APOLLO 14 (JAN 31, 1971)
AS-509/CSM-110/LM-8

FINAL

FLIGHT PLAN

PREPARED BY
APOLLO FLIGHT PLANNING SECTION
FLIGHT PLANNING BRANCH
FLIGHT CREW SUPPORT DIVISION

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CHANGED
JANUARY 18, 1971
APOLLO 14

(January 31, 1971)

FLIGHT PLAN

January 18, 1971

PREPARED BY: C. L. STOUGH
BOOK MANAGER

APPROVED BY: J. W. O'NEILL
FLIGHT PLANNING BRANCH
FLIGHT CREW SUPPORT DIVISION

It is requested that any organization having comments, questions, or suggestions concerning this document contact C. L. Stough, Flight Planning Branch, CF62, Building 4, room 231, telephone 483-4271.

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes should be submitted to the Apollo Flight Data File Manager T. W. Holloway, CF62, Building 4, room 230, telephone 483-4271.

Distribution of this document is controlled by W. J. North, Chief, Flight Crew Support Division.
FLIGHT DATA FILE PEN AND INK CHANGES

The enclosed pen and ink changes are included with change B to the Apollo 14 Flight Plan dated 1/11/71. The list of effective pages for change B reflect these pen and ink changes.

1. Page 1-16: Under CST and GET for Friday 5, FEB. Change "8:20 AM" to 8:06 AM" and "113:40" to "113:43".

2. Page 1-16: Under CST and GET for Saturday 6, FEB. Change "3:59AM" to "3:56 AM" and "133:31" to "133:33".

3. Page 3-78: Change CSM IMU roll angle for LOI +2 hr DPS abort from "301" to "121".

4. Page 3-78: Change LM FDAI angles for LOI +2 hr DPS abort from "10,81,1" to "170,261,359".

5. Page 3-79: At bottom of page change edition from "FINAL (JAN)" to "CHANGE B (JAN)" and Date from "DECEMBER 2, 1970" to "JANUARY 11, 1971".

6. Page 3-79: In the Notes column under S-IVB LUNAR IMPACT change "LONG 33.250" to "LONG -33.250".

7. Page 3-82: Change "AOS to LOS = 874 SEC" to "AOS TO LOS = 450 SEC".

8. Page 3-86: At bottom of page change edition from "FINAL (JAN)" to "CHANGE B (JAN)" and Date from "DECEMBER 2, 1970" to "JANUARY 11, 1971".

9. Page 3-86: Delete "V48 (21111)(X1111)" and "(21111)" (X1111) at the bottom of the page.

10. Page 3-87: At bottom of page change edition from "FINAL (JAN)" to "CHANGE B (JAN)" and Date from "DECEMBER 2, 1970" to "JANUARY 11, 1971".
11. Page 3-87:  Change DAP LOAD STATUS at top of time column from "21111" to "21101". 
Delete "V48 (21101)(X1111)" and "(21101)(X1111)" at bottom of page.

12. Page 3-106:  At bottom of page change edition from "CHANGE A (JAN)" to "CHANGE B (JAN)" and date from "DECEMBER 23, 1970" to "JANUARY 11, 1971".

13. Page 3-106:  Under CSM LOW ALTITUDE LANDMARK TRACKING PROFILE change "AOS TO LOS = 72 SEC" to "AOS TO LOS = 52 SEC"

14. Page 3-128:  At bottom of page change edition from "CHANGE A (JAN)" to "CHANGE B (JAN)" and date from "DECEMBER 23, 1970" to "JANUARY 11, 1971".

15. Page 3-128:  At 111:58 add "TERMINATE WASTE WATER DUMP".

16. Page 3-136:  At bottom of page change edition from "FINAL (JAN)" to "CHANGE B (JAN)" and date from "DECEMBER 2, 1970" to "JANUARY 11, 1971".

17. Page 3-136:  At 114:32 in the time column change "(10101)" to "(11101)"

18. Page 3-148:  At bottom of page Change edition from "CHANGE A (JAN)" to "CHANGE B (JAN)" and date from "DECEMBER 23, 1970" to "JANUARY 11, 1971".

19. Page 3-148:  At 118:24 change "CM4/DC/80/VHFW/BRKT-IVL (f2.8/1/60,∞) (51 FR)" to "CM4/DC/80/VHFW/BRKT,IVL, PCM CABLE (f2.8,1/60,∞) (51 FR)".

20. Page 3-214:  At bottom of page change edition from "FINAL (JAN)" to "CHANGE B (JAN)" and date from "DECEMBER 2, 1970" to "JANUARY 11, 1971".
21. Page 3-214: At 144:16, delete the following: "REMOVE DECOMTAMINATION BAGS (A8) UNSTOW AND ASSEMBLE:
   VACUUM CLEANER, PWR CABLE,
   HOSE, AND BAG (SIDE A12, SIDE A8)
   CONNECT PWR CABLE (PNL 201)".

22. Page 3-216: At 144:32, change "DECONTAMINATION BAGS (A8, U1)" to "DECONTAMINATION BAGS".

23. Page 3-216: At bottom of page change edition from "CHANGE A (JAN)" to "CHANGE B (JAN)" and date from "DECEMBER 23, 1970" to "JANUARY 11, 1971".

24. Page 3-225: At bottom of page change edition from "CHANGE A (JAN)" to "CHANGE B (JAN)" and date from "DECEMBER 23, 1970" to "JANUARY 11, 1971".

25. Page 3-225: In the LM LUNAR IMPACT BOX change "LONG 1929°W" to "LONG 19.27°W".

26. Page 3-225: In Notes column change "LAT 3.32°S" to "LAT 3.04°S" and "LONG 23.38°W" to "LONG 24.64°W".
Flight Data File Pen and Ink Changes

The enclosed pen and ink changes are included with change C to the Apollo 14 Flight Plan dated 1/18/71. The list of effective pages for change C reflect these pen and ink changes.

1. Page 3-142: At bottom of page change edition from "Final (Jan)" to "Change C (Jan)" and Date from "December 2, 1970" to "January 18, 1971."

2. Page 3-142: At 116:50 change "(000,114,045) HGA P -84, Y 356" to "(184,202,045) HGA P 3, Y 229"

3. Page 3-196: At bottom of page change edition from "Change A (Jan)" to "Change C (Jan)" and date from "December 23, 1970" to "January 18, 1971"


5. Page 3-198: At bottom of page change edition from "Final (Jan)" to "Change C (Jan)" and date from "December 2, 1970" to "January 18, 1971"

6. Page 3-198: At 140:06 change "Photo TGT 7, North (f11,1/250,∞)" to "Photo TGT 7, North (f8,1/250,∞)"

7. Page 1-16: Delete TV show on Thursday 4, February 7:23 pm CST.

8. Page 3-96: At bottom of page change edition from "CHANGE A (JAN)" to "CHANGE C (JAN)" and date from "DECEMBER 23, 1970" to "JANUARY 18, 1971"

9. Page 3-96: At 100:58, delete TV callout "CM5/TV-AVG (f22) TV (GDS) 101:00 - 101:14"

10. Page 3-98: At bottom of page change edition from "CHANGE A (JAN)" to "CHANGE C (JAN)" and date from "DECEMBER 23, 1970" to "JANUARY 18, 1971"

11. Page 3-98: From 101:00 to 101:14 delete TV show
FLIGHT PLAN  
(January 31, 1971 Launch) 

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<td>calibration</td>
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<td>CAM</td>
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<tr>
<td>CB</td>
<td>circuit breaker</td>
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<td>CGE</td>
<td>cold cathode gage experiment</td>
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<tr>
<td>CCIG</td>
<td>cold cathode ion gage</td>
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<td>CCW</td>
<td>counter clockwise</td>
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<td>CDH</td>
<td>constant delta altitude</td>
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<td>Command Module Pilot</td>
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<td>CS</td>
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<td>CSM</td>
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<td>CST</td>
<td>central standard time</td>
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<td>C/S</td>
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ABBREVIATIONS (CONT)

DCA    digital command assembly
DEDA   data entry and display assembly
DEG    degrees
DEPL   depletion
DES    descent
DET    digital event timer
DIFF   difference
DIR    direct
DK     docked
DO     detailed objective
DOI    descent orbit insertion
DPS    descent propulsion system
DRT    dome removal tool
DS     documented sample
DSE    data storage equipment (CSM)
DSEA   data storage equipment assembly (LM)
DSKY   display and keyboard
DTO    detailed test objective
DUA    digital uplink assembly
DWN    down

E      erasable or enter
ECS    environmental control system
ED     explosive device
EDT    eastern daylight time
EFH    earth far horizon
EI     earth (atmosphere) interface and entry interface
EKG    electrocardiogram
EL     electric Hasselblad camera
ELEV   elevation
EMER   emergency
EMS    entry monitor system
EMU    extravehicular mobility unit
ENG    engine
ENH    earth near horizon
ENT    entry
E.O.   earth orbit
EOM    end of mission
EPO    earth parking orbit
EPHEM  Ephemeris
EPS    electrical power subsystem
EQUIP  equipment
ERECT  erectable
EST    eastern standard time
ETB    equipment transfer bag
EVA    extravehicular activity
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<td>f</td>
<td>f-stop</td>
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<td>familiarize or familiarization</td>
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<td>LB or lb</td>
<td>pound(s)</td>
</tr>
<tr>
<td>LCG</td>
<td>liquid cooled garment</td>
</tr>
<tr>
<td>L/D</td>
<td>lift/drag</td>
</tr>
<tr>
<td>LD</td>
<td>lunar day (TV lens)</td>
</tr>
<tr>
<td>LDG</td>
<td>landing</td>
</tr>
<tr>
<td>LDMK</td>
<td>landmark</td>
</tr>
<tr>
<td>LEB</td>
<td>lower equipment bay</td>
</tr>
<tr>
<td>LEC</td>
<td>lunar equipment conveyor</td>
</tr>
<tr>
<td>LEVA</td>
<td>lunar extravehicular visor assembly</td>
</tr>
<tr>
<td>LFH</td>
<td>lunar far horizon</td>
</tr>
<tr>
<td>LGC</td>
<td>LM guidance computer</td>
</tr>
<tr>
<td>LH</td>
<td>left-hand</td>
</tr>
<tr>
<td>L/H</td>
<td>local horizontal</td>
</tr>
</tbody>
</table>
ABBREVIATIONS (CONT)

LHEB  left-hand equipment bay
LHFEB  left-hand forward equipment bay
LHSSC  left-hand side storage container
LiOH  lithium hydroxide
LLM  lunar landing mission
LLOS  landmark line of sight
LM  lunar module
LMP  Lunar Module Pilot
LNH  lunar near horizon
L/O  lift-off
LOI  lunar orbit insertion
LONG  longitude
LOS  loss of signal or loss of site
LPD  landing point designator
LPO  lunar parking orbit
LPM  lunar portable magnetometer
LR  landing radar
LRRR or LR^3  laser ranging retro-reflector
L/S  landing site or lunar surface
LSM  lunar surface magnetometer
LT  light
LTC  lunar topographic camera
LTG  lighting
LV  launch vehicle
L/V  local vertical
LVPD  launch vehicle pressure display
M  mandatory
MAD  Madrid, Spain
MAG  magazine (camera)
MAN  manual
MAX  maximum
MAX Q  maximum dynamic pressure
MBW  medium black and white film
MCC  midcourse correction
MCC-H  Mission Control Center - Houston
MDC  main display console
MEAS  measurement
MESA  modular experiment stowage assembly
MET  mission event timer
MGA  middle gimbal angle
M/I  minimum impulse
MIN  minimum or minutes(s)
MIR  mirror
MLA  Merrit Island, Florida, launch area
mm or MM  millimeter
ABBREVIATIONS (CONT)

MNA or MNB  main electrical bus A or B
MNVR  maneuver
MON  monitor
MPL  mid-Pacific line
MPS  main propulsion system
M/R  mixture ratio (fuel to oxidizer)
MSFN  Manned Space Flight Network
MTVC  manual thrust vector control

N\textsubscript{2}  nitrogen
NAV  navigation
NM  nautical miles
NO.  number
NOM  nominal
NXX  Noun XX

O\textsubscript{2}  oxygen
OBS  observation
O/F  oxidizer to fuel ratio
OGA  outer gimbal angle
OID  octal identifier
OMNI  omnidirectional antenna
OPR  operate
OPS  oxygen purge system
OPT  option
ORB  orbital
ORDEAL  orbit rate display earth and lunar
ORIENT  orientation
OVBD  overboard
OVHD  overhead

P  pitch or program
PAD  voice update
PCM  pulse code modulation
PC  plane change or chamber pressure
PDI  powered descent initiation
PER  Pericynthion
PGA  pressure garment assembly
PGNCS  primary guidance, navigation and control system (LM)
PGNS  primary guidance navigation system (LM)
PHOTO  photograph
PIPA  pulse integrating pendulous accelerometer
PKG  package
PLSS  portable life support system
PM  phase modulated
POL  polarity or polarizing
### ABBREVIATIONS (CONT)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>Pretoria, South Africa</td>
</tr>
<tr>
<td>PREF</td>
<td>preferred</td>
</tr>
<tr>
<td>PREP</td>
<td>preparation</td>
</tr>
<tr>
<td>PRESS</td>
<td>pressure</td>
</tr>
<tr>
<td>PRIM</td>
<td>primary</td>
</tr>
<tr>
<td>PROP</td>
<td>proportional</td>
</tr>
<tr>
<td>PRN</td>
<td>pseudo random noise</td>
</tr>
<tr>
<td>PRPLNT</td>
<td>propellant</td>
</tr>
<tr>
<td>PSE</td>
<td>passive seismic experiment</td>
</tr>
<tr>
<td>PSIA</td>
<td>pounds per square inch absolute</td>
</tr>
<tr>
<td>PSID</td>
<td>pounds per square inch differential</td>
</tr>
<tr>
<td>PSIG</td>
<td>pounds per square inch gage</td>
</tr>
<tr>
<td>PT</td>
<td>point</td>
</tr>
<tr>
<td>PTC</td>
<td>passive thermal control</td>
</tr>
<tr>
<td>PU</td>
<td>propellant utilization</td>
</tr>
<tr>
<td>PUGS</td>
<td>propellant utilization gaging system</td>
</tr>
<tr>
<td>PWR</td>
<td>power</td>
</tr>
<tr>
<td>PXX</td>
<td>Program XX</td>
</tr>
<tr>
<td>PYRO</td>
<td>pyrotechnic</td>
</tr>
<tr>
<td>QTY</td>
<td>quantity</td>
</tr>
<tr>
<td>QUAD</td>
<td>quadrant</td>
</tr>
<tr>
<td>R</td>
<td>roll or range</td>
</tr>
<tr>
<td>R&amp;B</td>
<td>red and blue</td>
</tr>
<tr>
<td>RAD</td>
<td>radiator, radial, or radiation</td>
</tr>
<tr>
<td>RCDR</td>
<td>recorder</td>
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<td>RCS</td>
<td>reaction control system</td>
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<tr>
<td>RCU</td>
<td>remote control unit</td>
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<tr>
<td>RCV</td>
<td>receiver</td>
</tr>
<tr>
<td>REACQ</td>
<td>reacquire</td>
</tr>
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<td>REFSTMMAT</td>
<td>reference stable member matrix</td>
</tr>
<tr>
<td>REG</td>
<td>regulator</td>
</tr>
<tr>
<td>REQD</td>
<td>required</td>
</tr>
<tr>
<td>REV</td>
<td>revolution</td>
</tr>
<tr>
<td>RH</td>
<td>right-hand</td>
</tr>
<tr>
<td>RHC</td>
<td>rotational hand controller</td>
</tr>
<tr>
<td>RING</td>
<td>ringsite</td>
</tr>
<tr>
<td>RLS</td>
<td>radius of landing site</td>
</tr>
<tr>
<td>RNDZ</td>
<td>rendezvous</td>
</tr>
<tr>
<td>RNG</td>
<td>range or ranging</td>
</tr>
<tr>
<td>RR</td>
<td>rendezvous radar</td>
</tr>
<tr>
<td>RSI</td>
<td>roll stability indicator</td>
</tr>
<tr>
<td>RSLV</td>
<td>resolver</td>
</tr>
<tr>
<td>RT</td>
<td>realtime</td>
</tr>
<tr>
<td>RTC</td>
<td>realtime command</td>
</tr>
<tr>
<td>RTG</td>
<td>radioisotope thermoelectric generator</td>
</tr>
<tr>
<td>RXX</td>
<td>Routine XX</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>SA</td>
<td>shaft angle</td>
</tr>
<tr>
<td>SC</td>
<td>spacecraft</td>
</tr>
<tr>
<td>SCE</td>
<td>signal conditioning equipment</td>
</tr>
<tr>
<td>SCS</td>
<td>stabilization control system</td>
</tr>
<tr>
<td>SCT</td>
<td>scanning telescope</td>
</tr>
<tr>
<td>SE</td>
<td>southeast or subearth</td>
</tr>
<tr>
<td>SEC</td>
<td>secondary</td>
</tr>
<tr>
<td>SECO</td>
<td>S-IVB engine cutoff</td>
</tr>
<tr>
<td>SECS</td>
<td>sequential events control system</td>
</tr>
<tr>
<td>SEF</td>
<td>sharp end forward</td>
</tr>
<tr>
<td>SEL</td>
<td>select</td>
</tr>
<tr>
<td>SEP</td>
<td>separate</td>
</tr>
<tr>
<td>SEQ</td>
<td>sequence</td>
</tr>
<tr>
<td>SHUT</td>
<td>shutter speed, TOPO camera</td>
</tr>
<tr>
<td>SIDE</td>
<td>suprathermal ion detector experiment</td>
</tr>
<tr>
<td>SII</td>
<td>Saturn II (second stage)</td>
</tr>
<tr>
<td>S-IVB</td>
<td>Saturn IVB (third stage)</td>
</tr>
<tr>
<td>SLA</td>
<td>service module LM adapter</td>
</tr>
<tr>
<td>SLOS</td>
<td>star line-of-sight</td>
</tr>
<tr>
<td>SM</td>
<td>service module</td>
</tr>
<tr>
<td>SPOT</td>
<td>spot meter</td>
</tr>
<tr>
<td>SPS</td>
<td>service propulsion system</td>
</tr>
<tr>
<td>SR</td>
<td>sunrise</td>
</tr>
<tr>
<td>SRC</td>
<td>sample return container</td>
</tr>
<tr>
<td>SRX</td>
<td>S-Band receiver mode no. X</td>
</tr>
<tr>
<td>SS</td>
<td>sunset or subsolar</td>
</tr>
<tr>
<td>STBY</td>
<td>standby</td>
</tr>
<tr>
<td>STX</td>
<td>S-Band transmit mode no. X</td>
</tr>
<tr>
<td>S.V.</td>
<td>state vector</td>
</tr>
<tr>
<td>SW</td>
<td>switch</td>
</tr>
<tr>
<td>SWC</td>
<td>solar wind composition</td>
</tr>
<tr>
<td>SWE</td>
<td>solar wind experiment</td>
</tr>
<tr>
<td>SXT</td>
<td>sextant</td>
</tr>
<tr>
<td>SYS</td>
<td>system</td>
</tr>
<tr>
<td>T EPHEM</td>
<td>time of Ephemeris update</td>
</tr>
<tr>
<td>TA</td>
<td>trunnion angle</td>
</tr>
<tr>
<td>TAN</td>
<td>Tananarive, Madagascar</td>
</tr>
<tr>
<td>TB</td>
<td>time base or talkback</td>
</tr>
<tr>
<td>TCA</td>
<td>time of closest approach</td>
</tr>
<tr>
<td>TD</td>
<td>touchdown</td>
</tr>
<tr>
<td>T&amp;D</td>
<td>transposition and docking</td>
</tr>
<tr>
<td>T&amp;D&amp;E</td>
<td>transposition docking and LM ejection</td>
</tr>
<tr>
<td>TDS</td>
<td>thermal degradation sample</td>
</tr>
<tr>
<td>TEC</td>
<td>transearth coast</td>
</tr>
<tr>
<td>TECH</td>
<td>technique</td>
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### ABBREVIATIONS (CONT)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>TEI</td>
<td>transearth injection</td>
</tr>
<tr>
<td>TEMP</td>
<td>temperature</td>
</tr>
<tr>
<td>TERM</td>
<td>terminate</td>
</tr>
<tr>
<td>TEX</td>
<td>Corpus Christi, Texas</td>
</tr>
<tr>
<td>TGT</td>
<td>target</td>
</tr>
<tr>
<td>THC</td>
<td>translation hand controller</td>
</tr>
<tr>
<td>TIG</td>
<td>time of ignition</td>
</tr>
<tr>
<td>TLC</td>
<td>translunar coast</td>
</tr>
<tr>
<td>TLI</td>
<td>translunar injection</td>
</tr>
<tr>
<td>TLM or TM</td>
<td>telemetry</td>
</tr>
<tr>
<td>TPF</td>
<td>terminal phase final</td>
</tr>
<tr>
<td>TPI</td>
<td>terminal phase initiation</td>
</tr>
<tr>
<td>TPM</td>
<td>terminal phase midcourse</td>
</tr>
<tr>
<td>T/R</td>
<td>transmitter/receiver</td>
</tr>
<tr>
<td>TRANS</td>
<td>translation</td>
</tr>
<tr>
<td>TRK</td>
<td>track or tracking</td>
</tr>
<tr>
<td>TRUN</td>
<td>trunnion</td>
</tr>
<tr>
<td>TV</td>
<td>television</td>
</tr>
<tr>
<td>TVC</td>
<td>thrust vector control</td>
</tr>
<tr>
<td>TWR</td>
<td>tower</td>
</tr>
<tr>
<td>UCTA</td>
<td>urine collection transfer assembly</td>
</tr>
<tr>
<td>UHT</td>
<td>universal hand tool</td>
</tr>
<tr>
<td>ULC</td>
<td>utility light clamp</td>
</tr>
<tr>
<td>ULL</td>
<td>ullage</td>
</tr>
<tr>
<td>UMB</td>
<td>umbilical</td>
</tr>
<tr>
<td>UNBAL</td>
<td>unbalance (meter)</td>
</tr>
<tr>
<td>UNDK</td>
<td>undock</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>V</td>
<td>velocity</td>
</tr>
<tr>
<td>VG\text{_IMU}</td>
<td>velocity to be gained as related to IMU orientation</td>
</tr>
<tr>
<td>VGX</td>
<td>velocity to be gained (X-body axis)</td>
</tr>
<tr>
<td>VGY</td>
<td>velocity to be gained (Y-body axis)</td>
</tr>
<tr>
<td>VGZ</td>
<td>velocity to be gained (Z-body axis)</td>
</tr>
<tr>
<td>VR</td>
<td>resultant velocity</td>
</tr>
<tr>
<td>VX</td>
<td>velocity along the X-axis</td>
</tr>
<tr>
<td>VY</td>
<td>velocity along the Y-axis</td>
</tr>
<tr>
<td>VZ</td>
<td>velocity along the Z-axis</td>
</tr>
<tr>
<td>VAN</td>
<td>USNS vanguard</td>
</tr>
<tr>
<td>VHBW</td>
<td>very high speed black and white film</td>
</tr>
<tr>
<td>VHF</td>
<td>very high frequency</td>
</tr>
<tr>
<td>VLV</td>
<td>valve</td>
</tr>
<tr>
<td>VOX</td>
<td>voice keying</td>
</tr>
<tr>
<td>VXX</td>
<td>Verb XX</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>WRT</td>
<td>with respect to</td>
</tr>
<tr>
<td>X</td>
<td>time of closest approach (symbol)</td>
</tr>
<tr>
<td>XDOT</td>
<td>rate of change along the X-axis</td>
</tr>
<tr>
<td>XFER</td>
<td>transfer</td>
</tr>
<tr>
<td>XMIT</td>
<td>transmit or transmitter</td>
</tr>
<tr>
<td>XPNDER</td>
<td>transponder</td>
</tr>
<tr>
<td>Y</td>
<td>yaw</td>
</tr>
<tr>
<td>YDOT</td>
<td>rate of change along the Y-axis</td>
</tr>
<tr>
<td>ZDOT</td>
<td>rate of change along the Z-axis</td>
</tr>
<tr>
<td>ZPN</td>
<td>impedance pneumogram</td>
</tr>
<tr>
<td>ΔAz</td>
<td>azimuth change (difference)</td>
</tr>
<tr>
<td>ΔH</td>
<td>altitude change (difference)</td>
</tr>
<tr>
<td>ΔP</td>
<td>pressure change (difference)</td>
</tr>
<tr>
<td>ΔR</td>
<td>position change (difference)</td>
</tr>
<tr>
<td>ΔV</td>
<td>velocity change (difference)</td>
</tr>
<tr>
<td>ΔVC</td>
<td>velocity change at engine cutoff</td>
</tr>
<tr>
<td>ΔVT</td>
<td>velocity change loaded pre-burn</td>
</tr>
<tr>
<td>#</td>
<td>frame number(s) (for camera data)</td>
</tr>
<tr>
<td>φ</td>
<td>latitude</td>
</tr>
<tr>
<td>λ</td>
<td>longitude</td>
</tr>
</tbody>
</table>
PHOTOGRAPHIC NOMENCLATURE

