
*VHF ANT-FWD
ATT CONT-PULSE
MODE CONT-AUTO
*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-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

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

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

V48, 1 (2) 1022

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

30

20

20

18
*CHECK RCS, EPS, ECS *

10
*VERIFY PGNS *
*V47, 414+1, 400+3 *
*400+2 *

SR
*EXT LTG-OFF *

P30
N33 TIG BOOST (INS + ΔT)

P41
*410+5 LOAD ΔV
*507+1
*407+0
*502R _____
ATT CONT-MODE CONT
*
*

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

STAGE AT BOOST IGNITION;
0 BOOST

60 BOOST

V76, MODE CONT-AUTO
*507+0
*416+1
*410+1
*373+
*275+
*310R
*402R
V48, 11022

ATT CONT-PULSE
MODE CONT-AUTO

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

40

V48, 11012
(IF R <400)
CB RR(2)-CLOSE
RATE/ERR MON-RNDZ RDR
V93
P20, AUTO MNVR
V80, MAX N49(2.0,12.0)
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

RR-AUTO TRACK

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

36 §R

33 RDOT §R

30 RDOT §R

27 RDOT §R

M=10,V32

24 RDOT §R

21 RDOT §R

18 RDOT §R
*CHECK RCS, EPS, ECS

15 RDOT §R
V90 OBTAIN CSM YDOT

12 RDOT §R
*402R

10 PRO-FINAL COMP

*USE HAM CHART

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

P30
N33 TIG HAM (INS + ΔT)

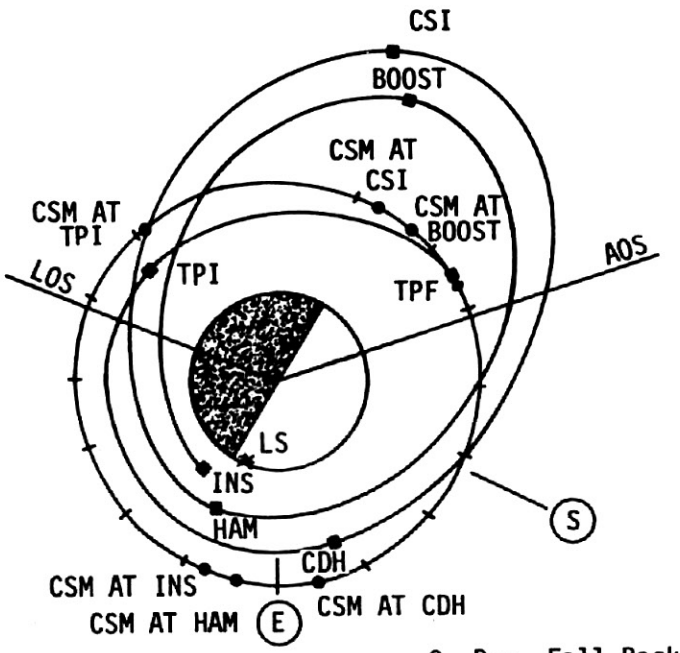
P41 N86
*410+5 LOAD ΔV
*507+1
*407+0
*267R
*502R

