NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FINAL

APOLLO 13 FLIGHT PLAN

AS-508/CSM-109/LM-7

MARCH 16, 1970

FLIGHT PLANNING BRANCH
FLIGHT CREW SUPPORT DIVISION

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SECTION I
SECTION II
SECTION III
SECTION IV
SECTION V
SECTION VI

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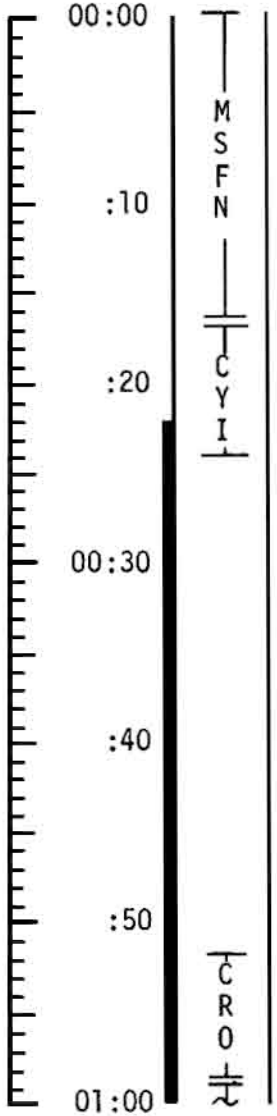
FLIGHT PLAN

MCC-H

1313 CST

LIFT-OFF APRIL 11, 1970 LAUNCH OPERATIONS CHECKLIST



SECO
INSERTION AND SYSTEMS CHECKS

UPDATE TO CSM
Z TORQUING ANGLE

P52 - IMU REALIGN
OPTION 3 - REFSMMAT
(LAUNCH ORIENT)

GDC ALIGN

SET UP CAMERA EQUIPMENT

DUMP DSE

REPORT GYRO TORQUING ANGLES

NOTES

LIFT-OFF CREW POSITIONS
LEFT COUCH - CDR
CENTER COUCH - CMP
RIGHT COUCH - LMP
AT SECO+20 SEC, S-IVB MNVRS TO LH AND INITIATES ORB RATE (HEADS DOWN)

P52 IMU REALIGN

N71: __ __,__ __

N05: __ __ __.__ __

N93:

X __ __.__ __ __

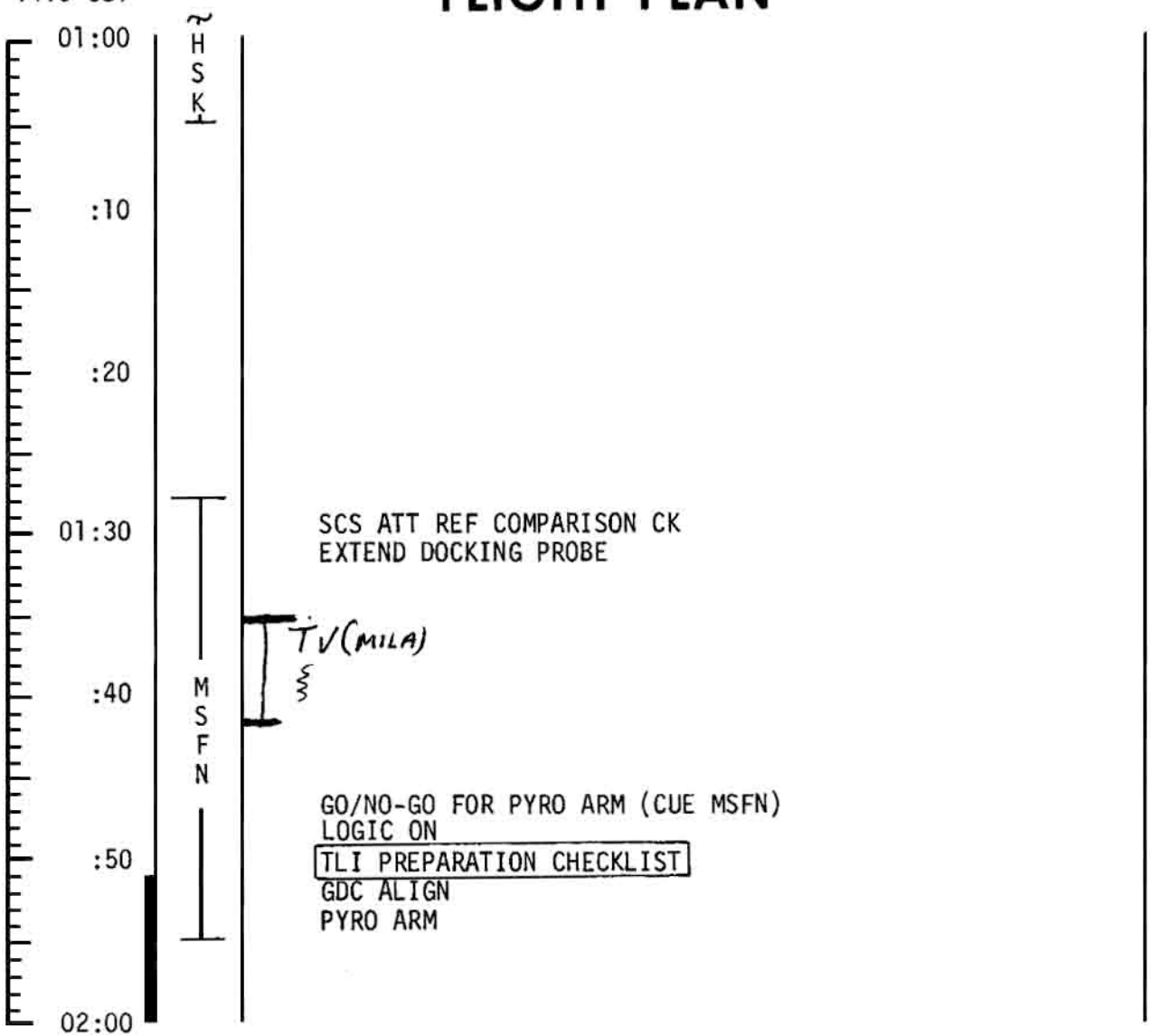
Y __ __.__ __ __

Z __ __.__ __ __

GET __ __ __:__ __:__ __

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	00:00 - 01:00	1/E.O.	3-1

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	01:00 - 02:00	1/E.O.	3-2

FLIGHT PLAN

TL1
BURN TABLE

P OR Y RATES	ATT DEVIATION	SHUTDOWN TIME	RESIDUALS
10°/SEC SHUTDOWN	±45° SHUTDOWN	BT + 6 SEC & V_i = PAD VALUE	NO TRIM

TABLE 3-1
3-2A

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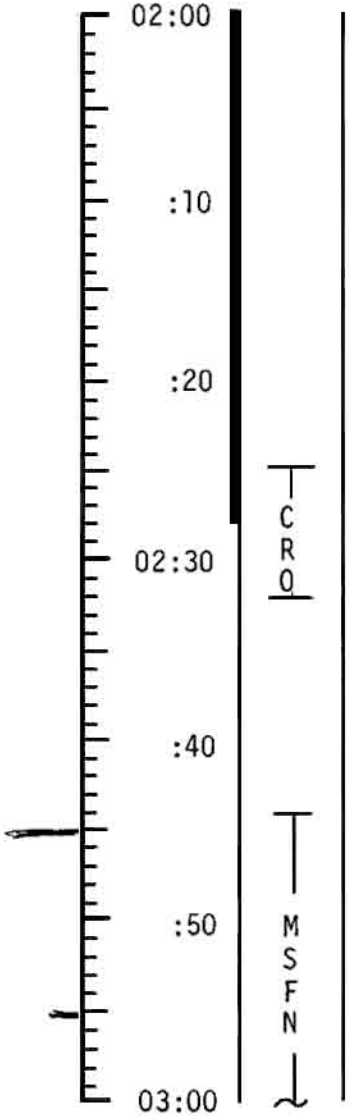
FLIGHT PLAN

MCC-H

1513 CST

NOTES



GO/NO-GO

DUMP DSE

GO/NO-GO FOR TLI
TB-6 (02:25:49.65)

P47 - THRUST MONITOR

TLI

TIG: 02:35:27.65
BT: 5 MIN 55.7 SEC

P00 - CMC IDLING
V66 - TRANS CSM SV TO LM SLOT
TLI BURN STATUS REPORT
CDR - TRANS TO CENTER COUCH, CMP - LEFT COUCH
LMP - RIGHT COUCH
WASTE STOWAGE VENT - CLOSED
DIRECT O2 VLV-OPEN, UNTIL CABIN IS 5.7 PSI, THEN CLOSE
GDC ALIGN
SIVB MNVRS TO SEP ATT
(2:56:25)

R 358 OMNI C
P 140
Y 320

AT SECO: S-IVB INERTIAL
AT SECO+2 MIN 31 SEC:
S-IVB TO LOCAL
HORIZONTAL ORB RATE,
HEADS DOWN

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	02:00 - 03:00	1/TLC	3-3

FLIGHT PLAN

MCC-H

1613 CST

GO/NO GO FOR T & D

GO/NO GO FOR PYRO ARM AND CSM/LM EJECTION

(TLI CUTOFF + 1HR 20 MIN)

03:00 :10 :20 03:30 :40 :50 04:00

MSFN

TV

ACTIVATE AND LOAD DAP N46 (11103, 11111)
LOAD DOCKING GIMBAL ANGLES
CSM SEP PREPARATION

CSM/SIVB SEP GET:03:06)

CSM MNVR TO DOCK ATT (03:10)
HGA TRACK - REACQ
HGA BEAM - WIDE DAP 11102

R 302 HGA
P 320 P -5
Y 040 Y 297

TV (GDS) 03:15 TO 04:23 CM4/TV - PEAK, BRKT (f 22)
VISUALLY INSPECT AND PHOTOGRAPH SIVB AND LM

DOCK GET: 03:16

BEGIN CSM/LM CABIN PRESSURE EQUALIZATION
CDR: CONFIGURE FOR LM EJECTION
TUNNEL PRESSURE INTEGRITY CHECK
REMOVE AND TEMPORARILY STOW TUNNEL HATCH
CHECK DOCKING LATCHES
VENT DOCKING PROBE
LM UMBILICAL CONNECTION
REINSTALL TUNNEL HATCH
LM TUNNEL VENT VLV - LM/CM ΔP
LEAVE TUNNEL EQUALIZATION VALVE CLOSED
CYCLE O_2 & H_2 FANS
S-IVB NON PROPULSIVE VENT START (GET: 03:41)
GO/NO-GO PYRO ARM (CUE MSFN)
LOGIC ON
LOAD DAP N46 (21101, 11111)
PYRO ARM
P47 - THRUST MONITOR
PHOTOGRAPH LM EJECTION
S-IVB VENT COMPLETE (GET: 03:56)

CSM/LM EJECTION

TIG: 04:01
BT: 3 SEC
ΔVR: 0.4 FPS
ULLAGE: N/A
ORBIT: N/A

NOTES

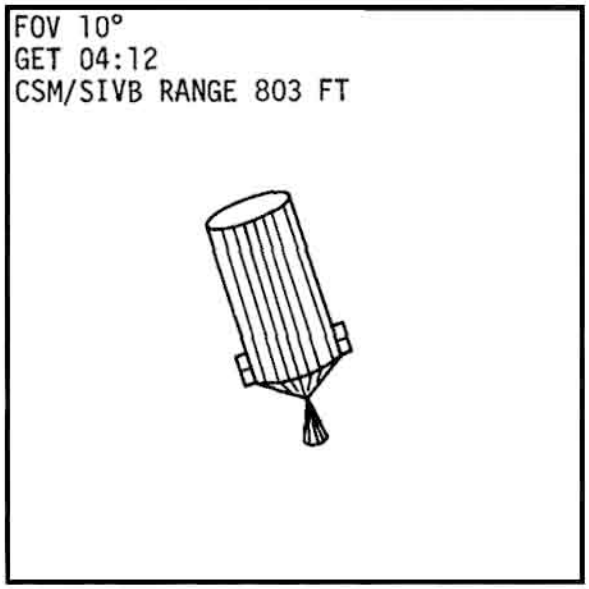
T&D MNVR
+X FOR 3 SEC (ΔV~0.5FPS), AFTER 15 SEC PITCH UP AT 2.0°/SEC. V49 AUTO MNVR TO DOCKING ATT. NULL TRANSLATION AND RATES, +X FOR 4 SEC (ΔV~0.7 FPS)

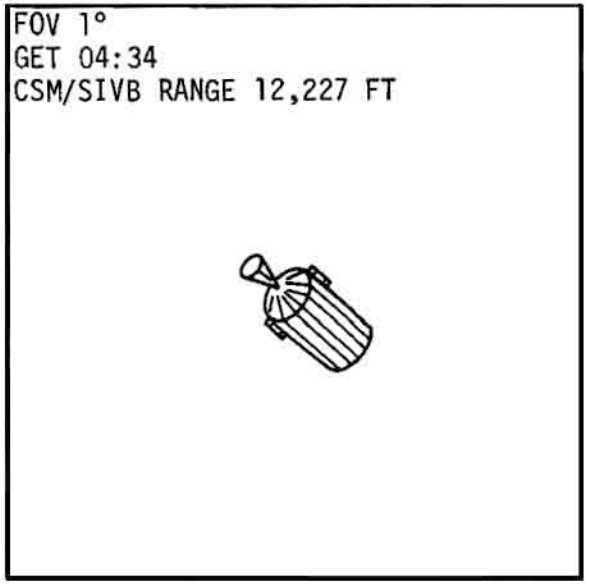
CAMERA SETTINGS FOR TRANSPOSITION/DOCKING:
CM2/DAC/18/CEX-BRKT, MIR(f8,250,7)12fps, 0.7 MAG (5 MIN) MAG A
CM/EL/80 CEX - SPOT (f8,250,FOCUS)10, MAG L

CAMERA SETTINGS FOR LM EJECTION:
CM 2/DAC/18/CEX - BRKT, MIR (f8,250,7) 6 fps, 0.3 MAG (5 MIN) MAG A

SPRING ACTUATOR ΔV ∿ 0.8 FPS. 5 SEC AFTER EJECTION THERE IS A 4 JET RCS -X TRANSLATION FOR 3 SEC (ΔV ∿ 0.4 FPS). TOTAL ΔV ∿ 1.2 FPS.