AAA/BBB/CCC/DDD - EEE, EEE, (fGG, HHH, III) JJ fps or (JJ FR) (KK% MAG)

AAA - Location from which photography is to be accomplished

BBB - Camera

CCC - Lens (film type on LTC camera only)

DDD - Film Type (direction of flight of CM, i.e., SEF, BEF, for LTC camera only)

EEE - Photography aids (i.e., brackets, intervalometer, mirror, etc.)

fGG - Lens Aperture Setting

HHH - Shutter Speed

III - Focus Distance in Feet

JJ - Number of frames for DC, LTC, EL or

JJ - Frame Rate for the DAC only

KK - Magazine percent for the DAC only

CODE EXAMPLE:

1. CM4/DAC/18/CEX-BRKT, SPOT (fGG,1/250,_) 12 fps (50% MAG)

Meaning: Photos are taken from CM right hand rendezvous window using the DAC with 18mm lens and S0368 film. The camera will be bracket mounted with the following camera settings: f-stop from spotmeter reading, shutter speed 1/250 of a second, focus at infinity, 12 frames per second, and 50% of MAG to be used.

2. CM4/EL/80/BW-BRKT, IVL (f6.5,1/125,_) (10 FR)

Meaning: Photos are taken from CM right hand rendezvous window using the Electric Hasselblad camera with the 80mm lens and black & white film (3400). The camera will be bracket mounted with the following settings f-stop (aperture) f6.5, shutter speed 1/125, and focus at infinity. The operation of the shutter will be controlled by the intervalometer. Ten frames have been alloted for this sequence.
PHOTOGRAPHIC NOMENCLATURE (CONT)

3. CM3/LTC/BW/SEF - SHUT-1/100, RNG - 74.2, INT 66.0) (164 FR)

Meaning: Photos are taken from the hatch window of the CM with the Lunar Topographic camera, with black and white film. The SC is oriented such that the sharp end (+X axis) is forward (in the direction of flight) and the camera is mounted with the "arrow" pointing in the direction of flight. The controls are set for a shutter speed of 1/100 of a second, the range to the calculated counter setting of 74.2 and the interval of 66.0 frames per minute. One hundred and sixty four (164) frames have been allotted for this photographic sequence.

CAMERA LOCATIONS

COMMAND MODULE

CM-1       LH Side Window
CM-2       LH Rendezvous Window
CM-3       Hatch Window
CM-4       RH Rendezvous Window
CM-5       RH Side Window

LUNAR MODULE

LM-1       LH Window
LM-2       Docking Window
LM-3       RH Window

CAMERA MOUNTS

CSM

CM4 - Electric Hasselblad (EL) +X axis +12°
CM4 - Electric Hasselblad reseau (DC) +X axis +12°
CM4 - Electric Hasselblad (EL) with 500mm lens only +X axis +10°
CM2 or 4 - Data Acquisition Camera with right angle mirror (DAC) +X axis
SXT - Data Acquisition Camera with SXT Adapter - same as SXT shaft & trunnion
CM3 - Lunar Topographic Camera - (perpendicular to hatch window) +X axis +57°
CM3 - Electric Hasselblad (EL) +X axis +57°
CM3 - Electric Hasselblad (DC) +X axis +57°
SYMBOL NOMENCLATURE

- LANDING SITE (TCA)
- LUNAR TERMINATOR
- SPACECRAFT SUNSET
- MSFN LOS
- START OF INDICATED REVOLUTION
- DARKNESS
- SPACECRAFT SUNRISE
- LUNAR TERMINATOR
- MSFN AOS
- SCHEDULED TELEVISION
- SUBSOLAR POINT
FLIGHT PLAN NOTES

I. Crew

A. Crew designations are as follows:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Prime</th>
<th>Backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commander (CDR)</td>
<td>Shepard</td>
<td>Cernan</td>
</tr>
<tr>
<td>Command Module Pilot (CMP)</td>
<td>Roosa</td>
<td>Evans</td>
</tr>
<tr>
<td>Lunar Module Pilot (LMP)</td>
<td>Mitchell</td>
<td>Engle</td>
</tr>
</tbody>
</table>

B. The nominal CM couch positions are:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Left</th>
<th>Center</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch thru TLI</td>
<td>CDR</td>
<td>CMP</td>
<td>LMP</td>
</tr>
<tr>
<td>T&amp;D thru Entry</td>
<td>CMP</td>
<td>CDR</td>
<td>LMP</td>
</tr>
</tbody>
</table>

C. The PGA's will be worn as follows:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>PRESSURIZED HARD SUIT</th>
<th>SUITED (SOFT SUIT)</th>
<th>PARTIAL SUIT WITHOUT HELMET &amp; GLOVES</th>
<th>SHIRT SLEEVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAUNCH</td>
<td></td>
<td>ALL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EARTH ORBIT THRU S-IVB</td>
<td></td>
<td></td>
<td>ALL</td>
<td></td>
</tr>
<tr>
<td>EVASIVE MNVR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLC &amp; TEC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM ACTIVATION</td>
<td></td>
<td></td>
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<td>Varies according to checklist for CDR &amp; LMP</td>
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<td>LM JETTISON THRU TEI</td>
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D. Crew status reports will be voiced to MCC-H before and after crew sleep periods. After waking, the crew will report sleep obtained during the last 24 hours and personal dosimeter readings. Before going to sleep, the crew will report medication used and any other pertinent information on activities performed. Before ascent prep, the LM crew will report personal dosimeter readings and medication used.

E. Negative reporting will be used in reporting completion of each checklist.

F. All onboard gauge readings will be read directly from the gauges with no calibration bias applied.

II. CSM Systems

A. Communications

1. The preferred S-Band communication modes are:
   (a) Uplink Mode 6 (Voice, PRN, and Updata)
   (b) Downlink Mode 2 (Voice, PRN, TLM-HBR)

2. OMNI B and VHF LEFT will be selected for lift-off. OMNI D will be selected by the crew during boost. OMNI D will probably be the best antenna for earth orbit.

3. VHF Duplex B will be used for launch, and Simplex A will be used for earth-orbit operations.

4. During TLC and TEC, OMNI antennas will normally be used. The CSM X-axis will be pitched up 90° (north) for TLC and pitched down 90° (south) for TEC with the Y&Z axes in the plane of the ecliptic. These attitudes permit high-gain antenna coverage and simultaneous viewing of the earth and moon through side windows.

5. MSFN relay will be used for LM/CSM communication during descent and ascent frontside passes. Communications during lunar stay periods will be through MCC-H.

6. Table 1-1 is a summary of the MSFN coverage available for the CSM.

7. Table 1-2 contains a summary of the scheduled CSM TV transmissions.
8. During PTC, the OMNI antennas will be switched via ground command. During periods of attitude control other than PTC, the crew will manage antenna operations.

B. DSE

1. The DSE will be normally operated via ground command except for special cases where the operation is time-limited. In these cases, the crew may be asked to rewind the tape.

2. During the earth-orbit phase, the CSM LBR data will be recorded when the CSM is not within MSFN coverage. The DSE will be dumped during the pass over the US and over CRO prior to TLI if possible.

3. CSM HBR DATA for stereo and LTC photographic strips are required for a minimum of 5 minutes at the beginning and at the end of the strip. If HGA coverage is not available, these data will be recorded on the DSE.

4. During the lunar-orbit phase, the CSM LBR data will be recorded when the CSM is not within MSFN coverage. The DSE will normally be dumped at AOS.

5. CSM LBR data will be recorded during all P24 landmark tracking.

6. CSM HBR will be recorded during all CSM engine burns.

7. LM LBR data will be recorded during LOS periods before PDI.

8. All entry data will be recorded in HBR during the blackout.

9. All HGA activations will be recorded on DSE.

C. Electrical Power

1. The CSM will normally remain powered up throughout the mission.

2. Table I-3 lists the fuel cell purges and waste water dumps.

3. Based on cryo purity and performance, the time between fuel cell O$_2$ purges will be increased to coincide with water dump times. The O$_2$ purge at 6 hours will allow a judgement to be made on the defined purge schedule.
4. The cryogenic heaters will be managed such that the planned usage is obtained out of each O$_2$ tank. The H$_2$ heaters will be in AUTO during the mission. The H$_2$ fans will be operated manually for one minute before and after each sleep cycle, prior to SPS or S-IVB thrusting and pre-CSM/LM ejection.

5. Table I-9 contains the battery charge schedule.

D. ECS and Water Management

1. Potable water will be chlorinated once a day after the eat period prior to each sleep period.

2. Waste water dump and fuel cell purge criteria:
   (a) Waste water dumps and fuel cell purges will be scheduled as follows:
       (1) Once during each 24 hours, if possible, following the initial dump and purge
       (2) H$_2$ fuel cell purges will be scheduled at every other O$_2$ fuel cell purge after the first O$_2$ fuel cell purge
   (b) The most opportune time to perform waste water dumps and fuel cell purges are as follows:
       (1) Immediately after the sextant star check in maneuver preparation or cislunar navigation
       (2) Behind the moon, with completion of dump or purge before AOS
   (c) If possible, dumps and purges will not be scheduled during the following periods:
       (1) Ten hours before MCC-2 or a TLC P23
       (2) Eight hours before MCC-5 or a TEC P23
       (3) MSFN tracking periods during two lunar orbits before TEI
(d) Dumps and purges will not be scheduled during the following MSFN tracking periods:

1. Ten hours before MCC-4 until after LOI
2. Four hours before DOI until six hours after PDI
3. Six hours before ascent from the lunar surface until after LM jettison
4. Ten hours before MCC-7 until entry

(e) All waste water dumps will be manual.

3. Only one CO₂ absorber filter (LiOH canister) is changed at a time. Table I-4 lists the LiOH canister change schedule. There are 20 filters on board, with 18 stowed at launch.

4. At lift-off, the cabin will contain 60% O₂ and 40% N₂. The CM will be purged after launch. The purge is terminated prior to LM pressurization after TLI. After the LM is configured for ejection, it will be isolated and the CM will be purged for eight more hours.

5. CSM O₂ will be used to pressurize the LM after transposition and docking; and repressurizing the LM before TLC LM entry, LOI and LM activation.

E. Guidance and Navigation

1. REFSMMAT Definitions

(a) The "Launch Pad" REFSMMAT will be used for launch, TLI, and TD&E. This REFSMMAT places the IMU X-axis along the launch azimuth at the pad and the Z-axis along the negative radius vector. The FDAI, at launch, will display roll 162° (launch azimuth +90°), pitch 90°, and yaw 0°.

(b) The "PTC" REFSMMAT will be used for all midcourse maneuvers (except MCC-7) and for other operations during TLC
and TEC. This REFSMMAT places the X-axis in the ecliptic plane and perpendicular to the earth-moon line projection in the ecliptic plane at the average time of transearth injection for the monthly launch window and azimuth range. The Z-axis is then perpendicular to the ecliptic and directed south. At the beginning of the PTC Mode, during TLC, the spacecraft will maneuver to an FDAI display of pitch 90°. During TEC, the pitch attitude will be 270°.

(c) The "Landing Site" REFSMMAT will be used for LOI, DOI, PDI, landing, and CSM lunar orbit activities up to the first plane change. This REFSMMAT places the CSM IMU X-axis along the positive lunar radius vector at the landing site at the predicted landing time and places the Z-axis in the direction of flight parallel to the CSM orbital plane. At nominal touchdown, the LM FDAI will display roll 0°, pitch 0°, and yaw 0°.

(d) A "Preferred" REFSMMAT will be used by the CSM for all lunar-orbit plane changes, and TEI. The CSM IMU X-axis will normally be aligned with the spacecraft X-body axis at the vehicle attitude for ignition with the thrust directed through the center of gravity. In the case of large plane change maneuvers, the IMU X-axis may be aligned 45° from the spacecraft body axis at ignition attitude. The Z-axis will be in the plane formed by the X-axis and the position vector and directed up away from the moon for plane changes. At burn ignition, the FDAI will display roll 0°, pitch 0°, and yaw 0°.

(e) The "Lift-Off" REFSMMAT will be used for all lunar activities after plane change 1, through rendezvous, and LM jettison. This REFSMMAT places the CSM IMU X-axis along the positive lunar radius vector at the landing site at predicted lift-off time, with the Z-axis parallel to the CSM orbital plane. At nominal lift-off time, the LM FDAI will display roll 0°, pitch 0°, and yaw 0° with slight differences reflecting actual touchdown yaw and slope tilt angles.

(f) The "Entry" REFSMMAT aligns the IMU X-axis in the local horizontal plane in the direction of flight at entry interface. The entry REFSMMAT is used for MCC-7 and all
remaining activities. The Z-axis is down along the negative radius at entry interface. At entry interface, with wings level, local horizontal, heat shield forward, lift up, heads down, the FDAI will display roll $0^\circ$, pitch $180^\circ$, and yaw $0^\circ$.

2. The CSM external lighting will be operated during the rendezvous from lift-off to docking. The running lights only will be on from CSM/LM separation to PDI.

3. The time tags on maneuvers in Section 3 indicate the completion time of the maneuvers unless otherwise stated. All maneuver angles are the angles read on the FDAI after the maneuver has been completed.

4. CSM/LM and CSM attitude maneuvers will normally be at the rate of $0.2^\circ$/sec ($0.5^\circ$/sec after rendezvous and docking) unless other rates are required.

5. Undocking will be done radially, CSM below, using the soft-undocking procedure. The probe will be extended its full length with the LM held on by the capture latches. When the rates are nulled, the CSM will then release the LM. The separation maneuver will then be performed immediately.

6. LM jettison will be done radially, CSM below, with jettison providing approximately 0.4 foot per second thrust radial. The separation burn will be performed five minutes after jettison, providing one foot per second thrust retrograde.

F. Propulsion Systems

1. In order to conserve SM RCS, the SPS engine will be used to "back-up" all LM rendezvous burns. The SPS gimbal motors will not be turned on during the normal maneuver preparation.

2. The SPS will always be started using a single bank, however, the other bank will be opened 2 to 5 seconds after ignition for burns longer than 6 seconds. The first engine ignition will be started on bank A.

3. Table 1-5 lists the CSM propulsion burns.
III. LM Systems

A. Communications

1. The preferred S-Band communications are:
   (1) Uplink Mode 7 (Voice, Updata)
   (2) Downlink Mode 1 (Voice, TLM-HBR)

2. The LM voice recorder (DSEA) will be used to record LM voice. Table I-8 is a schedule of LM voice recorder usage.

3. Figure 1-1 shows the communications mode for the first part of the EVA (CDR EVA only) and for the one-man contingency EVA. Figure 1-2 shows the nominal two-man EVA communications configuration.

B. ECS

1. The LM will contain ambient air at lift-off. During launch the pressure will bleed to zero psia. CSM O₂ will be used to pressurize the LM after T&D. After T&D, the LM will be isolated and allowed to bleed down via leakage. After the first LM egress, the LM will be isolated and allowed to leak down. For the entry into the LM before undocking, the CSM O₂ will be used to pressurize the LM. This procedure insures a higher percentage of oxygen in the LM at the first EVA.

2. LM O₂ will be used to pressurize the LM three times; after EVA-I and EVA-2, and after equipment jettison.

C. Guidance Systems

1. The LGC and CMC will use the same landing site and lift-off REFSMMATS.

2. The AGS will be placed in standby after the "GO" is given for lunar stay.

3. The RR will be powered down after TD plus 2 hours until lift-off preparation.

4. The IMU will be powered down and the LGC placed in standby approximately 3 hours and 25 minutes after TD until after the eat period following sleep on the lunar surface.
5. To prevent overheating of the antenna, the rendezvous radar will be pointed away from the sun and will be turned off when no functional use is required.

