

UNITED STATES GOVERNMENT

Memorandum

TO : Distribution

DATE: July 8, 1969

FROM : CF/Chief, Flight Crew Support Division

In reply refer to:
CF342-9M-133

SUBJECT: Revision A to the Apollo 11 Final Flight Plan

Enclosed is Revision A to the Apollo 11 Final Flight Plan. Enclosure 1 contains the pen and ink changes to be made on the indicated pages. Enclosure 2 contains the new pages which replace the same numbered pages in the final edition of the flight plan. Changes on the new pages are made with prestige elite type rather than gothic type so they will be readily evident.


Warren J. North 7-5

Enclosures 2

CF342:TAGuillory:jat 7-8-69



5010-106

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

ENCLOSURE 1

MAKE THE FOLLOWING PEN AND INK CHANGES TO THE FINAL FLIGHT PLAN

<u>PAGE</u>	<u>CHANGE</u>
1-7	ON "LM POWERED DESCENT/HIGH GATE TO TD" FIGURE CHANGE ORDINATE AND ABSCISSA FROM "FT" TO "FT X 10 ³ "
1-10	ON TABLE 1-3 FIRST COLUMN CHANGE "1409 EDT" TO "1209 EDT" ON TABLE 1-4 CHANGE A1 LONGITUDE FROM 60.500°E TO 65.500°E
1-11	CHANGE G1 DELTA ALTITUDE FROM -001.97 TO -001.76
1-17	PARAGRAPH Ei, CHANGE TIMES: 103:30:00 TO 107:15 148:00:00 TO 151:00 154:00:00 TO 172:00
2-31 & 2-32	CHANGE TITLES FROM "PHASING" TO "ASCENT PHASING"
2-44	CHANGE 275 (+0418.1) TO 275 (+0418.5) CHANGE ΔVX, ΔVY, AND ΔVZ BLOCKS FROM □0 0 ____ . ____ TO □0 ____ . ____
2-48	CHANGE ΔVR N42 BLOCKS FROM + 0 0 ____ . ____ TO + 0 ____ . ____ CHANGE F/A, R/L, AND D/U BLOCKS FROM □0 0 ____ . ____ TO □0 ____ . ____
3-ii	AT 05:25 CHANGE "S-IVB TO ORBIT CAPABILITY" TO "COI CAPABILITY"
3-1	AT 00:37 CHANGE "ECS REDUNDANT COMPONENT CHECK" TO "SEC GLYCOL LOOP CK" AT 00:43 IN BOTH COLUMNS CHANGE "RECORD ΔAZ CORRECTION" TO "RECORD Z TORQUE"
3-5	AT 04:07 DELETE "THRUST MONITOR - P47" AT 04:52 DELETE "MANEUVER TO OBSERVE SLINGSHOT"
3-6	AT 05:10 IN MCC-H COLUMN "ADD <u>UPLINK CMC</u> <u>ZERO TRUNNION BIAS</u> "
3-10	AT 11:50 IN NOTES COLUMN CHANGE THE MCC NOTE TO READ: "MCC1 WILL BE DELAYED TO MCC2 IF PROPELLANT COST IS NOT PROHIBITIVE"
3-19	AT 26:50 IN NOTES COLUMN CHANGE THE MCC NOTE TO READ: "TO AVOID EXECUTION OF MCC3, A NON FREE MCC2 WILL BE EXECUTED (SPS BURN IF THE BT >3 SEC)"

PAGECHANGE

3-33 AT 53:50 IN NOTES COLUMN CHANGE THE MCC NOTE TO READ: "MCC3 WILL BE DELAYED TO MCC4 IF PROPELLANT COST IS NOT PROHIBITIVE"

3-43 AT 70:50 IN NOTES COLUMN CHANGE THE MCC NOTE TO READ: "MCC4 WILL BE EXECUTED WITH THE SPS IF THE BT >3 SEC"

3-44 AT 71:25 DELETE "PRE-LOI ECS REDUNDANT COMPONENT CK ACTIVATE PRIMARY EVAPORATOR" AND ADD "SECONDARY RADIATOR LEAK CHECK"

3-51 AT 80:12 CHANGE "DO NOT TRIM" TO "TRIM X AXIS TO 1 FPS"

3-53 AT 82:13 CHANGE R 0, P 257/297, Y 0 TO R 0, P 296/303, Y 0

3-54 AT 83:20 CHANGE R 82, 350/229, Y 0 TO R 82, P 296/229, Y 0

3-61 AT 95:00 ADD "ROLL RT 40°, TO R 122, P 229, Y 0"

3-63 AT 96:48 IN MCC-H COLUMN DELETE "BLOCK DATA"

3-73 & 3-74 DELETE LOCAL HORIZONTAL PITCH OF 166.3 & 244.2 AT 106:47 AND 107:14 RESPECTIVELY

3-76 AT 109:45 IN LM COLUMNS ADD "RADIATION READOUT"

3-79 AT 112:30 IN CMP COLUMN ADD "ACTIVATE PRIM EVAPORATOR"

3-83 AT 116:40 IN LM COLUMN ADD "CONFIGURE COMM (TV-OFF)"

3-91 AT 126:00 IN MCC-H COLUMN ADD "DUMP DSE"

3-92 AT 126:07 IN LMP COLUMN CHANGE P -58 TO P +58
AT 126:30 CHANGE CSM ATTITUDE FROM R 180, P 264/177, Y 0
TO R 0, P 239/160, Y 0

3-93 AT 128:00 ADD IN CMP COLUMN "EXT RNDZ LT - OFF" AND IN MCC-H COLUMN "DUMP DSE"
AT 127:00 IN CMP & MCC-H COLUMNS ADD "GO/NO GO FOR PYRO ARM"

3-95 AT 130:00 IN MCC-H COLUMN ADD "DUMP DSE"

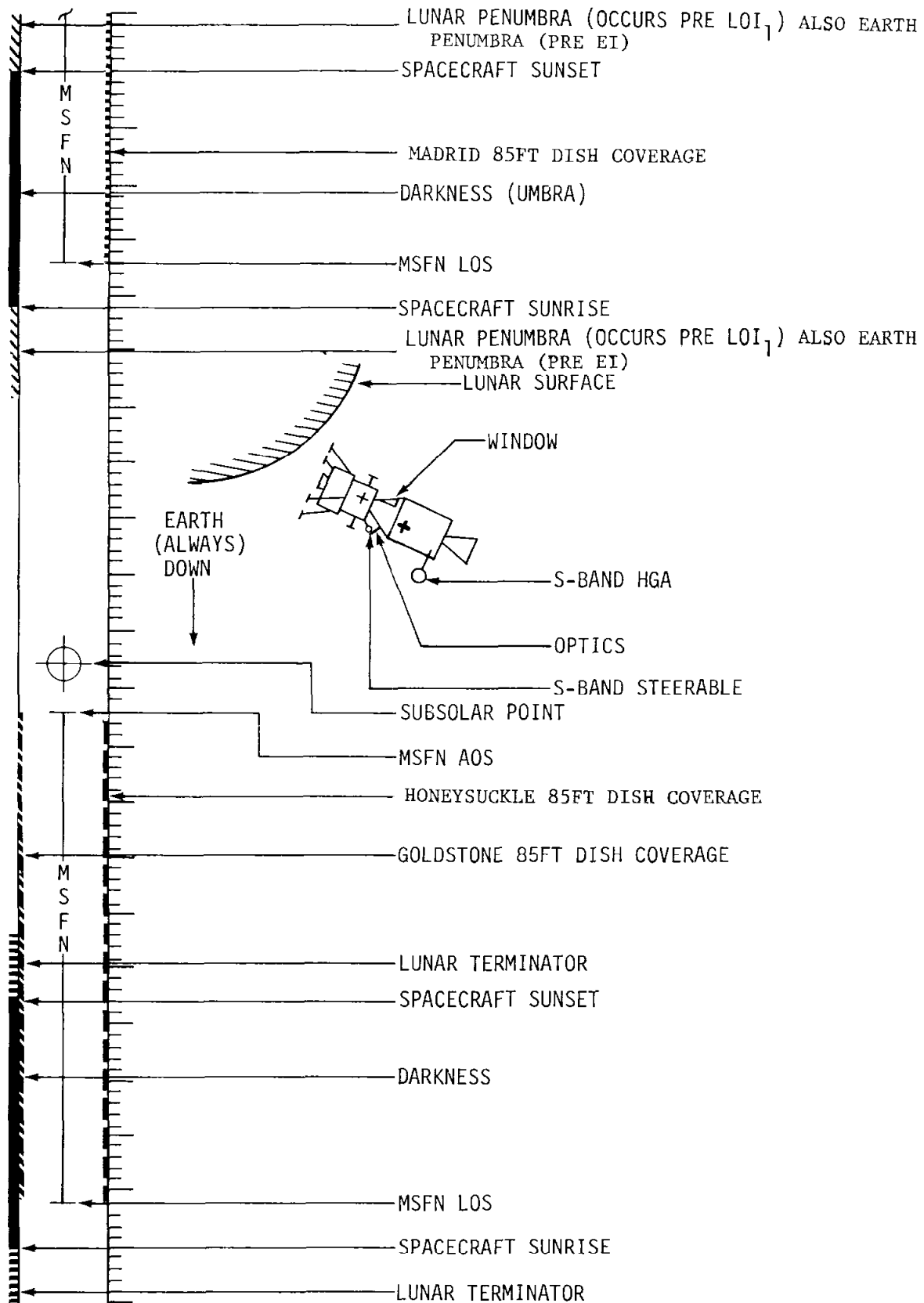
3-100 AT 134:12 DELETE "ECS REDUNDANT COMPONENTS CK"

3-101 AT 135:18 CHANGE "DAP - R1=10111 R2=11111" TO "DAP - R1=10101 R2=11111" AND MOVE TO 135:05

3-102 AT 136:15 ADD "DEACTIVATE PRIM EVAPORATOR"

3-132 AT 192:27 CHANGE "MENKAR (07) ENH" TO "MENKAR (07) EFH"

ENCLOSURE 2
SYMBOL NOMENCLATURE



INTRODUCTION

This Flight Plan has been prepared by the Flight Planning Branch, Flight Crew Support Division, with technical support by TRW Systems.