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	03:00 - 04:00	1/TLC	3-4


FOV 10°
GET 04:12
CSM/SIVB RANGE 803 FT


FOV 1°
GET 04:34
CSM/SIVB RANGE 12,227 FT

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FLIGHT PLAN

MCC-H

1713 CST

04:00

:10

:20

DUMP DSE

04:30

:40

:50

05:00

TV

MSFN

P00, V66 - TRANS CSM S.V. TO LM SLOT

MNVR TO ACQUIRE S-IVB IN HATCH WINDOW (04:12) R 094 P 323 Y 355 OMNI D

S-IVB APS EVASIVE MNVR (GET = 04:14) (GROUND COMMAND)
ΔV:9.4 FPS
LOAD DAP, N46 (21111, 11111)
FLIGHT PLAN

BATTERY CHARGE, BATTERY B
S-IVB MNVRS TO PROPELLANT DUMP ATT (GET: 04:24)

MNVR TO P52 ATT (04:25) R 052 P 234 Y 010 HGA P -10 Y 350

S-IVB CONTINUOUS H2 VENT ON (GET: 04:31)
S-IVB LOX DUMP (GET: 04:36)

[redacted]
HGA TRACK-MAN
HGA PITCH -52°
HGA YAW 270

DOFF & STOW PGA's

TRANSFER ITEMS OUT OF PGA POCKETS

NOTES

THE S-IVB 80° YAW MNVR IS PLANNED FOR LM EJECTION +3 MIN. THE MNVR WILL NOT BE STARTED UNTIL CREW REPORTS GOOD EJECTION. THE S-IVB EVASIVE MNVR WILL NOT BE STARTED UNTIL THE CREW HAS THE S-IVB IN SIGHT.

NOTE: DURING TLC HGA IS REQUIRED ONLY FOR TD&E, TV TRANSMISSIONS AND MCC'S. THE ANTENNA WILL BE STOWED AT OTHER TIMES.

LOX DUMP ΔV = 28.1 FPS

S/C INTERIOR PHOTOGRAPHY AT CREW OPTION

CM /DAC/5/CIN-SPOT (f2.8, 60, fixed) 6 fps, 1 mag MAG J

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	04:00 - 05:00	1/TLC	3-5

FLIGHT PLAN

MCC-H

1813 CST

05:00

:10

:20

:30

:40

:50

06:00

MSFN

UPLINK TO CSM
DESIRED ORIENTATION
(PTC)
ZERO TRUNION BIAS

UPDATE TO CSM
P37 PAD (L/O+15)

P52 - IMU REALIGN
OPTION 1 - PREFERRED
(PTC ORIENT)
GYRO TORQUE

REPORT GYRO TORQUING ANGLES

GDC ALIGN

SECURE HGA, HGA TRACK-MAN, HGA Pitch -52
HGA YAW 270

VHF A SIMPLEX - OFF
VERIFY WASTE STOWAGE VENT VALVE - VENT

STARS ____,____

SA ____, ____

TA ____, ____

NOTES

PREPARE FOR LAUNCH VEHICLE
SYSTEMS PERFORMANCE
DEBRIEFING AT 25 HRS.
SEE QUESTIONS ON PAGE 3-21

P52 IMU REALIGN

N71: __ __,__ __

N05: __ __ __.__ __

N93:

X __ __.__ __ __

Y __ __.__ __ __

Z __ __.__ __ __

GET __ __ __:__ __:__ __

P 37 PAD ASSUMES
NO MCC-1

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	05:00 - 06:00	1/TLC	3-6

MCC-H

1913 CST

FLIGHT PLAN

06:00 | :10 | :20 | 06:30 | :40 | :50 | 07:00

MSFN

MNVR TO OPTICS CALIBRATION ATT — R 147 — OMNI B
LOAD DAP, N46 (21101, 11111) — P 340
P23 - CISLUNAR NAVIGATION — Y 0
OPTICS CALIBRATION STAR 4 0
P00
V49 - MNVR TO SIGHTING ATT — R 159
STAR/EARTH HORIZON — P 297
P23 - CISLUNAR NAVIGATION — Y 0
LOAD W MATRIX (R1 + 8 0 0 0 0)(R2 + 0 0 0 7 0)

1. STAR 33 EFH (R3 00120) — ANTARES

2. STAR 221 ENH (R3 00110) — DELTA CAPRICORNI
N88: (R1 +39954)(R2 -26599)(R3 -14003)

3. STAR 125 EFH (R3 00120) — EPSILON SCORPII
N88: (R1 -12736)(R2 -37323)(R3 -28133)

4. STAR 40 ENH (R3 00110) — ALTAIR

5. STAR 42 ENH (R3 00110) — PEACOCK

O_2 FUEL CELL PURGE
WASTE WATER DUMP
} IF NO MCC-1

NOTES

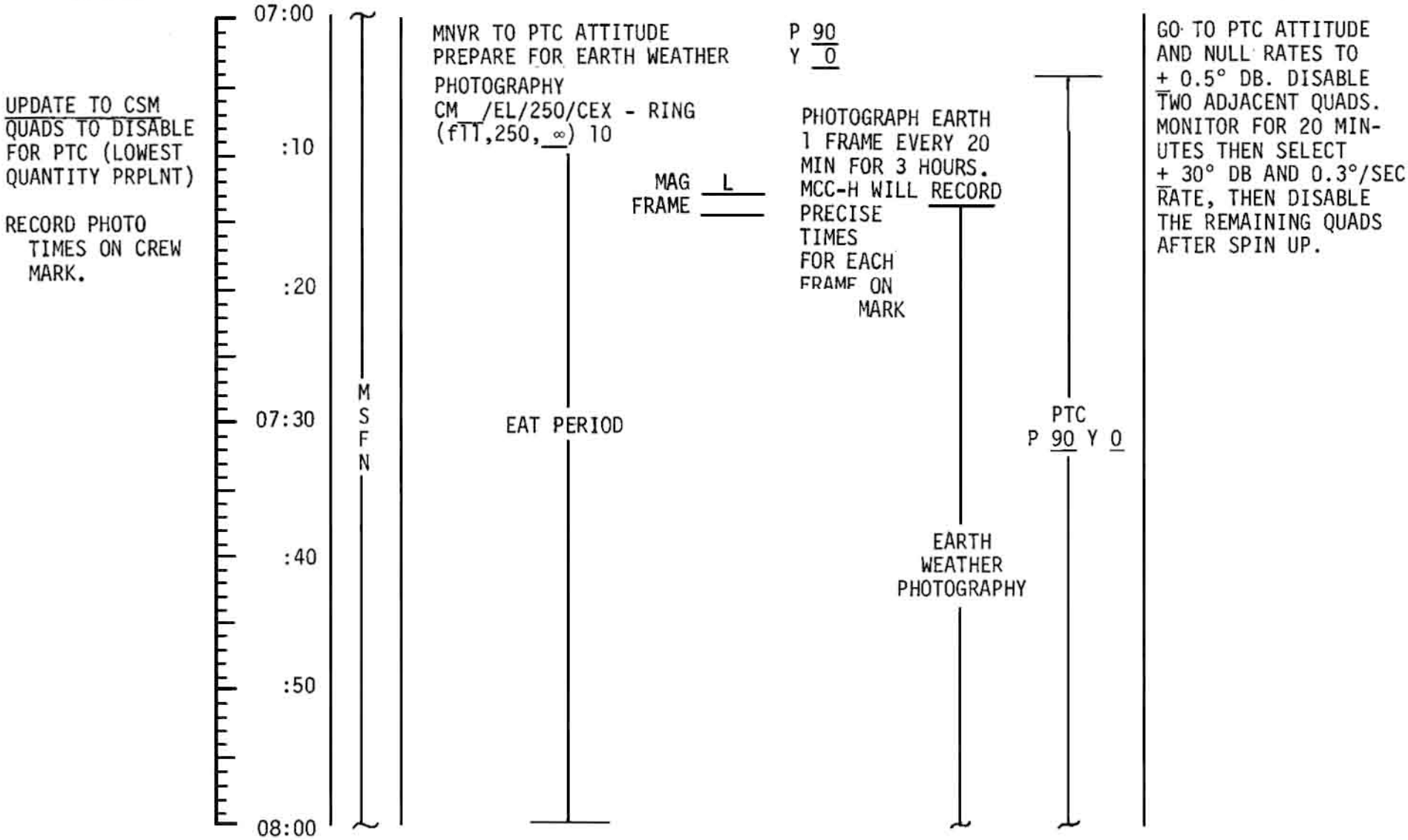
S-IVB APS MCC-1
GET: 06:00
$\Delta V \sim 3$ FPS

3 MARKS ON EACH STAR

INCORPORATE P23 MARK DATA AND UPDATE ONBOARD STATE VECTOR

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	06:00 - 07:00	1/TLC	3-7

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	07:00 - 08:00	1/TLC	3-8

MCC-H

2113 CST

FLIGHT PLAN

NOTES

08:00

:10

:20

08:30

:40

:50

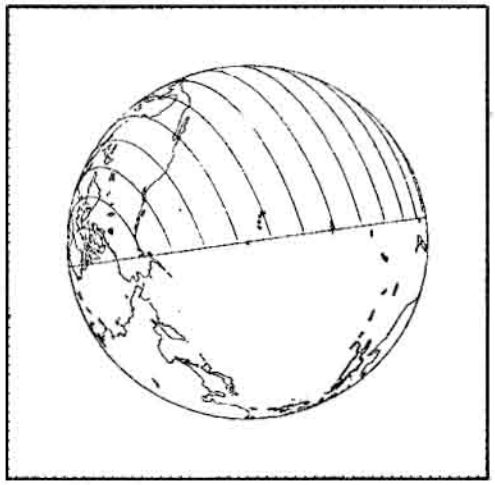
09:00

MSFN

DEACTIVATE PRIMARY EVAPORATOR
GLY EVAP H2O FLOW - OFF (CTR)
GLY EVAP STM PRESS AUTO - MAN
GLY EVAP STM PRESS INCR - INCR FOR 1 MIN

SELECT NORMAL LUNAR COMM EXCEPT:
S-BD AUX TAPE - OFF
TAPE RCDR FWD - OFF

GET 10 HRS F.O.V. 10°



LiOH CANISTER CHANGE
(3 INTO A, STOW 1 IN B5)

