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FLIGHT PLAN

CSM

P52 - IMU REALIGN (CONT)

UNSTOW S-158

CMP

LCM

2322 CST
133:00

REV 26

:07

CDR

SET DET & CHRONOMETER
FWD DUMP VALVE - OPEN

LM

OPEN FWD HATCH
FINAL PREP FOR EGRESS
PLSS H2O ON, FINAL SYSTEMS CHECK, TURN TV ON
VERIFY CB CONFIGURATION, JETTISON BAG & LHSSC

LMP

CDR EGRESS

:13

:15

:21

ETB TRANSFER
TRANSFER ETB TO SURFACE

ASSIST CDR

STOW TOOLS & EQUIP ON HTC
RETRIEVE & OPEN SRC #2
ATTACH SADDLE BAG TO LMP
UNSTOW SRC #2
SEAL ORGANIC CONT SAMPLE

GEOLOGY TRAVERSE PREP

M

S

F

N

GEOLGY TRAVERSE

DUMP DSE

0:20

0:30

0:40

UPDATE TO CSM

MAP UPDATE REV 27

P22 TRACKING PAD

0:50

134:00

133:30

LEGAL

REACQUIRE MSFN

HGA P -24, Y 254
SET UP DAC FOR LDMK
TRACKING PHOTOS THRU SXT

CM/DAC/SXT/CEX,(SEE LDMK
TRACK PAD)1FPS (5MIN)

MAP UPDATE REV 27

LOS : ______ : ______

180° : ______ : ______

AOS : ______ : ______

VERIFY DSE MOTION

MNVR TO TRACK ATT

BY 134:00

R 0 , P 338N/A, Y 0

OMNI D

GO ORB RATE

MISSION

APOLLO 12

EDITION

FINAL (NOV.14)

DATE

OCTOBER 15, 1969

TIME

133:00 - 134:00

DAY/REV

6/26

PAGE

3-109

MSC Form 1674 (OT)(June 69)

FLIGHT PLANNING BRANCH

REVISION A
22 DEG PITCH DOWN FROM LOCAL HORIZONTAL ORBITAL RATE THROUGHOUT TRACKING

CSM LANDMARK TRACKING PROFILE

AOS

MARK NO. 1

MARK NO. 2

MARK NO. 3

MARK NO. 4

MARK NO. 5

MARK NO. 6

MARK NO. 7

HORIZON

HORIZON

T1 GET AT 0° ELEVATION

T2 GET AT 35° ELEVATION

P22 AUTO ACQ P dn 22° RO° Y0° (1/60)

LANSBERG A

Δ T1 = 300 SEC
Δ T2 = 40 SEC
Δ T3 = 25 SEC
Δ T4 = 25 SEC
Δ T5 = 25 SEC
Δ T6 = 25 SEC
Δ T7 = 340 SEC

AOS TO LOS - 146 SEC
AOS TO FINAL MARK - 140 SEC

CENTER OF MOON

RADIUS OF MOON

RA

N or S NM SA TA CP

LAT + 0.150°

LONG/2 - 15.575°

ALT - 0.54 NM

FIGURE 3-3
3-110
FLIGHT PLAN

CSM
CMP

START DAC T2(-) 1 MIN

TRACK LANSBERG A
DO NOT PRO ON FINAL N89
25 SEC BETWEEN MARKS
5 MARKS

STOP DAC AFTER MARK 5
STOP ORB RATE @ P 232
MNVR TO ACO MSFN,
GO INERTIAL
R 180, P 232, Y 0
HGA P -26, Y 186

VERIFY DSE MOTION @ LOS

CDR

0022 CST
134:00

LM

1:00

LMP

UPDATE TO CSM
S-158 PAD
1:10

MCC-H

1:20

COLLECT DOCUMENTED SAMPLES
COLLECT CORE TUBE SAMPLES
TRENCH SITE SAMPLING
COLLECT GAS ANALYSIS SAMPLES
MAKE GENERAL OBSERVATIONS