ATT CONT-MODE CONT

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

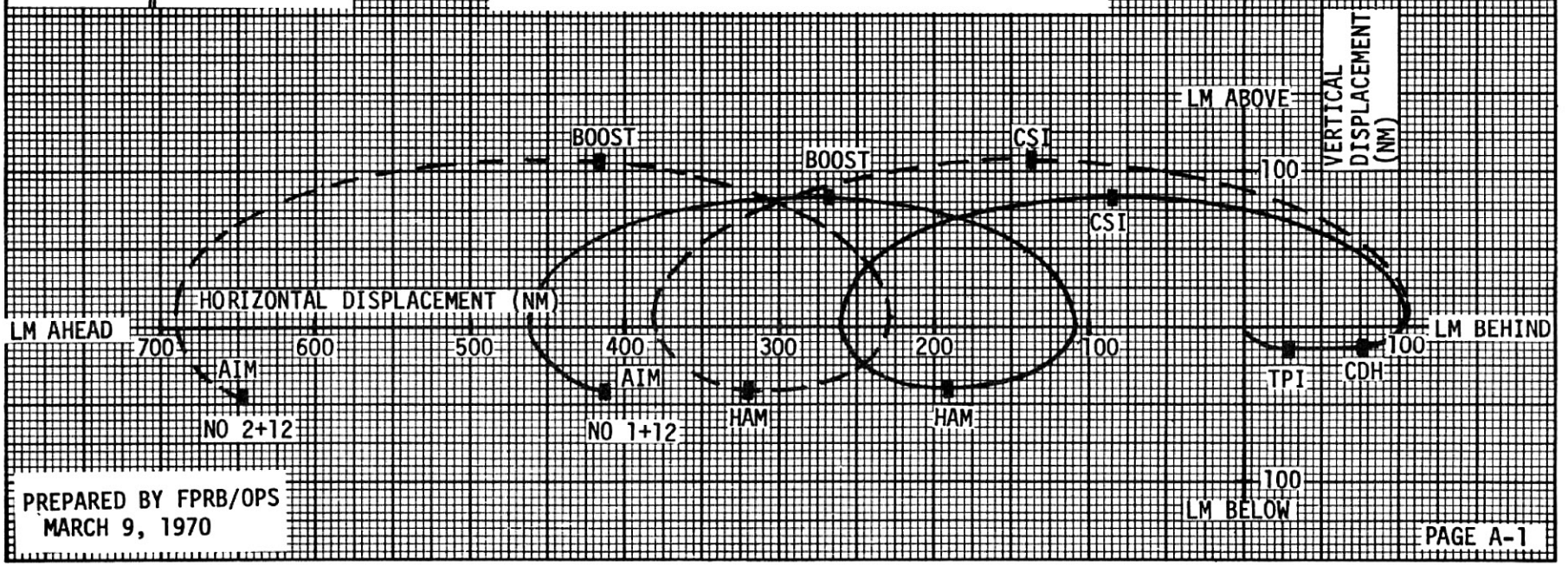
0 HAM

EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	



APOLLO 13
INERTIAL AND RELATIVE PLOTS

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



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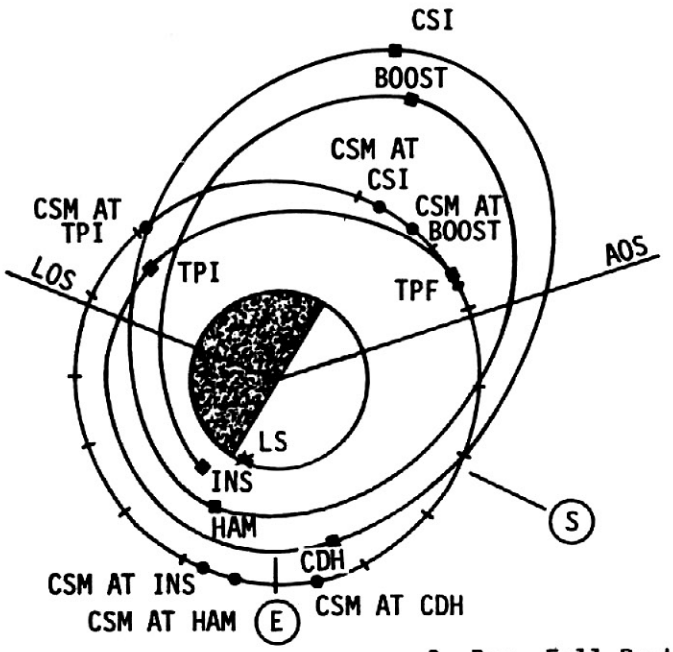
MARCH 9, 1970

PAGE A-1

NASA— MSC

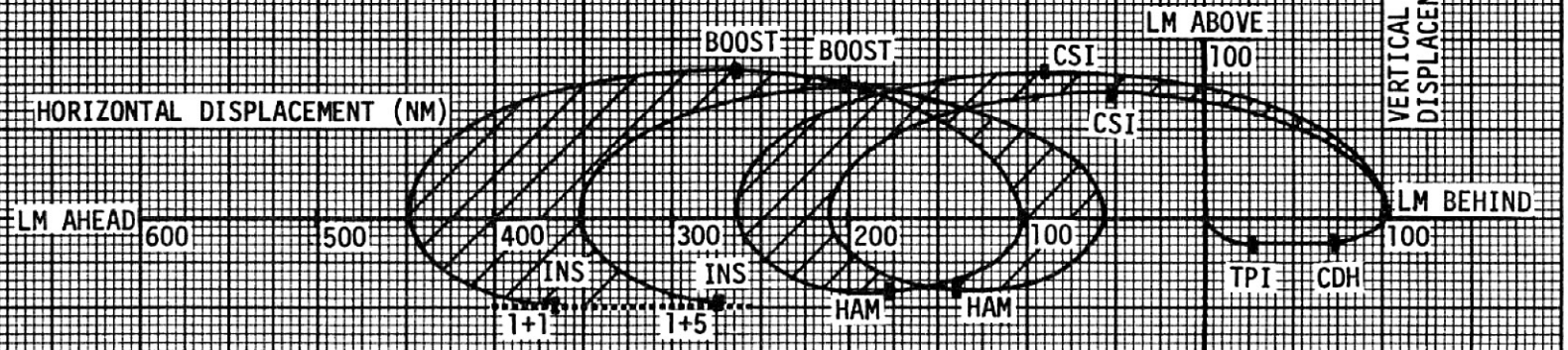
EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	