D. Propulsion Systems

1. The APS/RCS interconnect will be used during the lunar lift-off and ascent only.

2. Table 1-6 lists the LM propulsion burns.

IV. Procedures

A. CSM - Crew procedures called out in the flight plan may be found in the following documents:

1. Apollo Operations Handbook - CSM 110 (AOH), Volume 2
2. Crew Checklists
3. CSM Rendezvous Procedures
4. Photographic and TV Procedures
5. Lunar Landmark Tracking Attitude Studies
6. Lunar Orbit Attitude Sequence for Mission H-3

B. LM - Crew procedures called out in the flight plan may be found in the following documents:

2. Crew Checklists
3. LM Rendezvous Procedures
4. LM Descent/Ascent Procedures
5. Photographic and TV Procedures
6. Orbital EVA Procedures
7. Lunar Surface Procedures

V. Medical Data During Sleep Periods

A. During translunar and transearth coast phases, and in lunar orbit when all three crewmembers are in the CSM, an EKG and ZPN will be transmitted continuously from at least one crewman.

B. During lunar orbit, when the CMP is the sole occupant of the CSM, the CMP’s EKG and ZPN will be transmitted to MCC-H.

C. While on the lunar surface, an EKG will be transmitted continuously from at least one crewman.
VI. **Synchronization of Ground Elapsed Time (GET)**

The realtime GET will be synchronized with the flight plan GET if the difference is more than ± 1 minute. The time changes will occur approximately 30 hours before the second lunar orbit, and prior to LOS on the tenth orbit. The time changes will be based on the expected difference between realtime and flight plan GET's at the start of lunar orbit revs 2 and 20. The synchronization is performed by a V70 uplink from the ground followed by the crew synchronizing the mission time to the CMC clock.

VII. **Miscellaneous**

A. Table 1-7 contains a summary of the expected block data update times.

B. Table 1-10 is the Landmark Tracking Table.

C. Table 1-11 is a schedule of the P23 cislunar navigation sightings.

D. Table 1-12 is the Mission Activity Summary.
LUNAR EXPLORATION COMMUNICATIONS
ONE CREWMAN EVA
PRIMARY MODE

Figure 1-1
LUNAR EXPLORATION COMMUNICATIONS
BOTH CREWMEN EVA
EVCS DUAL MODE (RELAY)

Figure 1-2
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TABLE 1-1 (CONTINUED)

SC Coverage By MSFN Stations Using 85FT/210FT Dish/Antenna
TABLE 1-1 (CONTINUED)
SC Coverage By MSFN Stations Using 85FT/210FT Dish/Antenna

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<td>7 FEB</td>
<td>6:53 PM</td>
<td>172:30</td>
<td>00:30</td>
<td>INFLIGHT DEMONSTRATIONS</td>
</tr>
</tbody>
</table>
### TABLE 1-3

**FUEL CELL PURGE AND WATER DUMP SCHEDULE**

<table>
<thead>
<tr>
<th>GET, HR:MIN</th>
<th>O₂ FUEL CELL PURGE AND WATER DUMP</th>
<th>H₂ FUEL CELL PURGE</th>
<th>ΔTIME, HR:MIN</th>
<th>ΔTIME, HR:MIN</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>05:55</td>
<td>1</td>
<td>05:55</td>
<td>1</td>
<td>IF NO MCC-1</td>
<td></td>
</tr>
<tr>
<td>11:30</td>
<td>1</td>
<td>11:30</td>
<td>1</td>
<td>IF MCC-1 PERFORMED</td>
<td></td>
</tr>
<tr>
<td>30:15</td>
<td>2</td>
<td>24:20/18:45</td>
<td>1</td>
<td>30:15</td>
<td>MCC-2</td>
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<tr>
<td>60:20</td>
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<tr>
<td>84:50</td>
<td>4</td>
<td>24:30</td>
<td>2</td>
<td>54:35</td>
<td>LOI+2HR</td>
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<td>111:40</td>
<td>5</td>
<td>26:50</td>
<td>3</td>
<td>LOS MIDPOINT</td>
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<td>139:20</td>
<td>6</td>
<td>27:40</td>
<td>3</td>
<td>54:30</td>
<td>MCC-5</td>
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<td>166:00</td>
<td>7</td>
<td>26:40</td>
<td>4</td>
<td>IF NO MCC-6</td>
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</tr>
<tr>
<td>193:10</td>
<td>8</td>
<td>27:10</td>
<td>54:50</td>
<td>IF MCC-6 PERFORMED</td>
<td></td>
</tr>
<tr>
<td>194:10</td>
<td>8</td>
<td>28:10</td>
<td>4</td>
<td>54:50</td>
<td>CM/SM SEPARATION</td>
</tr>
<tr>
<td>CHANGE NO.</td>
<td>APPROXIMATE GET, HR:MIN</td>
<td>APPROXIMATE ΔT, HR</td>
<td>INSTALL CANISTER</td>
<td>INSTALL POSITION</td>
<td>REMOVE &amp; STOW CANISTER NO.</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------</td>
<td>--------------------</td>
<td>-----------------</td>
<td>----------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>1</td>
<td>12:00</td>
<td>14</td>
<td>3</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>26:10</td>
<td>12</td>
<td>4</td>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>38:00</td>
<td>13</td>
<td>5</td>
<td>A</td>
<td>3</td>
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<td>B</td>
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<td>5</td>
<td>64:12</td>
<td>13</td>
<td>7</td>
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<td>5</td>
</tr>
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<td>6</td>
<td>76:10</td>
<td>12</td>
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<td>B</td>
<td>6</td>
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<tr>
<td>7</td>
<td>90:15</td>
<td>13</td>
<td>9</td>
<td>A</td>
<td>7</td>
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<td>16</td>
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<td>8</td>
</tr>
<tr>
<td>9</td>
<td>119:30</td>
<td>27</td>
<td>11</td>
<td>A</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>147:05</td>
<td>15</td>
<td>12</td>
<td>B</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>162:10</td>
<td>12</td>
<td>13</td>
<td>A</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>174:00</td>
<td>13</td>
<td>14</td>
<td>A</td>
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</tr>
<tr>
<td>13</td>
<td>187:00</td>
<td>12</td>
<td>15</td>
<td>A</td>
<td>13</td>
</tr>
<tr>
<td>14</td>
<td>199:00</td>
<td>11</td>
<td>16</td>
<td>A</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>210:00</td>
<td>11</td>
<td>17</td>
<td>A</td>
<td>15</td>
</tr>
</tbody>
</table>
### TABLE 1-5

**CSM BURN SCHEDULE**

<table>
<thead>
<tr>
<th>BURN MNVR</th>
<th>GETI BURN TIME</th>
<th>ΔVT, FPS</th>
<th>ULLAGE ΔV, FPS</th>
<th>REFSSMMAT</th>
<th>RESULTANT HA &amp; HP</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLI</td>
<td>02:30:38</td>
<td>5 MIN 55.6 SEC</td>
<td>10353.1</td>
<td>PAD</td>
<td>S-IVB BURN</td>
<td></td>
</tr>
<tr>
<td>CSM/LM EJECTION</td>
<td>03:56</td>
<td>3.0 SEC</td>
<td>0.4</td>
<td>PAD</td>
<td></td>
<td>KCS BURN</td>
</tr>
<tr>
<td>MCC-1</td>
<td>11:36:33</td>
<td></td>
<td></td>
<td>PTC</td>
<td></td>
<td>NOM ZERO</td>
</tr>
<tr>
<td>MCC-2</td>
<td>30:36:07</td>
<td>11.08 SEC</td>
<td>73.40</td>
<td>NOT REQ'D PTC</td>
<td>SPS BURN</td>
<td></td>
</tr>
<tr>
<td>MCC-3</td>
<td>60:38:14</td>
<td></td>
<td></td>
<td>PTC</td>
<td></td>
<td>NOM ZERO</td>
</tr>
<tr>
<td>MCC-4</td>
<td>77:36:14</td>
<td></td>
<td></td>
<td>PTC</td>
<td></td>
<td>NOM ZERO</td>
</tr>
<tr>
<td>LOI</td>
<td>82:38:14</td>
<td>6 MIN:06.6 SEC</td>
<td>2986.0</td>
<td>NOT REQ'D LDG SITE</td>
<td>HA 170.00</td>
<td>HP 57.14</td>
</tr>
<tr>
<td>DOI</td>
<td>86:56:57</td>
<td>21.38 SEC</td>
<td>206.6</td>
<td>4 JET 14.0 SEC</td>
<td>LDG SITE</td>
<td>HA 58.44</td>
</tr>
<tr>
<td>BAILOUT BURN</td>
<td>87:27:31</td>
<td>10.17 SEC</td>
<td>100.0</td>
<td>4 JET 14.0 SEC</td>
<td>LDG SITE</td>
<td>SPS BURN</td>
</tr>
<tr>
<td>UNDOCK &amp; SEP</td>
<td>104:27:31</td>
<td>3.07 SEC</td>
<td>1.00</td>
<td></td>
<td>LDG SITE</td>
<td>HA 59.48</td>
</tr>
<tr>
<td>CIRC BURN</td>
<td>105:46:48</td>
<td>3.79 SEC</td>
<td>72.46</td>
<td>4 JET 11.0 SEC</td>
<td>LDG SITE</td>
<td>HA 63.51</td>
</tr>
<tr>
<td>PC-1</td>
<td>118:09:40</td>
<td>18.4 SEC</td>
<td>360.70</td>
<td>4 JET 11.0 SEC</td>
<td>PLANE CHANGE</td>
<td>HA 61.71</td>
</tr>
<tr>
<td>CSM SEP BURN</td>
<td>146:28:31</td>
<td></td>
<td>1.00</td>
<td></td>
<td>LIFT-OFF</td>
<td>HA 58.26</td>
</tr>
<tr>
<td>TEI</td>
<td>149:14:50</td>
<td>2 MIN 27.4 SEC</td>
<td>3449.55</td>
<td>12 SEC</td>
<td>TEI</td>
<td>SPS BURN</td>
</tr>
<tr>
<td>MCC-5</td>
<td>166:14:50</td>
<td></td>
<td></td>
<td>PTC</td>
<td></td>
<td>NOM ZERO</td>
</tr>
<tr>
<td>MCC-6</td>
<td>194:26:59</td>
<td></td>
<td></td>
<td>PTC</td>
<td></td>
<td>NOM ZERO</td>
</tr>
<tr>
<td>MCC-7</td>
<td>213:26:59</td>
<td></td>
<td></td>
<td>ENTRY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
1. HA & HP ARE HEIGHTS ABOVE LANDING SITE RADIUS (937.73488 NM).
2. BURN TIME DOES NOT INCLUDE ULLAGE OR TAILOFF BT.
## TABLE 1-6

**LM BURN SCHEDULE**

<table>
<thead>
<tr>
<th>BURN MNVR</th>
<th>GETI BURN TIME</th>
<th>( \Delta V_T ), FPS</th>
<th>ULLAGE ( \Delta V ), FPS</th>
<th>REFSDMAT</th>
<th>RESULTANT HA &amp; HP</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDI</td>
<td>108:42:01 11 MIN 31.5 SEC</td>
<td>6637.7 7.5 SEC</td>
<td>LDG SITE</td>
<td>--------</td>
<td>DPS BURN</td>
<td></td>
</tr>
<tr>
<td>ASCENT</td>
<td>142:24:29 7 MIN 10.7 SEC</td>
<td>6053.4 NONE</td>
<td>LIFT-OFF</td>
<td>HA 50.96 HP 9.14</td>
<td>APS BURN</td>
<td></td>
</tr>
<tr>
<td>TPI</td>
<td>143:09:40 4.0 SEC</td>
<td>92.2 13 SEC</td>
<td>LIFT-OFF</td>
<td>HA 61.0 HP 44.6</td>
<td>APS BURN</td>
<td></td>
</tr>
<tr>
<td>LM DEORBIT</td>
<td>147:52:58.9 1 MIN 17 SEC</td>
<td>183.7</td>
<td>LIFT-OFF</td>
<td>N/A</td>
<td>RCS BURN</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
1. HA & HP ARE HEIGHTS ABOVE LANDING SITE RADIUS (937.73488 NM).
2. BURN TIME DOES NOT INCLUDE ULLAGE OR TAILOFF BT.
## TABLE 1-7

**FINAL APOLLO 14 RETURN TO EARTH BLOCK DATA SCHEDULE**

<table>
<thead>
<tr>
<th>BLOCK DATA</th>
<th>PASSED DATA</th>
<th>GETI, HR:MIN</th>
<th>AV, FPS</th>
<th>GETIL, HR:MIN</th>
<th>(i_r), DEG</th>
<th>PAD TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLI + 90 MIN</td>
<td>1:40</td>
<td>4:00</td>
<td>7488</td>
<td>12:12</td>
<td>32.8°D</td>
<td>COMPLETE P30</td>
</tr>
<tr>
<td>L/O + 8 HR</td>
<td>1:40</td>
<td>8:00</td>
<td>3209</td>
<td>46:29</td>
<td>32.8°A</td>
<td>P37</td>
</tr>
<tr>
<td>L/O + 15 HR</td>
<td>6:00</td>
<td>15:00</td>
<td>5557</td>
<td>45:56</td>
<td>32.8°A</td>
<td>P37</td>
</tr>
<tr>
<td>L/O + 25 HR</td>
<td>14:00</td>
<td>25:00</td>
<td>4873</td>
<td>70:03</td>
<td>33.0 A</td>
<td>P37</td>
</tr>
<tr>
<td>L/O + 35 HR</td>
<td>14:00</td>
<td>35:00</td>
<td>7376</td>
<td>69:28</td>
<td>33.3 A</td>
<td>P37</td>
</tr>
<tr>
<td>L/O + 45 HR</td>
<td>14:00</td>
<td>45:00</td>
<td>5630</td>
<td>93:49</td>
<td>34.1 A</td>
<td>P37</td>
</tr>
<tr>
<td>L/O + 60 HR</td>
<td>14:00</td>
<td>60:00</td>
<td>5166</td>
<td>117:53</td>
<td>36.9 A</td>
<td>P37</td>
</tr>
<tr>
<td>LOI-5 FLYBY</td>
<td>35:00</td>
<td>77:38</td>
<td>403</td>
<td>165:57</td>
<td>40.0 D</td>
<td>COMPLETE P30 (DOCKED)</td>
</tr>
<tr>
<td>PC + 2</td>
<td>76:00</td>
<td>84:36</td>
<td>1519</td>
<td>141:42</td>
<td>30.1 D</td>
<td>ABB P30 (DOCKED)</td>
</tr>
<tr>
<td>TEI 4</td>
<td>79:30</td>
<td>91:15</td>
<td>3955</td>
<td>141:47</td>
<td>40° A</td>
<td>ABB P30</td>
</tr>
<tr>
<td>TEI 5</td>
<td>85:05</td>
<td>92:30</td>
<td>3220</td>
<td>166:14</td>
<td>40° A</td>
<td>ABB P30</td>
</tr>
<tr>
<td>TEI 12</td>
<td>89:20</td>
<td>105:54</td>
<td>3630</td>
<td>166:24</td>
<td>40° A</td>
<td>ABB P30</td>
</tr>
<tr>
<td>TEI 19</td>
<td>100:45</td>
<td>119:38</td>
<td>3326</td>
<td>191:13</td>
<td>40° A</td>
<td>ABB P30</td>
</tr>
<tr>
<td>TEI 34 (PRELIM)</td>
<td>115:00</td>
<td>149:15</td>
<td>3451</td>
<td>216:40</td>
<td>40° A</td>
<td>COMPLETE P30</td>
</tr>
<tr>
<td>TEI 34 (NOM)</td>
<td>147:40</td>
<td>149:15</td>
<td>3451</td>
<td>216:40</td>
<td>40° A</td>
<td>COMPLETE P30</td>
</tr>
<tr>
<td>TEI 35</td>
<td>147:40</td>
<td>151:14</td>
<td>3523</td>
<td>216:16</td>
<td>40° A</td>
<td>ABB P30</td>
</tr>
</tbody>
</table>

**NOTES:**

1. The TLI + 90 minute abort is to the AOL. All other block data maneuvers are to the MPL line [Nominal TEI (REV 34) is to EOM \(\phi, \lambda\)].
2. Lift-off + 15 hours abort assumes no MCC-1.
3. Lift-off + 35 hours abort assumes MCC-2.
4. Update flyby early if pericynthion is not clear of moon.
5. Pericynthion + 2 hours fast return to MPL assumes MCC-4.
6. TEI 4 assumes LOI and no DOI.
7. TEI 5 assumes DOI.
8. TEI 12 assumes no circularization maneuver.
9. TEI 19 assumes circularization and no plane change maneuvers.
10. TEI 34 (PRELIM) assumes the plane change maneuver.
11. All TEI's are \(i_r = 40°\) ascending returns.
TABLE 1-8
APOLLO 14/LM - 8 DSEA SCHEDULE

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>GET, HR:MIN</th>
<th>MODE</th>
<th>RECORD TIME x DUTY CYCLE (%) = TAPE TIME USED, HR:MIN</th>
<th>TOTAL TAPE TIME USED* HR:MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDOCK PREP TO POST-UNDOCKING</td>
<td>104:26</td>
<td>ICS/PTT</td>
<td>00:09 x 100% = 00:09</td>
<td>00:09</td>
</tr>
<tr>
<td>PDI PREP TO POST-TD (PDI+20)</td>
<td>108:20</td>
<td>VOX</td>
<td>00:42 x 63% = 00:27</td>
<td>00:36</td>
</tr>
<tr>
<td>EVA-1 PLSS COMM TO POST-EVA-1</td>
<td>112:50</td>
<td>VOX</td>
<td>5:05 x 63% = 3:12</td>
<td>03:48</td>
</tr>
<tr>
<td>EVA-2 PLSS COMM TO POST-EVA-2</td>
<td>133:35</td>
<td>VOX</td>
<td>5:05 x 63% = 3:12</td>
<td>07:00</td>
</tr>
<tr>
<td>LIFT-OFF (-16) TO LIFT-OFF (-) 2</td>
<td>142:08</td>
<td>ICS/PTT</td>
<td>00:14 x 100% = 00:14</td>
<td>07:14</td>
</tr>
<tr>
<td>LIFT-OFF (-) 2 TO INSERTION</td>
<td>142:22</td>
<td>VOX</td>
<td>00:12 x 63% = 00:08</td>
<td>07:22</td>
</tr>
<tr>
<td>INSERTION TO POST-DOCKING</td>
<td>142:34</td>
<td>ICS/PTT</td>
<td>1:41 x 100% = 1:41</td>
<td>09:03</td>
</tr>
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*REMAINING TAPE WILL BE REQUIRED IF EVA'S ARE EXTENDED
TABLE 1-9

BATTERY CHARGE SCHEDULE

<table>
<thead>
<tr>
<th>GET, HR:MIN</th>
<th>BATTERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:25</td>
<td>B</td>
</tr>
<tr>
<td>26:15</td>
<td>A</td>
</tr>
<tr>
<td>32:20</td>
<td>A</td>
</tr>
<tr>
<td>53:00</td>
<td>B</td>
</tr>
<tr>
<td>106:15</td>
<td>B</td>
</tr>
<tr>
<td>112:30</td>
<td>A</td>
</tr>
<tr>
<td>132:20</td>
<td>B</td>
</tr>
<tr>
<td>136:15</td>
<td>A</td>
</tr>
<tr>
<td>166:18</td>
<td>B</td>
</tr>
<tr>
<td>186:25</td>
<td>A</td>
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</tbody>
</table>
# TABLE 1-10

**LANDMARK AND LANDING SITE DATA**

<table>
<thead>
<tr>
<th>SITE</th>
<th>REV</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>*ALTITUDE (NM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MÖSTING A</td>
<td>2</td>
<td>3.250°S</td>
<td>5.283°W</td>
<td>000.00</td>
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<tr>
<td>H-3</td>
<td>3</td>
<td>3.691°S</td>
<td>7.542°W</td>
<td>000.00</td>
</tr>
<tr>
<td>14-1</td>
<td>12, 13, 15</td>
<td>4.046°S</td>
<td>15.600°W</td>
<td>-000.44</td>
</tr>
<tr>
<td>14-2</td>
<td>3</td>
<td>3.610°S</td>
<td>15.317°W</td>
<td>-000.15</td>
</tr>
<tr>
<td>14-3</td>
<td>3</td>
<td>3.919°S</td>
<td>15.139°W</td>
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</tr>
<tr>
<td>14-4</td>
<td>3</td>
<td>3.470°S</td>
<td>14.890°W</td>
<td>-000.87</td>
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<tr>
<td>RP3</td>
<td>15</td>
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<td>131.700°E</td>
<td>000.00</td>
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<td>RP5</td>
<td>15</td>
<td>10.567°S</td>
<td>99.400°E</td>
<td>000.00</td>
</tr>
<tr>
<td>DAGUERRE 66</td>
<td>15</td>
<td>11.717°S</td>
<td>33.200°E</td>
<td>000.00</td>
</tr>
<tr>
<td>LDG SITE</td>
<td>17</td>
<td>3.672°S</td>
<td>17.463°W</td>
<td>-000.76</td>
</tr>
<tr>
<td>RP2</td>
<td>18</td>
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*Difference between landmark radius vector and 938.4935 NM (mean lunar radius)*
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*Constraint Stars*
SECTION 2 - MISSION OBJECTIVES
SECTION 2

MISSION OBJECTIVES

This section contains an activity summary, reflecting the objectives for Apollo 14 as described in "Mission Requirements H-3 Type Mission." Table 2-1 provides a functional breakdown of the objectives and indicates the page(s) in the timeline where the activity occurs. The alphanumeric listing presented in Table 2-1 is not intended to represent a priority or a sequential listing.