EARTH
WEATHER
PHOTOGRAPHY

PTC
P 90 Y 0

S-IVB MCC-2 APPROX
09:00 GET, ΔV IS
NOMINALLY ZERO

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	08:00 - 09:00	1/TLC	3-9

MCC-H

2213 CST

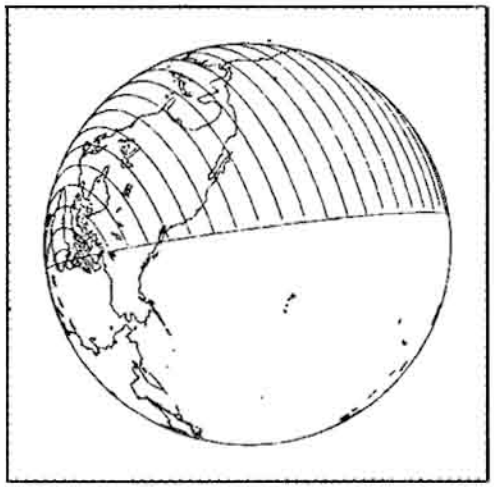
FLIGHT PLAN

NOTES

09:00
:10
:20
09:30
:40
:50
10:00

MSFN

GET [redacted] HRS F.O.V. 1[redacted]°

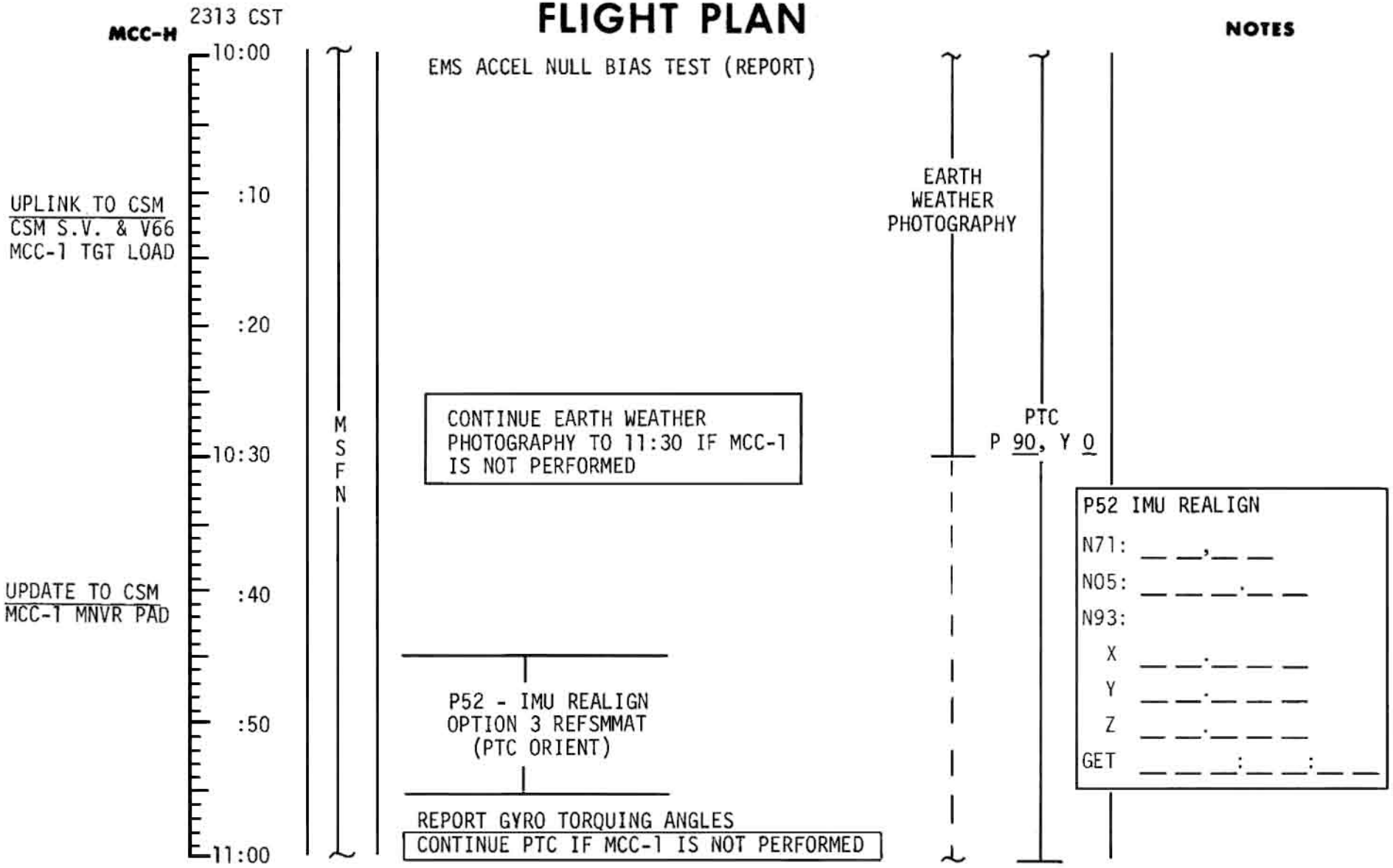


EARTH
WEATHER
PHOTOGRAPHY

PTC
P 90 Y 0

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	09:00 - 10:00	1/TLC	3-10

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	10:00 - 11:00	1/TLC	3-11

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FLIGHT PLAN

MCC-1
BURN TABLE

P OR Y RATES	ATT DEVIATION	SHUTDOWN TIME	RESIDUALS
10°/SEC TAKEOVER	±10° TAKEOVER	BT + 1 SEC	IF<2FPS, TRIM X $\bar{A}$XIS TO 0.2FPS IF>2FPS, NO TRIM

TABLE 3-2
3-11A

MCC-H

0013 CST

FLIGHT PLAN

11:00

:10

:20

11:30

:40

:50

12:00

MSFN

P30 - EXTERNAL ΔV

EARTH WEATHER PHOTOGRAPHY

V49 - MNVR TO BURN ATT
P40/41 - SPS/RCS THRUST
SXT STAR CHECK

O_2 FUEL CELL PURGE
WASTE WATER DUMP
} IF NOT PERFORMED AT 06:55

GDC ALIGN

MCC-1

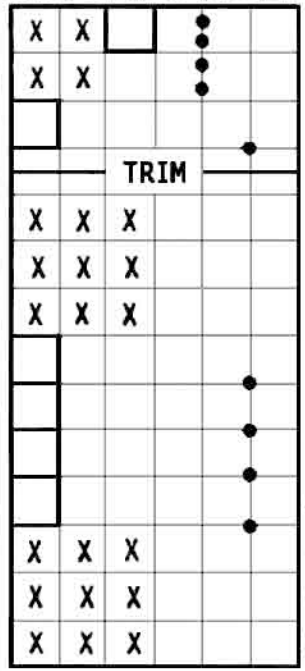
TIG: 11:41:25
BT: NOM. ZERO
ΔVR: NOM ZERO
ULLAGE: NONE
ORBIT: N/A

V66 - TRANSFER CSM SV TO LM SLOT
MCC-1 BURN STATUS REPORT

REPORT: LM/CM ΔP
WASTE STOWAGE VENT VLV - CLOSE (Δ8HRS FROM VENT)
VENT BATTS UNTIL SYSTEM TEST METER (4A) = 0

NOTES

BURN STATUS REPORT



*ITEMS TO BE REPORTED TO MSFN

MCC-1 WILL BE DELAYED TO MCC-2 IF PROPELLANT COST IS NOT PROHIBITIVE

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	11:00 - 12:00	1/TLC	3-12

FLIGHT PLAN

0113 CST

MCC-H

12:00

UPDATE TO CSM QUADS TO DISABLE FOR PTC (LOWEST QUANTITY PRPLNT)

:10

:20

12:30

UPDATE TO CSM P37 PADS (L/O + 25, 35, 45 & 60)

:40

:50

13:00

MSFN

MNVR TO PTC ATT P 90 Y 0

START PTC

EAT PERIOD

PRESLEEP CHECKLIST

PTC P 90, Y 0

NOTES

ONBOARD READOUT

BAT C _____

PYRO BAT A _____

PYRO BAT B _____

RCS A _____

B _____

C _____

D _____

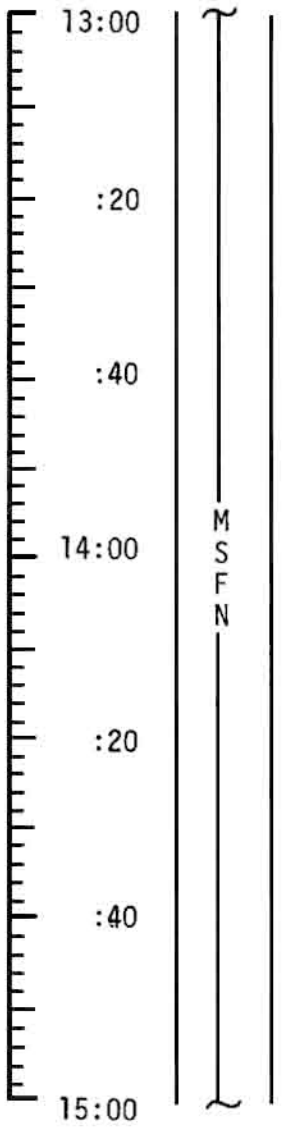
DC IND SEL - MNA OR B

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	12:00 - 13:00	1/TLC	3-13

MCC-H

0213 CST

FLIGHT PLAN



REST PERIOD
(10 HOURS)

PTC
P 90 Y 0

NOTES

DURING REST PERIOD TWO CREWMEN IN REST STATIONS AND ONE IN COUCH

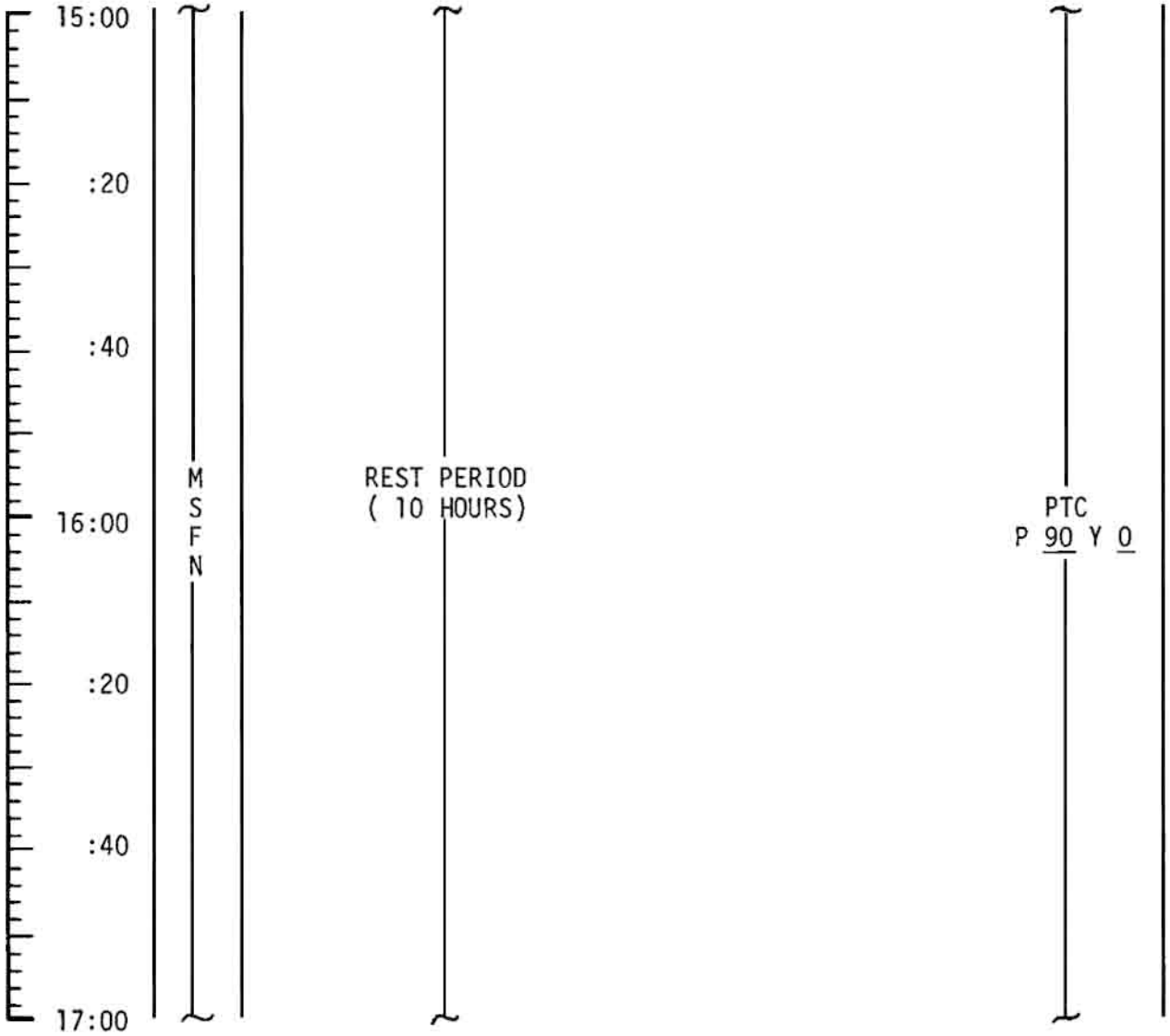
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	13:00 - 15:00	1/TLC	3-14