This document schedules the AS-506/CSM-107/LM-5 operations and crew activities to fulfill, when possible, the test objectives defined in the Mission Requirements, G Type Mission Lunar Landing.

The trajectory parameters used in this Flight Plan are for July 16, 1969 launch, with a 72° launch azimuth and were supplied by Mission Planning and Analysis Division as defined by the Apollo Mission G Spacecraft Operational Trajectory.

The Apollo 11 Flight Plan is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes to this document that fall in the following categories should be submitted to the CPCB via a Crew Procedures Change Request:

1. Items that impose additional crew training or impact crew procedures.
2. Items that impact the accomplishment of detailed test objectives.
3. Items that result in a significant RCS or EPS budget change.
4. Items that result in moving major activities to a different activity day in the Flight Plan.
5. Items that require a change to the flight data file.

The Chief, Flight Planning Branch (FCSD) will determine what proposed changes fall in the above categories.

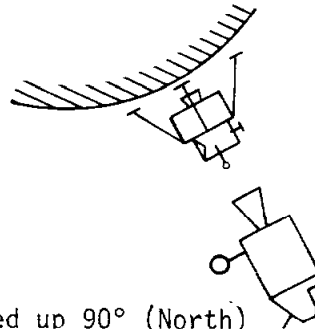
Mr. T. A. Guillory will act as co-ordinator for all proposed changes to the Apollo 11 Flight Plan.

Any requests for additional copies or changes to the distribution lists of this document must be made in writing to Mr. W. J. North, Chief, Flight Crew Support Division, MSC, Houston, Texas.

- b. The coolant loop operation will be as follows:
- (1) Launch - primary loop operation
 - (2) Earth Orbit - primary loop operation and secondary loop test
 - (3) Post TLI - deactivate both evaporators
 - (4) Pre LOI sec rad leak ck only.
 - (5) At 112:30 activate primary evaporator
 - (6) Post TEI - deactivate primary evaporator
 - (7) Entry interface minus 1 hour - activate primary and secondary evaporator.

3. Guidance and Navigation

- a. During lunar orbit, the CSM and LM will utilize the same landing site REFSMMAT such that the gimbal angles would be 0,0,0 at landing with the LM sitting face forward on landing site number two and the CSM over the landing site pitched up 90° from local horizontal "heads up".
- b. During PTC the CSM/LM x-axis is pitched up 90° (North) for TLC and down 90° (South) for TEC with the Y-Z axes in the plane of the ecliptic. This change in x-axis pointing is to enable simultaneous viewing of the earth and moon through the side windows while maintaining a favorable high gain antenna position.
- c. The CSM tracking light will be on continuously from undocking to landing and from LM lift-off to docking.

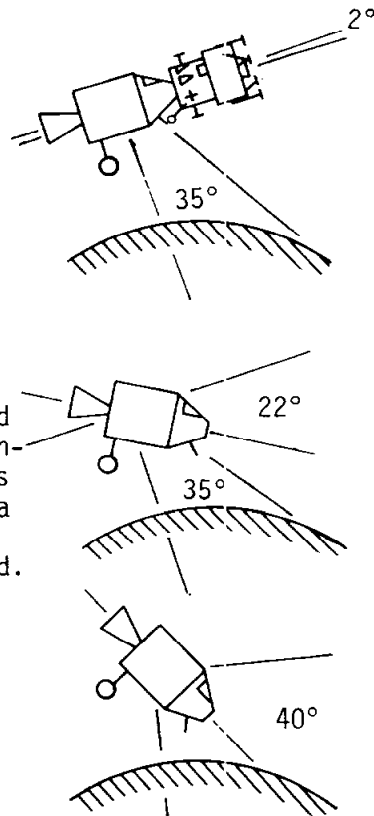


4. Landmark Tracking

The following ground rules were used for landmark tracking.

- a. IMU to be realigned on the dark side preceding each tracking period.
- b. MSFN is reacquired after each tracking period. The tracking data will be acquired by MSFN after all the marks have been made and while N49 ($\Delta R, \Delta V$) is displayed. MSFN will give a GO when data acquisition has been verified.
- c. The pseudo landmark tracking (A1) will be used to determine the altitude of an area in which the LM will be making altitude checks after DOI. The data will be processed during the sleep period after the trackings and relayed to the LM prior to undocking.

- d. In the docked configuration the CSM/LM approaches the landmark in an inertial hold attitude. This inertial attitude places the spacecraft 2° below the local horizontal at the 35° elevation angle point. At 35° elevation angle a pitch down of $0.3^\circ/\text{sec}$ is initiated. Five marks are then taken with the time between marks a minimum of 25 seconds. (See tracking profile)
- e. In the undocked configuration the CSM approaches the landmark in ORB RATE and pitched down 22° from the local horizontal. At 35° elevation angle five marks are taken with the time between marks a minimum of 25 seconds. ORB RATE is continued throughout the marking period.
- f. In the undocked COAS tracking the CSM will approach the LM in ORB RATE heads up and pitched down 40° from the local horizontal. When the LM is centered in the COAS the CSM will initiate a variable pitch rate to keep the LM centered in the COAS.



5. CSM/LM and CSM attitude maneuvers will normally be at a rate of $0.2^\circ/\text{sec}$ or $0.5^\circ/\text{sec}$, unless other rates are required.
NOTE: At $0.2^\circ/\text{sec}$, 15 minutes is required to maneuver 180° .
At $0.5^\circ/\text{sec}$, 6 minutes is required to maneuver 180° .
6. Passive thermal control mode will be initiated after MCC1 or as soon as MCC1 is scrubbed and maintained throughout the mission (except in lunar orbit) until at least three hours before entry except for interruptions for midcourse corrections, communications orientation (maximum interruption of three hours). PTC will not be initiated before approximately 7:00 GET.
7. Service Propulsion System All SPS burns will be initiated on Bank A except LOI1 which will be initiated on Bank B.

F. LM Notes

1. Entries into the LM

- a. Three entries into the LM are scheduled in the timeline at 56:30, 81:30 and 95:52 GET respectively.

FLIGHT PLAN

CSM

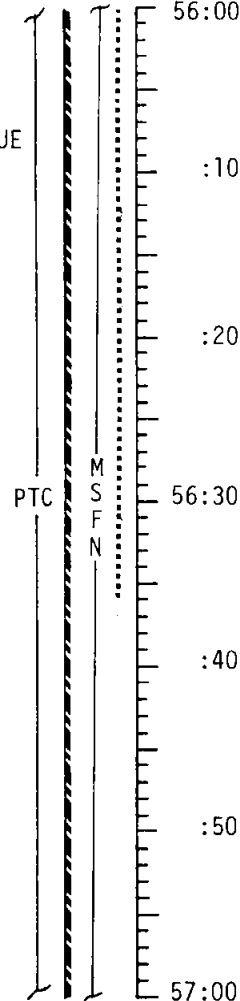
LM

MCC-H

CMP

1730 EDT

CLEAR TUNNEL OF CM
HATCH
INSPECT TUNNEL &
DOCKING LATCHES
REMOVE PROBE & DROGUE
TEMPORARILY STOW
PROBE AND DROGUE
CONFIGURE DSE
TO RECORD LM DATA
CSM PWR TO LM - ON
(AT LMP REQUEST)
DUMP DSE (LM DATA)
CSM PWR TO LM - OFF
(AT LMP REQUEST)



CDR

LMP

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VERIFY OPERATION
OF LM 16mm CAMERA