Details of the implemented test requirements are adequately covered in the Mission Requirements Document, the Lunar Surface Procedures Plan, and the Photographic and TV and Procedures Document.
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<tr>
<td>4.1</td>
<td>Photographs of Candidate Exploration Sites</td>
<td>LUNAR ORBIT</td>
<td>3-89</td>
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<tr>
<td>4.1.1</td>
<td>Obtain photographs of a selected lunar site from low altitude</td>
<td>LUNAR ORBIT</td>
<td>3-176-178/190-194</td>
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<tr>
<td>4.1.2</td>
<td>Obtain stereoscopic photographs and landmark tracking of selected</td>
<td>LUNAR ORBIT</td>
<td>3-180-186</td>
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<td>lunar sites</td>
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<td>4.1.3</td>
<td>Obtain high-resolution photographs of selected lunar sites</td>
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<td>4.2</td>
<td>Modular Equipment Transporter Evaluation</td>
<td>EVA-1</td>
<td>3-133</td>
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<tr>
<td>4.2.1</td>
<td>Demonstrate that an astronaut can unload and deploy the MET from a</td>
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<td>landed LM</td>
<td>EVA-2</td>
<td>3-183</td>
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<td>4.2.2</td>
<td>Obtain data on the dynamic interaction between the MET and the lunar</td>
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<td>surface</td>
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<td>4.3</td>
<td>Selenodetic Reference Point Update</td>
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<td>4.3.1</td>
<td>Obtain lunar landmark tracking data to permit an update of the selenodetic</td>
<td>LUNAR ORBIT</td>
<td>3-138-142</td>
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<td>coordinates of selected lunar reference points.</td>
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<td>3-190-194</td>
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<td>Transearth Lunar Photography</td>
<td>TEC</td>
<td>3-227/231/232</td>
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<td>4.4.1</td>
<td>Obtain lunar photographs after TEI to permit extension of selenodetic</td>
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<td>control and mapping</td>
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<td>4.5</td>
<td>EMU Water Consumption Measurement</td>
<td>LUNAR SURFACE</td>
<td>3-153</td>
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<tr>
<td>4.5.1</td>
<td>Obtain data for improving confidence in present method of computing</td>
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<td>water remaining during EVA</td>
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<td>4.6</td>
<td>CSM Oxygen FLOW RATE</td>
<td>TEC</td>
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<td>4.6.1</td>
<td>Obtain data on a single 02 tank under a maximum flow rate conditions</td>
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<td>3-248-288</td>
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<td>when the quantity is between 60% and 40%</td>
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<td>4.6.2</td>
<td>Obtain data on a single 02 tank under nominal flow rate conditions</td>
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<td>when the quantity is between 20% and 5%</td>
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<td>Visibility at High Sun Angles</td>
<td>LUNAR ORBIT</td>
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<tr>
<td>4.7.1</td>
<td>Obtain crew comments and photographs while viewing pre selected target</td>
<td>LUNAR ORBIT</td>
<td>3-196-198</td>
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<td>areas under specified sun elevation and line-of-sight elevation angles</td>
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<td>Thermal Coating Degradation</td>
<td>EVA-2</td>
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<td>4.8.1</td>
<td>Obtain data on the optical properties of twelve thermal control coatings after being covered with lunar dust</td>
<td>EVA-2</td>
<td>3-183/184</td>
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<td>4.8.2</td>
<td>Obtain data on the optical properties of twelve thermal control coatings after the lunar dust has been removed by brushing</td>
<td>EVA-2</td>
<td>3-187</td>
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<td>4.9</td>
<td>EVA Communication System Performance</td>
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<td>4.9.1</td>
<td>Determine the effects upon communication of obstructing lunar surface features between EVC-1 and the LM</td>
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<td>CSM Orbital Science Photography</td>
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<td>4.10.1</td>
<td>Obtain photographs of lunar surface areas of prime scientific interest, using the Lunar Topographic Camera</td>
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<td>4.10.2</td>
<td>Obtain photographs of lunar surface areas of prime scientific interest, using the Hasselblad camera with the 250mm lens.</td>
<td>LUNAR ORBIT</td>
<td>3-174/178</td>
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<tr>
<td>4.10.3</td>
<td>Obtain the photographs of specific segments of the lunar surface in earthshine and in low level light near the terminator, using the 16mm sequence camera with the 18mm lens and either type of Hasselblad camera with an 80mm lens</td>
<td>LUNAR ORBIT</td>
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<td>4.11</td>
<td>Dim Light Photography</td>
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<td>4.11.1</td>
<td>Obtain photographs of diffuse galactic light of four celestial subjects</td>
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<td>4.11.2</td>
<td>Obtain photographs of zodiacal light as the CSM approaches sunrise</td>
<td>LUNAR ORBIT</td>
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<td>4.11.3</td>
<td>Obtain photographs of the Lunar libration region, L4</td>
<td>LUNAR ORBIT</td>
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<tr>
<td>4.11.4</td>
<td>Obtain photographs through the CSM sextant of the earth's darkside</td>
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<td>4.11.5</td>
<td>Obtain earth limb photographs during solar eclipse by the earth; and obtain comet photography, if appropriated trajectory and celestial conditions exist</td>
<td>TEST CONDITIONS DO NOT EXIST</td>
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<td>Contingency Sample Collection</td>
<td>EVA-1</td>
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<td>5.1.1</td>
<td>Provide a contingency sample for postflight scientific investigation</td>
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<td>Selected Sample Collection</td>
<td>EVA-2</td>
<td>3-189</td>
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<td>5.2.1</td>
<td>Collect rock samples and fine-grained fragmental material</td>
<td>EVA-2</td>
<td>3-189</td>
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<td>5.2.2</td>
<td>Collect one large rock</td>
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<td>5.5</td>
<td>Apollo Lunar Surface Experiments Package</td>
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<td>Deploy the passive seismic experiment (S-031)</td>
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<td>Deploy the active seismic experiment (S-033)</td>
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<td>Deploy the suprathermal ion detector experiment (S-036) and the cold cathode ion gauge experiment (S-058)</td>
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<td>5.5.4</td>
<td>Deploy the charged particle lunar environment experiment (S-038)</td>
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<td>5.5.5</td>
<td>Deploy the lunar dust detector experiment (M-515)</td>
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<td>Lunar Geology Investigation</td>
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<tr>
<td>5.6.1</td>
<td>Examine, describe, photograph, and collect lunar geologic samples for return to earth</td>
<td>EVA-1 &amp; 2</td>
<td>3-145/185/187</td>
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<tr>
<td>5.6.2</td>
<td>Examine, describe, and photograph field relationships (such as shape, size, range, patterns of alignment or distribution) of all accessible types of lunar topographic features</td>
<td>EVA-2</td>
<td>3-185/187/189</td>
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<td>5.6.3</td>
<td>Collect special soil samples (i.e., core tube samples, a 4-kilogram sample and trench samples) from the lunar surface and subsurface</td>
<td>EVA-1</td>
<td>3-143</td>
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<td>5.6.4</td>
<td>Collect large equidimensional rock samples from the lunar surface</td>
<td>EVA-1</td>
<td>3-142-145</td>
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<td>5.6.5</td>
<td>Collect special container soil samples (i.e., lunar environment soil sample and exhaust-contaminated sample) from the lunar surface and subsurface</td>
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<td>Laser Ranging Retro-Reflector</td>
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<td>Deploy the laser ranging retro-reflector (LR3) experiment (S-078)</td>
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<td>Solar Wind Composition</td>
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<td>5.8.1</td>
<td>Conduct the solar wind composition experiment (S-080)</td>
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<td>5.9</td>
<td>CSM/LM S-Band Transponder Experiment</td>
<td>PASSIVE</td>
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<tr>
<td>5.9.1</td>
<td>Obtain S-Band Doppler tracking measurements of the docked CSM/LM and the undocked CSM during non powered flight while in lunar orbit</td>
<td>PASSIVE</td>
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<td>5.9.2</td>
<td>Obtain S-Band Doppler tracking measurements of the LM during non-powered portions of the lunar descent</td>
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<tr>
<td>5.9.3</td>
<td>Obtain S-Band Doppler tracking measurements of the LM ascent stage during non powered portions of the descent for lunar impact</td>
<td>PASSIVE</td>
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<td>Down-Link Bi-static Radar Observations of the Moon</td>
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<tr>
<td>5.10.1</td>
<td>Obtain data on the spectral properties of S-band bistatic radar echoes from the lunar crust</td>
<td>CSM SOLO</td>
<td>3-174-176</td>
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<td>5.10.2</td>
<td>Obtain data to allow a determination of the Brewster angle of the lunar crust in the S-band</td>
<td>CSM SOLO</td>
<td>3-174-176</td>
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<tr>
<td>5.10.3</td>
<td>Obtain data on the spectral properties of VHF bi-static radar echoes from the lunar crust</td>
<td>CSM SOLO</td>
<td>3-152-176</td>
</tr>
<tr>
<td>5.10.4</td>
<td>Obtain data to allow a determination of the Brewster angle of the lunar crust in the VHF band</td>
<td>CSM SOLO</td>
<td>3-152-176</td>
</tr>
<tr>
<td>5.11</td>
<td>Portable Magnetometer</td>
<td>EVA-2</td>
<td>3-183/185/189</td>
</tr>
<tr>
<td>5.11.1</td>
<td>Obtain data on the local magnetic field by use of a portable magnetometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.12</td>
<td>Soil Mechanics</td>
<td>EVA-2</td>
<td>3-189</td>
</tr>
<tr>
<td>5.12.1</td>
<td>Obtain data on the lunar surface and subsurface characteristics relative to the origin and nature of the lunar soil, to construction of a shelter and to mobility of a roving vehicle</td>
<td>EVA-2</td>
<td>3-189</td>
</tr>
<tr>
<td>5.12.2</td>
<td>Obtain data on lunar soil mechanical behavior</td>
<td>EVA-2</td>
<td>3-189</td>
</tr>
<tr>
<td>5.12.3</td>
<td>Obtain a representative sample of fine-grained fragmental material</td>
<td>EVA-1</td>
<td>3-143</td>
</tr>
<tr>
<td>5.13</td>
<td>Gegenschein from Lunar Orbit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.13.1</td>
<td>Obtain data on the spatial distribution of the Gegenschein and Moulton point</td>
<td>CSM SOLO</td>
<td>3-126-128</td>
</tr>
<tr>
<td>5-176</td>
<td>Apollo Window Meteroid Experiment</td>
<td>PASSIVE</td>
<td></td>
</tr>
<tr>
<td>T-029</td>
<td>Pilot Describing Function</td>
<td>PASSIVE</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 3 - DETAILED TIMELINE
FLIGHT PLAN

LIFT-OFF JANUARY 31, 1971

SECO
INSERTION AND SYSTEMS CHECKS

NOTE:
L/O CREW POSITIONS
LEFT COUCH - CDR
CENTER COUCH - CMP
RIGHT COUCH - LMP
AT SECO+20 SEC, S-IVB
MVNS TO LH AND
INITIATES ORB RATE
(HEADS DOWN)

THE DAP LOAD WILL
BE SHOWN WHEN
APPLICABLE IN THE
TIME COLUMN OR
AS A NOTE TO
INDICATE STATUS

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

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---------|---------|------|------|---------|-----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 00:00 - 01:00 | 1/E.O. | 3-1
FLIGHT PLAN

REPORT: GYRO TORQUING ANGLES

SCS ATT REF COMPARISON CHECK PAGE L 2-17
EXTEND DOCKING PROBE PAGE L 2-18

GO/NO-GO FOR PYRO ARM (CUE MSFN)
LOGIC ON

TLI PREPARATION PAGE L 2-23
PYRO ARM

UPDATE TO CSM
TLI PAD
TLI +90 MIN ABORT PAD
P37 (L/O+8) PAD
UPLINK TO CSM
CSM S.V. & V66
GO/NO-GO FOR PYRO ARM

DUMP DSE

01:00
(31102)
(01111)
01:10
01:30
01:40
01:50
02:00

AS A GENERAL RULE, EXCEPT DURING TEC, UNDOCKED PERIODS AND WHILE THE LM IS ON THE LUNAR SURFACE, MCC-H WILL UPLINK THE STATE VECTOR TO THE CSM SLOT AND TRANSFER IT VIA V66 TO THE LM SLOT IN ORDER TO HAVE REDUNDANT STATE VECTORS ONBOARD

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 01:00 - 02:00 | 1/E.O. | 3-2

MSC Form 29 (May 69).
FLIGHT PLANNING BRANCH

NASA — MSC
# FLIGHT PLAN

## TLI

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC TERMINATE</td>
<td>+45° TERMINATE</td>
<td>$v_1 = \text{PAD VALUE} + 2 \text{ SEC}$</td>
<td>NO TRIM</td>
</tr>
</tbody>
</table>

**TABLE 3-1**

3-4
# FLIGHT PLAN

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03:00</td>
<td>CSM/S-IVB SEP 03:01</td>
</tr>
<tr>
<td>03:05</td>
<td>CSM MNVR TO DOCK ATT (301,338,041)</td>
</tr>
<tr>
<td>03:05</td>
<td>V48 (11102)(01111) HGA P = 3, Y 299</td>
</tr>
<tr>
<td>03:05</td>
<td>TV (GDS) 03:05 TO 03:30 CM4/TV - PEAK, BRKT (f22) VISUALLY INSPECT AND PHOTOGRAPH S-IVB AND LM</td>
</tr>
<tr>
<td>03:11</td>
<td>DOCK 03:11</td>
</tr>
<tr>
<td>03:15</td>
<td>CSM/LM PRESSURE EQUALIZATION PAGE L 3-5</td>
</tr>
<tr>
<td>03:20</td>
<td>TUNNEL HATCH REMOVAL PAGE L 3-5</td>
</tr>
<tr>
<td>03:20</td>
<td>DOCKING LATCH VERIFICATION PAGE L 3-6</td>
</tr>
<tr>
<td>03:20</td>
<td>LM UMBILICAL CONNECTIONS PAGE L 3-6</td>
</tr>
<tr>
<td>03:20</td>
<td>HATCH INSTALLATION PAGE L 3-6</td>
</tr>
<tr>
<td>03:20</td>
<td>PRE LM SEP &amp; EJECTION PAGE L 3-7</td>
</tr>
<tr>
<td>03:30</td>
<td>S-IVB NON-PROPULSIVE VENT START (03:36:33.7)</td>
</tr>
<tr>
<td>03:40</td>
<td>V48 (21101) (X1111) GO/NO-GO PYRO ARM (CUE MSFN)</td>
</tr>
<tr>
<td>03:40</td>
<td>LOGIC ON</td>
</tr>
<tr>
<td>03:40</td>
<td>PYRO ARM</td>
</tr>
<tr>
<td>03:40</td>
<td>P47 THRUST MONITOR</td>
</tr>
<tr>
<td>03:50</td>
<td>S-IVB NON-PROPULSIVE VENT COMPLETE (03:51:33.7)</td>
</tr>
<tr>
<td>03:50</td>
<td>PHOTOGRAPH LM EJECTION</td>
</tr>
<tr>
<td>04:00</td>
<td>CSM/LM EJECTION</td>
</tr>
<tr>
<td>04:00</td>
<td>POO, V66 SET CSM S.V. INTO LM S.V.</td>
</tr>
<tr>
<td>04:00</td>
<td>REPORT: GOOD EJECTION</td>
</tr>
</tbody>
</table>

## NOTES

- T&D MNVR +X FOR 3 SEC (ΔV≈0.5 FPS), AFTER 15 SEC PITCH UP AT 0.5°/SEC. V49 AUTO MNVR TO DOCKING ATT. NULL TRANSLATION AND RATES, +X FOR 4 SEC (ΔV≈0.7 FPS) DURING TLC, HGA IS REQUIRED ONLY FOR TD&E, TV TRANSMISSION, AND MCC'S. THE ANTENNA WILL BE STOWED AT OTHER TIMES. DURING PTC MCC-H WILL COMMAND OMNI SELECTION.
- 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.
- TIG: 03:56
- BT: 3 SEC
- ΔVT: 0.4 FPS
- ULLAGE: NONE
- ORBIT: N/A

---

**Facts:**

- **MCC-H**: 1723 CST
- **Edition**: APOLLO 14 FINAL (JAN)
- **Date**: DECEMBER 2, 1970
- **Time**: 03:00 - 04:00
- **Day/Rev**: 1/TLC
- **Page**: 3-6

---

**Source:** MSC Form 29 (May 69) **FLIGHT PLANNING BRANCH**

---

**Additional Information:**

- **NASA — MSC**
THIS PAGE INTENTIONALLY LEFT BLANK
S-IVB APS EVASIVE INITIATION
CSM/S-IVB RANGE 1583 FT

S-IVB LOX DUMP INITIATION
CSM/S-IVB RANGE 12 023 FT
FLIGHT PLAN

V49 MNVR TO VIEW S-IVB IN HATCH WINDOW BY 04:09
(090,340,356) OMNI D
REPORT: GO FOR S-IVB YAW MNVR
VISUALLY INSPECT S-IVB/IU THERMAL SHROUD, TAKE PHOTOS IF
DAMAGE IS EVIDENT
S-IVB YAW MNVR 04:09 (GROUND COMMAND)

REPORT: GO FOR S-IVB EVASIVE BURN
S-IVB APS EVASIVE BURN 04:19 (GROUND COMMAND)
CHARGE BATTERY B

S-IVB MNVRS TO PROPELLANT DUMP ATT 04:29
REPORT: LM/CM ΔP
S-IVB CONTINUOUS H₂ VENT-ON 04:36
V49 MNVR TO P52 ATTITUDE (05:20)
(230,300,356) HGA P 31, Y 310
S-IVB LOX DUMP (04:40)

DOFF PGA'S
TRANSFER ITEMS OUT OF PGA POCKETS
ZIP SUIT AND INSTALL ELECTRICAL
COVER PRIOR TO STOWING (PGA BAG)
STOW COMM CARRIERS & UCTA (PGA BAG)

NOTES
THE MNVR TO ACQUIRE
THE S-IVB WILL BE
PERFORMED AT 0.2°/SEC AND WILL BE INITIATED AFTER GOOD
EJECTION IS VERIFIED

GO FOR S-IVB YAW MNVR
INDICATES THAT THE
S-IVB IS IN THE CREW
FIELD OF VIEW AND
ADEQUATE SPACECRAFT
SEPARATION HAS BEEN
ACHIEVED.
THE S-IVB YAW MNVR
WILL BE PERFORMED
NOMINALLY AT LM
EJECTION +13 MIN

EVASIVE BURN ΔV
≈ 9.4 FPS
LOX DUMP ΔV ≈ 28 FPS

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>04:00 - 05:00</td>
<td>1/TLC</td>
<td>3-9</td>
</tr>
</tbody>
</table>

MSC Form 29 (May 88)  FLIGHT PLANNING BRANCH  NASA — MSC
FLIGHT PLAN

PREPARE FOR LAUNCH VEHICLE
SYSTEMS PERFORMANCE DEBRIEFING
AT 27 HOURS. SEE QUESTIONS ON
PAGE 3-28

ATT DEADBAND - MIN
RATE - LOW
BMAG (3) - ATT 1/RATE 2
SC CONT - SCS

REPORT: CYRO TORQUING ANGLES

SC CONT - CMC
BMAG (3) - RATE 2
SECURE HGA, HGA TRACK - MAN
HGA P -52, Y 270
O2 FUEL CELL PURGE
IF NO MCC-1
WASTE WATER DUMP
VHF A SIMPLEX - OFF
VERIFY WASTE STOWAGE VENT VALVE - VENT

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>05:00 - 06:00</td>
<td>1/TLC</td>
<td>3-10</td>
</tr>
</tbody>
</table>