MCC-H

0413 CST

FLIGHT PLAN

NOTES

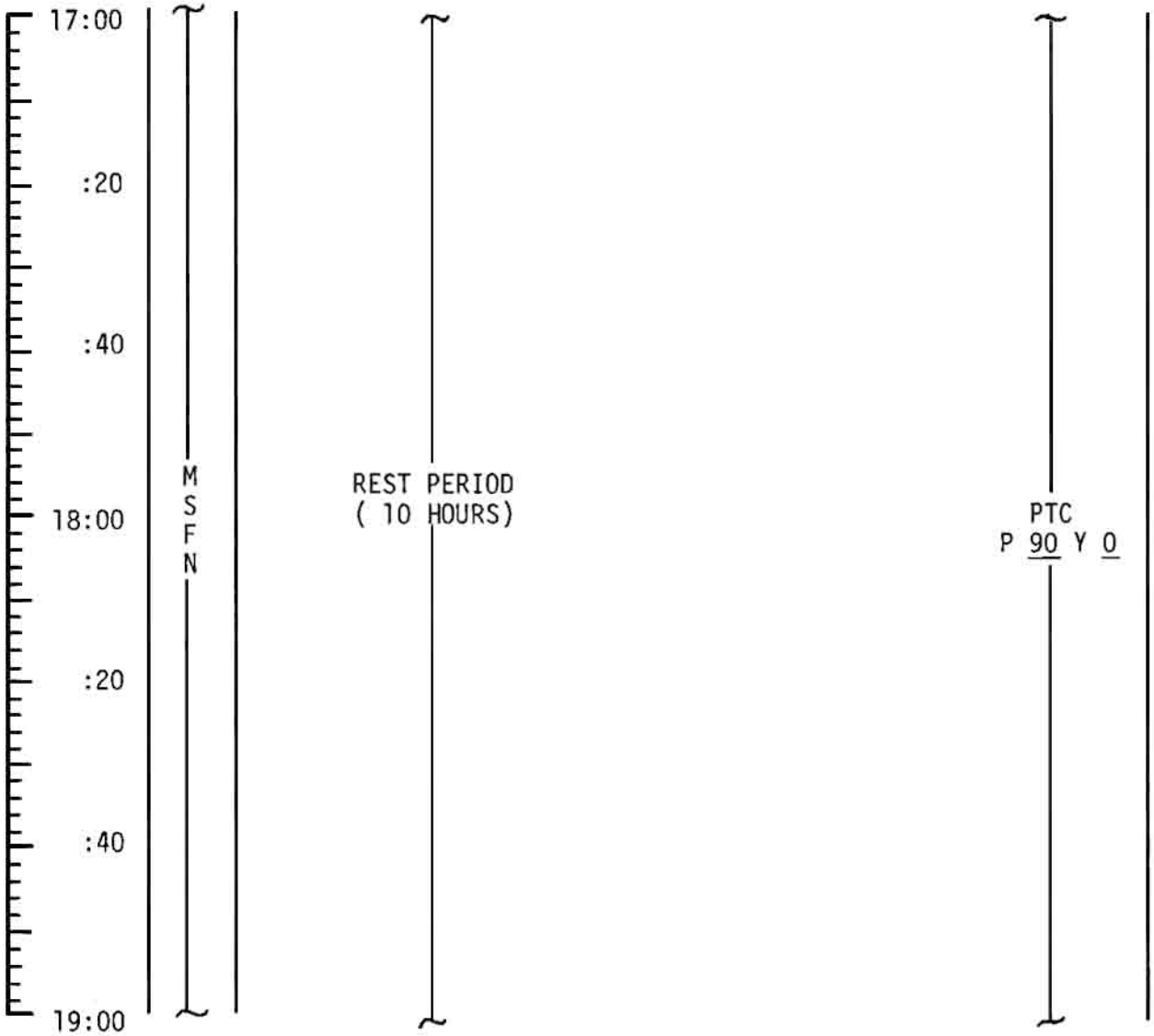


MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	15:00 - 17:00	1/TLC	3-15

MCC-H

FLIGHT PLAN

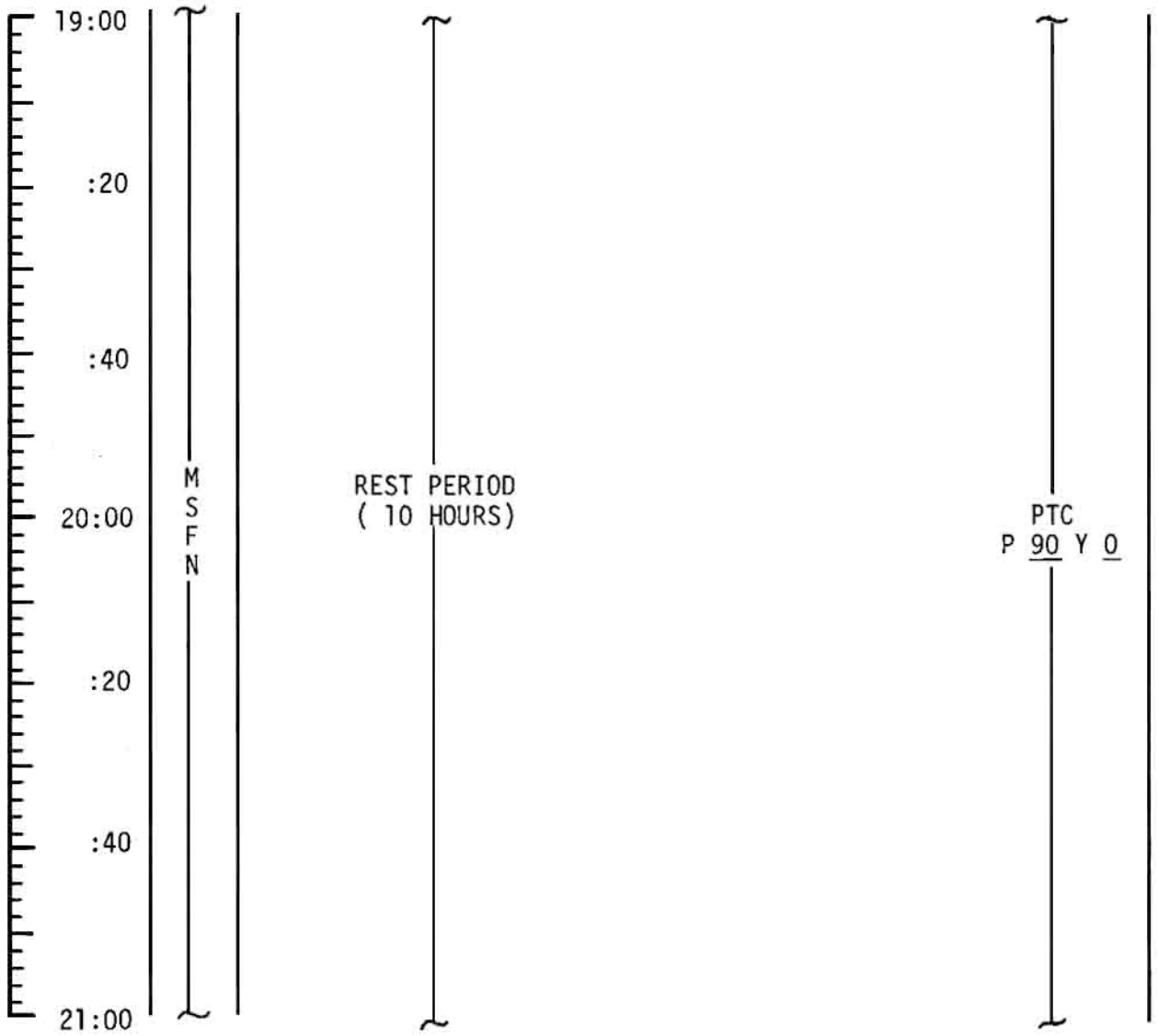
NOTES



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	17:00 - 19:00	1/TLC	3-16

FLIGHT PLAN

MCC-H



NOTES

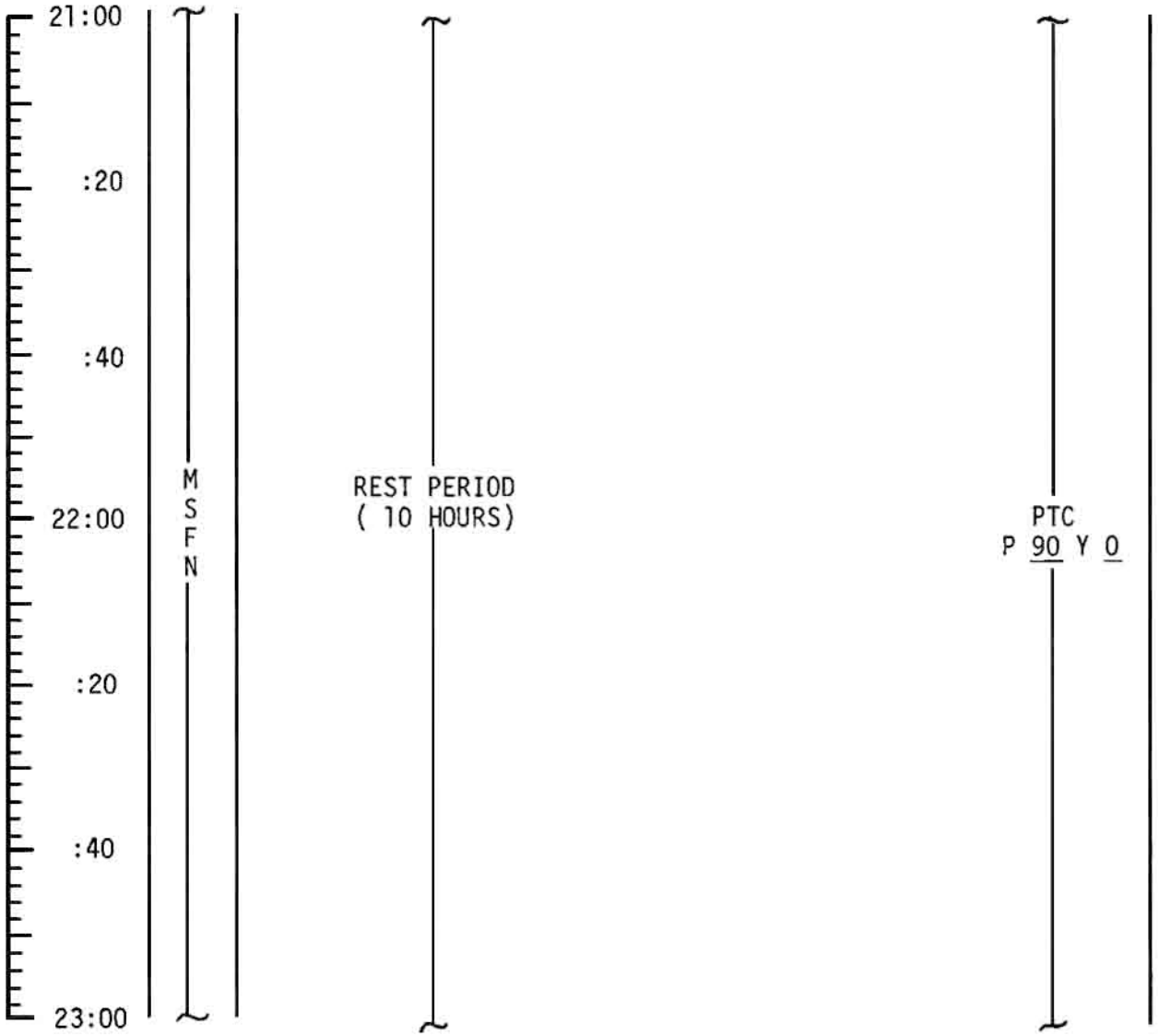
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	19:00 - 21:00	1/TLC	3-17

MCC-H

1013 CST

FLIGHT PLAN

NOTES



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	21:00 -23:00	1/TLC	3-18

FLIGHT PLAN

1213 CST

MCC-H

UPDATE TO CSM CONSUMABLES FLIGHT PLAN

23:00

:10

:20

23:30

:40

:50

24:00

MSFN

POSTSLEEP CHECKLIST

LIOH CANISTER CHANGE
(4 INTO B, STOW 2 IN B5)

BATTERY CHARGE, BATTERY A

EAT PERIOD

REPORT LM/CM ΔP

PTC

P 90, Y 0

NOTES

CSM CONSUMABLES UPDATE

GET: __ __ __:__ __

RCS TOTAL _____

QUAD A _____ B _____

C _____ D _____

H_2 TOTAL _____

O_2 TOTAL _____

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	23:00 - 24:00	2/TLC	3-19

MCC-H

1313 CST

FLIGHT PLAN

24:00

:10

:20

24:30

:40

:50

25:00

MSFN

P52 IMU REALIGN
OPTION 3 REFSMMAT
(PTC ORIENT)

REPORT GYRO TORQUING ANGLES

GDC ALIGN

GET 25 HRS F.O.V. 5°

PTC
P 90 Y 0

NOTES

P52 IMU REALIGN

N71: __ __,__ __

N05: __ __ __.__ __

N93:

X __ __.__ __ __

Y __ __.__ __ __

Z __ __.__ __ __

GET __ __ __:__ __:__ __

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	24:00 - 25:00	2/TLC	3-20

FLIGHT PLAN

MCC-H

1413 CST

NOTES

LAUNCH VEHICLE DEBRIEFING

25:00

:10

:20

25:30

:40

:50

26:00

MSFN

LAUNCH VEHICLE SYSTEMS PERFORMANCE DEBRIEFING

1. Were there any significant changes in noise level between stages of powered flight?
2. Were there any significant changes in noise/vibration level during a single stage of powered flight?
3. Were there any unexpected acceleration transients experienced at initiation of IGN, SII CECO, MAX Q or M/R shift for both SII and S-IVB?
4. After SC separation, describe the conditions of the IU thermal shroud. Was there any looseness?
5. How was ground/SC comm at ignition/liftoff time region relative to vibration and acoustic environments?
6. Describe any visible venting or suspected leak after separation.
7. When, and at what distance, was the S-IVB seen for the last time?
8. Are there any comments relative to S-IVB/IU TLI guidance cutoff conditions (predicted vs actual SC display)?