2 Rev. Fall Back

APOLLO 13
INERTIAL AND RELATIVE PLOTS

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



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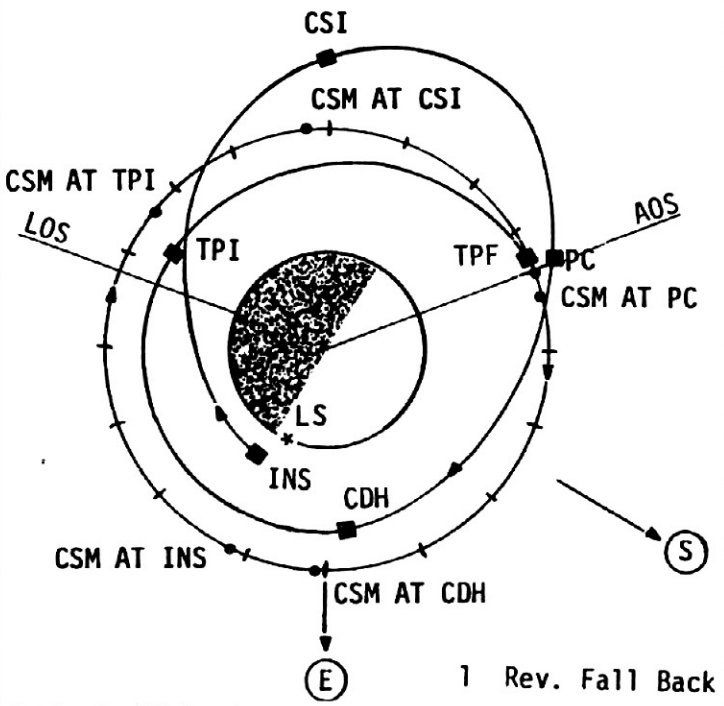
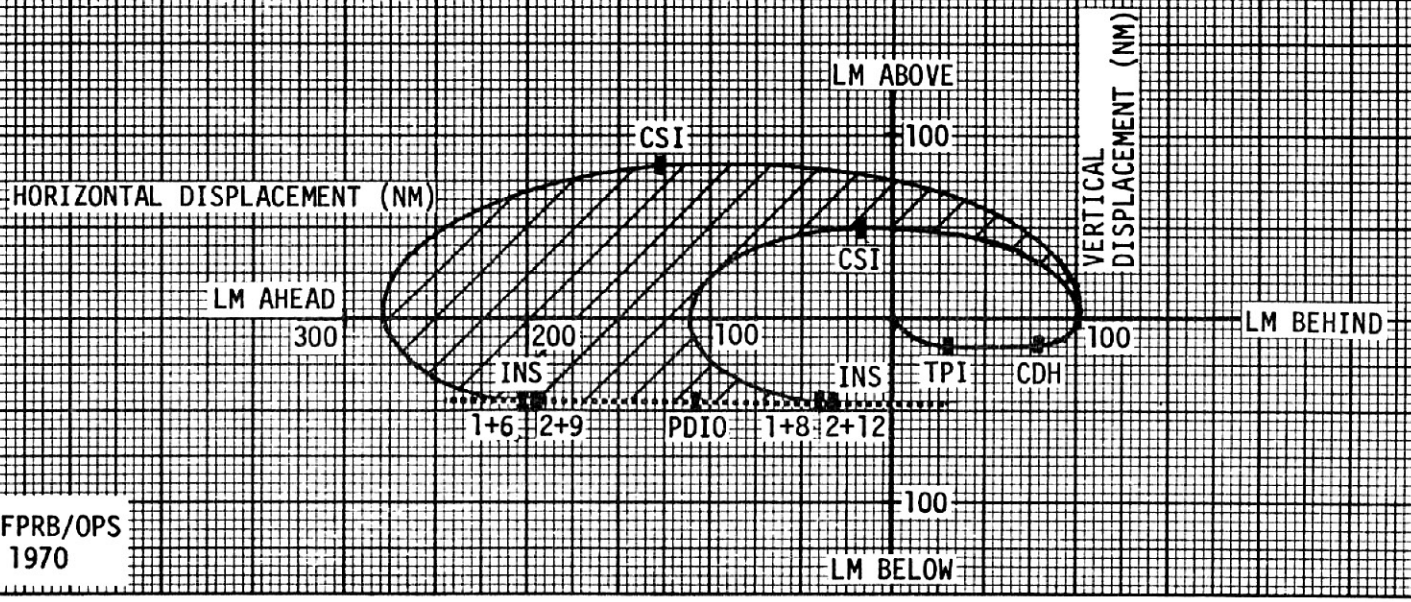
PAGE A-2

EVENT	GET TIG
INS	
CSI	
PC	
CDH	
TPI	

APOLLO 13
INERTIAL AND RELATIVE PLOTS

1. PDIO
2. $6 \leq$ PDI 1 ≤ 8
3. $9 \leq$ PDI 2 ≤ 12





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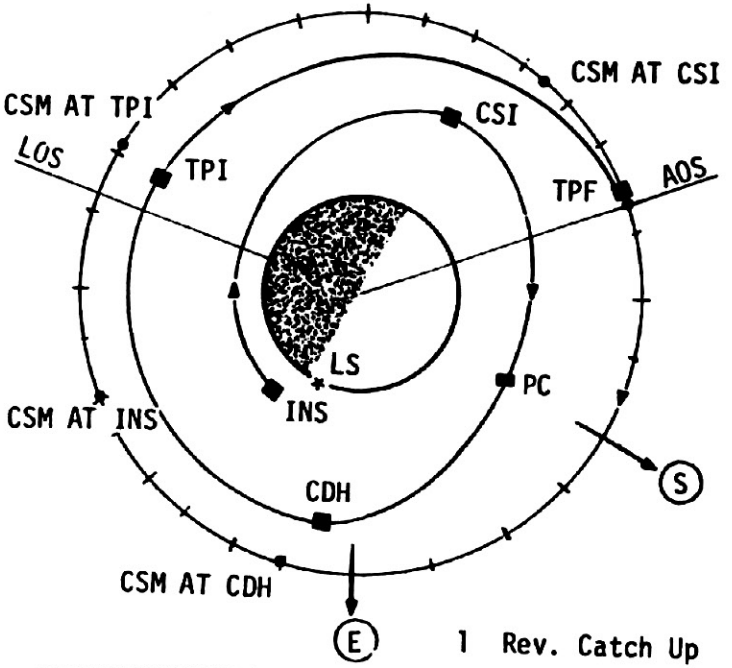
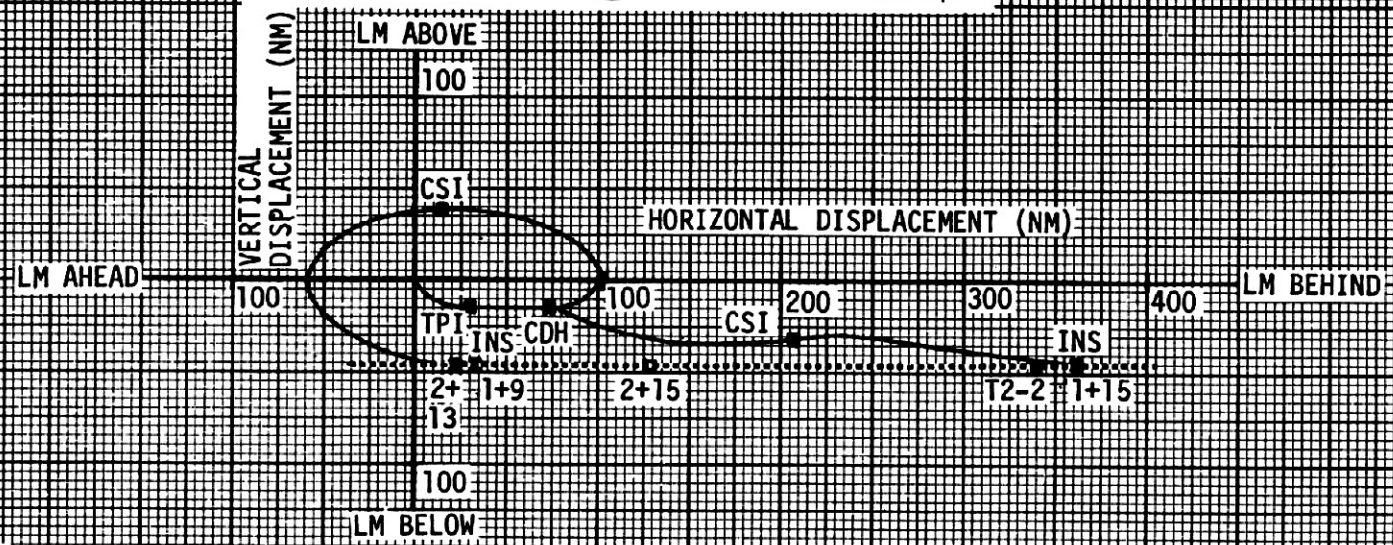
PAGE A-3