NOTES
SC INTERIOR PHOTOGRAPHY AT CREW OPTION
CM/DAC/10/CIN- SPOT
(T2.8,1/60,3) 6 fps
(87% MAG)
(MAG (H) , FR #

STARS
SA
TA

P52 IMU REALIGN
N71:
N50:
N93:
X
Y
Z
GET

P52 IMU REALIGN

P37 PAD ASSUMES
NO MCC-1
FLIGHT PLAN

07:00

07:10

07:20

07:30

07:40

07:50

08:00

EAT PERIOD

NOTES

DAP LOAD STATUS
(21101)(X1111)

MISSION | EDITION  | DATE             | TIME        | DAY/REV | PAGE
--------|---------|------------------|-------------|---------|-----
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 07:00 - 08:00 | 1/TLC | 3-12

MSC Form 28 (May 89)
FLIGHT PLANNING BRANCH

NASA - MSC
FLIGHT PLAN

MCC-H 2223 CST

08:00

:10

:20

08:30

:40

:50

09:00

EAT PERIOD

CSM SYSTEMS CHECKLIST

DEACTIVATE PRIMARY EVAP

COMM MODE -
NORMAL LUNAR CONFIGURATION
COAST AWAKE

PAGE S 1-13

PAGE S 1-24

NOTES

DAP LOAD STATUS
(21101)(X1111)

GET: 9:00

F.O.V. 10°

PTC

S-IVB MCC-2 GET ≈ 09:30
ΔV IS NOMINALLY ZERO
EARTH DISTANCE
≈ 44 241 NM

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>08:00 - 09:00</td>
<td>1/TLC</td>
<td>3-13</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

P52 IMU REALIGN
OPTION 3 REFSMMA (PTC ORIENT)

REPORT: GYRO TORQUING ANGLES

CSM G&C CHECKLIST
ΔV TEST & NULL BIAS CHECK PAGE G 2-5
REPORT: BIAS

EXIT G&N PTC PAGE G 8-3
V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(153,224,328)
OMNI_A
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00034)
POO
V49 MNVR TO SIGHTING ATTITUDE
(173,275,310) OMNI_B
V67 (+80000) (+00070) (+00003)

P23 CISLUNAR NAVIGATION
5 MARKS ON EACH STAR, UPDATE STATE VECTOR
1. N70 (00000) (00000) (00120)
   N88 (-54083) (-07011) (-83821)

NOTES
DAP LOAD STATUS (21101)(X1111)
P52 IMU REALIGN
N71: __ __ __
N50: __ __ __
N93:
   X __ __ __
   Y __ __ __
   Z __ __ __
GET __ __ __:

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---------|---------|------|------|---------|-----
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 09:00 - 10:00 | 1/TLC | 3-14

FLIGHT PLANNING BRANCH
FLIGHT PLAN

2. N70 (00000)(00000)(00110)
   N88 (-64989)(-89085)(-06316)

3. N70 (00000)(00000)(00120)
   N88 (-64872)(-11412)(-75242)

4. N70 (00000)(00000)(00110)
   N88 (-35412)(-91724)(-18240)

POO
V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(153,224,328) OMNI_A
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00034)

CSM G&C CHECKLIST

PASSIVE THERMAL CONTROL (G&N) PAGE G 8-2

V49 MNVR TO PTC ATTITUDE
(N20,090,000)
V79 (-0.3750)
(+030.00)
(+00000)

MCC-H 0023 CST
10:00
(21101)(X1111)
:10

UPDATE TO CSM
MCC-1 MNVR PAD
CSM S.V.
UPLINK TO CSM
CSM S.V. & V66
MCC-1 TGT LOAD

UPDATE TO CSM
QUADS TO ENABLE
FOR PTC SPINUP

11:00

NOTES
236 DELTA
OPHIUCHI (ENH)

53 GAMMA
CENTAURI (EFH)

202 ZETA
OPHIUCHI (ENH)

DAP LOAD STATUS
(21101)(X1111)
START PTC IF
MCC-1 NOT REQUIRED

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---------|---------|------|------|---------|------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 10:00 - 11:00 | 1/TLC | 3-15

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

MCC-1
BURN TABLE

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC TERMINATE</td>
<td>±10° TERMINATE</td>
<td>BT + 1 SEC</td>
<td>IF &lt;2 FPS, TRIM X AXIS TO 0.2 FPS IF &gt;2 FPS, NO TRIM</td>
</tr>
</tbody>
</table>

TABLE 3-2
3-16
FLIGHT PLAN

P30 EXTERNAL ΔV

V49 MNVR TO PAD BURN ATTITUDE
WASTE STOWAGE VENT VLV - CLOSE (8 HOURS FROM VENT)
O₂ HEATERS 1&2 (2) - OFF
O₂ HEATERS 3 (1) - AUTO

SXT STAR CHECK
P40 SPS THRUSTING OR P41 RCS THRUSTING
O₂ FUEL CELL PURGE IF NOT PERFORMED AT 05:55
WASTE WATER DUMP

V66 SET CSM S.V. INTO LM S.V.
BURN STATUS REPORT

REPORT: LM/CM ΔP
VENT BATTERIES UNTIL SYSTEM TEST METER 4A=0
LiOH CANISTER CHANGE (3 INTO A, STOW 1 IN B5)

TLI CUTOFF +9 HR

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>11:00 - 12:00</td>
<td>1/TLC</td>
<td>3-17</td>
</tr>
</tbody>
</table>

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

*ITEMS TO BE REPORTED TO MSFN

MSC FORM 29 (May 69)

FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

CSM G&C CHECKLIST
PASSIVE THERMAL CONTROL (G&N) PAGE G 8-2
V49 MNVR TO PTC ATTITUDE
(N20,090,000)
V79 (-0.3750)
(+030.00)
(+00000)

UPDATE TO CSM
QUADS TO ENABLE
FOR PTC SPINUP

MISSON | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 12:00 - 13:00 | 1/TLC | 3-18

DAP LOAD STATUS
(21101)(X1111)
START PTC IF
MCC-1 WAS
PERFORMED
FLIGHT PLAN

MCC-H

0623 CST

16:00

:20

:40

17:00

M S F N

REST PERIOD
(10 HOURS)

:20

:40

18:00

NOTES

DAP LOAD STATUS
(21101)(X1111)
DURING REST PERIOD,
TWO CREWMEN IN
REST STATIONS AND
ONE IN COUCH

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>16:00 - 18:00</td>
<td>1/TLC</td>
<td>3-22</td>
</tr>
</tbody>
</table>
MCC-H 0823 CST

FLIGHT PLAN

18:00

:20

:40

19:00

MSFN

REST PERIOD
(10 HOURS)

:20

:40

20:00

NOTES
DAP LOAD STATUS
(21101)(X1111)

MISSION | EDITION     | DATE       | TIME       | DAY/REV | PAGE
---------|-------------|------------|------------|---------|------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 18:00 - 20:00 | 1/TLC  | 3-23

MSC Form 29 (May 69) FLIGHT PLANNING BRANCH

NASA — MSC
**FLIGHT PLAN**

**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 SECO, 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/LIFT-OFF 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)?**
9. **WHAT DID THE ORDEAL BALL LOOK LIKE DURING TLI?**

---

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
--- | --- | --- | --- | --- | ---
**APOLLO 14** | **FINAL (JAN)** | **DECEMBER 2, 1970** | **27:00 - 28:00** | **2/TLC** | **3-28**

---

**FLIGHT PLANNING BRANCH**

---

**NOTES**

**DAP LOAD STATUS**

(21101)(X1111)
FLIGHT PLAN

CSM G&C CHECKLIST

ΔV TEST & NULL BIAS CHECK PAGE G 2-5
REPORT: BIAS

P52 IMU REALIGN
OPTION 3 REFSSMAT (PTC ORIENT)

REPORT: GYRO TORQUING ANGLES

EXIT G&N PTC PAGE G 8-3

V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(151,227,333)
OMNI A

P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00034)
POO

V49 MNVR TO SIGHTING ATTITUDE
(155,265,310) OMNI B
V67 (+45000) (+00006) (+00003)

P23 CISLUNAR NAVIGATION
5 MARKS ON EACH STAR, UPDATE STATE VECTOR
1. N70 (00000)(00000)(00110)
   N88 (-35412)(-91724)(-18240)

2. N70 (00000)(00000)(00120)
   N88 (-58200)(-46152)(-66954)

NOTES

DAP LOAD STATUS
(21101)(X1111)

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

EARTH DISTANCE
≈ 114 188 NM

LOAD W MATRIX

202 ZETA
OPHIUCHI (ENH)

165 ETA
CENTAURI (EFH)

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
-----------------|-------------|-------|--------|---------|-------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 28:00 - 29:00 | 2/TLC | 3-29
FLIGHT PLAN

3. N70 (00033)(00000)(00110)

4. N70 (00000)(00000)(00120)
   N88 (-64929)(-74326)(-16121)

P00
V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(151,227,333)
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00034)
ACQUIRE MSFN HGA P -64 Y 102

H₂ PURGE LINE HEATERS - ON

P30 EXTERNAL ΔV
V49 MNVR TO PAD BURN ATTITUDE
(208,347,316)

NOTES
33 ANTARES
(ENH)

172 BETA
LIBRAE (EFH)

IF HGA LOCK
IS LOST ACQUIRE
MANUALLY WITH
HGA P -2 Y 356
### FLIGHT PLAN

#### MCC-2
BURN CHART

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC TERMINATE</td>
<td>+10° TERMINATE</td>
<td>BT + 1 SEC</td>
<td>IF &lt;2FPS, TRIM X AXIS TO 0.2FPS IF &gt;2FPS, NO TRIM</td>
</tr>
</tbody>
</table>

**TABLE 3-3**
3-31
**EARTH DARKSIDE DIM LIGHT PHOTOGRAPHY**

**CONFIGURE CAMERA**
CM/DAC/SXT/VHBB, (EXP 1/500) 24 fps (2.5% MAG)
MAG (J) _ MAG % _

**UTILITY POWER - ON**

V49 MNVR TO EARTH DARKSIDE PHOTO ATTITUDE (30:55)
(156,269,310) OMNI B
SECURE HGA, HGA TRACK-MAN, HGA P -52, Y 270

**DAMP VEHICLE RATES PER PTC PROCEDURE STEP 5**
AFTER 20 MIN DISABLE ALL JETS
P22 ORBIT NAVIGATION (NO MARKS)

LDMK:
LAT +15.000  SA +314.00
LONG/2 -42.500  TA +04.000
ALT +000.00

**VERIFY THRU SXT THAT OPTICS BORESIGHTED ON EARTH DARKSIDE**
MOUNT DAC ON SXT, DAC-ON AT 24 fps FOR 2 SEC
CHANGE DAC TO TIME & 1/60

1 FRAME, EXP TIME 60 SEC
1 FRAME, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC

CHANGE DAC TO 24 fps & 1/500; DAC ON AT 24 fps FOR 2 SEC
CYCLE CMC MODE - FREE AUTO
ENABLE JETS
RECORD MAG % ___
REMOVE AND STOW DAC

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>30:50 - 31:30</td>
<td>2/TLC</td>
<td>3-32</td>
</tr>
</tbody>
</table>
### FLIGHT PLAN

**MCC-H** 2023 CST

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>30:00</td>
<td>(21101)</td>
</tr>
<tr>
<td>:10</td>
<td></td>
</tr>
<tr>
<td>30:30</td>
<td></td>
</tr>
<tr>
<td>:40</td>
<td>MCC-2</td>
</tr>
<tr>
<td>:50</td>
<td></td>
</tr>
<tr>
<td>31:00</td>
<td></td>
</tr>
</tbody>
</table>

**TLI CUTOFF +28 HR**

- **SXT STAR CHECK**
- **P40 SPS THRUSTING**
- **H₂ & O₂ FUEL CELL PURGE**
- **WASTE WATER DUMP**
- **H₂ PURGE LINE HEATERS - OFF**

**V66 SET CSM S.V. INTO LM S.V.**
**BURN STATUS REPORT**

- **TIG:** 30:36:07
- **BT:** 11.08 SEC
- **ΔVT:** 73.40 FPS
- **ULLAGE:** NONE
- **ORBIT:** N/A

**NOTES**

- **ΔTIG**
- **BT**
- **V₉ₓ**
- **R**
- **P**
- **V₉ₓ**
- **V₉ᵧ**
- **V₉z**
- **AV**

**FUEL**
**OX**
**UNBAL**

*ITEMS TO BE REPORTED TO MSFN*

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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</thead>
<tbody>
<tr>
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<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>30:00 - 31:00</td>
<td>2/TLC</td>
<td>3-33</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

VENT BATTERIES UNTIL SYSTEM TEST METER 4A=0
CREW EXERCISE PERIOD

CHARGE BATTERY A
<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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</thead>
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<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>35:00 - 36:00</td>
<td>2/TLC</td>
<td>3-38</td>
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</table>

MCC-H 0123 CST

FLIGHT PLAN

NOTES
DAP LOAD STATUS
(21101)(X1111)

MSC Form 29 (May 88)

FLIGHT PLANNING BRANCH

NASA—MSC
FLIGHT PLAN

34:00

LTC CHECKOUT
UNSTOW LTC
CM3/LTC/MBW/BEF - (SHUT 1/100, RNG 10.0, INT 8) (12 FR)
MAG (V) , FR #
LTC INSTALLATION (DECAL)
RECORD LTC CLOCK TIME
RECORD TIME :__:__ & DAY ____ (LTC CLOCK)

AT GET __:__ :__:
LTC CHECKOUT (DECAL)
LTC FILM MAGAZINE CHANGE (DECAL)
ADVANCE 4 FRAMES, RECORD FR # ___
PUT MAG (W) ON LTC
RESET FRAME COUNTER
LTC REMOVAL (DECAL) & STOW

UPDATE TO CSM
LOI MINUS 5 HR
FLYBY

LOI MINUS 5 HR
FLYBY IS A
CIRCUMLUNAR
TRAJECTORY TO THE
PRIME MPL AND WITH
A PERICYCTHON
BETWEEN 60 AND
1500 NM

<table>
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<td>34:00 - 35:00</td>
<td>2/TLC</td>
<td>3-37</td>
</tr>
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</table>
FLIGHT PLAN

L10H CANISTER CHANGE
(5 INTO A, STOW 3 IN B5)

NOTES
DAP LOAD STATUS
(21101)(X1111)

REPORT: LM/CM ΔP

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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<td>DECEMBER 2, 1970</td>
<td>38:00 - 39:00</td>
<td>2/TLC</td>
<td>3-41</td>
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</tbody>
</table>
FLIGHT PLAN

UPLINK TO CSM
CSM S.V. & V66

0523 CST

39:00

:10

:20

39:30

:50

40:00

P52 IMU REALIGN
OPTION 3 REFSMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 39:00 - 40:00 | 2/TLC | 3-42

FLIGHT PLANNING BRANCH

DAP LOAD STATUS
(21101)(X1111)
**FLIGHT PLAN**

**MCC-H 0623 CST**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>40:00</td>
<td>EAT PERIOD</td>
</tr>
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<td>40:30</td>
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</tr>
<tr>
<td>41:00</td>
<td></td>
</tr>
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</table>

**NOTES**

DAP LOAD STATUS
(21101)(X1111)

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

EARTH DISTANCE
≈ 141,981 NM

**CSM SYSTEMS CHECKLIST**

PRE-SLEEP CHECKLIST PAGE S 1-26

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**  
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 40:00 - 41:00 | 2/TLC | 3-43

*MSC Form 29 (May 69)*

**FLIGHT PLANNING BRANCH**

*NASA — MBC*
FLIGHT PLAN

MCC-H 0723 CST

41:00

42:00

REST PERIOD (10 HOURS)

43:00

NOTES
DAP LOAD STATUS
(21101)(X1111)
DURING REST PERIOD,
TWO CREWMEN IN
REST STATIONS AND
ONE IN COUCH

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>41:00 - 43:00</td>
<td>2/TLC</td>
<td>3-44</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

NOTES
DAP LOAD STATUS
(21101)(X1111)

MCC-H 1323 CST

47:00

48:00

M S F N

REST PERIOD
(10 HOURS)

PTC

49:00

<table>
<thead>
<tr>
<th>MISSION</th>
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<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>47:00 - 49:00</td>
<td>2/TLC</td>
<td>3-47</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

CSM SYSTEMS CHECKLIST

POST-SLEEP CHECKLIST

PAGE S 1-26

L10H CANISTER CHANGE
(6 INTO B, STOW 4 IN B5)

REPORT: LM/CM AP

NOTES

DAP LOAD STATUS
(21101)(X1111)

CSM CONSUMABLES UPDATE

GET: __ __ __

RCS TOTAL ______________

QUAD A _____ B _____

C _____ D _____

H₂ TANK 1 _____ 2 _____

O₂ TANK 1 _____ 2 _____

3 ______

EARTH DISTANCE
≈ 160 954 NM

UPDATE TO CSM
CONSUMABLES
FLIGHT PLAN

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
--------|---------|------|------|---------|------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 51:00 - 52:00 | 3/TLC | 3-49

MSC Form 29 (May 89)

FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

S-170 BISTATIC RADAR FREQUENCY CHECK
VHF AM B - DUPLEX
VHF RANGING - ON
VHF ANT - LEFT (VERIFY)
NOTE: MSFN WILL TURN OFF
S-BAND UPLINK FOR
APPROXIMATELY 5 MIN
WHILE S-BAND DOWNLINK
FREQUENCY IS MEASURED

ON GROUND CUE:
VHF AM B - OFF
VHF RANGING - OFF

GET: 52:00
F.O.V. 3°

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---------|---------|------|------|---------|------
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 52:00 - 53:00 | 3/TLC | 3-50

MSC Form 28 (May 89)
FLIGHT PLANNING BRANCH
NASA — MBC
FLIGHT PLAN

CHARGE BATTERY B

P52 IMU REALIGN
OPTION 3 REFSMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES

NOTES
DAP LOAD STATUS
(21101)(X1111)

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

PTC

MISSION          EDITION          DATE                  TIME                  DAY/REV   PAGE
---------------------------------------------------------------------------------------------
APOLLO 14        FINAL (JAN)    DECEMBER 2, 1970    53:00 - 54:00           3/TLC     3-51
**FLIGHT PLAN**

**UPLINK TO CSM**
LIFT-OFF TIME (IF REQ'D)

**UPDATE TO CSM**

**T EPHEM**
(IF REQ'D)
P37 (L/O +60 TIG) (IF REQ'D)

LOI-5 FLYBY TIG (IF REQ'D)

SYNCHRONIZE MISSION TIMER TO CMC (IF REQUIRED)
V05NO1E, 1706 E

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>54:00 - 55:00</td>
<td>3/TLC</td>
<td>3-52</td>
</tr>
</tbody>
</table>

**NOTES**
DAP LOAD STATUS (21101)(X1111)

**T EPHEM UPDATE**

<table>
<thead>
<tr>
<th>OID</th>
<th>LOAD B</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td></td>
</tr>
</tbody>
</table>

LIFT-OFF TIME WILL BE UPDATED IF THE TIME PROPAGATED AHEAD TO START OF REV 2 DIFFERS FROM 84:45:12 BY MORE THAN 1 MIN.
**FLIGHT PLAN**

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>56:00 - 57:00</td>
<td>3/TLC</td>
<td>3-54</td>
</tr>
</tbody>
</table>

MCC-H 2223 CST

NOTES
DAP LOAD STATUS (21101)(X1111)

MSC Form 29 (May 69)

FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

CSM G&C CHECKLIST
AV TEST & NULL BIAS CHECK
REPORT: BIAS
PAGE G 2-5

IF LM/CM ΔP < 2.7 PSID - VENT
UNTIL ΔP ≥ 2.7

O₂ HEATERS 1&2 (2) - AUTO
O₂ HEATERS 3 (1) - OFF

P52 IMU REALIGN
OPTION 3 REFSSMAT
(PTC ORIENT)
REPORT: GYRO TORQUING ANGLES
PAGE G 8-3

DAP LOAD STATUS
(21101)(X1111)

NOTES

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

UPDATE TO CSM
GO/NO-GO MCC-3
MCC-3 MNVR PAD

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 59:00 - 60:00 | 3/TLC | 3-57

MSC Form 29 (May 69)
FLIGHT PLANNING BRANCH

NASA — MSC
# FLIGHT PLAN

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
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</thead>
<tbody>
<tr>
<td>10°/SEC TERMINATE</td>
<td>+10° TERMINATE</td>
<td>BT + 1 SEC</td>
<td>IF &lt;2 FPS, TRIM X AXIS TO 0.2 FPS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IF &gt;2 FPS, NO TRIM</td>
</tr>
</tbody>
</table>