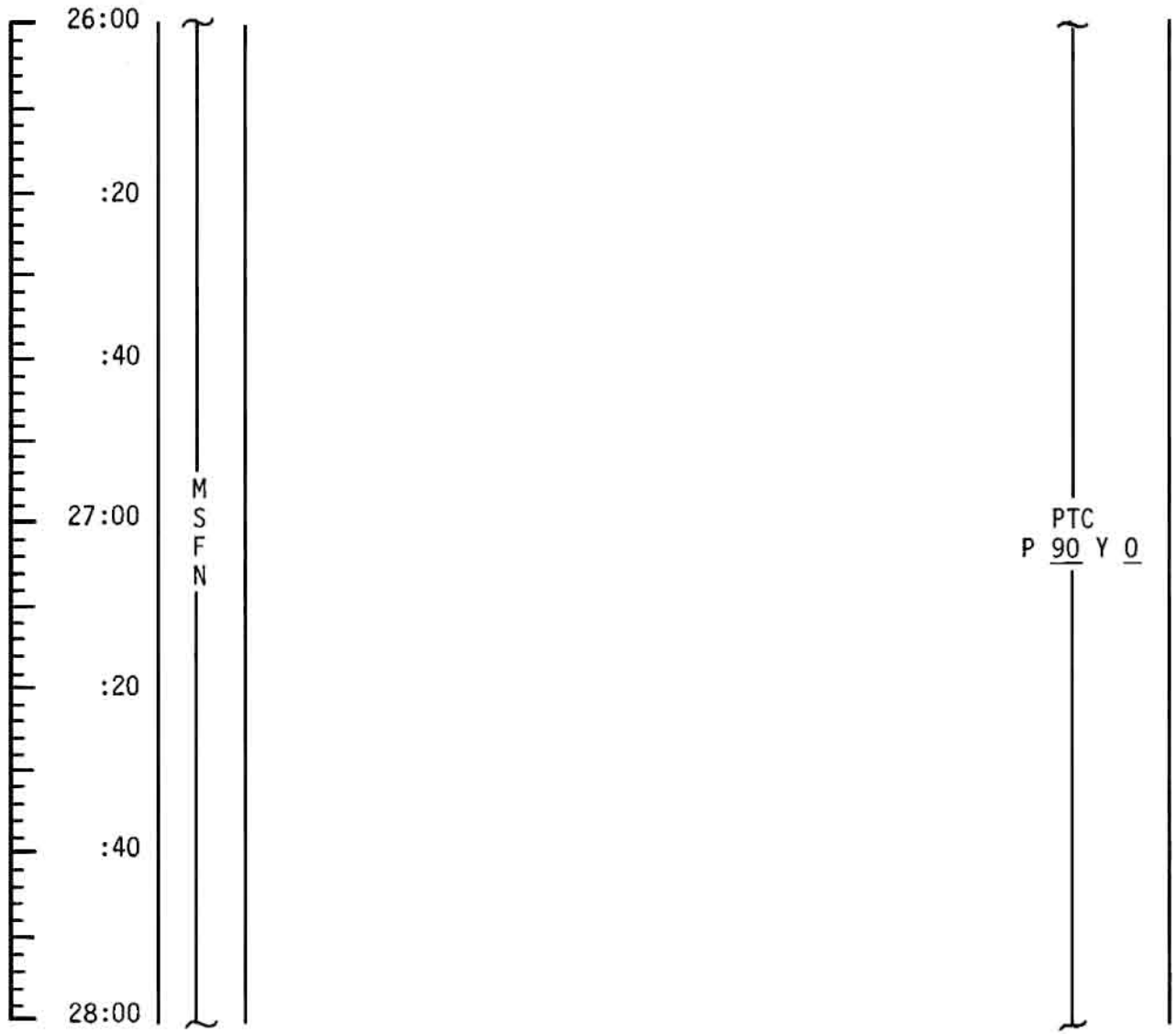
PTC
90 Y 0

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	25:00 - 26:00	2/TLC	3-21

MCC-H

FLIGHT PLAN

NOTES



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	26:00 - 28:00	2/TLC	3-22

FLIGHT PLAN

MCC-H

1713 CST

28:00

:20

:40

29:00

:20

:40

30:00

UPLINK TO CSM
CSM S.V. & V66
MCC-2 TGT LOAD

UPDATE TO CSM
GO/NO-GO MCC-2
MCC-2 MNVR PAD

MSFN

EAT PERIOD

P52 - IMU REALIGN
OPTION 3 - REFSMMAT
(PTC ORIENT)

REPORT GYRO TORQUING ANGLES
STOP PTC
EMS ACCEL NULL BIAS TEST (REPORT)
H_2 PURGE LINE HTRS ON
P30 EXTERNAL ΔV

V49 - MNVR TO BURN ATT

PTC
P90, Y 0

R____ HGA
P____ P____
Y____ Y____

NOTES

P52 IMU REALIGN

N71: __ __,__ __
N05: __ __ __.__ __
N93:
X __ __.__ __ __
Y __ __.__ __ __
Z __ __.__ __ __
GET __ __ __:__ __:__ __

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	28:00 - 30:00	2/TLC	3-23

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MCC-2
BURN TABLE

P OR Y RATES	ATT DEVIATION	SHUTDOWN TIME	RESIDUALS
10°/SEC TAKEOVER	±10° TAKEOVER	BT + 1 SEC	IF<2FPS, TRIM X $\bar{A}$XIS TO 0.2FPS IF>2FPS. NO TRIM

TABLE 3-3
3-23 A

FLIGHT PLAN

MCC-H

1913 CST

30:00

:10

:20

30:30

:40

:50

31:00

TV

MSFN

TLI CUTOFF
+ 28 HRS

P40 - SPS THRUST
SXT STAR CHECK

TV (GDS) 30:15 TO 30:45
CM4/TV-AVG (f5.6)

H_2 & O_2 FUEL CELL PURGE
WASTE WATER DUMP
H_2 PURGE LINE HEATERS - OFF

NOTE: MCC-2 WILL BE ACCOMPLISHED ON BANK A ONLY

GDC ALIGN

MCC-2

V66 - TRANSFER CSM SV TO LM SLOT
MCC-2 BURN STATUS REPORT

TIG: 30:40:49
BT: 2.2 SEC
ΔVR: 15.1 FPS
ULLAGE: - NONE
ORBIT: N/A

NOTES

BURN STATUS REPORT

X	X		●			ΔTIG
X	X		●			BT
					●	V_{gx}
		TRIM				
X	X	X				R
X	X	X				P
X	X	X				Y
					●	V_{gx}
					●	V_{gy}
					●	V_{gz}
					●	ΔV_c *
X	X	X				FUEL *
X	X	X				OX *
X	X	X				UNBAL

*ITEMS TO BE REPORTED TO MSFN

ATTITUDE FOR MCC-2 BURN IS CONSTRAINED IN ROLL FOR HGA ACQUISITION FOR TV AND BY SXT STAR CHECK

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	30:00 - 31:00	2/TLC	3-24

MCC-H

2013 CST

FLIGHT PLAN

31:00
:10
:20
31:30
:40
:50
32:00

MSFN

OMNI-B

MNVR TO OPTICS CALIBRATION ATT R 147
P 340
P23-CISLUNAR NAVIGATION Y 0
OPTICS CALIBRATION
STAR 4 0
P00

V49 - MNVR TO SIGHTING ATT R 136
STAR/EARTH HORIZON P 307
P23 - CISLUNAR NAVIGATION Y 0
LOAD W MATRIX (R1 + 4 5 0 0 0) (R2 + 0 0 0 0 6)

1. STAR 37 EFH (R3 00120) NUNKI

2. STAR 221 ENH (R3 00110) DELTA CAPRICORNI
N88: (R1 [redacted])(R2 [redacted] 48220)(R3 [redacted] 24881)

3. STAR [redacted] EFH (R3 00120) [redacted] DELTA SAGITTAR II

4. STAR [redacted] ENH (R3 00110) [redacted] ENIF

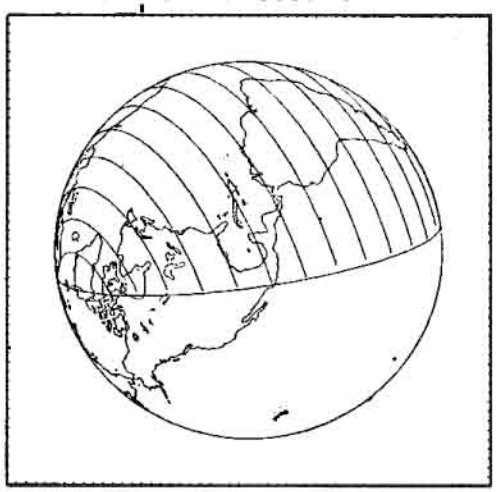
5. STAR 77 EFH (R3 00120) KAUS AUST
N88: (R1 +03986)(R2 -41062)(R3 -28249)

NOTES

3 MARKS EACH STAR

INCORPORATE P23 MARK DATA AND UPDATE ONBOARD STATE VECTOR

GET 30 HRS F.O.V. 4°



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	31:00 - 32:00	2/TLC	3-25

FLIGHT PLAN

MCC-H

2113 CST

UPDATE TO CSM
QUADS TO DISABLE
FOR PTC (LOWEST
QUANTITY PRPLNT)

32:00

:10

:20

32:30

:40

:50

33:00

M
S
F
N

MANEUVER TO PTC ATTITUDE P 90
START PTC Y 0

S-BAND ANT - OMNI B ON MCC CUE

SECURE HGA
HGA TRACK - MAN
HGA PITCH -52°
HGA YAW 270°

CHECK BAT VENT (TEST METER 4A)

PTC
P 90 Y 0

NOTES

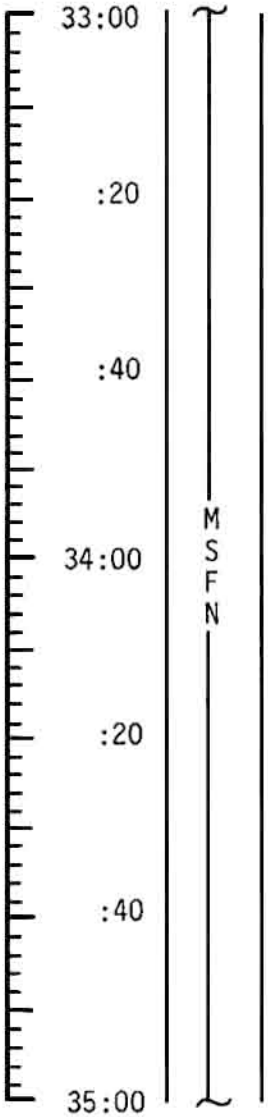
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	32:00 - 33:00	2/TLC	3-26

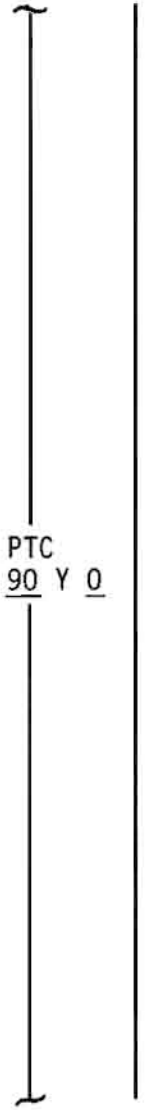
MCC-H

2213 CST

FLIGHT PLAN

NOTES





LOI MINUS 5 HR FLYBY IS A CIRCUMLUNAR TRAJECTORY TO THE PRI MPL AND WITH A PERILUNE BETWEEN 60 AND 1500 NM.