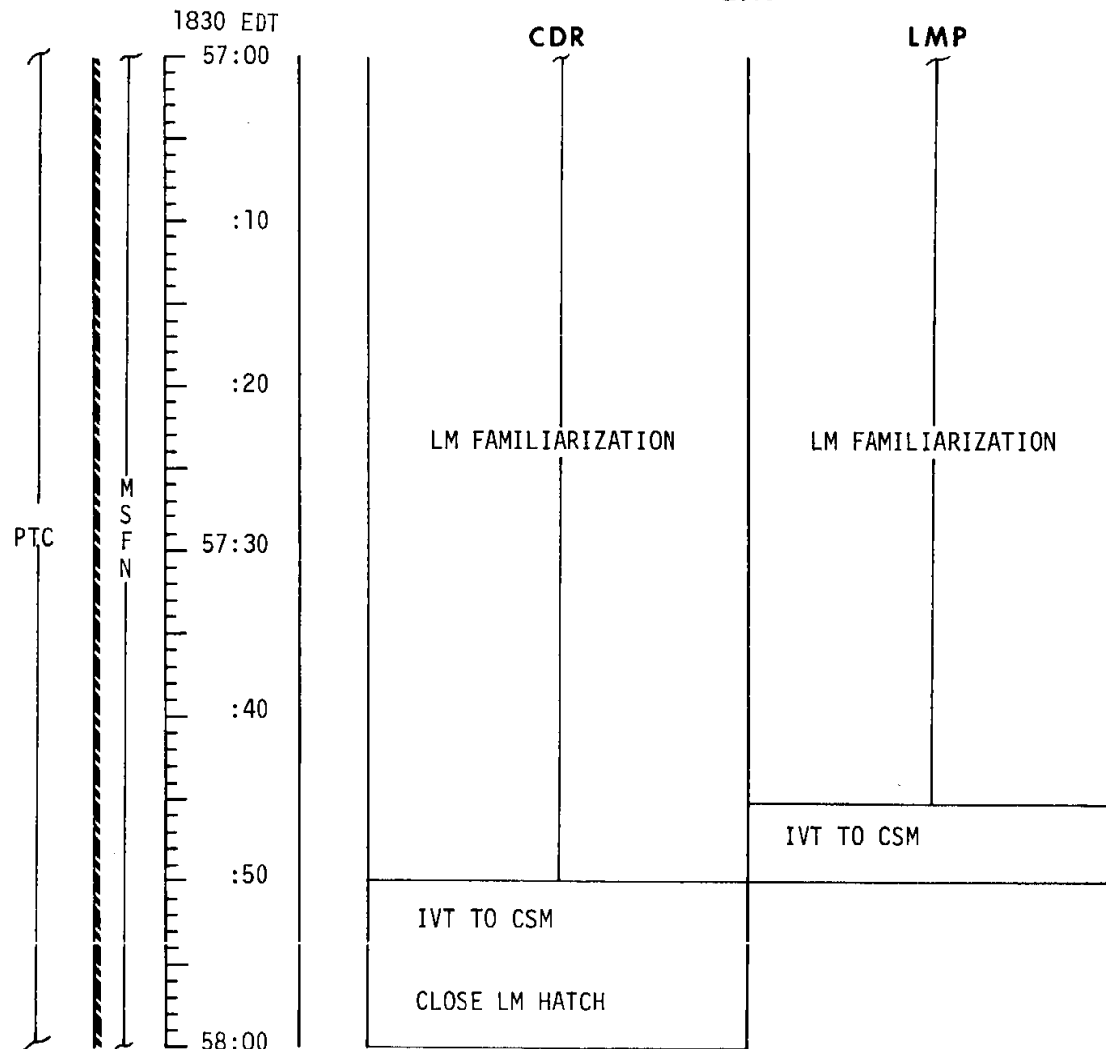
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	56:00 - 57:00	3/TLC	3-35

FLIGHT PLAN

CSM
CMP

LM

MCC-H



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	57:00 - 58:00	3/TLC	3-36

LOI₁
BURN CHART

	P OR Y RATES	ATT DEVIATION	SHUTDOWN TIME	RESIDUALS
LOI ₁	10°/SEC TAKEOVER	+10° TAKEOVER	BT + 10 SEC	DO NOT TRIM
LOI ₁ ABORT MODES				
LOI ₁ V _{GO}	BT	TRAJECTORY	ABORT MODE	
2924.0 - 2129.0	0-01:50	HYPERBOLIC	MODE I - COAST 2 HR - DPS - P37 (P37 BEYOND SPHERE FOR VGO >2279 AND BT <01:30	
2129.0 - 1589.0	01:50 - 03:00	UNSTABLE	MODE II - COAST 2 HR - 2 DPS BURNS FOR STABILIZA- TION AND WATER or CLA LANDING	
1589.0 - 0	03:00 - 06:05	LUNAR ORBIT	MODE III - DPS BURN AFTER ONE REV	

MCC-H

2130 EDT

FLIGHT PLAN

NOTES

84:00	O ₂ FUEL CELL PURGE		
84:01			
REV 5			
84:30	EAT PERIOD		
84:33			
85:00	CO ₂ FILTER CHANGE NO. 7 (9 INTO A, STORE 7 IN B6)		

CSM PRESLEEP CHECKLIST

CREW STATUS REPORT
(RADIATION & MEDICATION)
CYCLE O₂ & H₂ FANS
CHLORINATE POTABLE WATER
SELECT NORMAL LUNAR COMM
CONFIGURATION - EXCEPT:
S-BAND SQUELCH-ENABLE
HGA TRACK-REACQ
HGA BEAM - NARROW

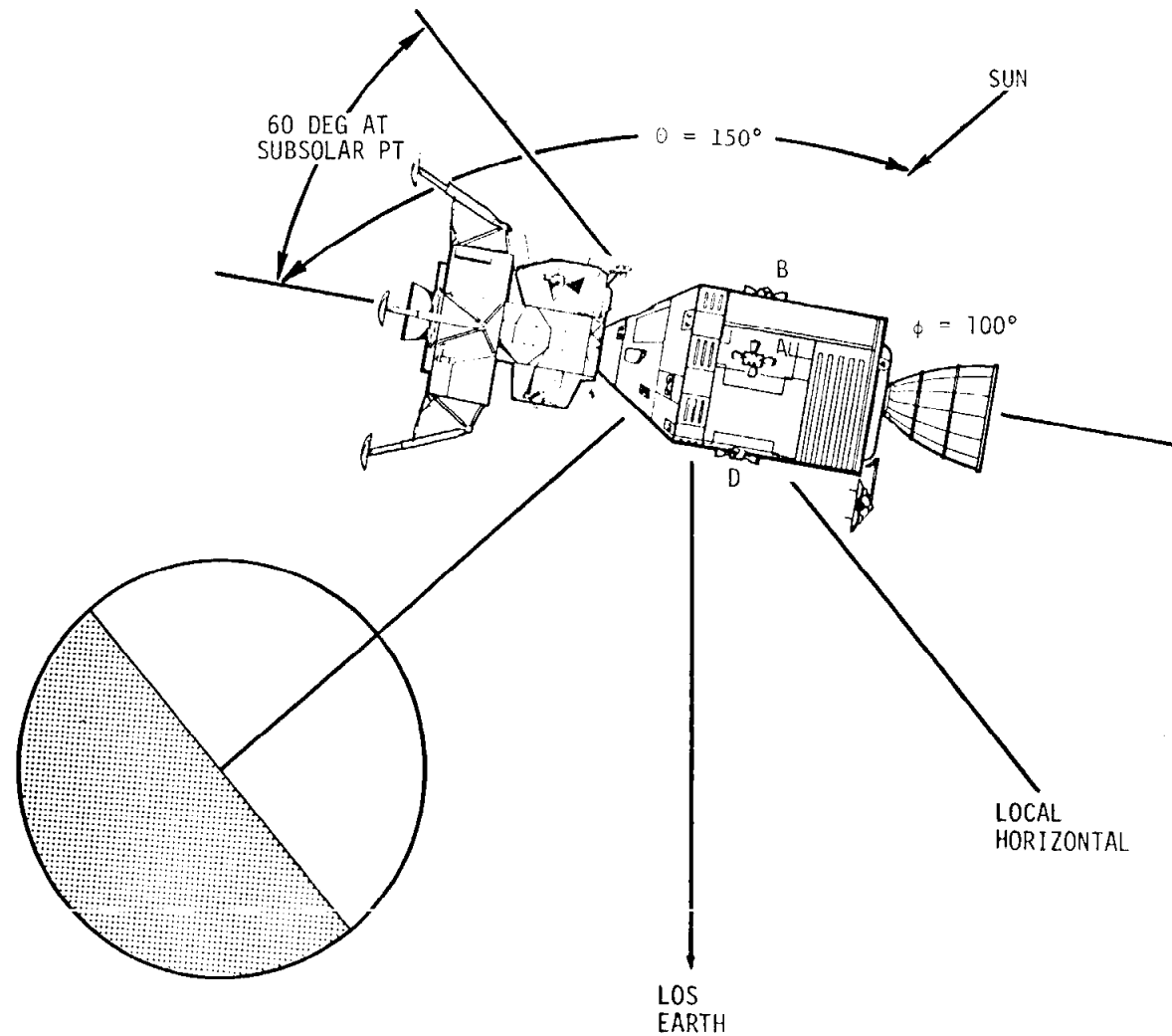
VERIFY:
WASTE MNGMT OVBD DRAIN-OFF
WASTE STOW VENT-CLOSED
EMERGENCY CABIN PRESS-BOTH
SURGE TANK O₂ VALVE-ON
REPRESS PACK O₂ VALVE - OFF
POTABLE WATER HTR-OFF
LM TUNNEL VENT VALVE-LM PRESS

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	84:00 - 85:00	4/5	3-55

MSC Form 29 (May 69)

FLIGHT PLANNING BRANCH

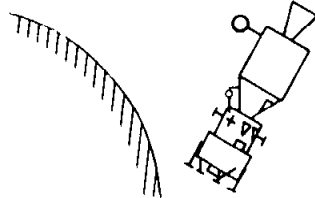
LUNAR ORBIT REST PERIOD ATTITUDE



FLIGHT PLAN

CSM

CMP



MANEUVER TO TRACKING
ATTITUDE

R O , P 297/270, Y0
DOFF HELMET & GLOVES

SELECT OMNI C

GO INERTIAL
UNSTOW OPTICS
P22 ORBITAL NAVIGATION

TRACK LDG SITE LANDMARK
(5 MARKS ON LDMK 130)
PITCH DOWN 0.3°/SEC AT T2
DO NOT INCORPORATE MARKS

CONTINUE PITCH TO
AGS CAL PITCH ATT (22.5)

V64 ACQUIRE MSFN

1130 EDT
98:00

98:21

98:30

98:50

98:56

99:00

LM

CDR

LMP

DON HELMET & GLOVES	DON HELMET & GLOVES
ARS/PGA PRESSURE INTEGRITY CHECK	ARS/PGA PRESSURE INTEGRITY CHECK
CABIN REGULATOR CHECK	CABIN REGULATOR CHECK
DOFF HELMET & GLOVES COPY DAP DATA COPY GYRO TORQUE ANGLES AND FINE ALIGN IMU X ___, Y ___, Z ___	DOFF HELMET & GLOVES SELECT OMNI <u>FWD</u> BIO MED SWITCH - RIGHT
RATE GYRO CHECK	AGS ACT & SELF TEST
<p>R O, P 126.5/22.5, Y0 HGA P-45, Y3</p>	