**MCC-3 BURN CHART**

**TABLE 3-4**
3-58
**FLIGHT PLAN**

- **MCC-H**
  - 0223 CST
  - 60:00
    - (21101)
    - (X1111)
  - :10
  - :20
  - 60:30
  - :40
  - :50
  - 61:00

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

**BURN STATUS REPORT**
- X X X
- X X X
- X X X
- X X X
- X X X
- X X X
- *ITEMS TO BE REPORTED TO MSFN

**PREPARE TRANSFER ITEMS PER LM ACTIVATION CHECKLIST**
- REMOVE 16MM & 70MM MAG FROM R13

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 60:00 - 61:00 | 3/TLC | 3-59

**FLIGHT PLANNING BRANCH**

**XO**

**P30 EXTERNAL ΔV**

**V49 MNVR TO PAD BURN ATTITUDE**

- SXT STAR CHECK
- P40 SPS THRUSTING OR P41 RCS THRUSTING
- O₂ FUEL CELL PURGE
- WASTE WATER DUMP

**BURN STATUS REPORT**
- TIG: 60:38:14
- BT: NOM. ZERO
- ΔVT: NOM. ZERO
- ULLAGE: NONE
- ORBIT: N/A

**APOLLO 14**

**DECEMBER 2, 1970**

**60:00 - 61:00**

**3/TLC**

**3-59**
FLIGHT PLAN

CSM SYSTEMS CHECKLIST

IVT TO LM (CHECK OUT, TLC) PAGES 2-1
PRESSURIZE CSM TO 5.7 PSIA

TV (HSK) 61:45 to 62:30
CM/TV - AVG (f5.6)

PRESSURIZE LM
EXIT G&N PTC PAGE G 8-3
V48 (21111) (X1111)
V49 MNVR TO TV ATTITUDE (61:45)
(282,090,000)
ACQ MSFN HGA P 34, Y 263

PREPARE FOR LM INGRESS
REMOVE TUNNEL HATCH AND STOW
REMOVE PROBE & DROGUE AND STOW

△H DETERMINED
FROM STAR/ EARTH
HORIZON SIGHTINGS
WILL BE UPLINKED
IF IT DIFFERS FROM
△H IN E-MEMORY
BY MORE THAN 5.0 KM
<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>63:00 - 64:00</td>
<td>3/TLC</td>
<td>3-62</td>
</tr>
</tbody>
</table>

MSC Form 1674 (OT) (June 69) FLIGHT PLANNING BRANCH
FLIGHT PLAN

LMP & CDR IVT TO CSM & CLOSE LM HATCH
INSTALL PROBE, DROGUE AND CM HATCH

LM TUNNEL VENT VALVE - LM/CM ΔP
CYCLE CMC MODE - FREE/AUTO
V48 (21101)(X1111)
LI0H CANISTER CHANGE
(7 INTO A, STOW 5 IN B6)

CSM G&C CHECKLIST

PASSIVE THERMAL CONTROL (G&N) PAGE 8-2
(N20,090,000)
V79 (-0.3750)(+030.00)(+00000)

GET: 65:00 F.O.V. 3°
GET: 65:00

DAP LOAD STATUS
(21101)(X1111)

UPDATE TO CSM
QUADS TO ENABLE
FOR PTC SPINUP

F.O.V. 5°
02 HEATERS 1&2 (2) - OFF
02 HEATERS 3 (1) - AUTO

UPDATE TO CSM
CSM S.V. (67:00)

MISSION | EDITION | DATE        | TIME       | DAY/REV | PAGE
--------|----------|-------------|------------|---------|-------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 65:00 - 66:00 | 3/TLC | 3-64

NOTES
DAP LOAD STATUS
(21101)(X1111)
ONBOARD READOUT
BAT C
PYRO BAT A
PYRO BAT B
RCS A
B
C
D
DC IND SEL - MNA OR B

EARTH DISTANCE
≈ 184 307 NM
**MCC-H**

<table>
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<tr>
<th>MISSION</th>
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<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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<td>DECEMBER 2, 1970</td>
<td>66:00 - 68:00</td>
<td>3/TLC</td>
<td>3-65</td>
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</table>

**FLIGHT PLAN**

**NOTES**
- DAPLOAD STATUS (21101)(X1111)
- DURING REST PERIOD, TWO CREWMEN IN REST STATIONS AND ONE IN COUCH

**MISSING DATA**

- [Diagram showing flight plan with times and notes]
<table>
<thead>
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<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<td>DECEMBER 2, 1970</td>
<td>70:00 - 72:00</td>
<td>3/TLC</td>
<td>3-67</td>
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<td>EDITION</td>
<td>DATE</td>
<td>TIME</td>
<td>DAY/REV</td>
<td>PAGE</td>
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<td>---------</td>
<td>------</td>
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<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>72:00 - 74:00</td>
<td>3/TLC</td>
<td>3-68</td>
</tr>
</tbody>
</table>

MCC-H 1423 CST

FLIGHT PLAN

REST PERIOD (9 HOURS)

NOTES
DAP LOAD STATUS (21101)(X1111)

MSC Form 29 (May 68)

FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

74:00
:20
:40
75:00
:20
:40
76:00

MCC-H
1623 CST

REST PERIOD
(9 HOURS)

CSM SYSTEMS CHECKLIST
POST-SLEEP CHECKLIST

EAT PERIOD

NOTES
DAP LOAD STATUS
(21101)(X1111)

IF MCC-4 IS NOT
PERFORMED, CREW
AWAKE TIME IS 78:00

EARTH DISTANCE
≈ 196 739 NM

<table>
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<tr>
<th>MISSION</th>
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<th>DAY/REV</th>
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<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>74:00 - 76:00</td>
<td>3-4/TLC</td>
<td>3-69</td>
</tr>
</tbody>
</table>
MCC-H

UPDATE TO CSM
FLIGHT PLAN
CONSUMABLES
PERICYTHERION +2 HR
ABORT PAD
MCC-4 MNVR PAD

1823 CST
76:00
:10
:20
M
S
F
N
76:30
77:00

UPLINK TO CSM
CSM S.V. & V66
MCC-4 TGT LOAD

FLIGHT PLAN

CSM G&C CHECKLIST
ΔV TEST & NULL BIAS CHECK PAGE G 2-5
REPORT: BIAS

LiOH CANISTER CHANGE
(8 INTO B, STOW 6 IN B6)

NOTE: PERICYCINTHON +2 HR
ABORT PAD TARGETED PTC
FOR A FAST RETURN
TO MPL.

P52 IMU REALIGN
OPTION 3 REFSMNMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES
EXIT G&N PTC PAGE G 8-3

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 76:00 - 77:00 | 4/TLC | 3-70

MSC Form 29 (May 89) FLIGHT PLANNING BRANCH

NOTES
DAP LOAD STATUS
(21101)(X1111)

CSM CONSUMABLES UPDATE
GET: __ __ __: __ __ __

RCS TOTAL ______________
QUAD A __ B __
C __ D __
H₂ TANK 1 __ 2 __
O₂ TANK 1 __ 2 __
3 __

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

NASA — MSC
**FLIGHT PLAN**

**MCC-4**
**BURN CHART**

<table>
<thead>
<tr>
<th>P OR Y RATE</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC</td>
<td>±10°</td>
<td>BT + 1 SEC</td>
<td>TRIM X AXIS ONLY TO 1.0 FPS</td>
</tr>
<tr>
<td>TERMINATE</td>
<td>TERMINATE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 3-5**
3-72
FLIGHT PLAN

P30 EXTERNAL ΔV
V49 MNVR TO PAD BURN ATTITUDE

SXT STAR CHECK
P40 SPS THRUSTING OR P41 RCS THRUSTING

V66 SET CSM S.V. INTO LM S.V.
BURN STATUS REPORT

MCC-4

MCC-H 1923 CST

77:00

:10

:20

77:30

:40

:50

78:00

NOTES

DAP LOAD STATUS
(21101)(X1111)

BURN STATUS REPORT

ΔTIG
BT
V gx

TRIM

RP
V y
V y

ΔV c

FUEL*
OX*

UNBAL

TIG: 77:38:14
BT: NOM. ZERO
ΔVT: NOM. ZERO
ULLAGE: NONE
ORBIT: N/A

*ITEMS TO BE REPORTED TO MSFN

LOI -5 HR

MSC Form 29 (May 89)

FLIGHT PLANNING BRANCH

MISSION  EDITION  DATE  TIME  DAY/REV  PAGE

APOLLO 14  FINAL (JAN) DECEMBER 2, 1970  77:00 - 78:00  4/TLC  3-73

NASA - MSC
FLIGHT PLAN

CSM SYSTEMS CHECKLIST
PRE-LOI SECONDARY GLYCOL LOOP CHECK
REPORT: LM/CM ΔP

UPDATE TO CSM
(IF NO MCC-4)
FLIGHT PLAN
CONSUMABLES (76:10)
PERICYTHION +2 HR
ABORT PAD

:10
80:00

78:30
VERIFY LM/CM ΔP < 2.4 PSID
IF LM/CM ΔP > 2.4 PSID
PRESSURIZE CSM TO 5.7 PSIA

:40

:50
(21111)
V48 (21111)(X1111)
EXIT G&N PTC

79:00
V49 MNVR TO MOON VIEW ATTITUDE (79:10)
(352,110,311) (HATCH WINDOW)
HGA P -30, Y 293

MISSON | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 78:00 - 79:00 | 4/TLC | 3-74

NASA — MSC
FLIGHT PLANNING BRANCH
FLIGHT PLAN

CSM SYSTEMS CHECKLIST
CSM/LM PRESSURE EQUALIZATION (DECAL) PAGE 5 2-3

CHECK MISSION TIMER AGAINST CMC CLOCK

ATT DEADBAND - MIN
RATE - LOW
BMAG (3) - ATT 1/RATE 2
SC CONT - SCS

P52 IMU REALIGN
OPTION 3 REFSSMAT
(STARS )
(PTC ORIENT )

REPORT: GYRO TORQUING ANGLES

P52 IMU REALIGN
OPTION 1 PREFERRED
(LDG SITE ORIENT )

SC CONT - CMC
BMAG (3) - RATE 2

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 79:00 - 80:00 4/TLC 3-75
FLIGHT PLAN

CSM SYSTEMS CHECKLIST

C&W SYSTEM OPERATIONAL CHECK
CM RCS MONITORING CHECK
SM RCS MONITORING CHECK
SPS MONITORING CHECK
ECS MONITORING CHECK
OXIDIZER FLOW VALVE INCR - INCR (VERIFY)
O₂ HEATERS 1&2 (2) - AUTO
O₂ HEATERS 3 (1) - OFF
CYCLE CMC MODE - FREE/AUTO
V48 (21101) (X1111)
P30 EXTERNAL ΔV
V49 MNVR TO PAD BURN ATTITUDE (82:00)
(355,261,327)
ACQ MSFN OMNI C

NOTES

MAP UPDATE REV 1

LOS:

180°:

AOS WITH LOI:

AOS WITHOUT LOI:

THE PU VALVE SHOULD BE USED TO MAINTAIN THE INDICATED UNBALANCE TO WITHIN ±50 LBS OF THE STABILIZED READING (TIG +25 SEC) UNTIL CROSSOVER. AFTER CROSSOVER THE VALVE SHOULD BE USED TO CONTROL THE UNBALANCE WITHIN THE GREEN BAND (0 ± 100 LBS). DURING NORMAL ENGINE OPERATION THE PU VALVE DECREASE POSITION SHOULD NOT BE USED.

THE APPROXIMATE TIME OF CROSSOVER IS 04:06 TO 04:10 INTO THE LOI BURN.

MISSION | EDITION      | DATE           | TIME       | DAY/REV | PAGE  
---------|--------------|----------------|------------|---------|------ 
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 81:00 - 82:00 | 4/TLC  | 3-77 |
# FLIGHT PLAN

## TABLE 3-6

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC COMPLETE</td>
<td>±10° COMPLETE</td>
<td>BT + 10 SEC</td>
<td>DO NOT TRIM</td>
</tr>
</tbody>
</table>

---

### CSM 4-1. LOI mode IDPS abort. 11/13/70 Final

<table>
<thead>
<tr>
<th>Burntime</th>
<th>ΔVM</th>
<th>Mode</th>
<th>SPS</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00 - 0:33</td>
<td>0 - 238</td>
<td>I</td>
<td>TIGHT</td>
<td>DPS at 2 hr (RTCC)</td>
</tr>
<tr>
<td>0:33 - 1:15</td>
<td>238 - 545</td>
<td>I</td>
<td>LOOSE</td>
<td>DPS at 30 min (crewchart)</td>
</tr>
<tr>
<td>1:15 - 1:39</td>
<td>545 - 725</td>
<td>I</td>
<td>LOOSE</td>
<td>DPS at 30 min to depletion + APS at 2 1/2 hr (RTCC); Loss of comm, DPS followed immediately by APS (crewchart)</td>
</tr>
<tr>
<td>1:39 - 2:41</td>
<td>725 - 1202</td>
<td>II</td>
<td>LOOSE</td>
<td>DPS at 2 hr + DPS at perihel (RTCC)</td>
</tr>
<tr>
<td>2:41 - 3:20</td>
<td>1202 - 1513</td>
<td>III</td>
<td>LOOSE</td>
<td>DPS at perihel (RTCC)</td>
</tr>
<tr>
<td>3:20 - Cutoff</td>
<td>1513 - Cutoff</td>
<td>III</td>
<td>TIGHT</td>
<td>DPS at perihel (RTCC)</td>
</tr>
</tbody>
</table>

---

### CSM IMU angles for LOI + 30 min DPS abort

<table>
<thead>
<tr>
<th>GET abort Ignition</th>
<th>Roll</th>
<th>Pitch</th>
<th>Yaw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### CSM IMU angles for LOI + 2 hr DPS abort

<table>
<thead>
<tr>
<th>GET abort Ignition</th>
<th>Roll</th>
<th>Pitch</th>
<th>Yaw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### LM FDI angles for LOI + 2 hr DPS abort

<table>
<thead>
<tr>
<th>GET abort Ignition</th>
<th>Roll</th>
<th>Pitch</th>
<th>Yaw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

## Diagram

- **LOI ΔV magnitude, ΔVM, fps**
- **LOI mode IDPS abort.**

---

3-78
FLIGHT PLAN

SXT STAR CHECK
P40 SPS THRUSTING

GO/NO-GO FOR LOI

VERIFY DSE TAPE MOTION (LBR/RCD/FWD/CMD RESET)

V66 SET CSM S.V. INTO LM S.V.

V48 (21111)(X1111)
V49 MNVR TO COMM ATTITUDE (82:57)
(000,176,000)

ACQ MSFN HGA P -15, Y 180
BURN STATUS REPORT

TIG: 82:38:14
BT: 6 MIN 06.6 SEC
ΔVT: 2,986.0 FPS
ULLAGE: NONE
ORBIT: 170x57.1 NM

*ITEMS TO BE REPORTED TO MSFN
**REPORT IF OFF MORE THAN 1 SEC
***REPORT IF >0.2 FPS
S-IVB LUNAR IMPACT
(LET 83:07:46.5)
LAT -1.596
LONG 33.250

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td></td>
<td>DECEMBER 2, 1970</td>
<td>82:00 - 83:00</td>
<td>4/1</td>
<td>3-79</td>
</tr>
</tbody>
</table>

MSC Form 28 (May 69)
FLIGHT PLAN

ESTABLISH ORB RATE TO OBSERVE LUNAR SURFACE
V79 (-0.0507)
(+005.00)
(+00001)
PRO TO START PITCH RATE (000,215/176,000)

UPDATE TO CSM
MAP UPDATE REV 2

MCC-H
0123 CST

FLIGHT PLANNING BRANCH

NOTES
LINE UNDER PITCH ATTITUDE INDICATES AN ORDEAL (LOCAL HORIZONTAL) ANGLE.
THE SC CONTROLLING RATE AND DEADBAND WILL BE SHOWN IN THE TIME COLUMN IF OTHER THAN THE DAP LOAD.

DURING LUNAR ORBIT, URINE DUMPS SHOULD BE PERFORMED, WHEN REQUIRED, WHILE THE SC IS ON THE BACK SIDE OF THE MOON.
FLIGHT PLAN

STOP ORB RATE AT P52 ATTITUDE (84:05) (000,065,000) HGA P -54, Y 0

P52 IMU REALIGN
OPTION 3 REFSSMAT (LDG SITE ORIENT)

REPORT: GYRO TORQUING ANGLES
VERIFY DSE TAPE MOTION (LBR/RCD/FWD/CMD RESET)

CSM SYSTEMS CHECKLIST
COMM MODE - NORMAL LUNAR CONFIGURATION
H₂ PURGE LINE HEATERS ON
CYCLE CMC MODE - FREE/AUTO

V48 (21101)(X1111)
V49 MNVR TO LDMK TRACK ATTITUDE (85:00) (000,262,000)

H₂ & O₂ FUEL CELL PURGE
WASTE WATER DUMP
H₂ PURGE LINE HEATERS - OFF

MCC-H 0223 CST

NOTES

P52 IMU REALIGN
N71: ___ ___ ___
N05: ___ ___ ___
N93: ___ ___ ___
X ___ ___ ___
Y ___ ___ ___
Z ___ ___ ___
GET ___ ___ ___

PERICYCTHON +2 HR

PERICYCTHON +2 HR

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 84:00 - 85:00 4/1-2 3-81

MSC Form 28 (May 89) FLIGHT PLANNING BRANCH NASA — MSC
19 DEG PITCH DOWN FROM LOCAL HORIZONTAL ORBITAL RATE THROUGHOUT TRACKING

CSM LANDMARK TRACKING PROFILE
(60 x 170 NM ORBIT)

T2-AOS (T1+7:04)
TCA (T1+12:04)
T3-LOS (T1+14:34)

ΔT1 = 424 SEC
ΔT2 = 300 SEC
ΔT3 = 150 SEC

AOS TO LOS = 874 SEC
450 SEC

RADIUS OF MOON

CENTER OF MOON

P24 LDMK TRACKING
TGT: MÖSTING A

(1/60)

T1
T2
TCA
T3

R ___ °P ___ °Y ___ ° (T2 ACQ)

N or S NM ___ / SA ___ TA ___ (T2 ACQ)

N89
LAT -03.250
LONG/2 -02.642
ALT +000.00

3-82
FLIGHT PLAN

UPDATE TO CSM
LDMK TRK PAD REV 2
TEI 5 PAD
LDMK H-3 PAD REV 3
MAP UPDATE REV 3
UPLINK TO CSM
CSM S.V. & V66

ACQ MSFN OMNI C

CSM &C CHECKLIST

ΔV TEST & NULL BIAS CHECK
REPORT: BIAS

CONFIGURE CAMERA: (LDMK TRACK)
CM/DAC/SXT/CEX (EXP PAD) 1 fps (9% MAG)
MAG (B) MAG %
UTILITY POWER-ON
P24 (MÖSTING A)
OPT ZERO-OFF
OPT MODE-CMC
SC CONTROL-CMC/AUTO (VERIFY)
V79 (N16 LOAD T2 TIME)
(-0.0433)
(+000.50)
(+000001)
PRO (AUTO PITCH RATE AT T2 TIME)

TRACK LDMK MÖSTING A START DAC AT T2 -1 MIN
30 SEC BETWEEN MARKS STOP DAC AT T3

RECORD MAG %
V49 MNVR TO BURN PAD ATTITUDE EXCEPT IN ROLL (86:10)
(060,269,000) HGA P 29, Y 255

NOTES

TEI 5 PAD ASSUMES NOMINAL DOI ACCOMPLISHED

MAP UPDATE REV 3
LOS : __ : __ : __ : __
180° : __ : __ : __ : __
AOS : __ : __ : __ : __

LDMK IS AT 10.6° SUN ANGLE

MCC-H
0323 CST

85:00
(21101)
(X1111)

85:30

86:00
(21101)
(X1111)

85:00
(21101)
(X1111)

85:10

85:20

85:40

86:50

87:00

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
--------|---------|------|------|---------|------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 85:00 - 86:00 | 4/2 | 3-83

MSC Form 29 (May 69)

FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

DOI
BURN TABLE

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATIONS</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC TERMINATE</td>
<td>+10° TERMINATE</td>
<td>BT</td>
<td>*TRIM OVERBURNS IN X TO WITHIN 1 FPS, DO NOT TRIM Y &amp; Z</td>
</tr>
</tbody>
</table>