1:30

1:40

1:50

REV 27
135:00

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 12 FINAL (NOV 14) OCTOBER 15, 1969 134:00 - 135:00 6/26-27 3-111

MSC Form 1674 (OCT)(June 69) FLIGHT PLANNING BRANCH
S-158 REV 27

BLUE  GREEN, BLACK - (f5.6) ___, RED (f4.0) ___

T₁  START BLUE, GREEN & RED CAMERAS @ 135:19:00 (___:___:___)
    START BLACK CAMERA @ T₁ + 5 MIN

T₂  STOP ALL CAMERAS @ 135:30:00 (___:___:___)

T₃  START BLUE, GREEN & RED CAMERAS @ 135:40:00 (___:___:___)
    START BLACK CAMERA @ T₃ + 7 MIN

T₄  STOP ALL 4 CAMERAS @ 136:02:00 (___:___:___)
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134:58:13
BEGIN REV 27
(180,NA/232,0)
IATTH

MNVR TO S158
PHOTO ATT
(0,213/NA ,0)
LATTH

LEGEND:
□ MSFN AOS, LOS
○ ○ S/C SUNRISE, SUNSET
⊕ SUBEARTH POINT
(R,LHP/INP,Y)
IATTH - INERTIAL ATTITUDE HOLD
LATTH - LOCAL ATTITUDE HOLD

REV 27
FLIGHT PLAN

CSM

CMP

STOP ALL CAMERAS
CONTINUE ORB RATE

LM

0222 CST

136:00

CDR

CHECK & CLEAN LMP EMU
CLOSE & SEAL SRC

LEC TRANSFERS:
CHECK 70MM(2) IN ETB
CLOSE & TRANSFER ETB
REST/CHECK EMU
ATTACH LEC TO SRC
TRANSFER SRC INTO LM
REST/CHECK EMU

TRANSFER SURVEYOR PARTS BAG

EVA TERMINATION
STOW 70MM CAMERA IN ETB
CLEAN EMU
ASCEND TO PLATFORM, INGRESS
CHECK EMU & LM SYSTEMS

ASSIST CDR WITH TRANSFERS

DISCARD LEC

EVA TERMINATION
CLEAN EMU, ASCEND TO
PLATFORM
INGRESS

CLOSE HATCH & REPRESS CABIN

POST EVA SYSTEMS CONFIGURATION
CONFIGURE VALVES AND CIRCUIT BREAKERS

DOFF GLOVES
DISCONNECT OPS O2 HOSES & CONNECT LM O2 HOSES
DISCONNECT PLSS H2O HOSES & CONNECT LM H2O HOSES
LCG PUMP CB-CLOSE
SWITCH TO LM COMM SYSTEM
PLSS/OPS DOFFING
REMOVE RCU'S DISCONNECT PLSS O2 HOSES
DOFF PLSS/OPS
REMOVE OPS & CHECKOUT

MCC-H

MAP UPDATE REV 28
UPDATE TO CSM
MAP UPDATE REV 28
S-158 PAD

VERIFIED DSE MOTION @ LOS

MISSION

APOLLO 12

EDITION

FINAL (NOV 14)

DATE

OCTOBER 15, 1969

TIME

136:00 - 137:00

DAY/REV

6/27-28

PAGE

3-114

MSC Form 14

(T) (June 69)

FLIGHT F

ING BRANCH
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BLUE, GREEN, BLACK (f8.0) ____, RED (f5.6) ____.  
T1 START ALL CAMERAS @ 137:27:00 (____:____:____)
T2 STOP ALL CAMERAS @ 137:40:00 (____:____:____)

SELECTED TARGETS

NORTH WALL OF THEOPHILUS
R____-, P____-, Y____-
BLUE, GREEN, BLACK (f5.6) ____, RED(f4.0) ____
T1 START ALL CAMERAS @ 137:47:00 (____:____:____)
T2 STOP ALL CAMERAS AFTER 2 PHOTOS (20 SEC)