UPDATE TO CSM
LOI MINUS 5 HR
FLYBY

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	33:00 - 35:00	2/TLC	3-27

MCC-H

0013 CST

FLIGHT PLAN

NOTES

35:00

:20

:40

36:00

:20

:40

37:00

M S F N

LiOH CANISTER CHANGE
(5 INTO A, STOW 3 IN B5)

REPORT LM/CM ΔP

EAT PERIOD

PRESLEEP CHECKLIST

PTC
P 90 Y 0

ONBOARD READOUT	
BAT C	
PYRO BAT A	
PYRO BAT B	
RCS A	
B	
C	
D	
DC IND SEL - MNA OR B	

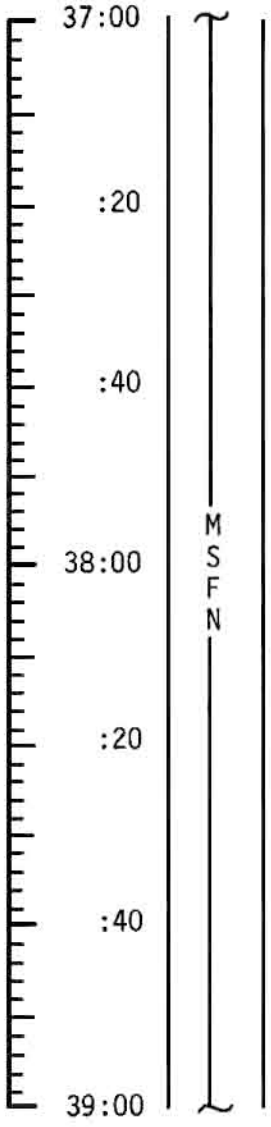
UPLINK TO CSM
CSM S.V. & V66

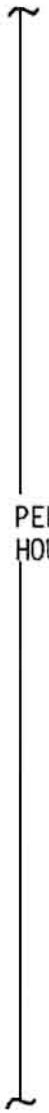
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	35:00 - 37:00	2/TLC	3-28

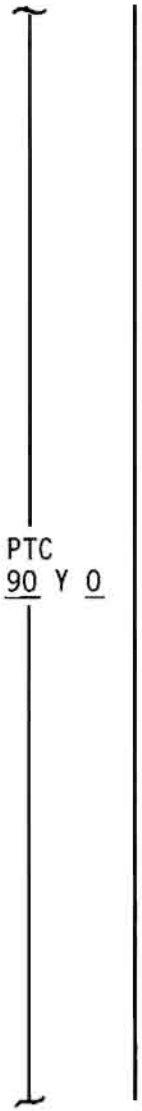
MCC-H

0213 CST

FLIGHT PLAN







NOTES

DURING REST PERIOD TWO CREWMEN IN REST STATIONS AND ONE IN COUCH

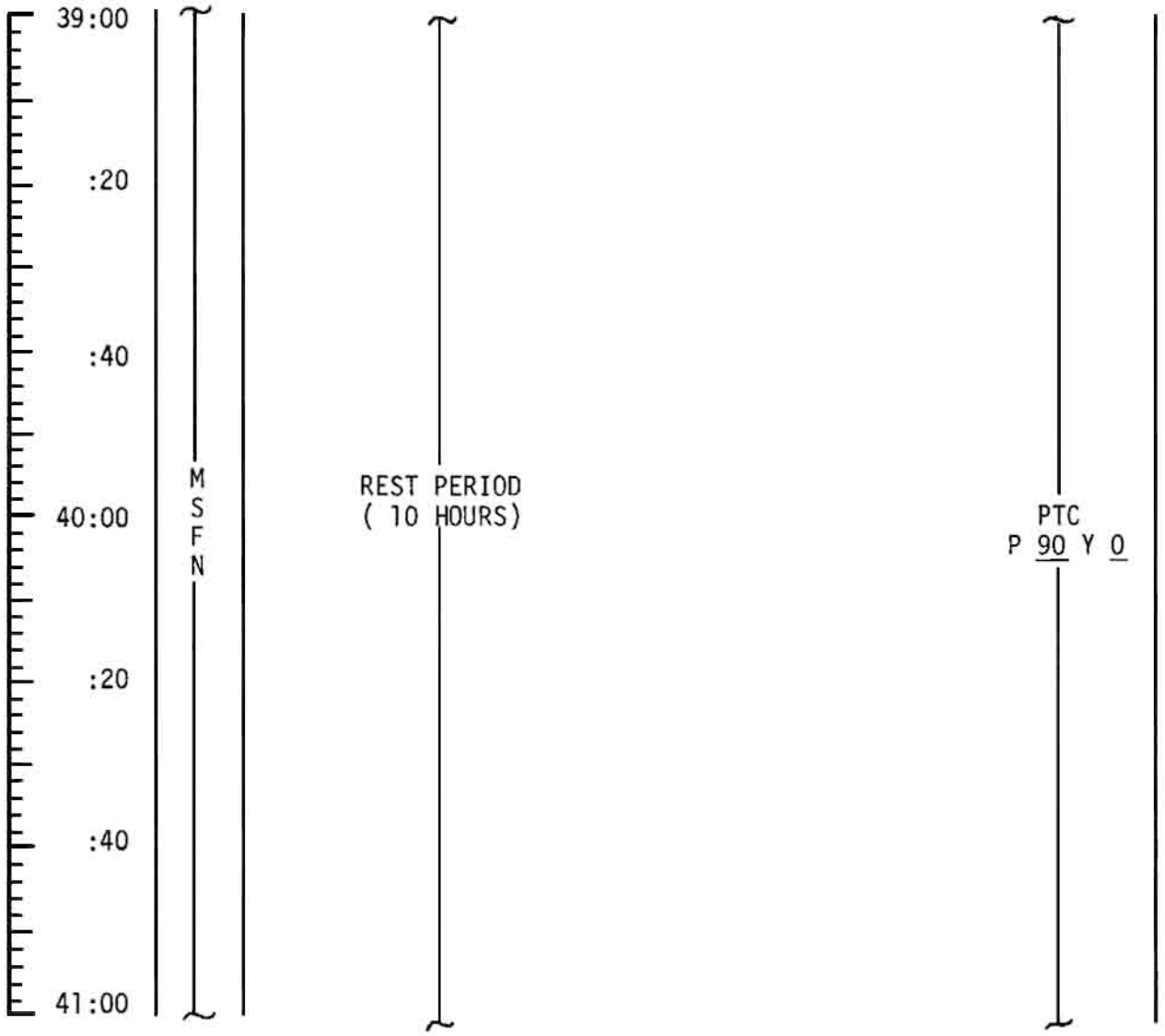
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	37:00 - 39:00	2/TLC	3-29

MCC-H

0413 CST

FLIGHT PLAN

NOTES

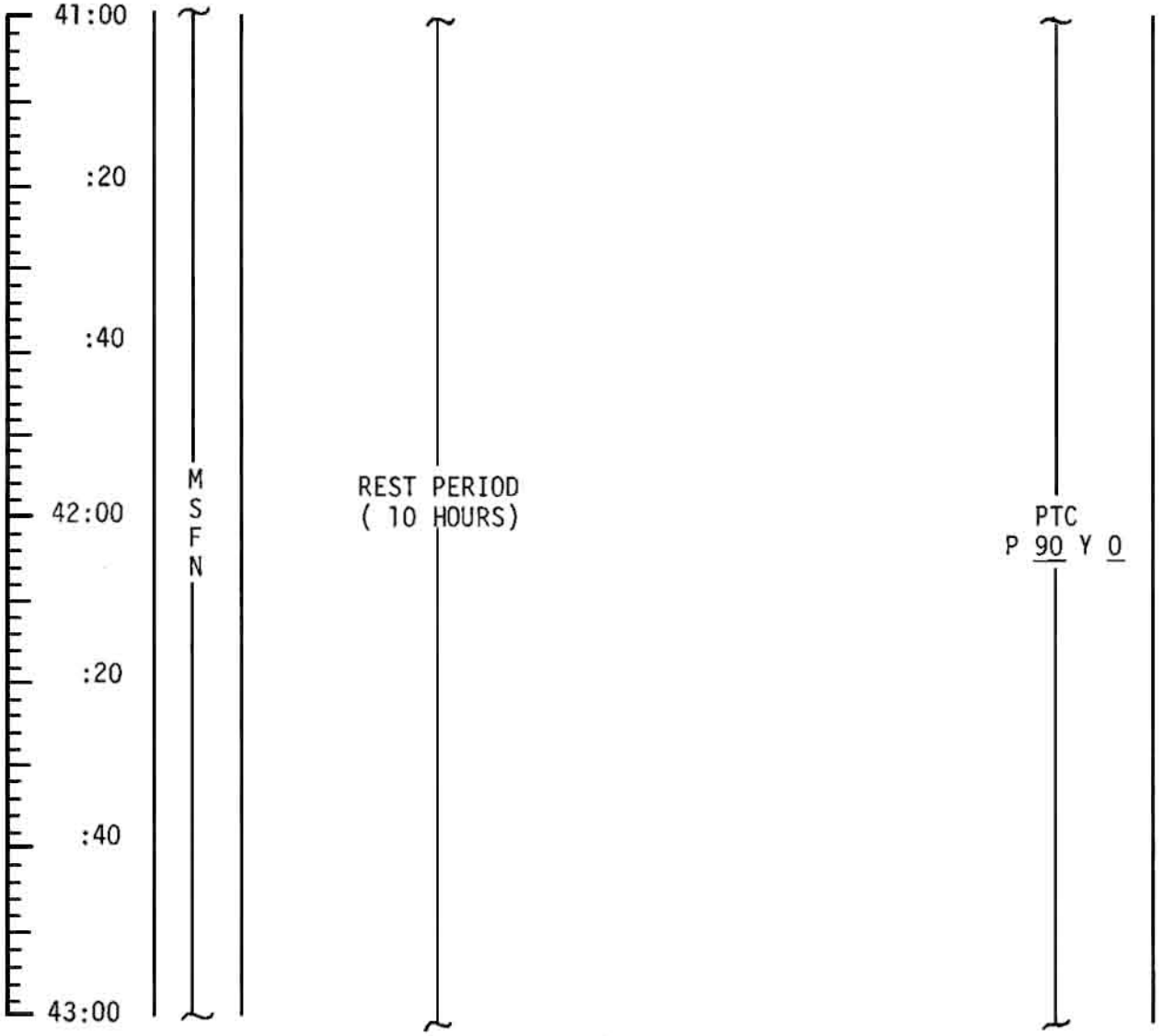


MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	39:00 - 41:00	2/TLC	3-30

MCC-H

FLIGHT PLAN

NOTES



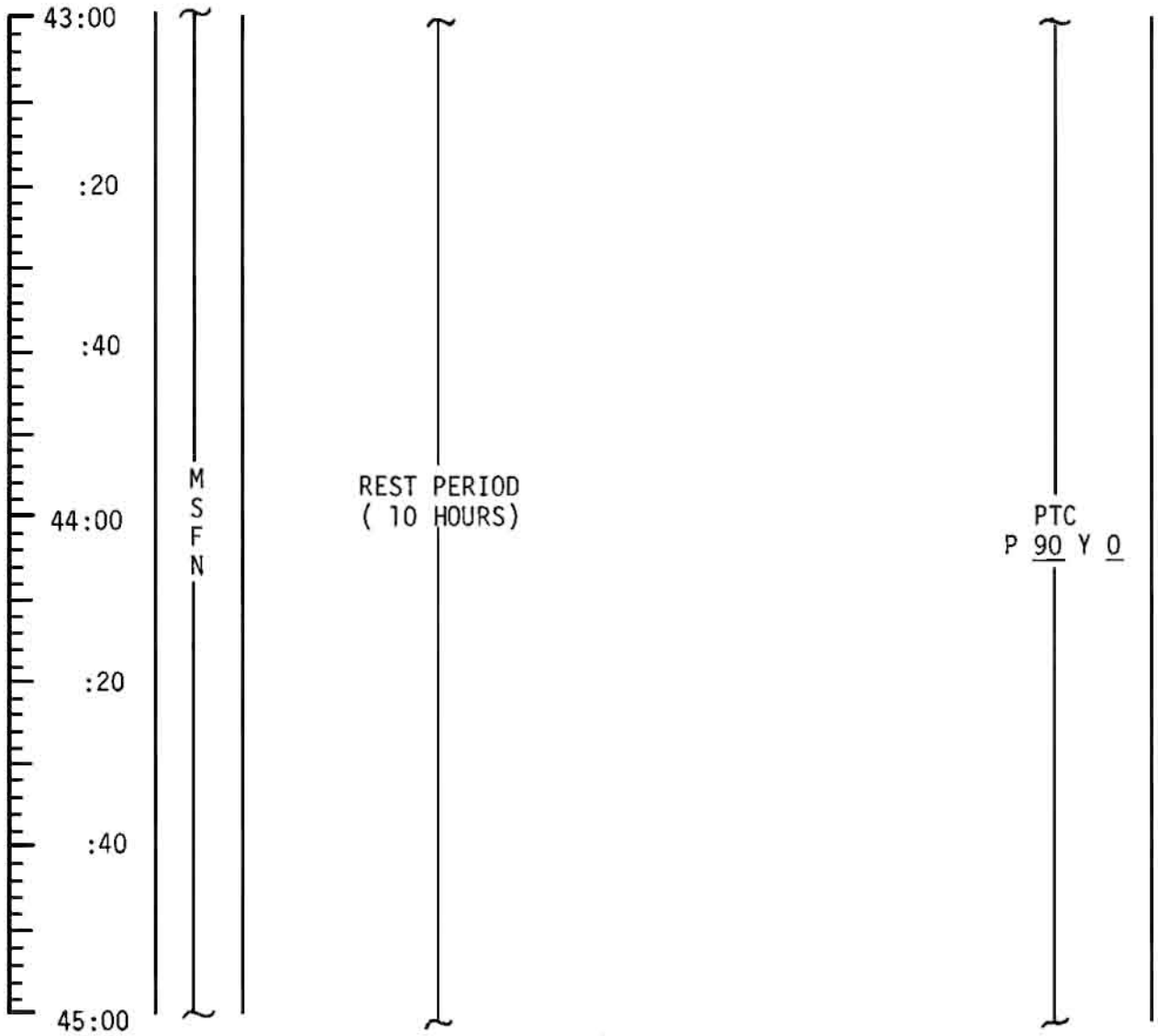
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	41:00 - 43:00	2/TLC	3-31