MCC-H

UPDATE LM

DAP DATA
GYRO TORQUE
ANGLES

P22 AUTO OPTICS
LMK ID 130
T1 9 8:4 0:0 2 (HOR)
T2 9 8:4 5:0 8 (35°)
9.6 NM (N OR S)
N 89
LAT + 0 1.2 4 3
LONG/2 + 1 1.8 4 4
ALTITUDE- 0 0 1.4 6 NM

V64 ACQUIRE MSFN
ANT P 187, Y 70

DUMP DSE

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	98:00 - 99:00	5/12	3-65

FLIGHT PLAN

CSM

CMP

STOW FLIGHT PLAN
UNSTOW SOLO BOOK
COPY PADS

DON HELMET & GLOVES
SC CONT - SCS
MIN/MAX DB, LOW/HIGH
RATE
(AT REQUEST OF CDR)
GO/NO-GO FOR UNDOCKING
DISABLE ROLL JETS FOR
RCS HOT FIRE

VERIFY TUNNEL VENT
VALVE - OFF

RECORD LM PCM DATA
SC CONT - CMC AUTO
MANEUVER TO
AGS CALIBRATION ATTITUDE

SC CONT - SCS
RATES <0.1°/SEC
DISABLE THRUSTERS FOR
32 SEC
(AT REQUEST OF LMP)
MANEUVER TO UNDOCKING
ATTITUDE
R0, P320/14, Y0

1230 EDT
99:00

M
S
F
N

99:30
99:32

99:43

99:49
REV 13

100:00

CDR

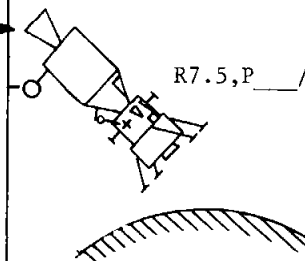
DRIFT CHECK-REPORT GIMBAL
ANGLES & TIME TO MSFN
DEPLOY LANDING GEAR
ORDEAL INITIALIZATION

LOAD DAP DATA - 32012
CSM WT _____
P TRIM _____
Y TRIM _____
DPS GIMBAL DRIVE AND
THROTTLE TEST

RCS PRESSURIZATION

RCS CHECKOUT

RR ACT & SELF TEST



DPS PRESS & CHECKOUT

LM

LMP

V47 INITIALIZE AGS

COPY AGS ABORT CONSTANT
AND K FACTOR

RCS PRESSURIZATION

GO/NO-GO FOR UNDOCKING
RCS CHECKOUT

AFT OMNI - LBR

SLEW STEERABLE ANTENNA
ANT P 123, Y -37

AGS ACCEL & GYRO
CALIBRATION

MCC-H

UPLINK LGC

LS REFSMMAT
LM & CSM STATE
VECTORS
LGC/CMC CLOCK SYNC
PIPA BIAS
LGC ABORT CONSTANT

UPDATE LM

AGS ABORT CONSTANT
AGS K FACTOR

UPLINK CMC

LM & CSM STATE
VECTORS

UPDATE CSM

P30 MNVR PAD
(SEPARATION)

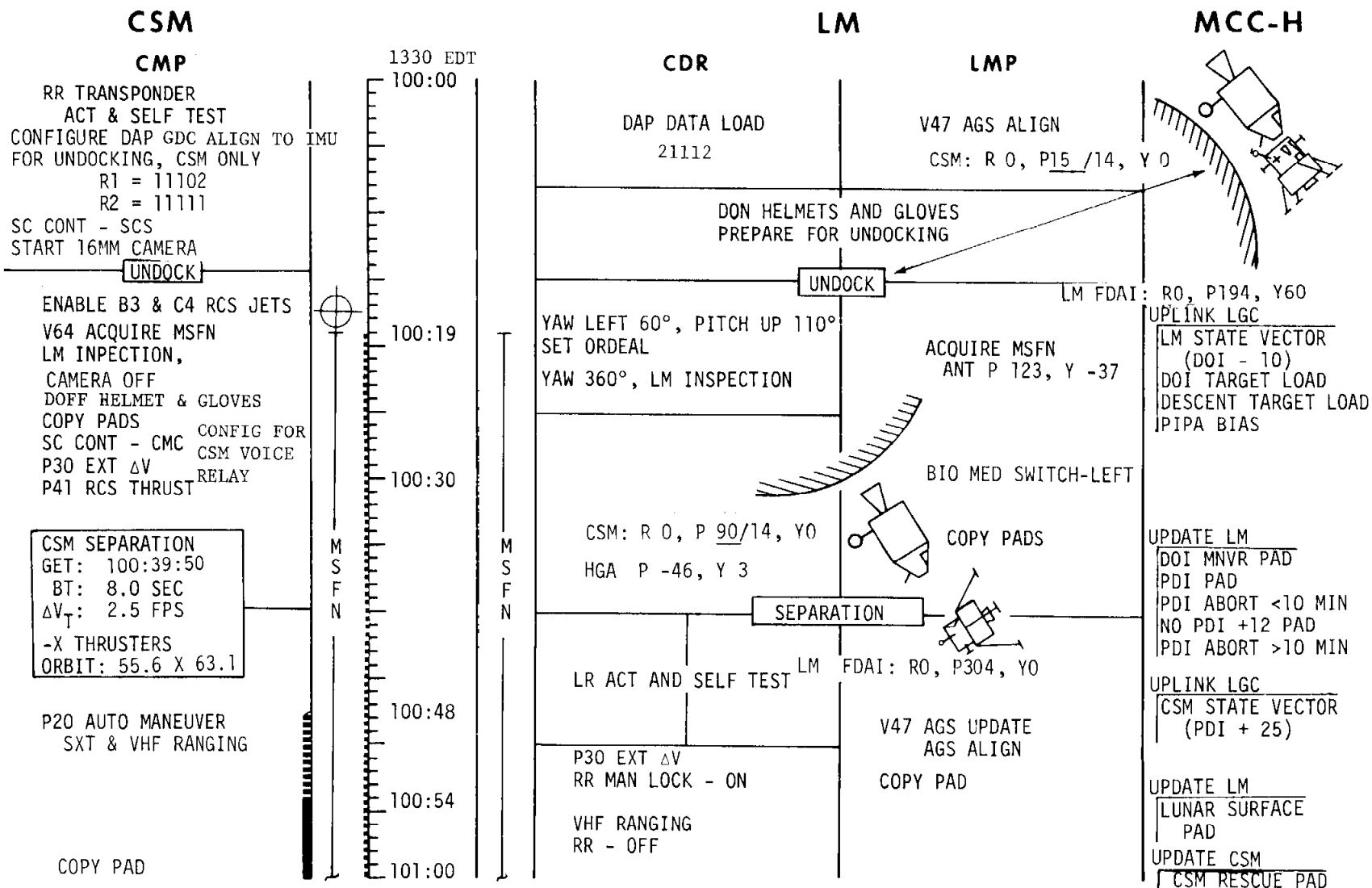
GO/NO-GO

UPDATE LM

STEERABLE ANTENNA
ANGLES(GET:100:25)

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	99:00 - 100:00	5/12-13	3-66

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	100:00 - 101:00	5/13	3-67

FLIGHT PLANNING BRANCH

FLIGHT PLAN

CSM

LM

MCC-H

CMP

P52 IMU REALIGN
OPTION 3 REFSMMAT
REPORT:

P52 (LDG SITE REFSMMAT)

N71: _____

N05: _____

N93: _____

X _____

Y _____

Z _____

GET _____:_____:_____

GDC ALIGN TO IMU
VHF B - DATA
P20 AUTO MANEUVER
TO SEXTANT TRACK LM

CONFIRM DOI-VHF RANGING
INCORPORATE P76
P20 AUTO MANEUVER
TO SEXTANT TRACK LM
SEXTANT TRACK ONLY

SEXTANT AND VHF
TRACKING OF LM

1430 EDT
101:00

M
S
F
N

M
S
F
N

101:30

101:41

101:47

REV 14

102:00

REPORT: CDR

P52 (LDG SITE REFSMMAT)

N71: _____

N05: _____

N93: _____

X _____

Y _____

Z _____

GET _____:_____:_____

P40 DPS THRUST
MNVR TO DOI ATTITUDE

DPS, DOI

TRIM V_X RESIDUALS

PITCH DOWN, P=195, RR-ON
P20 MAN LOCK - ON

RR-OFF

P30 EXT ΔV
LOAD PDI + 12 ABORT
PITCH DOWN TO 106.5°
YAW LEFT 180°

LMP

SYSTEMS CHECKS

V47 AGS ALIGN

OMNI AFT, PCM LBR
VHF A-VOICE, B-DATA

SLEW STEERABLE ANTENNA
ANT P 220, Y 28

N20 AGS ALIGN
LOADS AGS EXT ΔV

GETI: 101:38:19.6
ULLAGE: 2 JET, 7.5 SEC
BT: 28.5 SEC
ΔV: 70 FPS
RETROGRADE
ORBIT 8.97 X 57.87

VHF A-VOICE/RNG LM FDAI: R0, P294.9, Y0

VHF B - XMTR - OFF
SET CAMERA
16mm/HCEX(4,500,INF) 6 fps
COAS OVERHEAD

UPLINK CMC

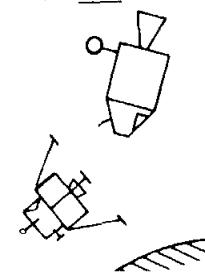
CSM STATE VECTOR
(PDI + 25)
LM STATE VECTOR
(DOI - 10)
PIPA BIAS

DUMP DSE

GO/NO GO FOR DOI

UPDATE LM
STEERABLE ANTENNA
ANGLES
(GET: 102:19)