*IF OVERBURN IS >2.2 FPS PITCH 180 AND TRIM

TABLE 3-7
3-84
### FLIGHT PLAN

#### CSM SYSTEMS CHECKLIST

<table>
<thead>
<tr>
<th>Checklist</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&amp;W SYSTEM OPERATIONAL CHECKLIST</td>
<td>1-17</td>
</tr>
<tr>
<td>CM RCS MONITORING CHECK</td>
<td>1-1</td>
</tr>
<tr>
<td>SPS MONITORING CHECK</td>
<td>1-1</td>
</tr>
<tr>
<td>ECS MONITORING CHECK</td>
<td>1-5</td>
</tr>
</tbody>
</table>

- **P52 IMU REALIGN**
- **OPTION 3 REFSMATT**
- **LDG SITE ORIENT**

**REPORT:**
- **GYRO TORQUING ANGLES**
- **P30 EXTERNAL δV**
- **P40 SPS THRUSTING**
- **V49 MNVR TO PAD BURN ATTITUDE (86:40)**
  - (000,269,000)
- **VERIFY DSE TAPE MOTION (LBR/RCD/FWD/REV CMD RESET)**

- **SXT STAR CHECK**
- **P40 SPS THRUSTING**

---

**MISSION**

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>86:00 - 87:00</td>
<td>4/2-3</td>
<td>3-85</td>
</tr>
</tbody>
</table>

**NOTES**

- **P52 IMU REALIGN**
- **N71:**
- **N05:**
- **N93:**
- **X:**
- **Y:**
- **Z:**
- **GET:**

- **TIG:** 86:56:57
- **BT:** 21.38 SEC
- **ΔVT:** 206.6 FPS
- **ULLAGE:** 4 JET 14 SEC
- **ORBIT:** 58.4x9.8 NM
FLIGHT PLAN

V49 MNVR TO BAILOUT BURN ATTITUDE (87:10)
(325,063,000)

* * * * * * * * * * * * * * * * * *
*AOS - NO UP VOICE PROCEDURE*
*1. WAIT 30 SEC, CHECK HGA *
*2. SELECT OMNI B *
*3. SELECT SEC XPNDR *
*4. AFTER 3 MIN GO TO LOS *
OF COMM CUE CARD

ACQ MSFN HGA P-39,Y325

BURN STATUS REPORT

* * * * * * * * * * * * * * * * * *

SC CONTROL-SCS
P47 THRUST MONITOR

BAILOUT BURN

IF REQ'D

TIG: 87:27:31
BT: 10.17 SEC
ΔVC: 100.0 FPS
ULLAGE: 4 JET 14 SEC
ORBIT: N/A

V49 MNVR TO LANDMARK OBSERVATION ATTITUDE (87:45)
(000,292,000)

OMNI D

LDMK H-3
T HOR: ______:____:____
TCA -20 SEC: ______:____:____
LAT: -03.691
LONG/2: -03.771
ALT: +000000

STAY/BAILOUT
DUMP DSE

NOTES

BURN STATUS REPORT

ΔTIG**
BT*
V gx

TRIM

R P

V gx***

V gy***

V gz***

ΔV c*

FUEL*

OX*

UNBAL

*ITEMS TO BE
REPORTED TO MSFN
**REPORT IF OFF
MORE THAN 1 SEC
***REPORT IF >0.2 FPS

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 CHANGE C (JAN) JANUARY 18, 1971 87:00 - 88:00 4/3 3-86

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

P52 IMU REALIGN
OPTION 3 REFSMAT
(LDG SITE ORIENT)

REPORT: GYRO TORQUING ANGLES
VERIFY DSE TAPE MOTION (LBR/RCD/FWD/CMD RESET)

V49 MNVR TO LTC ATTITUDE (89:05)
(181,257,359)

CONFIGURE CAMERA: TARGET 9 (DESCARTES)
CM3/LTC/BW/BEF - (SHUT 1/200, RNG PAD, INT 65.0) (402 FR)
MAG (W), FR #
LTC INSTALLATION (DECAL)
RECORD TIME: ___:___:___, DAY ___ (LTC CLOCK)
AT GET: ___:___:___
LTC CHECKOUT (DECAL)
CYCLE CMC MODE - FREE/AUTO
V48 (21101) (X1111) DELETE

NOTES
MAP UPDATE REV 4
LOS: __:__:__
180°: __:__:__
AOS: __:__:__

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

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 CHANGE CHANGE (JAN) DECEMBER 2, 1970 88:00 - 89:00 4/3-4 3-87
LUNAR ORBIT REST PERIOD ATTITUDE

\[ \theta_s = 150^\circ \]
\[ \phi_s = 263^\circ \]
\[ DB = 10^\circ \]

The smallest angle between the spacecraft X body axis and the sun line of sight.

The angle which is measured from the minus Z spacecraft body axis positively about the X body axis to the sun line of sight vector projection in the Y - Z axis plane.
FLIGHT PLAN

DUMP DSE

UPDATE TO CSM
LTC PHOTO PAD
TEI 12 PAD
MAP UPDATE REV 10
UPLINK TO CSM
CSM S.V. & V66

0723 CST

89:00

(21101)

X1111

90:00

89:30

ACQ MSFN HGA P -64, Y 177

V49 TWEAK MNVR TO LTC PAD ATTITUDE

VERIFY LTC MODE - STANDBY/PWR - ON (T START - 1 MIN) ZERO DET

LTC MODE - AUTO, DET - START/UP (T START)
PHOTO TGT 9 (DESCARTES)
(SEE PAD FOR RANGE CHANGES)
LTC MODE - STANDBY (T STOP)
LTC FILM MAG CHANGE (DECAL)
ADVANCE 4 FRAMES, RECORD FR # ___
PUT MAG (V) ON LTC
RESET FRAME COUNTER
LTC REMOVAL (DECAL) & STOW
V49 MNVR TO REST ATTITUDE (90:00)
(126,286,000) HGA P -35, Y 272
MAN ATT (3) - ACCEL CMD
SC CONT - CMC/AUTO (VERIFY)
V79 (-0.0000) (+010.00) (+00001)
MAN ATT (3) - RATE CMD

NOTES

LTC PHOTO PAD TGT: 9 (DESCARTES)
(181,257,359)
R
P P Y
T START: __ __ __ __ __ __
T STOP: __ __ __ __ __ __
RNG: ___ (51.7) (T START)
RNG: ___ (53.0) (T START + 00:54)
RNG: ___ (44.5) (T START + 01:23)
RNG: ___ (36.4) (T START + 02:21)
RNG: ___ (33.0) (T START + 04:41)
RNG: ___ (28.1) (T START + 05:18)

MAP UPDATE REV 10
LOS: __ __ __ __ __
180°: __ __ __ __ __
AOS: __ __ __ __ __

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 89:00 - 90:00 4/4 3-89

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

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>95:00 - 97:00</td>
<td>4/7-8</td>
<td>3-93</td>
</tr>
</tbody>
</table>

**NOTES**

DAP LOAD STATUS (21101)(X1111)

**DUMP DSE**
FLIGHT PLAN

REST PERIOD
(8.5 HOURS)

VERIFY DSE TAPE MOTION (LBR/RCD/FWD/CMD RESET)

EAT PERIOD

CSM SYSTEMS CHECKLIST
POST - SLEEP CHECKLIST PAGE S 1-26

MCC-H 1723 CST
99:00
(-0.0000)
(+010.00)

:10

:20

:40

:50

100:00

DAP LOAD STATUS
(21101)(X1111)

WAKE CREW AT 99:00
IF TWEAK BURN IS
REQUIRED AT 99:46

NOTES

REST ATT
CSM FLIGHT PLAN

SET UP TV (101:00)

GET: ___ ___ ___ ___

RCS TOTAL

QUAD A ___ B ___
C ___ D ___

H₂ TANK 1 ___ 2 ___
O₂ TANK 1 ___ 2 ___
3 ___

EAT PERIOD

CSM TO LM TRANSFER ITEMS:

SUIT WITH ACCESSORIES
FLIGHT DATA IN BAG
(EACH CREWMAN)

LM TIMELINE BOOK

UCTA

FCS (UI)

LCG (UI)

SUNGLASSES WITH POUCH

WRISTWATCH

PEN

PEN - FELT TIP

PENCIL

CHECKLIST POCKET

SCISSORS POCKET

GLOVES

HELMET

BIO-INSTRUMENTATION EQUIPMENT

SCISSORS (1 ONLY)

PERLIGHT

EARIPLUGS

DOSIMETER

COMM EARMOLD

ACQ MSFN HGA P -34, Y 266

MSFN:
DUMP OSE

LMP DON LCG & PGA WITHOUT HELMET AND GLOVES

MSFN UPLINK:

NOTE: LIFT-OFF TIME WILL BE UPDATED IF THE TIME
OF REV 20 MERIDIAN CROSSING DIFFERS MORE
THAN 1 MIN FROM
119:39:13

CSM S.V. AND V66
DESIRED ORIENT (LCG SITE)
LIFT-OFF TIME (IF REQ'D)

TRAJECTORY STATUS

CONSUMABLES

FLIGHT PLAN

REFRMAT DD TIME COPY AT (101:22)

MAP UPDATE REV 11 (101:35)

TEI 12 T16 (IF REQ'D)

TEI 19 PAD

Synchronize mission timer to chc (if req'd)

VOSMOOE, 1706 E

VERIFY LM/CM δp < 2.4

IF δp > 2.4 PRESSURIZE CSM TO 5.7

REPORT δp TO MSFN

CDR DON LCG & PGA WITHOUT HELMET AND GLOVES

CDS TV - AND (FSS)

APOLLO 14 EDITION

DATE PAGE

DECEMBER 06, 1970 3-96

Jan 18, 1971
THIS PAGE INTENTIONALLY LEFT BLANK
LM FLIGHT PLAN

MCC-H
1923 CST

CDR
101:00

LMP

NOTES

LM ACTIVATION CHECKLIST

IVT TO LM
OPEN HATCH
VERIFY DOCKING ANGLE
TRANSFER POWER

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>101:00 - 102:00</td>
<td>5/10</td>
<td>3-99</td>
</tr>
</tbody>
</table>
MARK TO LM FOR LM MISSION
TIMER SYNC AT CDR REQUEST

CONFIGURE CAMERAS FOR UNDOCKING
CMC/EL/BO/CES (78,1/250, FOCUS) (10 FR)
MAG (N) _____, FR # _____
CMC/DEC/DB/CDX-BKET, MIR (78,1/250,7) 12 fps (100% MAG)
MAG (C) _____, MAG % ______
UTILITY PWR – ON

SWITCH TO CDR COMM UMB

VHF C/O AT LMP REQUEST
VHF ANT - RIGHT
VHF AM B - SIMPLEX FOR VHF B CHECK
VHF AM A - SIMPLEX FOR VHF A CHECK

ACQ MSFN HGA P = 80, Y 90

SUET CTK INTEGRITY CHECK (DECA)
LM FLIGHT PLAN

CDR

- IVT TO LM
- TRANSFER HELMETS & GLOVES
- MISSION TIMER ACTIVATION
- ECS ACTIVATION AND C/O
- CONNECT TO LM ECS
- PGNS TURN-ON & SELF-TEST

LMP

- LIGHTS ON
- DES O₂ AND H₂O - OPEN
- EPS ACTIVATION
- CONNECT TO LM COMM
- CONFIGURE S-BAND
- PRIMARY GLYCOL LOOP ACT
- CAUTION/WARNING C/O
- CONNECT TO LM ECS
- CB ACTIVATION
- VHF CHECKOUT

NOTES

- REPORT: LM POWER TRANSFER TIME
- SEC S-BAND VOICE CHECK, PRIM S-BAND CHECK, STEERABLE ANTENNA ACTIVATION P116, Y41
- SUIT FAN/H₂O SEP CHECK
- GLYCOL PUMP CHECK
- BIOMED - RIGHT

- ASCENT BATTERY ACTIVATION AND C/O
- REPORT: ED BAT VOLTAGE

<table>
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<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>102:00 - 103:00</td>
<td>5/10-11</td>
<td>3-101</td>
</tr>
</tbody>
</table>
CSM FLIGHT PLAN

103:00

AT CMR'S REQUEST DURING RCS CHECKOUT
CMC - FREE FOR RCS HOT FIRE

* * * * * * * * * * *
* PANEL 10 *
* MODE - VOX *
* VOX SENS TM - 5 *
* S-BO - OFF *
* INTERCOM - OFF *
* VHF AM T/R - T/R (VERIFY) *
* * * * * * * * * * *

103:10

AFTER LM RCS CHECKOUT
CMC - AUTO

ROLL (B) - OFF UNTIL LM/CM ΔP > 3.5 PSI
REMOVE AND STOW CSM/LM UMBSICAL IN F1 or F2
INSTALL DROGE AND PROBE (DECAL)
PRE-LOAD PROBE (DECAL)
DOCKING LATCH RELEASE (DECAL)
HATCH INSTALLATION (DECAL)
HATCH INTEGRITY CHECK (DECAL)

103:20

CYCLE CMC MODE - FREE/AUTO
ROLL (4) - ON
V49 (21101)
X1111
LOAD H47 & H48
V49 TRIM TO AGS CALIB ATT
(007.5,112.5,022.5)

* * * * * * * * * * *
* CB RNDZ XPNDR FLT BUS - CLOSE (VERIFY) *
* RNDZ XPNDR - HTR (VERIFY) *
* VHF ANT - RIGHT (VERIFY) *
* VHF RCY ONLY - B DATA *
* VHF AM A - SIMPLEX *
* VHF AM B - OFF *
* * * * * * * * * * *

103:30

103:40

RR XPNDR ACTIVATION AND SELF-TEST (DECAL)

RNDZ XPNDR - HTR

103:50

SET DET COUNTING UP TO UNDOCK/SEP
UNDOCK CUE CARD

LM DRIFT CHECK
VOE HSOE
ON COR MARK - ENTER
RECORD GIMBAL ANGLES
VOICE ANGLES TO LM

* * * * * * * * * * *
* N20: *
* R: *
* P: *
* Y: *
* * * * * * * * * * *

LM RR SELF-TEST
RNDZ XPNDR - HTR (VERIFY)
AUTO RCS SEL 03 - OFF
### LM Flight Plan

**MCC-H** 2123 CST

<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
<th>LMP</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>103:00</td>
<td>RCS CHECKOUT</td>
<td>COPY UPDATES</td>
<td></td>
</tr>
<tr>
<td>(32022)</td>
<td>V48 (31022)</td>
<td>AGS ACTIVATION &amp; SELF-TEST</td>
<td></td>
</tr>
<tr>
<td>103:10</td>
<td>DOCKED IMU FINE ALIGN</td>
<td>AGS TIME INITIALIZATION</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VERIFY DROGUE &amp; PROBE INSTALLATION</td>
<td>LOAD AGS PAD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLOSE AND SECURE HATCH</td>
<td>COPY AGS K FACTOR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>V47 INITIALIZE AGS (K)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CONFIGURE COMM FOR LOS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEERABLE ANT P132, V48</td>
<td></td>
</tr>
<tr>
<td>103:30</td>
<td>DON HELMETS &amp; GLOVES</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ARS/PGA INTEGRITY CHECK</td>
<td></td>
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<tr>
<td></td>
<td>CABIN REGULATOR CHECK</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>DOFF HELMETS &amp; GLOVES (CREW OPTION)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>DRIFT CHECK</td>
<td>RATE GYRO TEST</td>
<td></td>
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**Mission**

<table>
<thead>
<tr>
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<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>103:00 - 104:00</td>
<td>5/11-12</td>
<td>3-103</td>
</tr>
</tbody>
</table>
CSM FLIGHT PLAN

VERIFICATION:
CMC/CL/RO/DBX (KH, 1/250, FOCUS)
CM2/DBY/18/IX/BRAT, MCR (18, 1/250, 7) 12 fps
UTILITY PWR - ON

LM AGS CALIB
RATE < 0.075"/SEC
CMC MODE - FREE
AFTER COMPLETION OF AGS CALIB
(APPROX 6 MIN) CMC MODE - AUTO

P30; LOAD UNDOCK/SEP

WHEN LM RR SELF-TEST COMPLETE:
AUTO RCS SEL B3 - ON, RANDZ XPDHR - PWR

V49 MNVR TO UNDOCK PAD ATT (104:19)

LOAD ΔV IN EMS TO -100.0
VERIFY NULL BIAS
VERIFY EMS -100.0/ΔV/STBY

GDC ALIGN
VERIFY ORDEAL
ALT SET = 40 NM

PERFORM UNDOCKING SWITCH
CONFIGURATION:

ACQ HSIN HGA P 980. Y 13

GO/NO-GO FOR UNDOCK/SEP
P41 (TRIM)

SC CONT - SCS
BMG (3) - ATT 1/RATE 2

V48 (11110)
(X1111)
RHC & THC - ARMED

PERFORM UNDOCKING CHECKLIST

UNDocking SEparation (000,090/102,000)

TIG: 104:27:31
BT: 3.07 SEC
ΔVT: 1 FPM
ULLAGE: N/A
ORBIT: 59.5 x 8.2

Mission: Apollo 14
Edition: Change A (Jan)
Date: December 23, 1970
Page: 3-104

UNDOCKING CHECKLIST

59:30 EMS MODE - NORM, DAC - ON
THC PWR - ON

00:00 PROBE EXT/REL - EXT/REL (MOM)
VERIFY PROBE EXTENDED, LM ATTACHED
ALLOW MOTION TO DAMP (3 SEC)
PROBE EXT/REL - EXT/REL (HOLD) (< 20 SEC)
AFTER 2 SEC X-LATE (4 JET) AFT
FOR < 3 SEC (VXG to + 2.0)
AFTER PROBE/DROgue DISengaged,
PROBE EXT/REL - OFF
THC & RHC - LOCKED, THC PWR - OFF
PDU
SC CONT - CMC, ATT DB - MAX
ΔV CG - CSM
BMAR (3) - RATE 2
RHC PWR DIR - OFF
ROLL (4) - OFF
EMS FNC - ΔV SET/VHF RNG
EMS MODE - VHF RNG
VHF ANT - LEFT
VHF AM A - OFF
VHF AM B - DUPLEX
VHF RANING - RANNING

SET STARS

R C S N G A N
ΔV X N81
ΔV Y
ΔV Z

P ALIGN
0 0 N A PTRIM N48
Y ALIGN
0 0 0 UTILITY
- 0 0 0 0 0 ΔV X
- 0 0 0 0 0 ΔV Y
- 0 0 0 0 0 ΔV Z

ULLAGE

XXX R (000)
XXX Y (000)
XXX P (102)
CSM FLIGHT PLAN

VERIFY LM TRACKER LT - ON
DAC - OFF

RECORD MAG % _____, FR # _____
GDC ALIGN
VERIFY ORDEAL
ALT SET = 40 NM
V49 MNVR TO LDMK TRK PAD ATT 104:48

OMNI

104:40

MONITOR S-BAND

CONF ctypesCamera: (LDMK TRK)
CM/DAC/SXT/CEX (EXP-PAD) 1 fps (2.7% MAG)

MAG (B) _____, MAG % _____
UTILITY PAR = ON

P24 (L/S LDMK 14-X)
OPT ZERO - OFF, OPT MODE - CMC
OPT TEL TRUEN - SLAVE TO SXT
OPT COUPLING - RSVL, OPT SPEED - HI

CS CONT - CMC/AUTO & MAN ATT (3) - RATE CMD (VERIFY)
V79 (NI6 LOAD T2 TIME)
-2.00000
(4000.50)
(4000.01)

PRO
0:00 - T1 (HORIZON) DET - ZERO/UP/START, DAC - ON

0:00 - T2 (AUTO PITCH RATE BEGINS) OPT MODE - MAN, TAKE MARKS
2:08 - TCA
2:30 - T3 (LDMK LOSS) DAC - OFF

104:50

105:00

P24 LDMK TRACKING
TGT: L/S LDMK 14-X (1/60)

T1 _____
T2 _____
TCA _____
T3 _____
R  _____

N of S NM _____ / SA _____ TA _____ (T2 ACQ)

<table>
<thead>
<tr>
<th>R99</th>
<th>14-1</th>
<th>14-2</th>
<th>14-3</th>
<th>14-4</th>
</tr>
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<tbody>
<tr>
<td>LAT</td>
<td>-04.046</td>
<td>-03.610</td>
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<td>-03.470</td>
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<tr>
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<td>-07.800</td>
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<td>-07.570</td>
<td>-07.445</td>
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<tr>
<td>ALT</td>
<td>-000.44</td>
<td>-000.15</td>
<td>-000.38</td>
<td>-000.87</td>
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MISSION APOLLO 14
EDITION CHANGE 1 (JAN)
DATE 1/27/70
PAGE 3-106
**LM FLIGHT PLAN**