MCC-H

0813 CST

FLIGHT PLAN

NOTES



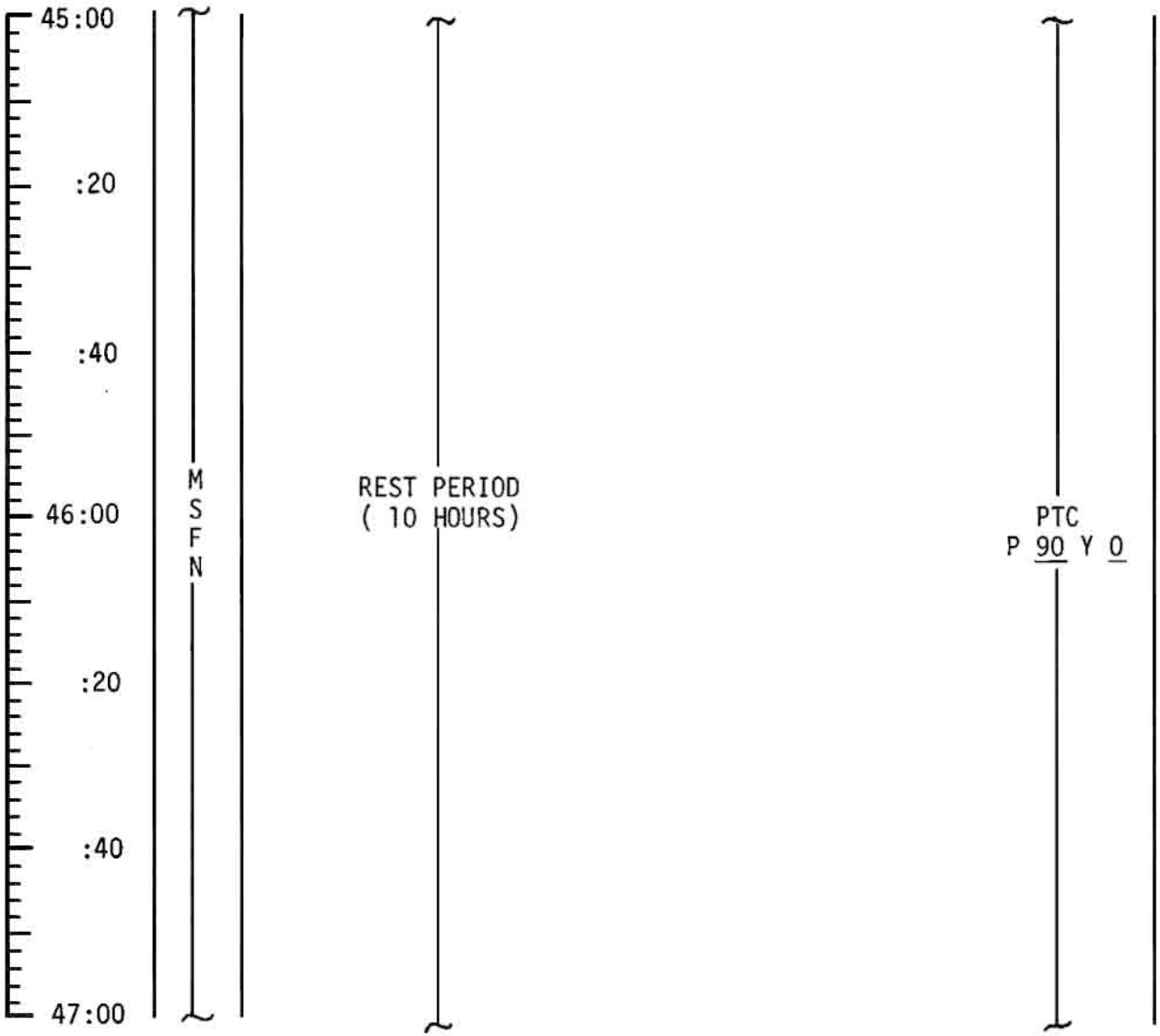
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	43:00 - 45:00	2/TLC	3-32

MCC-H

1013 CST

FLIGHT PLAN

NOTES



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	45:00 - 47:00	2/TLC	3-33

FLIGHT PLAN

MCC-H

1213 CST

NOTES

UPDATE TO CSM CONSUMABLES FLIGHT PLAN

47:00

:20

:40

48:00

:20

:40

49:00

MSFN

POST SLEEP CHECKLIST

EAT PERIOD

LiOH CANISTER CHANGE
(6 INTO B, STOW 4 IN B5)

REPORT LM/CM ΔP

CSM CONSUMABLES UPDATE
GET: __ __ __:__ __
RCS TOTAL _____
QUAD A _____ B _____
C _____ D _____
H_2 TOTAL _____
O_2 TOTAL _____

PTC
P 90 Y 0

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	47:00 - 49:00	3/TLC	3-34

MCC-H

1413 CST

FLIGHT PLAN

NOTES

49:00

:20

:40

50:00

:20

:40

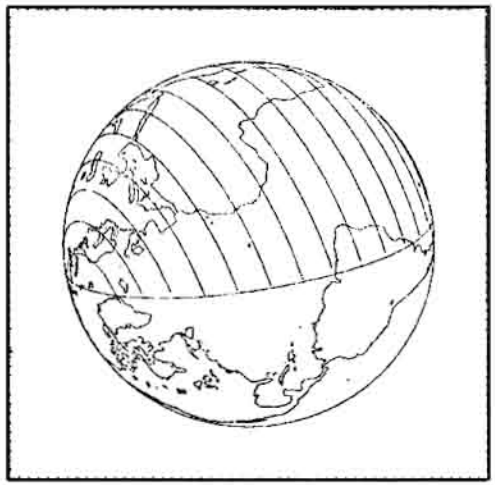
51:00

MSFN

P52 - IMU REALIGN
OPTION 3 - REFSMMAT
(PTC ORIENT)

REPORT GYRO TORQUING ANGLES

GET 50 HRS F.O.V. 3°



PTC
P 90 Y 0

P52 IMU REALIGN

N71: __ __,__ __

N05: __ __ __.__ __

N93:

X __ __.__ __ __

Y __ __.__ __ __

Z __ __.__ __ __

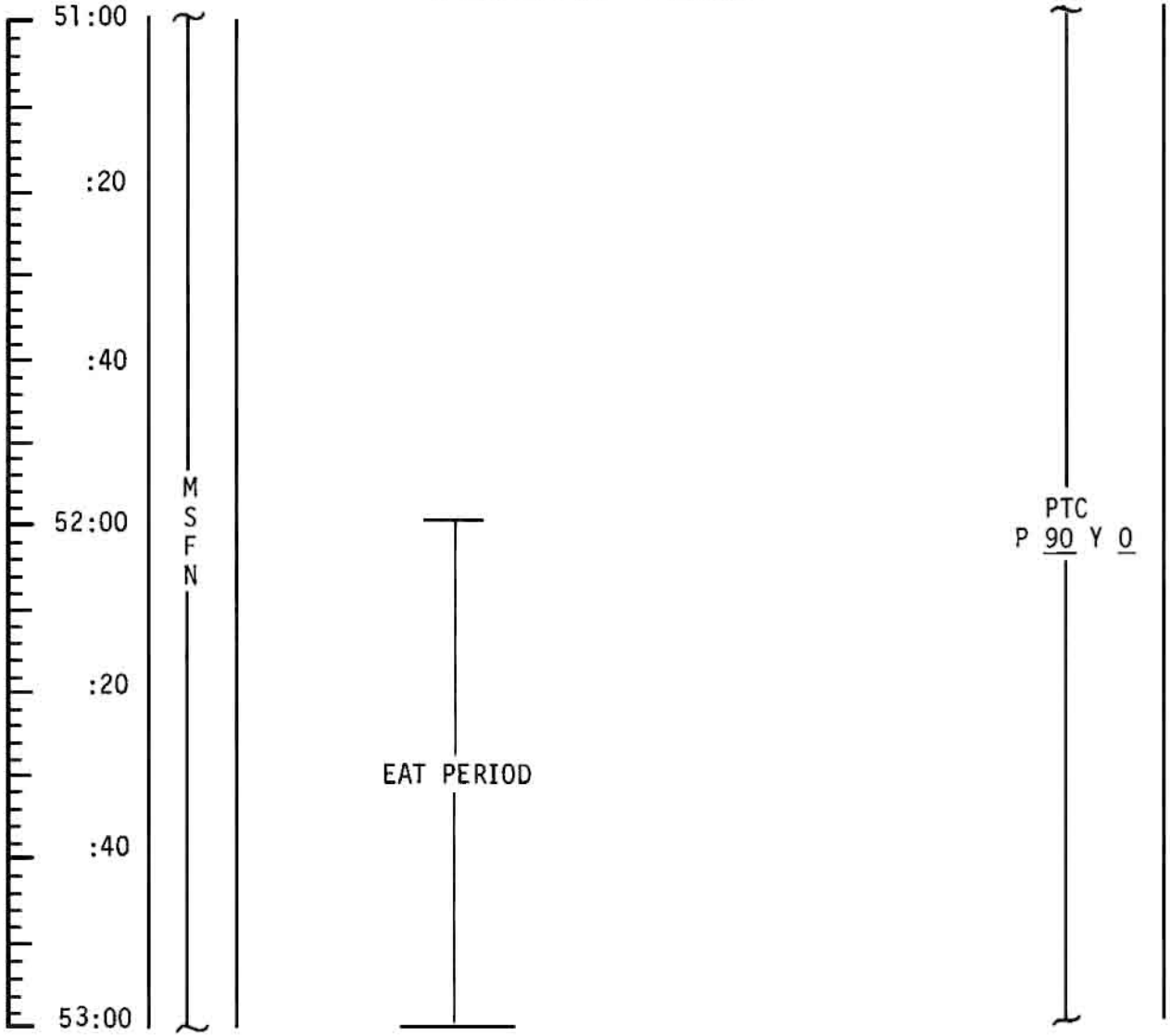
GET __ __ __:__ __:__ __

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	49:00 - 51:00	3/TLC	3-35

MCC-H

FLIGHT PLAN

NOTES



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	51:00 - 53:00	3/TLC	3-36

FLIGHT PLAN

MCC-H

1813 CST

53:00

:20

:40

54:00

:20

:40

55:00

M S F N

UPLINK TO CSM

CSM S. V. & V66
MCC-3 TGT LOAD

UPDATE TO CSM

GO/NO-GO MCC-3
MCC-3 MNVR PAD

P52 IMU REALIGN
OPTION 3 REFSMMAT
(PTC ORIENT)

CONTINUE PTC IF MCC-3 IS NOT PERFORMED
REPORT GYRO TORQUING ANGLES

P30 - EXTERNAL ΔV

PTC
P 90 Y 0

NOTES

FUEL CELL PURGE AND
WASTE WATER DUMP
SCHEDULED AT 55:08
WILL BE DELAYED
TO 57:50 IF MCC-3
IS NOT PERFORMED

P52 IMU REALIGN
N71: __ __,__ __
N05: __ __ __.__ __
N93:
X __ __.__ __ __
Y __ __.__ __ __
Z __ __.__ __ __
GET __ __ __:__ __:__ __

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	53:00 - 55:00	3/TLC	3-37

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MCC-3
BURN TABLE

P OR Y RATES	ATT DEVIATION	SHUTDOWN TIME	RESIDUALS
10°/SEC TAKEOVER	±10° TAKEOVER	BT + 1 SEC	IF<2FPS, TRIM X $\bar{A}$XIS TO 0.2FPS IF>2FPS, NO TRIM

TABLE 3-4

MCC-H

FLIGHT PLAN

2013 CST

55:00

:10

:20

(LOI - 22 HRS)

55:30

UPDATE TO CSM
QUADS TO DISABLE
FOR PTC (LOWEST)
QUANTITY PRPLNT)