CSM: R0, P215/319, Y0



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	101:00 - 102:00	5/13-14	3-68

FORM 718 (OT) (Rev 6-68)

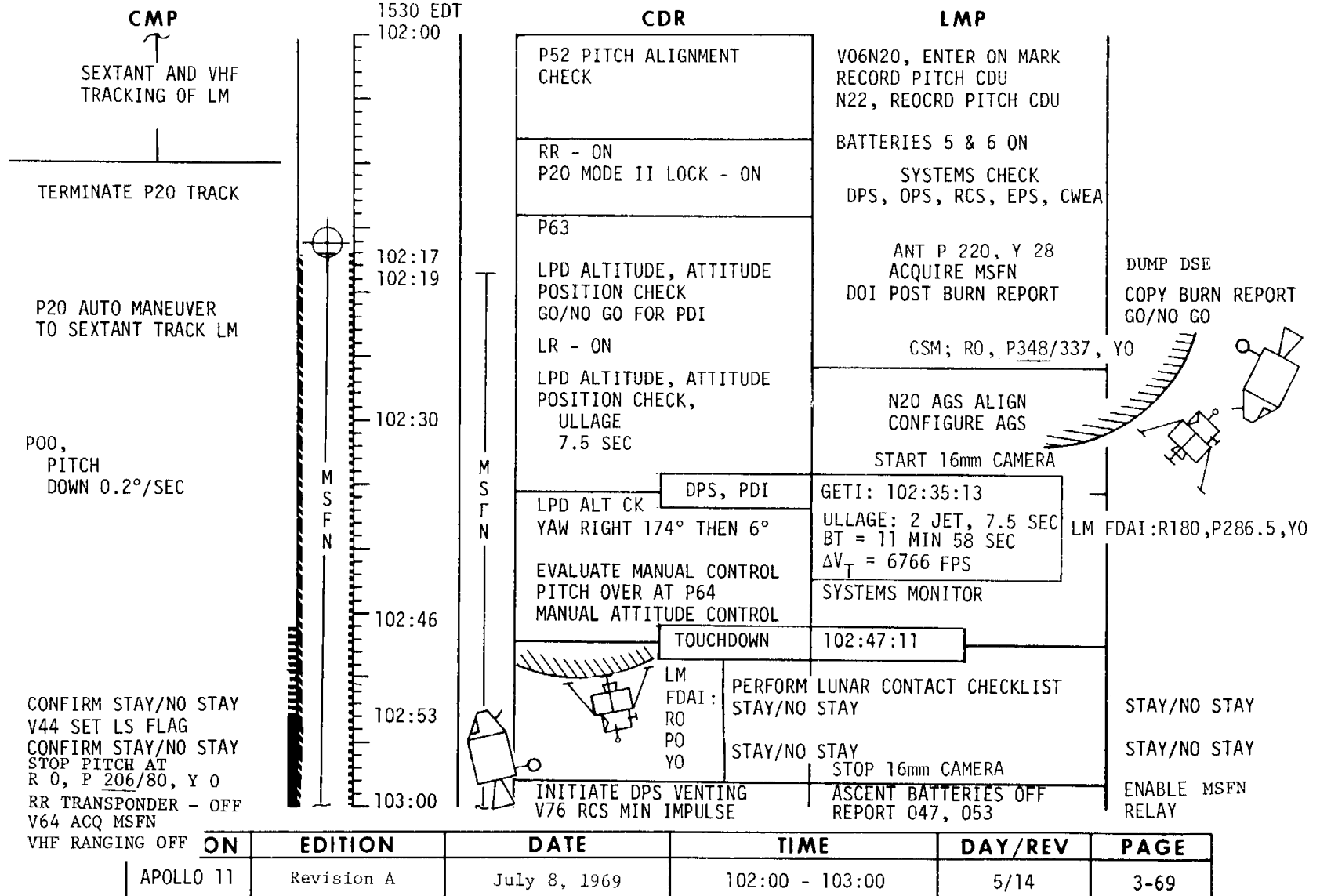
FLIGHT PLANNING BRANCH

FLIGHT PLAN

CSM

LM

MCC-H



FLIGHT PLAN

CSM

LM

MCC-H

CMP

CDR

LMP

REPORT:

P52 (LDG SITE REFSMMAT)

N71: OPTION 3

N05: .

N93:

X .

Y .

Z .

GET: : :

ALIGN GDC, VERIFY ORDEAL

COPY LM TRACKING PAD
(SEE GET - 104:35)

P22 AUTO MNVR TO
TRACKING ATTITUDE
ORB RATE (IF TIME PERMITS
IF NOT, AT 104:10)
RO P338/76, Y0

1630 EDT

103:00

M
S
F
N

103:29

103:30

M
S
F
N

103:39

103:45

REV 15

104:00

AND GLOVES

DOFF HELMET

RR TO STANDBY
REPORT ESTIMATE OF LANDED
LOCATION
CLOSE SHADES

80mm/BW/CHECKLIST
60mm/HCEX/CHECKLIST

6 FRAMES FAR FIELD
(FOCUS 50') 6 FRAMES
NEAR FIELD (FOCUS 20')
WITH EACH CAMERA
REMOVE MAGS AND STOW
INSTALL PROTECTIVE
COVER AND STOW CAMERAS

PHOTOGRAPH LUNAR
SURFACE

AGS LUNAR SURFACE GYRO
CALIBRATION
LOAD AGS ASCENT TARGET
H=60,000 FT, H DOT=32 FPS
CLOSE SHADES, DOFF
HELMET AND GLOVES

P57-IMU ALIGN (REFSMMAT)
GRAVITY MEASUREMENT
N04: .

AGS LUNAR ALIGNMENT

P57-IMU ALIGN (REFSMMAT)
2 CELESTIAL BODIES

N04: .

N05: .

N71: .

N93:

X .

Y .

Z .

N89:

LAT .

LONG/2 .

ALT .

GET : :

INITIALIZE AGS
COPY AND LOAD
ASCENT PAD DATA
INSTALL WINDOW SHADES
COARSE ALIGN RR CDU

COPY AGS
AZIMUTH

COPY LANDED
LOCATION, GRAVITY
MEASURE

UPDATE CSM

LM TRACKING
PAD

COPY P57 DATA

COPY AGS
AZIMUTH

UPLINK LGC

RLS
CSM STATE
VECTOR
(TD + 1:40)
UPDATE LM
ASCENT PAD

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	103:00 - 104:00	5/14-15	3-70

WFO Form 2187 (RT) (Rev 6-69)

FLIGHT PLANNING BRANCH

FLIGHT PLAN

CSM

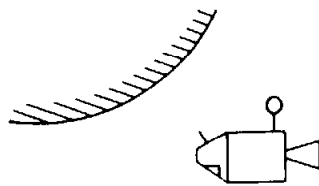
CMP

S/C CONT - SCS

P22 AUTO MANEUVER TO
TRACKING ATTITUDE,
ORB RATE

RO, P338/342,YO

CONFIRM STAY/NO STAY



LM TRACKING
5 MARKS ON LM
ORB RATE

PITCH DOWN 0.05°/SEC
STOP ORB RATE
GO INERTIAL
ROLL 170° TO ACQ MSFN
V64 ACQUIRE MSFN

1730 EDT
104:00

104:15

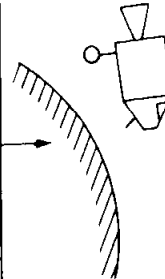
104:30

104:45

104:51

105:00

CDR



DON HELMET & GLOVES

STAY/NO STAY FOR LUNAR SURFACE OPERATIONS

DAP LOAD 12012

LM WT _____

CSM WT _____

P12 - ASCENT PROGRAM

END SIMULATED COUNTDOWN AT TIG -1 MINUTE

CLOSE FUEL VENT

CONFIGURE SYSTEMS FOR PWR DWN

DOFF HELMET & GLOVES

EAT PERIOD
(40 MIN)

LM

REPORT: LMP

P57 - GRAVITY AND ONE
CELESTIAL BODY (T-ALIGN)

N04: _____

N71: _____

N93: _____

X _____

Y _____

Z _____

GET _____:_____:_____

CONFIGURE COMM

FOR LUNAR STAY

AGS LUNAR ALIGN

BIOMED SWITCH-RIGHT

COPY UPDATE

V47 - INITIALIZE AGS

CHECK APS, RCS, ECS, EPS

AGS GUIDANCE STEERING

AGS PARTIAL POWER DOWN

(AGS STATUS SW -STBY)

CONFIGURE SYSTEMS FOR PWR DWN

DOFF HELMET & GLOVES

EAT PERIOD
(40 MIN)

MCC-H

STAY/NO STAY

UPDATE LM

T₄ THRU T₇
LIFT OFF TIMES

P22 AUTO OPTICS
LUNAR MODULE

T1104:34:31

(HOR)

T2104:39:32

(35°)

0.2 NM (N OR S)

N89

LAT + 00.691°

LONG/2 + 11.858°

ALT - 001.44 NM

(IF REQUIRED)

UPLINK CMC

DESIRED ORIENT

(PLANE CHANGE)

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	104:00 - 105:00	5/15	3-71

MSC Form 21PQ (OT) (Rev 6-64)