DESCARTES
R____-, P____-, Y____-
NO CHANGE IN f STOPS
T1 START ALL CAMERAS @ 137:51:00 (____:____:____)
T2 STOP ALL CAMERAS AFTER 2 PHOTOS (20 SEC)

FRA MAURO
R____-, P____-, Y____-
ALL CAMERAS (f2.8) ____
T1 START ALL CAMERAS @ 138:01:00 (____:____:____)
T2 STOP ALL CAMERAS AFTER 2 PHOTOS (20 SEC)
138:54:46
BEGIN REV 29
(180, NA/312, 0)
IATTH

BEGIN IMU
REALIGN
(180, NA/312, 0)
IATTH

END ORBRATE,
MNVR TO IMU
REALIGN ATT
(180, NA/312, 0)
IATTH

ROLL 180 DEG
TO LDMK
TRKNG ATT
(0, 338/NA, 0)
LATTH

LEGEND:

- MSFN AOS, LOS

- S/C SUNRISE, SUNSET

- SUBEARTH POINT

(R, LHP/INP, Y)

IATTH - INERTIAL ATTITUDE HOLD
LATTH - LOCAL ATTITUDE HOLD

REV 29

3-117A

REVISION B
22 DEG PITCH DOWN FROM LOCAL HORIZONTAL ORBITAL RATE THROUGHOUT TRACKING

MARK NO. 1
MARK NO. 2
MARK NO. 3
MARK NO. 4
MARK NO. 5

35°
16°
17°
22°
22°
17°
51°

HORIZON
HORIZON

T1 GET AT 0° ELEVATION
T2 GET AT 35° ELEVATION

ΔT1 = 300 SEC
ΔT2 = 40 SEC
ΔT3 = 25 SEC
ΔT4 = 25 SEC
ΔT5 = 25 SEC
ΔT6 = 25 SEC
ΔT7 = 340 SEC

AOS TO LOS - 146 SEC
AOS TO FINAL MARK - 140 SEC

P22 MAN ACQ P dn 22° RO° YO°

T1
T2

R

N or S NM __ SA __ TA __

CP

LAT
LONG/2
ALT

193

RADIUS OF MOON

CENTER OF MOON

FIGURE 3-3

3-118a
FLIGHT PLAN

CSM

CMP

TRACK LANDMARK 193
DO NOT PRO ON FINAL N89
25 SEC BETWEEN MARKS
5 MARKS

STOP PITCH AND MANEUVER
TO P52 ATTITUDE BY
140:06
R 180 P 312 Y 0
HGA P -73 Y 338

P52 - IMU REALIGN
OPTION 3 - REFSSMAT
(LIFTOFF ORIENTATION)

REPORT GYRO TORQUE ANGLES
GDC ALIGN TO IMU

H₂ PURGE LINE HTR-ON

LM

CDR

0622 CST
140:00

09

TRACK CSM WITH RR

LM

LMP

R47-AGS INITIALIZATION

RCS CHECKOUT

MCC-H

V47-AGS INITIALIZATION

UPLINK TO CSM
RESET SURFACE FLAG
LM S.V. (INS + 18)

LOAD AGS ASCENT TGT:
H = 60,000 FT
H DOT = 9 FT/SEC

UPLINK TO LM
LGC GYRO COMPENSATION
UPDATE TO LM
ASCENT PAD
CSI PAD
AGS K FACTOR
LM & CSM DAP WEIGHTS

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
--- | --- | --- | --- | --- | ---
APOLLO 12 | FINAL (NOV 14) | OCTOBER 15, 1969 | 140:00 - 141:00 | 6/29-30 | 3-119
22 deg pitch down from local horizontal orbital rate throughout tracking

CSM LANDMARK TRACKING PROFILE

T1 GET AT 0° ELEVATION
T2 GET AT 35° ELEVATION

NOTE: Coordinates of LM to be updated real time
140:53:02
BEGIN REV 30
(180, NA/312, 0)
IATTH