EVENT	GET TIG
INS	
CSI	
PC	
CDH	
TPI	

APOLLO 13
INERTIAL AND RELATIVE PLOTS

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





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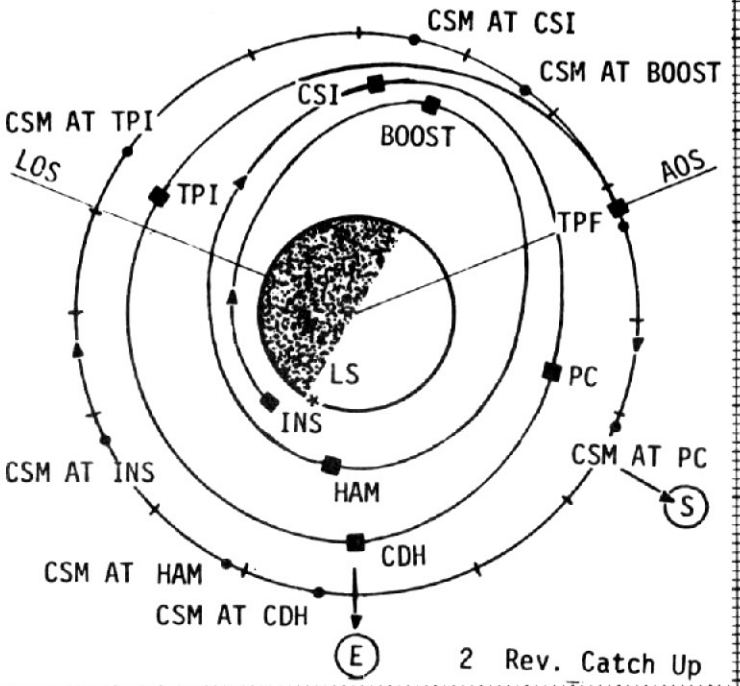
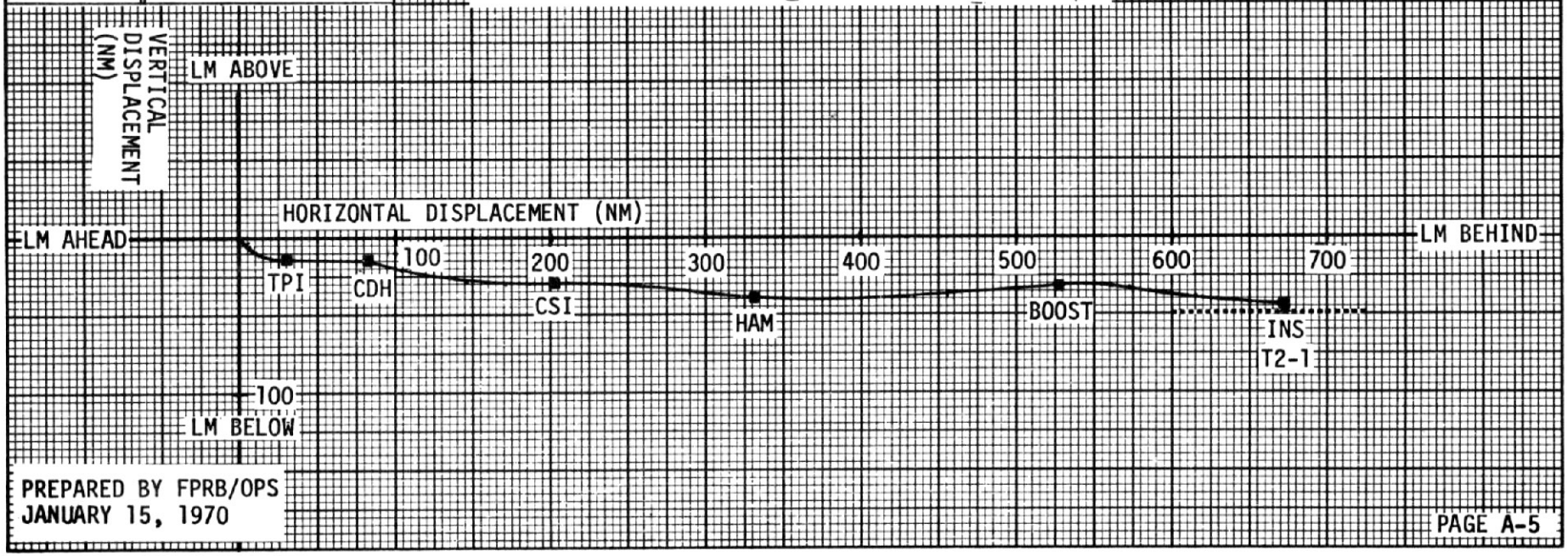
PAGE A-4

EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	

APOLLO 13
INERTIAL AND RELATIVE PLOTS

1. T2-1





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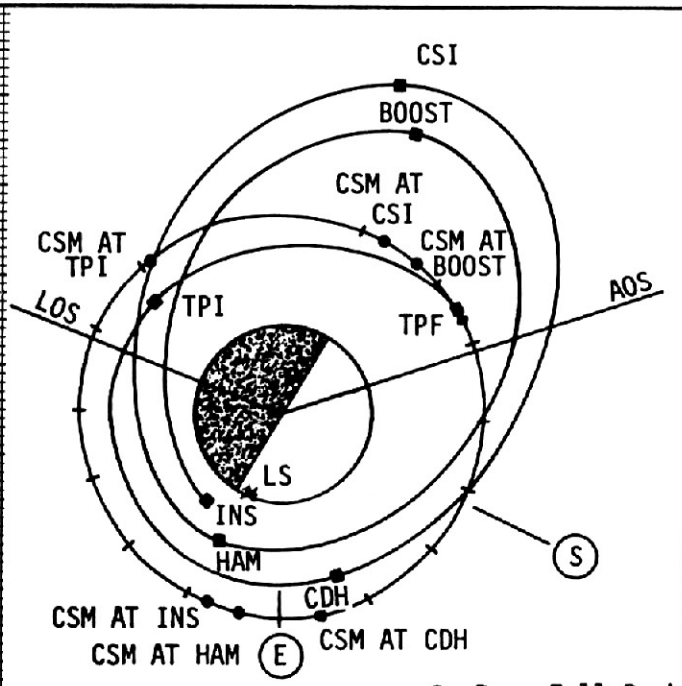
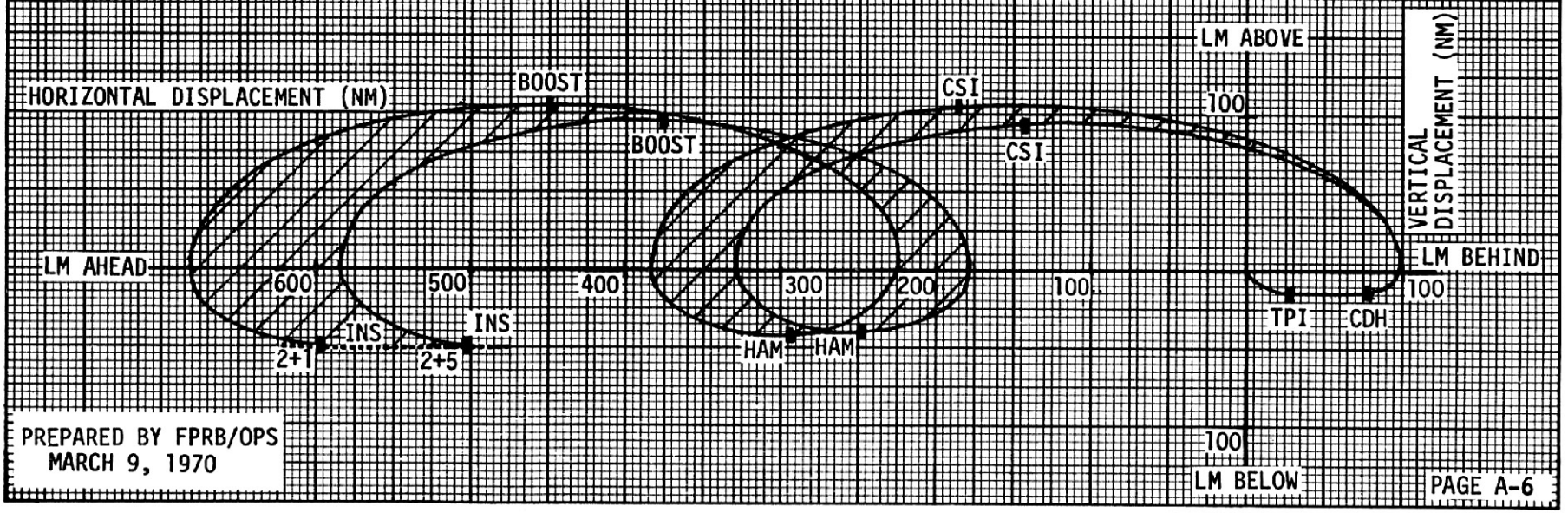
PAGE A-5

EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	



APOLLO 13
INERTIAL AND RELATIVE PLOTS

1. 1 ≤ PDI 2 ≤ 5



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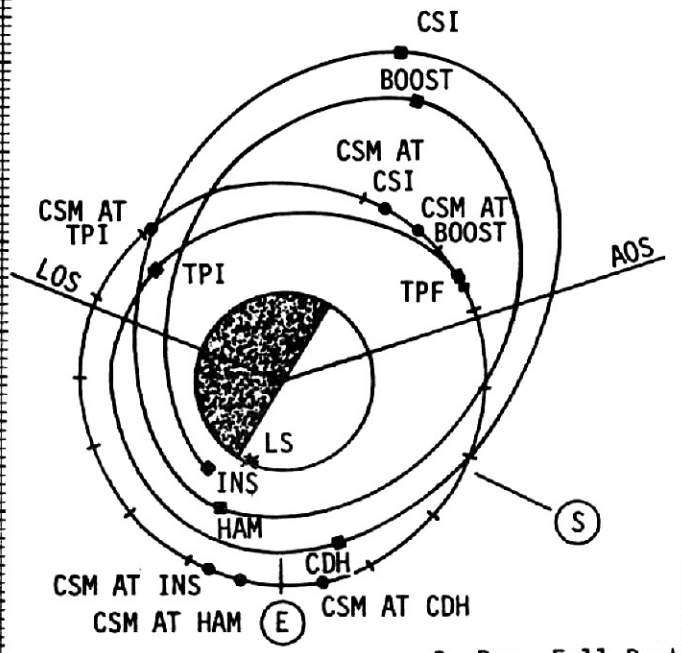
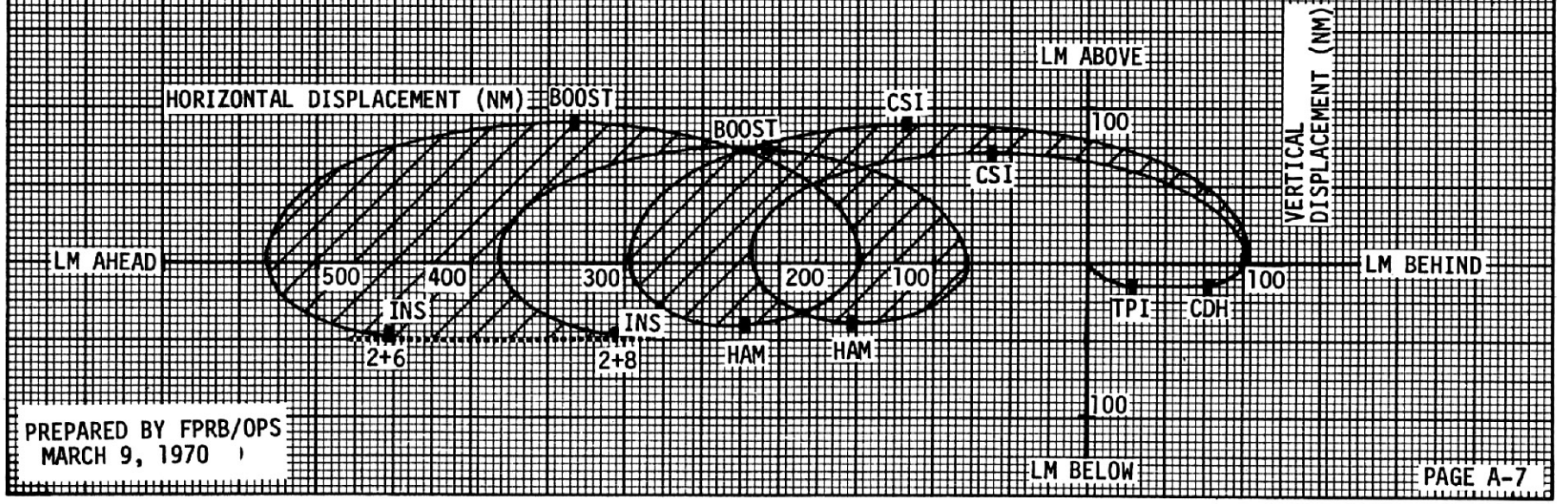
PAGE A-6