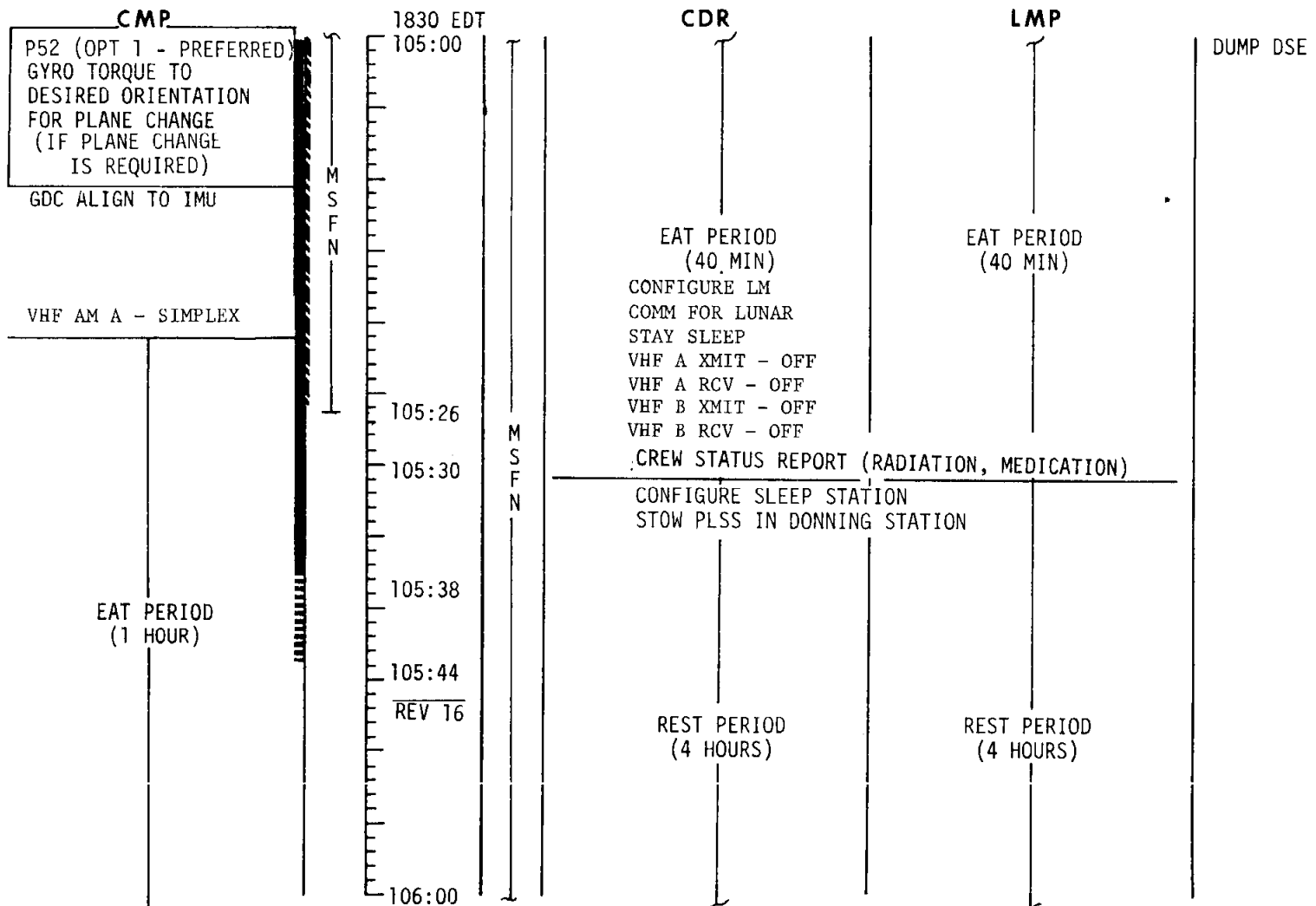
FLIGHT PLANNING BRANCH

FLIGHT PLAN

CSM

LM

MCC-H



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	105:00 - 106:00	5/15-16	3-72

FLIGHT PLAN

CSM

LM

MCC-H

CMP

CDR

LMP

2330 EDT
110:00

110:09

EAT PERIOD
(1 HOUR)

EAT PERIOD
(1 HOUR)

COPY UPDATE

DUMP DSE

UPDATE LM

CAMERA EXPOSURE
UPDATED FOR
LM AZIMUTH AND
T₇ THRU T₁₀

STAY/NO STAY

REST PERIOD
(4 HOUR)

CHANGE CO₂ FILTER
STAY NO STAY FOR EVA PREP
CREW STATUS REPORT (SLEEP, RADIATION)

CREW STATUS

SYSTEMS PREPARATION FOR EGRESS
C&W LIGHT CK, ADJUST INTERIOR LIGHTING

LM CONSUMABLES UPDATE

GET ____ : ____

RCS A ____ B ____

DESC O₂ ____

DESC A-H ____

ASC A-H ____

PREPARATION FOR EGRESS
STOW LOOSE ITEMS AND ARMREST
PREPARE CAMERAS

PLSS/OPS DONNING
UNSTOW PLSS AND OPS
CONFIGURE PLSS AND OPS
FOR DONNING

16mm/HCEX/AS PER DECAL
60mm/FRESH HCEX/
AS PER DECAL
80mm/HCEX/AS PER DECAL

110:30

110:40

110:47

111:00

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	110:00 - 111:00	5/18	3-77

MSO Form 2189 (OT) (Rev 6/69)

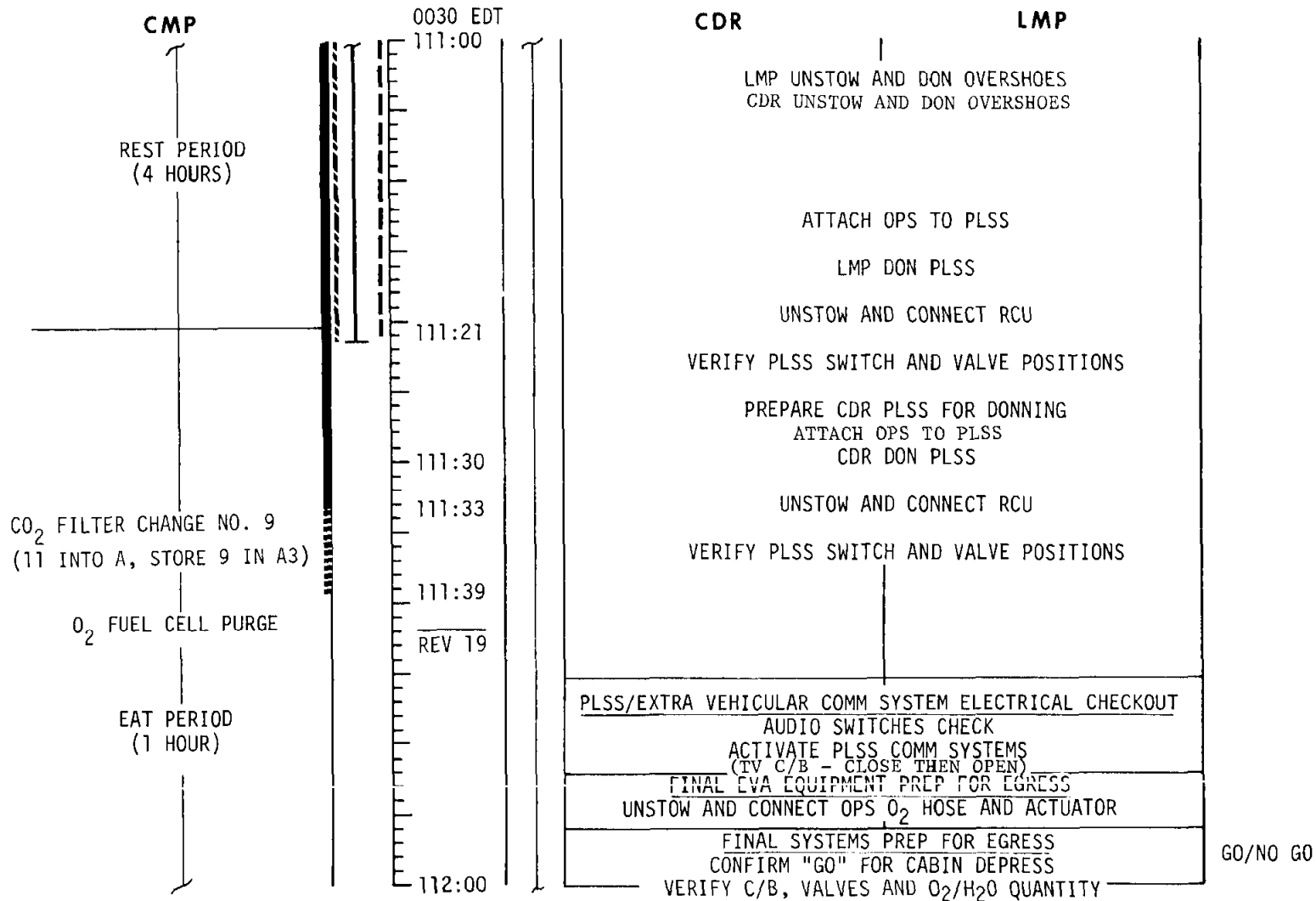
FLIGHT PLANNING BRANCH

FLIGHT PLAN

CSM

LM

MCC-H



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	111:00 - 112:00	5/18-19	3-78