142:01:18
LM LIFT-OFF
(0, NA/166, 0)
LOSM TO LM, MAN

END ORBRATE,
BEGIN LOSM TO LM
(0, 338/NA, 0)
LOSM TO LM, MAN

ROLL 180 DEG TO
LM TRKNG ATT
(0, NA/312, 0)
IATTH

END IATTH,
BEGIN LATTH
(0, 338/NA, 0)
LATTH

LEGEND:
☐ ☐ MSFN AOS, LOS
○ ○ S/C SUNRISE, SUNSET
⊕ SUBEARTH POINT
(R, LHP/INP, Y)
IATTH - INERTIAL ATTITUDE HOLD
LATTH - LOCAL ATTITUDE HOLD

3-120A

REVISION B
FLIGHT PLAN

CSM

CMP

SET UP CAMERAS FOR DOCKING CM2/DAC/18/CES-BRKT, MIR(f8,250,7) 6 FPS, 1 MAG, 16 MIN CM2/EL/BO/CES (f8,250,FOCUS), 10 CM4/TY-IN BRKT (f22)

REACQUIRE MSFN HGA: P -73, Y 338

LM

CDR

0722 CST 141:00 - 141:01

LMP

MCC-H

MAP UPDATE REV 31

LOS :

180° :

AOS :

UPDATE TO CSM LM TRACKING PAD

MAP UPDATE REV 31

UPLINK TO CSM (IF REQ)

LM S.V. (INS + 18)

CSM S.V. (INS + 18)

UPLINK TO LM (IF REQ)

CSM S.V. (INS + 18)

RLS GO/NO-GO FOR LIFTOFF FOR REV 30

V49-MNVR TO LM TRACK ATT BY 141:21

R 0 P 312 Y 0

OMNI D

M57-LUNAR SURFACE ALIGN OPTION 4-LANDING SITE A/T-3-GRAVITY & ONE CELESTIAL BODY (LIFTOFF ORIENTATION)

DON HELMET & GLOVES

LOAD DAP N46-12002

P12-POWERED ASCENT

GO/NO-GO FOR LIFTOFF

PRELAUNCH SWITCH CHECKS

VENT DPS & SHE

ALIGNS AGS TO PGNCS

DON HELMET & GLOVES

SET CAMERA FOR ASCENT:

LM3/DAC/10/CES(f2,8,500,30) 12 FPS, 1 MAG, 8 MIN

ASCENT BATS-ON, DES 183-OFF

ENTER AGS LUNAR ALIGN

PRELAUNCH SWITCH CHECKS

V47-AGS INITIALIZATION

LIFTOFF COMM

DES BATS 2&4- OFF

DEADFACE DES BATS

VERIFY CB STATUS

CHECK APS BURN CARD

CHECK APS, RCS, EPS, ECS

SEQ CAMERA - ON

L/O - 6 MINUTES:

DISABLE MSFN RELAY

MISSION EDITION DATE TIME PAGE
APOLLO 12 FINAL (NOV 14) OCTOBER 15, 1969 141:00 - 142:00 6/30 3-121

FLIGHT PLANNING BRANCH

REVISION A
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<td>3-124</td>
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</tbody>
</table>

**Diagram Description**:

- **CSM CMP**
  - P34-TARGET TPI
  - SXT & VHF TRACKING

- **1022 CST**
  - 144:00
  - 06:07
  - 12:15

- **CDR**
  - RNDZ RADAR TRACKING
  - FINAL TPI COMPUTATION
  - NULL RESIDUALS
  - P35-TPM TARGETING (MCC-1)
  - RNDZ RADAR TRACKING
  - ROCKET ENGINE AIR DUMP