EVENT	GET TIG
INS	
BOOST	
HAM	
CSI	
PC	
CDH	
TPI	

APOLLO 13
INERTIAL AND RELATIVE PLOTS

1. $6 \leq PDI\ 2 \leq 8$





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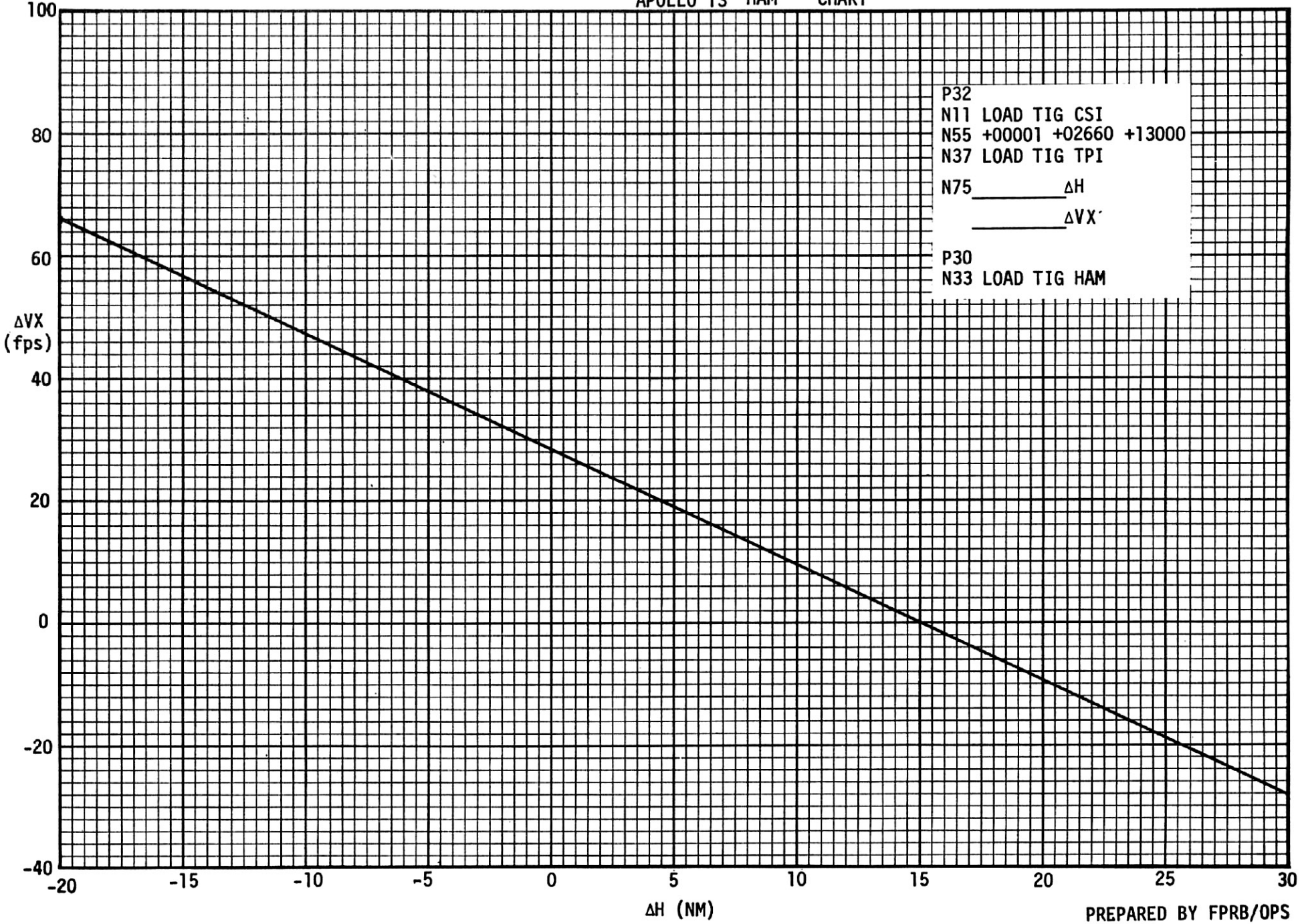
MARCH 9, 1970