FLIGHT PLAN

CSM

CMP

LM

MCC-H

0330 EDT

114:00

114:06

114:30

114:37

114:43

115:00

CDR

LMP

SELECT DEPLOY SITE
CARRY CAMERAS
DEPLOY LR³ EXPERIMENT
PHOTO EXPERIMENTS

DOCUMENTED SAMPLE COLLECTION
REST/PHOTO LMP
CLOSE-UP PHOTOS
TETHER SAMPLE BAG TO LMP
PHOTO SAMPLING
UNSTOW GNOMON
PHOTO DS AREA
PHOTO SAMPLE COLLECTION
STOW ALSCC FILM
COLLECT ENVIRONMENTAL SAMPLES
RETRIEVE AND STOW SWC
PACK SRC
CLOSE AND SEAL SRC

REST/PHOTO LMP

SRC TRANSFER

TRANSFER BULK SRC AND

STILL CAMERA MAGAZINE
REST CHECK EMU
TRANSFER DS SRC

SELECT DEPLOY SITE
CARRY EXPERIMENTS
DEPLOY PSE
TAKE CLOSEUP PHOTOS

DOCUMENTED SAMPLE COLLECTION
MOVE BULK SRC TO STRUTS OR FOOT PAD
PREPARE DS SRC

COLLECT CORE TUBE SAMPLE
UNSTOW TOOLS
COLLECT SAMPLES
STOW ALSCC FILM
COLLECT ENVIRONMENTAL SAMPLES
COLLECT LOOSE MATERIAL
CORE TUBE SAMPLE

EVA TERMINATION
WIPE SUIT AND EMU
WIPE FEET ON LANDING PAD AND LADDER
ASCEND LADDER
INGRESS CABIN
CHECK LM
OPERATE SEQ CAMERA
RECEIVE AND STOW SRC AND MAGAZINE
RECEIVE AND STOW SRC

1+30

1+40

DUMP DSE

1+50

LM ACQUISITION
GET: _____:_____:_____

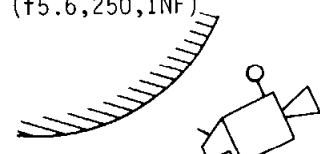
2+00

2+10

2+20

2+30

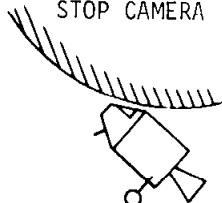
EL/250/BW-BRKT, INT
(f5.6,250,INF)



CHANGE

SHUTTER TO 1/125
PITCH UP 38°
ROLL 180° TO HEADS UP
RO, P320/229,YO
PITCH DOWN, PHOTOGRAPH
LM WHILE TRACKING
THROUGH COAS

STOP PITCH AND
ROLL 180° TO HEADS DOWN
ATTITUDE FOR SURFACE
OBSERVATIONS
STOP CAMERA



R180, P282/185, YO
HGA P -7, Y 183

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	114:00-115:00	5/21	3-81

FLIGHT PLAN

CSM

LM

MCC-H

CMP

0430 EDT

CDR

LMP

PRESLEEP CHECKLIST
CREW STATUS REPORT (RADIATION, MEDICATION)
CYCLE O₂ & H₂ FANS
CHLORINATE WATER
VERIFY:

WASTE MNGMT OVBD DRAIN VLV - OFF
WASTE STOW VENT VLV - CLOSED
EMER CABIN PRESS VLV - BOTH
SURGE TANK O₂ VLV - ON
REPRESS PACK O₂ VLV - OFF
POTABLE H₂O HTR - OFF
SELECT COMM NORMAL LUNAR CONFIGURATION - EXCEPT:
S-BAND SQUELCH - ENABLE
HGA TRACK - REACQ
HGA BEAM - NARROW
HGA P -59, Y 355

EAT PERIOD
(1 HOUR)

115:00

115:18

115:30

115:37
REV 21

116:00

M
S
F
N

TERMINATE EVA
WIPE FEET ON LANDING
PAD AND LADDER
ASCEND LADDER

CABIN REPRESS JETT EQUIP
CLOSE FWD HATCH

POST EVA SYSTEMS CONFIGURATION

VERIFY CAUTION LIGHTS OFF
DISCONNECT RCU
DISCONNECT OPS O₂ HOSES
CONNECT LM O₂ HOSES
CONFIGURE VALVES AND CIRCUIT BREAKERS
DISCONNECT PLSS H₂O HOSES
SWITCH TO LM COMM SYSTEM

PLSS/OPS DOFFING

REMOVE LMP RCU
OPS CHECK
STOW PLSS/OPS ON CABIN FLOOR
REMOVE CDR RCU
STOW PLSS/OPS ON CABIN FLOOR

80mm/HCEX/EVA CARD #1
6 FRAMES EACH, FAR & NEAR
FIELD (FOCUS 50' & 20') AND
80mm/BW/EVA CARD #1
6 FRAMES EACH, FAR & NEAR
FIELD (FOCUS 50' & 20')

FINAL SYSTEMS CONFIGURATION
PREP FOR EQUIPMENT JETTISON

REPORT PLSS FEEDWATER
REMOVE OPS FROM PLSS

2+30

2+40
END EVA

COPY REPORT

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	115:00-116:00	5/20-21	3-82

FLIGHT PLAN

CSM

LM

MCC-H

CMP

CDR

LMP

SET LEB TIMER TO
NOMINAL LIFT OFF
TIME AND STOP
GDC ALIGN TO IMU
ORDEAL VERIFY
RR XPONDER-HTR

EAT PERIOD
(1 HOUR)
RR XPONDER-PWR

121:00

121:12

121:25

121:30

121:32

REV 24

121:58

122:00

M
S
F
N

REST PERIOD
(4 HR 40 MIN)

REST PERIOD
(4 HR 40 MIN)

DUMP DSE

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	121:00 - 122:00	5/23-24	3-87

FLIGHT PLAN

CSM

LM

MCC-H

CMP

CDR

LMP

SELECT COMM: NORMAL
LUNAR CONFIGURATION
CREW STATUS REPORT(SLEEP)

1130 EDT
122:00

CREW STATUS REPORT (SLEEP)

LGC SELF TEST
AGS TURN ON, SELF TEST
AND SYSTEM TESTS
INITIALIZE AGS TIME
REPORT BIAS TO MCC-H
REPORT:

COPY TIME BIAS

P57 - GRAVITY AND ONE
CELESTIAL BODY (REFSMMAT)

N04: _____

N71: _____

N93: X _____

Y _____

Z _____

GET _____:_____:_____

RR - ON, SELF TEST, OFF

RCS HOT FIRE

AGS GYRO CALIBRATE

EAT PERIOD
(35 MIN)

EAT PERIOD
(35 MIN)

UPLINK LGC

CSM STATE VECTOR
(INSERTION +18 MIN)
PGNCS GYRO COMP
(IF REQUIRED)

UPLINK CMC

CSM STATE VECTOR
(INSERTION +18 MIN)
NOMINAL LM S. V.
(INSERTION +18 MIN)

V45 RESET LUNAR SURFACE
FLAG

P52 IMU REALIGN

OPTION 3 (REFSMMAT)

REPORT

P52 LIFT OFF REFSMMAT

N71: _____

N05: _____

N93: _____

X _____

Y _____

Z _____

GET: _____:_____:_____

M
S
F
N

122:30
122:31
122:37

M
S
F
N

123:00

EDITION

DATE

TIME

DAY/REV

PAGE

APOLLO 11

Revision A

July 8, 1969

122:00 - 123:00

6/24

3-88

FLIGHT PLAN

CSM

CMP

COPY CONSUMABLES UPDATE

RR XPONDER - SELF
TEST THEN PNR

O₂ FUEL CELL PURGE

SET UP CAMERA FOR DOCKING
16mm/18/CEX-BRKT
MIR(f8,250,INF) 6 fps

1230 EDT

123:00

123:10

123:24

123:30
REV 25

123:56

124:00

M
S
F
N

CDR

COPY CONSUMABLES UPDATE

LM

LMP

COPY ASCENT PAD
LOAD PAD DATA

VERIFY AGS:
AZIMUTH CORRECTION = 0
H = 60,000 FT
H DOT = 32 FPS
NO S-BAND YAW MNVR
ORBIT INSERTION MODE

SET CAMERA FOR ASCENT
16mm/HCEX/OVERHEAD
(f4,500,INF) 12 fps

REPORT:

P57-GRAVITY AND ONE
CELESTIAL BODY (T-ALIGN)

N04: _____

N71: _____

N93: _____

X _____

Y _____

Z _____

GET: _____:_____:_____

ENTER AGS LUNAR ALIGN

MCC-H

UPDATE LM

ASCENT PAD & CSI PAD

CONSUMABLES UPDATE
(Δ FROM NOMINAL)

GET: _____

RCS TOT _____

A _____

B _____

C _____

D _____

H₂ TOT _____

O₂ TOT _____

LM CONSUMABLES UPDATE

GET: _____:_____

RCS A _____ B _____

DESC O₂ _____

DESC A-H _____

ASC A-H _____

DUMP DSE

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	123:00-124:00	6/24-25	3-89

FLIGHT PLAN

CSM

CMP

V64 ACQUIRE MSFN

VHF RANGING
MNVR TO SUPPORT
LIFT OFF
RO, P250/207, Y0

EXT RNDZ LT - ON

PITCH DOWN, 0.2°/SEC

CONFIRM INSERTION

VHF RANGING
REPORT:

P52 (LIFT OFF REFSMMAT)
N71: OPTION 3
N05: _____
N93: _____
X _____
Y _____
Z _____
GET _____:_____:_____

1330 EDT
124:00

M
S
F
N

124:30
124:31
124:36
124:37

125:00

CDR

LOAD DAP - 12012
DON HELMET AND GLOVES
P12 ASCENT PROGRAM
RR-ON

PRELAUNCH SWITCH CK (PRESS
VERIFY RESTRAINTS APS)