- **LM**
  - CHECK RCS, EPS, ECS
  - OMNI-AFT, BIOMED-OFF

- **LMP**
  - PCM-LO
  - LOAD AGS TPI EXT ΔV

- **MCC-H**
  - TIG: 144:36:25.7
  - BT: 22.1 SEC
  - ΔVr: 24.6 FT/SEC
  - ORBIT: 61.9 x 44.2
  - GET: 144:51:25.7

- **TPI BACKUP**
  - CONFIRM LM TPI
  - P35-TARGET MCC-1
  - SXT & VHF TRACKING

- **FINAL MCC-1 COMP**
  - P41-RCS THRUSTING
  - MCC-1 BACKUP
  - CONFIRM LM MCC-1

- **P35-TARGET MCC-2**
  - SXT & VHF TRACKING

**Revision Note**: REV 32

**Page Information**: FLIGHT PLANNING BRANCH

**Form Information**: MCC Form P180 (OT) (Nov 68)

**Revision**: REVISION A
144:36:50
TPI BURN IGN
CSM(0,NA/4,0)
IATTH
LM(0,NA/273,0)
LOSM TO CSM

145:17:39
FIRST LM BRAKING BURN
CSM(60,NA/9,0)
LOSM TO LM
LM(0,NA/238,0)
LOSM TO CSM

145:21:51
FINAL LM BRAKING BURN
CSM(0,NA/334,0)
LOSM TO LM ALONG X-AXIS
LM(0,NA/244,0)
LOSM TO CSM

CSM AND LM BEGIN
VHF RNG AND RR TRKNG, RESPECTIVELY
CSM(0,NA/129,0)
LOSM TO LM
LM(0,NA/4,0)
LOSM TO CSM

CSM AND LM END
VHF RNG AND RR TRKNG, RESPECTIVELY
CSM(0,NA/161,0)
IATTH
LM(0,NA/36,0)
IATTH

145:40:00
CSM/LM DKNG
CSM(180,NA/336,0)
IATTH
LM(180,NA/336,300)
IATTH

LEGEND:

☐ ■ MSFN ACS, LOS
○ ● S/C SUNRISE, SUNSET
⊕ SUBEARTH POINT
(R,LHP/INP,Y)

IATTH - INERTIAL ATTITUDE HOLD
LATTH - LOCAL ATTITUDE HOLD

REV 32

3-124A
**FLIGHT PLAN**

**CSM CMP**
- 1322 CST
- 147:00
- REACQUIRE MSFN
  - HGA P-41 Y 5
- UNSTOW & INSTALL HATCH
- HATCH INTEGRITY CHECK
- GO/NO-GO FOR PYRO ARM
  - (CUE MSFN)
  - LOGIC-ON
- DEPRESS TUNNEL
- CONFIGURE CSM FOR JETT
- SET UP CAMERA FOR JETT
  - CM4/DAC/18/CEX-BRKT,
  - MIR(f8,250,7)12FPS,
  - 0.5 MAG, 4 MIN
- PYRO ARM
  - V48-LOAD DAP,N46-
    - R1(11102)
    - R2(01111)
- P47-THRUST MONITOR

**CDR**
- DISCONNECT FROM LM
- IVT TO CM

**LM LMP**
- CONFIGURE S-BAND
  - VERIFY COMM
  - ALIGN AGS TO PGNCS
  - V47-AGS INITIALIZATION
  - P30-TARGET PGNCS
  - TARGET AGS ΔV
  - CONFIGURE FOR LM JETT
  - CLOSE HATCH, IVT TO CM
- DUMP DSE
- UPDATE TO CSM
  - P76 PAD
  - MAP UPDATE REV 34
- GO/NO-GO FOR LM JETT & PYRO ARM

**MCC-M**
- MAP UPDATE REV 34
- LOS : __ __ __ __ __ __
- 180°W: __ __ __ __ __ __
- AOS : __ __ __ __ __ __

**LM JETTISON**
- SET ORDEAL

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
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APOLLO 12 | FINAL (NOV 14) | OCTOBER 15, 1969 | 147:00 - 148:00 | 6/33 | 3-127

**FLIGHT PLANNING BRANCH**

**REVISION A**
MCC-H
1422 CST

148:00
:03

CSM SEPARATION
R180 P90/NA Y 0
HGA P-36 Y352

SET ORDEAL

P20-RENDEZVOUS NAVIGATION
AUTO MNVR TO LM TRACK ATT
SET UP CAMERA FOR LM IMPACT
CM/DAC/SXT/CEX
(FIXED, 250/FIXED) 1 FPS, 0.5 MAG, 46 MIN
TRACK LM AND PHOTOGRAPH THROUGH SEXTANT
VERIFY DSE MOTION @ LOS