PAGE A-7

DATE MARCH 16, 1970

APOLLO 13 HAM CHART



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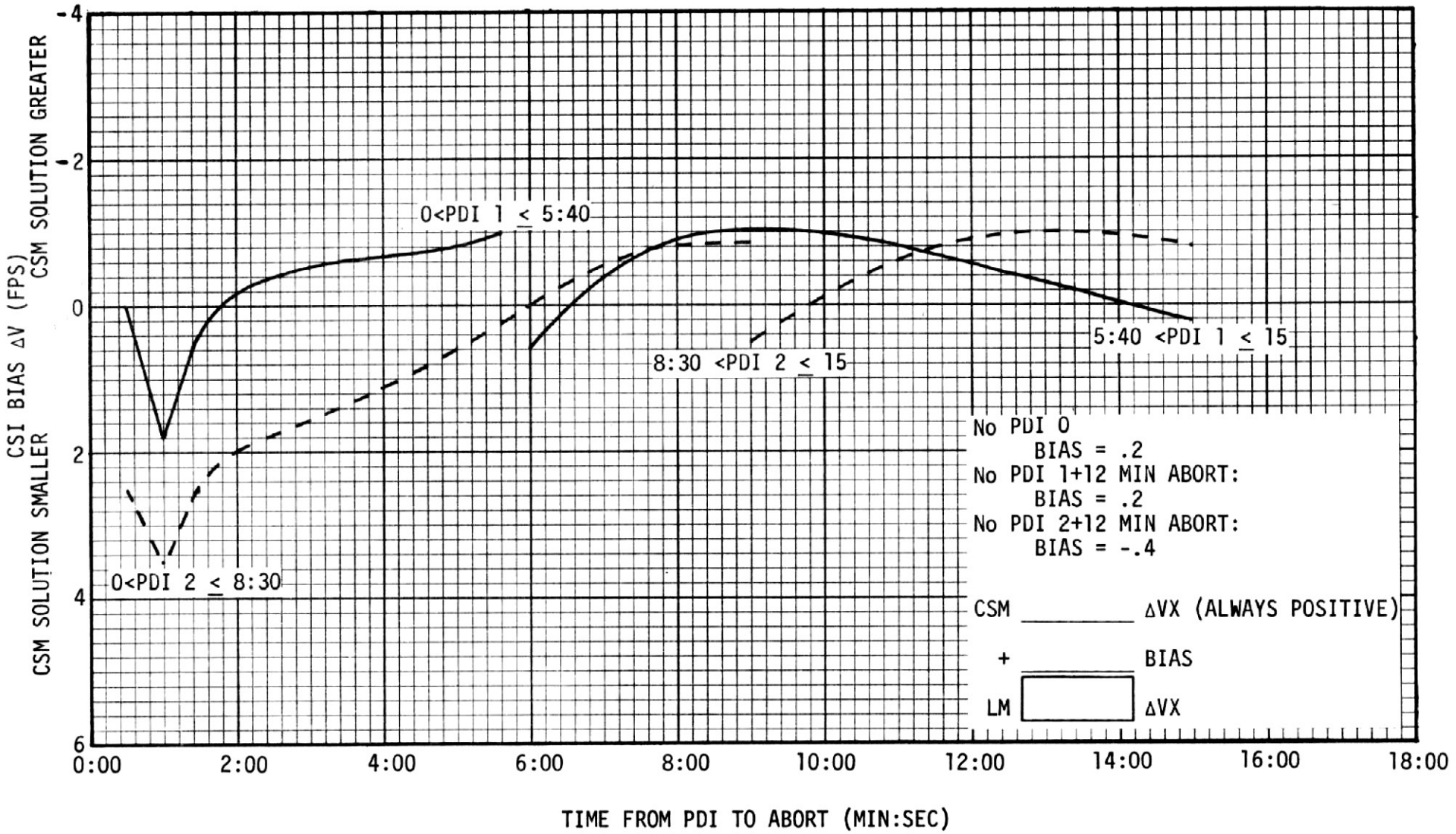
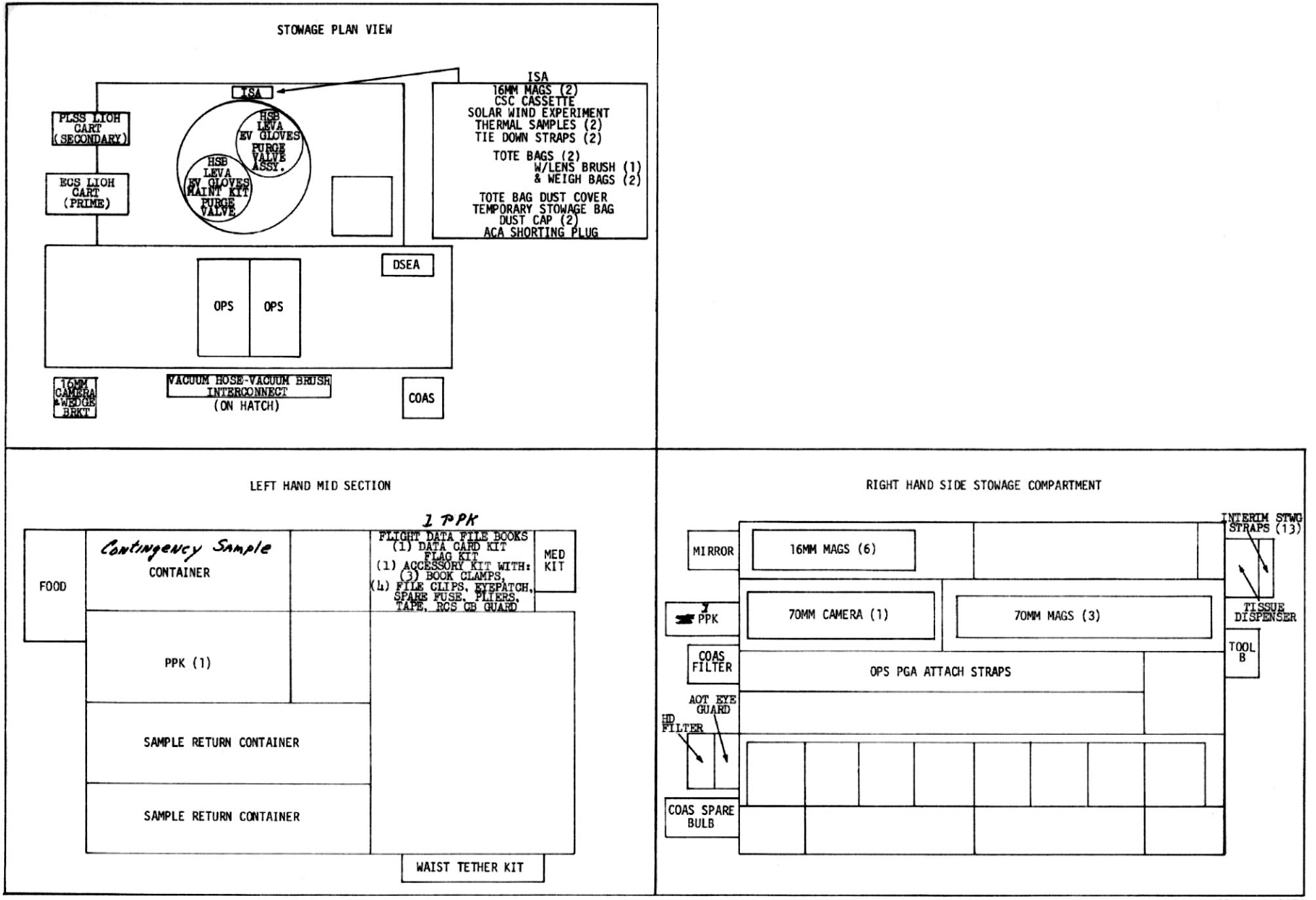
CSI BIAS CHART



MPAD DATA MODIFIED BY FPRB/OPS
MISSION APOLLO 13, MARCH 31, 1970

DATE APRIL 2, 1970



31 March 1970

LM-7 LUNAR LAUNCH STOWAGE CONFIGURATION

* CM TO LM TRANSFER ITEMS

LM-7 EARTH LAUNCH STOWAGE CONFIGURATION

31 March 1970