:40

:50

56:00

MSFN

V49 - MNVR TO BURN ATT
P40/41 - SPS/RCS THRUST
SXT STAR CHECK
O_2 FUEL CELL PURGE
WASTE WATER DUMP

GDC ALIGN

MCC-3

V66 - TRANSFER CSM SV TO LM SLOT
MCC-3 BURN STATUS REPORT

BATTERY CHARGE, BATTERY B

START PTC

LM TUNL VENT VALVE - LM/CM ΔP
IF LM/CM ΔP <1.7 psid - VENT
UNTIL ΔP≥1.7

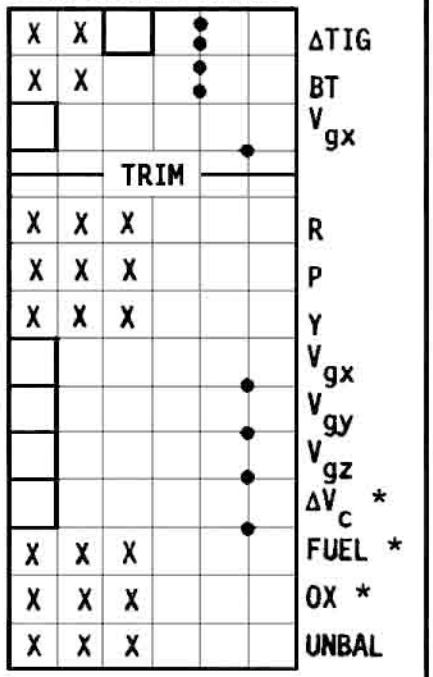
TIG: 55:24:53
BT: NOM. ZERO
ΔVR: NOM ZERO
ULLAGE: NONE
ORBIT: N/A

PTC
P 90, Y 0

NOTES

MCC-3 WILL BE DELAYED TO MCC-4 IF PROPELLANT COST IS NOT PROHIBITIVE

BURN STATUS REPORT

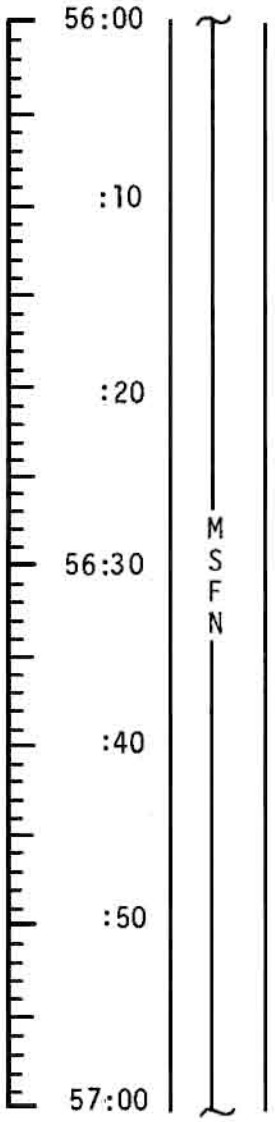


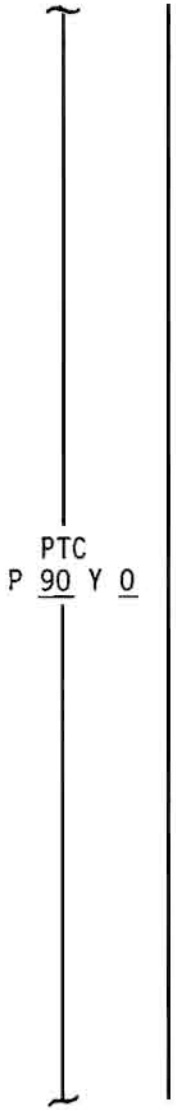
*ITEMS TO BE REPORTED TO MSFN

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	55:00 - 56:00	3/TLC	3-38

MCC-H

FLIGHT PLAN





NOTES

LUNAR PHOTOGRAPHY
AT CREW OPTION
CM /EL/80 or 250/BW
RING(f5.6.250.-)10
MAG P
CM /EL/80 or 250/CEX-
RING (f5.6.250.-)10
MAG L

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16. 1970	56:00 - 57:00	3/TLC	3-39

FLIGHT PLAN

MCC-H

2213 CST

UPLINK TO CSM
ΔH (IF REQUIRED)

57:00

:10

:20

57:30

:40

:50

58:00

M
S
F
N

PRESSURIZE CSM TO 5.7 PSIA
PRESSURIZE LM

T EPHEM: V05N01 1706E
COPY IN LM ACTIVATION CHECKLIST (ACT 33)

CLEAR TUNNEL OF
CM HATCH
INSPECT TUNNEL &
DOCKING LATCHES
REMOVE PROBE & DROGUE

TV (GDS) 58:00 TO 58:30
CM__/TV-AVG (f5.6)

LOAD DAP. N46 (21111, 11111)

STOP PTC ROLL AT ____.

HGA P___ Y___

PTC
P 90 Y 0

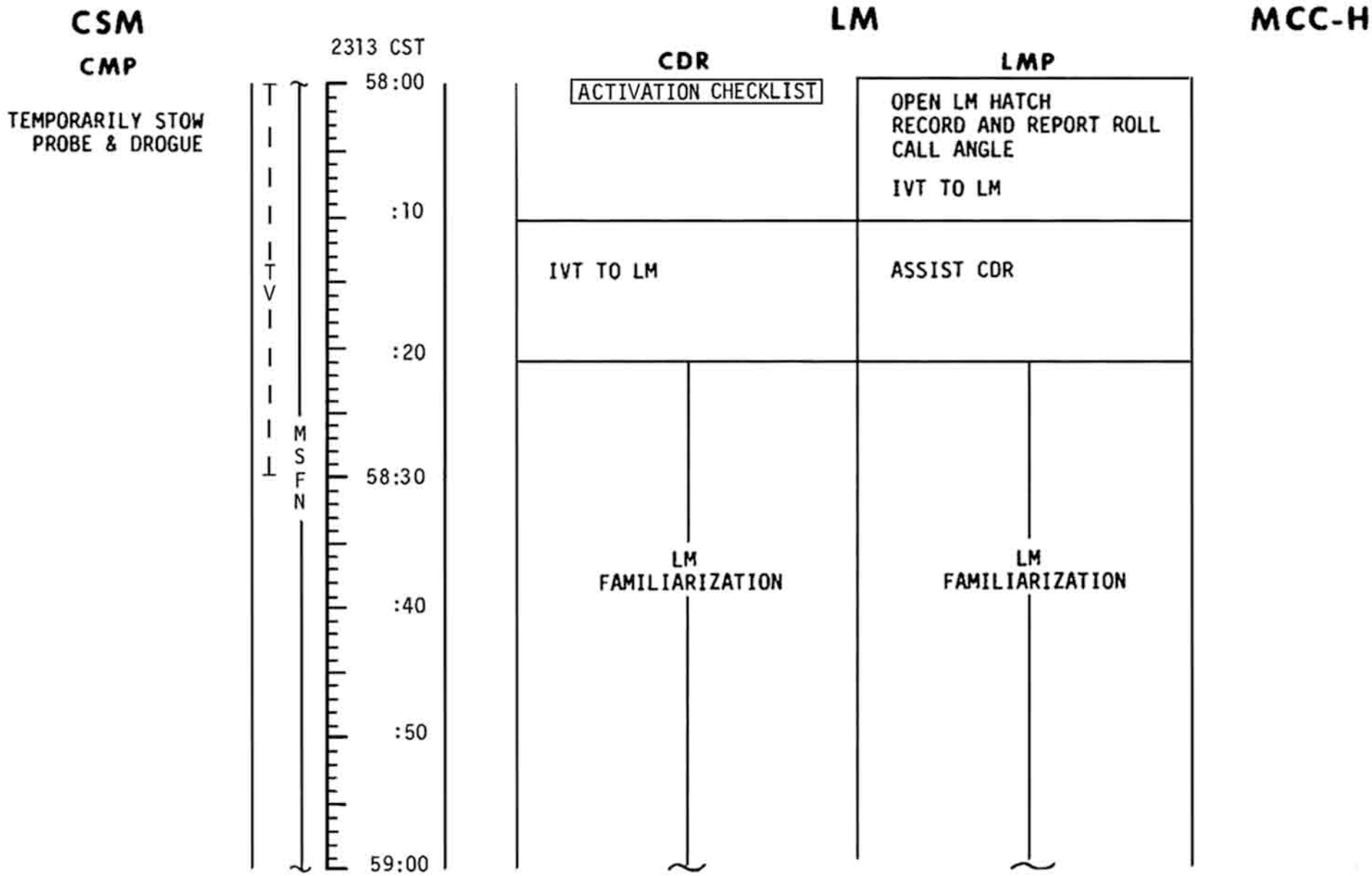
NOTES

ΔH DETERMINED
FROM STAR/EARTH
HORIZON SIGHTINGS
WILL BE UPLINKED
IF IT DIFFERS FROM
ΔH IN E-MEMORY
BY MORE THAN 5.0 KM

O2 FUEL CELL PURGE
& WASTE WATER DUMP
@ 57:50 IF NOT
PERFORMED AT 55:08

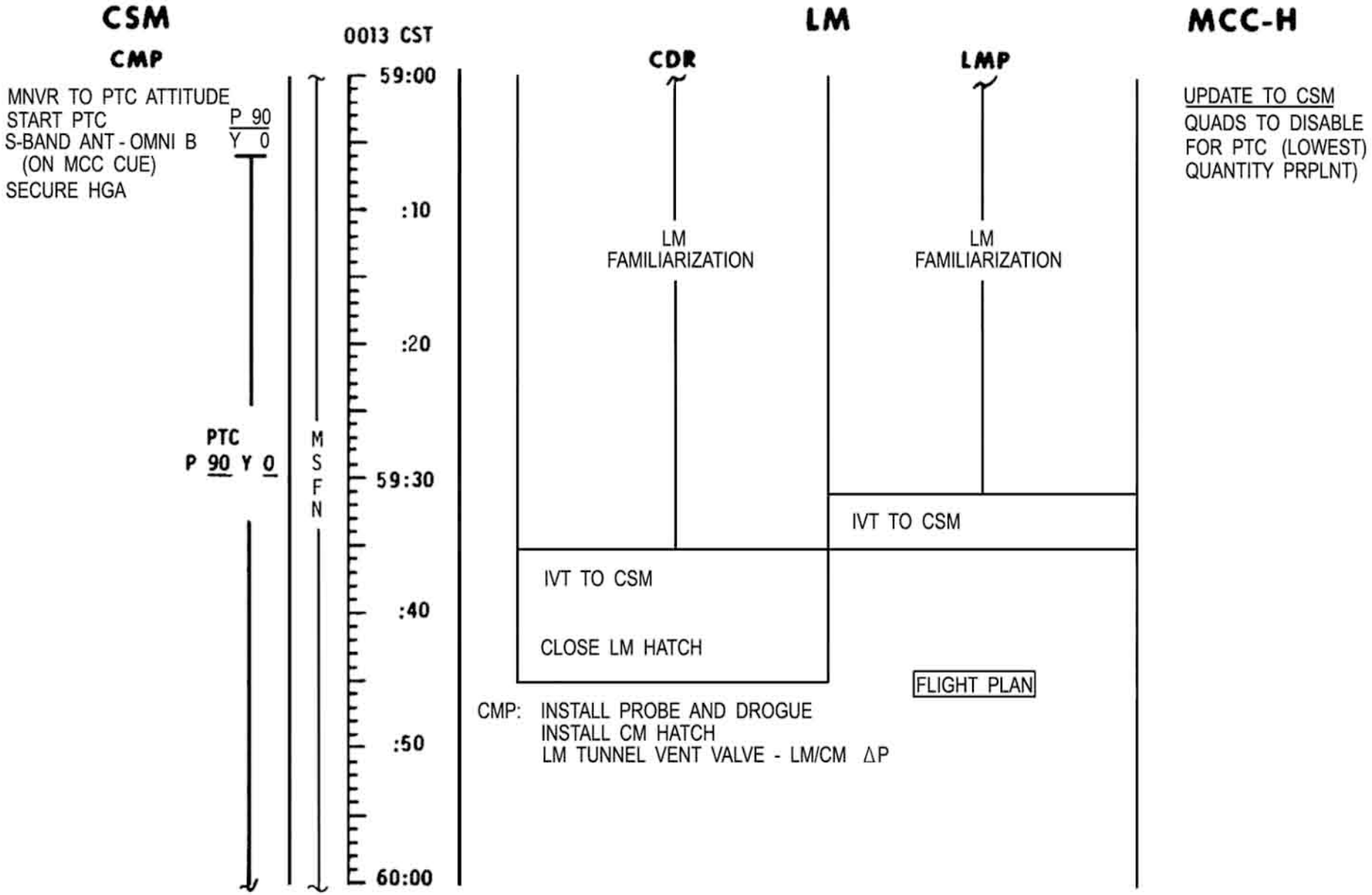
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	57:00 - 58:00	3/TLC	3-40

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	58:00 - 59:00	3/TLC	3-41

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	59:00 - 60:00	3/TLC	3-42