VACUUM, DOFF, BAG, AND STOW PGA'S

NOTES
CSM SEPARATION
BT: 2.7 SEC
ΔVr: 1.0 FT/SEC
ORBIT: 59.7 x 58.6
SM RCS Z-AXIS BURN

PRESLEEP CHECKLIST
E-MEMORY DUMP
CREW STATUS REPORT (medication)
ONBOARD READOUTS to MSFN
CYCLE H2, O2 FANS
CHLORINATE WATER
VERIFY
WASTE MNGT OVBD DRAIN vlv - OFF
WASTE STOW VENT vlv - CLOSED
EMER CABIN PRESS vlv - BOTH
SURGE TK O2 vlv - ON
REPRESS O2 vlv - OFF
LM TUNNEL VENT vlv - OFF
NORMAL LUNAR COMM EXCEPT
S BD SQUELCH - ENABLE
HI GAIN ANTENNA TRACK - REACQ
HI GAIN ANTENNA BEAM - NARROW
S BD ANT - HI GAIN

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
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APOLLO 12 | FINAL (NOV 14) | OCTOBER 15, 1969 | 148:00 - 149:00 | 6/33-34 | 3-128

MSC Form 29 (May 69)
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BEGIN REV 34
(180,NA/234,0)
LOSM TO LM, AUTO

149:24:41
LM IMPACT BURN
LM(63,NA/240,290)
IATTH

MNVR TO REST ATT
(123,NA/278,0)
IATTH

3-128A

LEGEND:

■ MSFN AOS, LOS
○ ● S/C SUNRISE, SUNSET
⊕ SUBEARTH POINT
(R,LHP/INP,Y)
IATTH - INERTIAL ATTITUDE HOLD
LATTH - LOCAL ATTITUDE HOLD

REVISION B
FLIGHT PLAN

1522 CST
149:00
:02
:08
:15
MSFN
OMNI D
EAT PERIOD
PHOTOGRAPH LM THROUGH Sextant
MNVR TO REST ATT BY 150:00 R123, P278, Y D, GO INERTIAL
HGA P-24 V243
LOAD DAP, RT(11112)R2(X1111)
V21 N01
3255E, 1616E

NOTES

LM IS TARGETED FOR APS IMPULSE BURN. THRUST IS RCS ULLAGE ONLY.

TEI 39 PAD ASSUMES NO PLANE CHANGE 2

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

LM DEORBIT BURN
TIG: 149:24:41.2
BT: 83.8 SEC
ΔVr: 189.7 FT/SEC

LM LUNAR IMPACT
GET: 149:52:50.5
LAT: 3°17'S
LONG: 23°23'W

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--------|---------|------|------|---------|------
APOLLO 12 | FINAL (NOV 14) | OCTOBER 15, 1969 | 149:00 - 150:00 | 6/34 | 3-129

MSC Form 29 (May 69)  
FLIGHT PLANNING BRANCH
FLIGHT PLAN

1822 CST

152:00

:07

:18

:30

REV 36

:53

:59

153:00

:04

DUMP DSE

154:00

:30

:59

REST PERIOD
(7.5 HOURS)

NOTES

MISSION     EDITION     DATE         TIME             DAY/REV     PAGE
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MSC Form 29 (May 69)
FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

154:00
:05
:16
:30

MSFN

155:00
:51
:58
02

MSFN

156:00
:30

DUMP DSE

REST PERIOD (7.5 HOURS)

156:00
:57

REST ATT

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 12 | FINAL (NOV 14) | OCTOBER 15, 1969 | 154:00 - 156:00 | 6/36-37 | 3-132

MSC Form 29 (May 89)
FLIGHT PLANNING BRANCH
NASA — MSC
FLIGHT PLAN

REST PERIOD
(7.5 HOURS)

HGA P-22 Y239