TIG-5 SEC, ABORT STAGE

APS, LIFT OFF

RR LOCK ON, MODE II

ORBIT INSERTION

RR-OFF
VERIFY INSERTION VEL

P52 (LIFT OFF REFSMMAT)
N71: OPTION 3
N05: _____
N93: _____
X _____
Y _____
Z _____
GET _____:_____:_____

RR - ON

LM

LMP

DON HELMET AND GLOVES

GO/NO GO FOR PGNC
ASCENT GUIDANCE AND
LIFT OFF THIS REV
PRELAUNCH SWITCH CK
VERIFY RESTRAINTS

LIFT OFF COMM
START 16mm CAMERA
V47 INITIALIZE AGS
AGS GUIDANCE STEERING

TIG: 124:23:26
BT: 7 MIN 18 SEC
ΔV: 6060 FPS
ORBIT: 60 KFT x 45NM

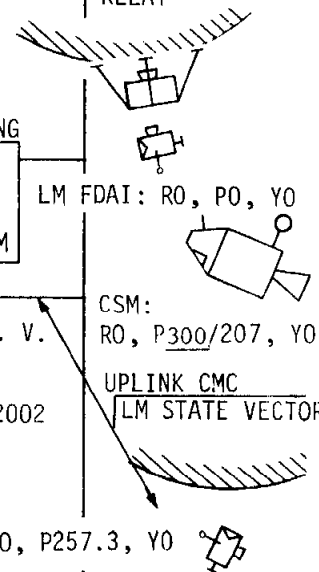
124:30:44
P00 - DOWNLINK LM S. V.
STOP 16mm CAMERA
ECS CHECK
V48 LOAD DAP N46, 12002
V56, V41
TURN ON TRACK LIGHT

V93 (BEFORE FIRST MARK)
V80, V47 INITIALIZE AGS
P32 CSI PRETHRUST

MCC-H

UPDATE LM
GO/NO GO

LIFT OFF -6 MIN
DISABLE S-BAND
RELAY



CSM: RO, P235/119, Y0

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	124:00 - 125:00	6/25	3-90

MCC-H

2030 EDT

FLIGHT PLAN

NOTES

131:00
131:03

EQUIPMENT STOWAGE

131:18

VACUUM PGAS

131:25
REV 29

SET UP CAMERA FOR LM JETTISON

16mm/18/CEX-BRKT,MIR
(f8,250,7) 12 fps

131:30

SM RCS CHECK

ENABLE JETS B-3 AND C-4

CONFIGURE DAP - R1=11102, R2=11111

GO/NO-GO FOR PYRO ARM

PYRO LOGIC ARM

THRUST MONITOR - P47

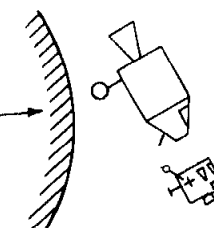
START CAMERA

LM JETTISON

SM RCS CHECK

GETI = 131:53:05
BT =
 $\Delta V = 1.5$ FPS
RETROGRADE
ORBIT: 58.5 X 59.4

DAP CONFIGURATION
FOR LM JETTISON
CSM, 0.5° DB, 0.5°/SEC
A/C ROLL, 4 JET



RO, P45/25, Y0
HGA P-53, Y3

GO/NO GO

DUMP DSE

131:50

132:00

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	131:00 - 132:00	6/29	3-97

MSC Form 29 (May 69)

FLIGHT PLANNING BRANCH

MCC-H

2130 EDT

132:00

UPDATE

TEI₃₀ MNVR PAD

132:23

132:30

M
S
F
N

133:00

FLIGHT PLAN

MNVR TO TEI BURN ATTITUDE (EXCEPT ROLL)

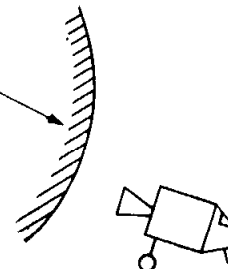
V66 - TRANS CSM STATE VECTOR TO LM SLOT
BURN STATUS REPORT
RECORD PRELIMINARY TEI₃₀ MNVR PAD

GO INERTIAL

DOFF AND BAG PGA'S HELMETS
AND GLOVES

EAT PERIOD

NOTES



R1.1 P93.2/52.6 Y13.8
HGA P -79, Y 10

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	132:00 - 133:00	6/29	3-98

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FLIGHT PLANNING BRANCH

)

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TEI
BURN CHART

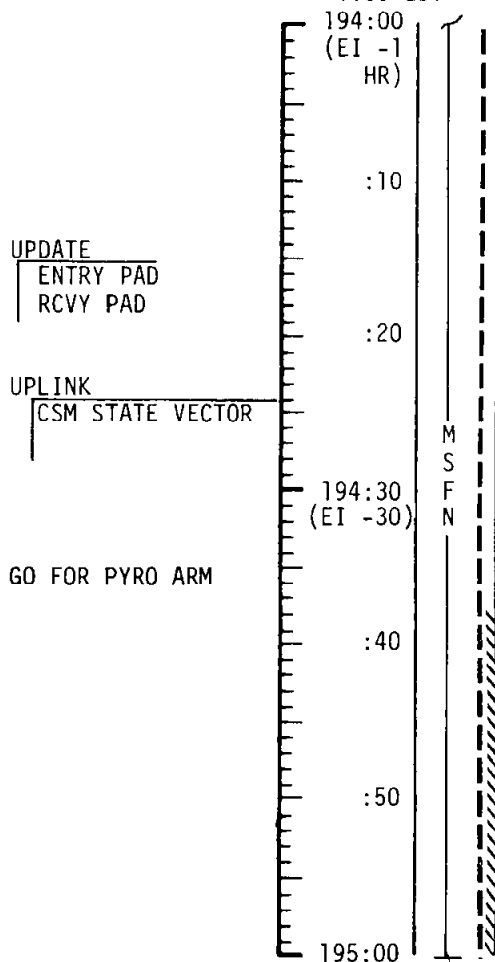
	P OR Y RATES	ATT DEVIATION	SHUTDOWN TIME	RESIDUALS
TEI	10°/SEC TAKEOVER	+10° TAKEOVER	BT + 2 SEC & $\Delta V_c = -40$ FPS	TRIM X AXIS TO 0.2 FPS
TEI ABORT MODES				
TEI V_{GO}	BT	TRAJECTORY	ABORT MODE	
3292.7 - 1436.0	0-01:30	LUNAR ORBIT	MODE III - AFTER 1 REV	
1436.0 - 1207.0	1:30- 1:40	UNSTABLE	MODE II - 2 SPS BURNS FOR ORBIT STABILIZATION AND WATER OR CLA LANDING.	
1207.0 - Q	1:40-02:29	UNSTABLE/ HYPERBOLIC	MODE I - 1 BURN AT TEI + 2 HRS P37 AT SPHERE OF INFLUENCE HYPERBOLIC (ΔV 580 to 0, BT 02:05 - 02:29	

MCC-H

1130 EDT

FLIGHT PLAN

NOTES



PRIMARY EVAPORATOR ACTIVATION

FINAL GDC DRIFT CHECK
TERM CM RCS PRFHEATSECONDARY EVAPORATOR ACTIVATION
PYRO BATTERY CHECK
RECORD ENTRY PAD AND RECOVERY DATAP27 UPDATE - V66 - TRANS CSM STATE VECTOR TO
LM SLOTSET DET TO RRT
EMS INITIALIZATION
RSI ALIGN TO GDCCM RCS CK
ENTRY BATTS - ONSEPARATION CHECKLIST
GO FOR PYRO ARMP61 ENTRY PREP
MNVR TO CM/SM SEP ATT

CM/SM SEP

P62 - ENTRY ATTITUDE
MNVR TO ENTRY ATT

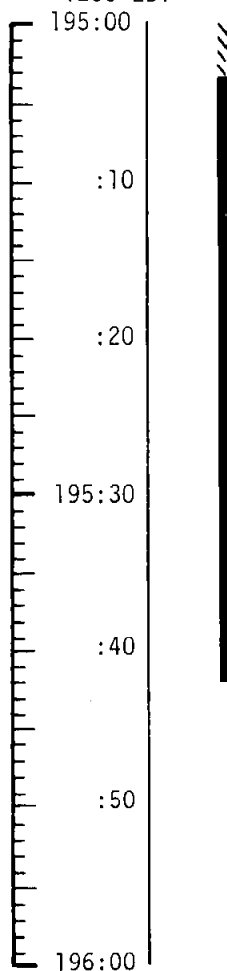
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	194:00 - 195:00	9/TEC	3-134

MCC-H

1230 EDT

FLIGHT PLAN

NOTES



P63 - ENTRY INITIATE

EI - GET = 195:05:04

P64 - ENTRY POST .05G

TRAJECTORY EVENT

TIME FROM
ENTRY INTERFACE
MIN:SEC

400,000 FEET (GET 195:05:04)	00:00
ENTER S-BAND BLACKOUT	00:18
0.05G	00:28
KA - INITIATE CONSTANT DRAG	00:52
RDOT = -700 FPS	01:18
PEAK G (6.6)	01:22
SUBCIRCULAR VELOCITY	02:08
P64 to P67	02:08
EXIT S-BAND BLACKOUT	03:24
GUIDANCE TERMINATION	07:14
DROGUE DEPLOYMENT	08:12
MAIN DEPLOYMENT	09:00
SPLASHDOWN	13:55

 $\gamma = -6.50^\circ$, $L/D = 0.295$, $V = 36,195$, & $R = 1285$

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	Revision A	July 8, 1969	195:00 - 196:00	9/TEC	3-135

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FLIGHT PLANNING BRANCH