**MCC-H**

**CDR**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>104:30 (21002)</td>
<td>EXTERIOR LTG - TRACK-OFF</td>
</tr>
<tr>
<td>104:35</td>
<td>DOFF HELMET &amp; GLOVES</td>
</tr>
<tr>
<td>104:40</td>
<td>V83 SET ORDEAL</td>
</tr>
<tr>
<td>104:50</td>
<td>DPS THROTTLE CHECK</td>
</tr>
<tr>
<td>104:55</td>
<td>PITCH TO OBSERVE LANDING SITE (104:55) (000,325/337,000)</td>
</tr>
<tr>
<td>105:00</td>
<td>OBSERVE AND PHOTO LANDING SITE DAC - ON (5 MIN) DC 5 FRAMES</td>
</tr>
</tbody>
</table>

**LMP**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>104:35</td>
<td>DOFF HELMET &amp; GLOVES</td>
</tr>
<tr>
<td>104:40</td>
<td>V47 INITIALIZE AGS (S.V.)</td>
</tr>
</tbody>
</table>

**UPDATE TO LM**

REV 12 TCA (LS)

**UPLINK TO LM**

CSM S.V.
PIPA BIAS (IF REQ'D)
GYRO COMPENSATION (IF REQ'D)

**RECORD PCM LBR ON DSE DURING P24**

---

**MISSION | EDITION | DATE | TIME | DAY/REV | PAGE**

| APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 104:30 - 105:00 | 5/12 | 3-107 |
CSM FLIGHT PLAN

105:10

STOP PITCH RATE AT BURN ATT P 110
VHF RNG - RESET, COMPARE RR AND VHF RANGE
ACQ MSFN HGA P 027, Y 02

RECORD MAG %
REMOVE & STORE DAC

P52 (OPTION 3)
(LDG SITE ORIENT)

REPORT: GYRO TORKING ANGLES

MSFN UPLINK:
CSM S.V.
CIRC TARGET LOAD

MSFN UPDATE:
CIRC PAD
MAP UPDATE REV 13
PADS A-D COPY AT (106:10)
P24 TRK PAD: (L/S LDMK 14-1) (106:35)
P30; VERIFY CIRC TIG AND ΔV'S
V49 TRIM TO CIRC BURN PAD ATT

SXT STAR CHECK
P40 (TRIM)

GO/NO-GO FOR CIRC

* *
* VHF AM B - OFF
* VHF AM A - SIMPLEX *
* VHF RCV ONLY - B DATA *
* *

VERIFY USE TAPE MOTION (LBR/HCD/F10/CMO RESET)

GDC ALIGN
VERIFY ORDEAL
ALT SET = 50 NM

105:30

P52 IMU REALIGN
N71: ___ ___ ___ ___
N05: ___ ___ ___ ___
N93: ___ ___ ___ ___
X ___ ___ ___ ___
Y ___ ___ ___ ___
Z ___ ___ ___ ___
GET ___ ___ ___ ___

MAP UPDATE REV 13
LOS : ___ ___ ___ ___
180°: ___ ___ ___ ___
AOD : ___ ___ ___ ___
LM FLIGHT PLAN

CDR

105:00
(21002)

MNVR TO RR CHECKOUT ATTITUDE
(000,329,000)

STEERABLE ANTENNA
P 150, Y -23

RR & VHF RANGING CHECKOUT
COPY CSM CIRC TIG & ΔVS

105:15

P52 IMU REALIGN
OPTION 3 REFIMMAT
(LDG SITE ORIENT)

105:30

V49 MNVR TO AGS CALIB ATT (105:31)
(024,239,021)

ALIGN AGS TO PGNS

LMP

NOTE
CSM FLIGHT PLAN

CIRC BURN TABLE

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
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</thead>
<tbody>
<tr>
<td>10°/SEC</td>
<td>±10°</td>
<td>BT + 1 SEC</td>
<td>TRIM X TO &lt; 1 FPS</td>
</tr>
<tr>
<td>TERMINATE</td>
<td>TERMINATE</td>
<td></td>
<td>TRIM Y TO &lt; 0.2 FPS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DO NOT TRIM Z</td>
</tr>
</tbody>
</table>

CSM CIRCULARIZATION (000, 352/110, 359)

TIG: 105:46:48
BT: 3.79 SEC
ΔV: 72.46 FPS

POO; V/S 076 BURN DATA TO LM V82
ORBIT: 63.5 x 56

V48 (11111)

DOFF P/CG
ZIP SUIT & INSTALL ELECTRICAL COVER PRIOR TO STOWING (P/CG BAG)
STOW COMM CARRIERS & UCTA (P/CG BAG)

P30 MANEUVER

<table>
<thead>
<tr>
<th>SET STARS</th>
<th>G I R C</th>
<th>PURPOSE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>SPSPG &amp; N</td>
<td>PROP/GUID</td>
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<tr>
<td></td>
<td>+</td>
<td>WT N47</td>
</tr>
<tr>
<td>R ALIGN</td>
<td>0 0</td>
<td>P TRIM N48</td>
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<tr>
<td>P ALIGN</td>
<td>0 0</td>
<td>Y TRIM</td>
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<td>Y ALIGN</td>
<td>+ 0 0</td>
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<td>+ 0 0 0</td>
<td>MIN N33</td>
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<tr>
<td></td>
<td>+ 0</td>
<td>SEC</td>
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<tr>
<td>ULLAGE</td>
<td></td>
<td>ΔV X N81</td>
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<td></td>
<td>ΔV Y N1</td>
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<td>R (000)</td>
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<td></td>
<td>X X X</td>
<td>P (110)</td>
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<tr>
<td></td>
<td>X X X</td>
<td>Y (359)</td>
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<tr>
<td>HORIZON/WINDOW</td>
<td>+</td>
<td>HA N44</td>
</tr>
<tr>
<td></td>
<td>+</td>
<td>Hp</td>
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<td>ΔVT</td>
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<td>+</td>
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<tr>
<td></td>
<td>+</td>
<td>VTO</td>
</tr>
<tr>
<td></td>
<td>+</td>
<td>GET 0.056</td>
</tr>
</tbody>
</table>

MISSION | EDITION | DATE | PAGE
--------|---------|------|------
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 3-110
LM FLIGHT PLAN

MCC-H 2353 CST

CDR 105:30

LMP (21002)

NOTES

UNDOCKED AGS CALIBRATION
V48 (21012)

SYSTEMS CHECKS

MNVR TO OBSERVE CSM CIRCULARIZATION BURN (105:45)
(000,236,000)
DAC-ON (5 MIN)
DC 2 FRAMES

P76 TARGET ΔV
(UPDATE CSM S.V.)

V83 SET ORDEAL
ESTABLISH ORBITAL RATE
(000,325/148,000)

V47 INITIALIZE AGS (S.V.)

CSM CIRCULARIZATION
105:46:48

REVISION 13

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 105:30 - 106:00 5/12-13 3-111
LM FLIGHT PLAN

MCC-H

0023 CST

CDR

LMP

NOTES

RESET DET TO COUNT DOWN TO PDI_0

VERIFY COMM AT AOS
STEERABLE ANTENNA
P 14, Y -10

BIOMED - RIGHT
REPORT: DELTA NYRO ANGLES,
GET, LPD BIAS

DPS PRESSURIZATION AND CHECKOUT

LANDING RADAR CHECKOUT

UPLINK TO CSM
CSM S.V. (PDI-10)
LM S.V.
PIPA BIAS
UPDATE TO CSM
PADS E-N
UPDATE TO LM
NO PDI + 12 PAD
PDI PAD
PDI ABORT EARLY
PDI ABORT LATE
T2 ABORT PAD
AND T3 TIG

<table>
<thead>
<tr>
<th>MISSION</th>
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<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>106:00 - 106:30</td>
<td>5/13</td>
<td>3-113</td>
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</tbody>
</table>
**CSM FLIGHT PLAN**

**106:30**

CONFIRM CAMERA: (LDMK TRACKING)
CM/DAC/SWC/CSC (EXC-MAG) & T15 (3,8, MAG)

MAG (8) --- MAG X
UTILITY PWR - ON

**106:40**

VERIFY ORDEAL
ALT SET = 60 NM

**106:50**

P24 (L/S LDMK 14-1)
OPT ZERO - OFF, OPT MODE - CMC
SC CONT - CMC/AUTO
V79 (116 LOAD ALL ZERO'S)
(+0.0507)
(+000.50)
(+000001)

PRO TO START PITCH RATE (000,333/274,000)

0:00 - T1 (HORIZON) DET - ZERO/UP/START

3:50 - DAC - ON

4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART

6:30 - TCA
7:18 - T3 (LDMK LOSS) DAC - OFF

V48 (11112)

V49 MNVR TO P52 AND COAS CALIB ATT (107:05)
(160,236,354) HGA P -32, Y 177

**107:00**

**MISSION** | **EDITION** | **DATE** | **PAGE**
---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 3-114
LM FLIGHT PLAN

**MCC-H**

0053 CST

06:30

(21012)

**CDR**

V83 SET ORDEAL

**LMP**

V47 INITIALIZE AGS (S.V.)

**NOTES**

UPLINK TO LM

CSM S.V. (PDI-10)

LM S.V.

PIPA BIAS

DESCENT TARGET

LPD BIAS (IF REQ'D)

:35

:40

106:45

MNVR TO LPD ALTITUDE CHECK ATTITUDE

ESTABLISH ORBITAL RATE

(000,295/354,000)

LPD ALTITUDE CHECK

(IF DESIRED)

:50

:55

107:00

PITCH TO OBSERVE LANDING SITE

---

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 106:30 - 107:00 | 5/13 | 3-115
CSM FLIGHT PLAN

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EDITION: FINAL (JAN)
DATE: DECEMBER 2, 1970
PAGE: 3-116

PS2 MU REALIGN

N71: ___ ___ ___ ___
N50: ___ ___ ___ ___
N93: ___ ___ ___ ___
X ___ ___ ___ ___
Y ___ ___ ___ ___
Z ___ ___ ___ ___
GET ___ ___ ___ ___

COAS CALIB - N92
SHAFT: ___ ___ ___ ___
TRUN: ___ ___ ___ ___

VERIFY OS TAPE MOTION (LBR/RCV/MD/MD/MD/MD)

*MSFN ENABLES MSFN S-BAND RELAY*

MAP UPDATE REV 14

LOS: ___ ___ ___ ___
180°: ___ ___ ___ ___
AQS: ___ ___ ___ ___

CYCLE CMOD - FREE/AUTO
V45 IN (I1110)
V49 IN (X1110)
V49 MNVR TO LTG TGT: 16 PHOT PAD ATT (107:52)

CONFIGURE CAMERAS: (LTC & EL ORB SCIENCE PHOTOS)
CM/EL/500/C500 (F8, 1125, 1133 FR)
MAG (L) ___ FR # ___
CM3/LTC/M4/BST (SHUT 1/100, RING 1-PAD. INT 82) (127 FR)
MAG (V) ___ FR # ___
LTC INSTALLATION (DECAL)
LTC CHECKOUT (DECAL)

LTC PHOTO PAD TGT: 16 (000, 202, 000)
R ___ ___ Y ___ ___
T START: ___ ___ ___ ___
T STOP: ___ ___ ___ ___
RNG 1 (91.1) T START
RNG 2 (90.2) T START + 7:10

ORBITAL SCIENCE PHOTOGRAPHY

SC CONT - CMOD/AUTO (VERIFY)
V79 (-0.0507)
(+000.50)
(+000001)
PRO TO START PITCH RATE AT ORDEAL P 212

PHOTO TGT 14, SOUTH (+8, 1125, °) 30 FR AT 4 SEC (500 NM)
(180° 40:10)
**LM FLIGHT PLAN**

**CDR**

- P52 IMU REALIGN
- OPTION 3 REFSSMAT
  (LDG SITE ORIENT)

**LMP**

- REPORT: DELTA GYRO ANGLES, GET

**NOTES**

- CONFIGURE COMM FOR LOS
- STEERABLE ANT P 2, Y 2
- BIOMED - OFF
- RELOCATE DAC ABOVE RH WINDOW

**MINIATURE**

- REVEL 14

- START MNVR TO PDI ATTITUDE
- P30 EXTERNAL ΔV
  (NO PDI + 12 ABORT)
- V48 (22112)
- P63 MNVR TO PDI ATT (107:45)
  (000,113,000)
- P00
- COAS TO OVERHEAD WINDOW
- DON HELMET & GLOVES

- ALIGN AGS TO PGNS
- VERIFY LOOSE GEAR STOWED
- RESTRAINTS ATTACHED

- DON HELMET & GLOVES
- CONFIGURE EGRESS MODE
- CHECK SYSTEMS CONFIGURATION

---

**MISSION**  | **EDITION**  | **DATE**  | **TIME**  | **DAY/REV**  | **PAGE**
---|---|---|---|---|---
APOLLO 14  | CHANGE A (JAN)  | DECEMBER 23, 1970  | 107:00 - 108:00  | 5/13-14  | 3-117
CSM FLIGHT PLAN

108:00

PHOTO TGT 3, NORTH (φ=1.125, ω=) 33 FR AT 6 SEC (500MM)
(180° +0:18)

ACQ MSFN OMNI D
VHF AM T/R - OFF (PANEL 9)

108:10

PHOTO TGT 15, NORTH (φ=1.125, ω=) 70 FR AT 4 SEC (500MM)
(180° +0:26)

LTC PHOTO PAD TGT: 12 (LGR L/H)
(0000, 150.3, 000)

R P Y
T START: - - -
T STOP : - - -
RNG (91.7)

SET DET COUNTING UP TO PDI

108:20

RECORD EL FR #

ACQ MSFN OMNI A

108:30

109:00

V64: ACQ MSFN HGA P -16, Y 177

VERIFY: LTC MODE - STBY/PWR-ON (T START -1 MIN)
LTC TGT 16 (SHUT 1/100, RNG 1-PAD, INT 8.2)(65 FR)
LTC MODE - AUTO (T START)

GO/HO-GO PDI

* * * * * * * * * * * * *
* IF CSM RELAY REQ'D *
* S-90 MODE - RELAY *
* * * * * * * * * * * *

LM PDI (108:42:01)

CHANGE TO RNG 2 (T START +7:10)

LTC MODE - STBY (T STOP)

LM TOUCHDOWN (108:53:33)

LTC TGT 12 (SHUT 1/50, RNG-PAD, INT 30)(30 FR)
LTC MODE - AUTO (T START) - (LTC PHOTOS OF LM LANDING)

LTC MODE - STBY/PWR - OFF (T STOP)

V48 (11111)

V49 MNVR TO P52 ATT (109:04)
(000, 100, 000) HGA P -75, Y 11

CONFIRM STAY/HO-STAY FOR 11

V44 (SET LUNAR SURFACE FLAGS)
VHF RANGING - OFF
VHF AM T/R - RCV (PANEL 9)

MISSION: APOLLO 14
EDITION: FINAL (JAN)
DATE: DECEMBER 2, 1970
PAGE: 3-118
LM FLIGHT PLAN

MCC-H 0223 CST

CDR

108:00

PRE-PDI SW SETTINGS
SYSTEMS CHECKS

LMP

BATS 5 & 6 NORM FEED-ON
VERIFY COMM AT AOS
STEERABLE ANTENNA
P 2, Y 2
BIomed - LEFT

REPORT: ASCENT BAT-ON TIME

RECODER - ON
V47 INITIALIZE AGS (S.V.)
TARGET AGS FOR ABORT

ALIGN AGS TO PGNs
COMM CHECK WITH CSM ON
S-BAND RELAY

UPMICK TO LM
LM S.V.
RLS
GYRO COMPENSATION
UPDATE TO LM
AGS RLS (231)

GC/NO-GO FOR PDI

UPDAt? 2 LM
A RLS

DUMP DSE

STAY/NO-STAY FOR HTML

P66 LANDING PHASE (ROD)

ENG STOP-PUSH
STAY/NO-STAY FOR HTML
P68 LDG CONFIRMATION

TOUCHDOWN

UPDATE LM ∆RLS (N69)
SYSTEMS MONITOR
DAC-ON (PHOTO LDING)
UPDATE AGS ALT AT 12 000 FT

TIG: 108:42:01
BT: 11 MIN 31.5 SEC
XVR: 6637.7 FPS
ULLAGE: 4 JET 7.5 SEC

109:00

NOTES

MISSION EDITION DATE TIME DAY/REV PAGE

APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 108:00 - 109:00 5/14 3-119
CSM FLIGHT PLAN

S-BAND MODE = VOICE (VERIFY)
CONFIRM STAY/NO-STAY FOR T2

PS2 (OPTION 3)
(LOG SITE ORIENT)
REPORT: GYRO TORQUING ANGLES

GDC ALIGN
VERIFY ORIGINAL

MSFN UPDATE:
MAP UPDATE REV 15

MSFN UPLINK
CSM S.V.

CONFIGURE CAMERA: (LDMK TRK)
CM/DAE/SXT/CX/E (EXP-PAD) 1 fps (15.2% MAG)
MAG (B) = MAG %
UTILITY PIR = ON

LTC FILM MAG CHANGE (DECAL)
ADVANCE 4 FRAMES, RECORD FR #
PUT MAG (U) ON LTC, RESET FRM COUNTER
LTC REMOVAL: (DECAL) & STOW
VERIFY DDE TAPE MOTION (LBR/RCD/FWD/REW/MD/RESET)

CYCLE CMC MODE = FREE/AUTO
V48: (11101) (X1111)
V49 MWMR TO LDMK TRK AT (109:50) (000,066,000)

*MSFN DISABLES MSFN S-ED RELAY*

MAP UPDATE REV 15
LOS:
180°:
ADS:

P24 LDMK TRACKING
TGT: RP-3

T1
T2
TCA
T3
R: *(P) Y (T1 ACQ)
N or S NM ___ / SA ___ TA ___ (T2 ACQ)

N89
LAT: +03.533
LONG/2: +65.850
ALT: +000.00

EAT PERIOD

P24 (RP-3)
OPT ZERO - OFF, OPT MODE - CMC
SC CONT - CMC/AUTO
V79 (N16 LOAD ALL ZERO'S)
(-.0507)
(+000.50)
(+00001)

PRO TO START PITCH RATE (000,338/066,000)

0:00 - T1 (HORIZON) DET - ZERO/UP/START

MISSION EDITION DATE PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 3-120
LM FLIGHT PLAN

CDR

0323 CST

109:00
(22112)

P12 POWERED ASCENT
STAY/NO-STAY FOR T2
LR-OFF

LUNAR SURFACE CHECKLIST

DOFF HELMET & GLOVES
REPORT DEDA 047,053

LMP

RECORDER-OFF

BAT 5&6 - OFF

DOFF HELMET & GLOVES

AGS LUNAR SURFACE GYRO
CALIBRATION, BIOMED - RIGHT
CONFIGURE COMM FOR LUNAR
SURFACE
STEERABLE ANT: P 119, Y-39

INSTALL WINDOW SHADES

TERMINATE AGS
GYRO CALIBRATION

P57 LUNAR SURFACE ALIGN
OPTION 3 REFSSMAT
A/T 1 - GRAVITY & LM Z AXIS
(LDG SITE ORIENTATION)

STOW WINDOW SHADES

ALIGN AGS TO PGNS
STORE AZIMUTH

P57 LUNAR SURFACE ALIGN
OPTION 3 REFSSMAT
A/T 2 - TWO CELESTIAL BODIES
(LDG SITE ORIENTATION)

P57 LUNAR SURFACE ALIGN
OPTION 3 REFSSMAT
A/T 2 - TWO CELESTIAL BODIES
(LDG SITE ORIENTATION)

MCC-H

STAY/NO-STAY FOR T2

COPY AGS AZIMUTH
UPDATE TO CSM
MAP UPDATE REV 15
P24 TRACKPADS
UPLINK TO CSM
CSM S.V.

DISABLE MSFN
S-BD RELAY

STAY/NO-STAY FOR POWER DOWN

UPLINK TO LM
RLS (IF REQ'D)
CSM S.V.

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 109:00 - 110:00 | 5/14-15 | 3-121
CSM FLIGHT PLAN

110:10

3:50 - DAC - ON
4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART
6:30 - TCA
7:18 - T3 (LDMK LOSS) DAC - OFF
P24 (RP-5)
V76E, PR0, PROF
OPT ZERO - OFF, OPT MODE - CMC
0:00 - T1 (HORIZON) DET - ZERO/UP/START
ACQ MSFN OMNI D

110:11

3:50 - DAC - ON
4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART
6:30 - TCA
7:18 - T3 (LDMK LOSS) DAC - OFF
P24 (DAGUERRE 66)
V76E, PR0, PROF
OPT ZERO - OFF, OPT MODE - CMC

0:00 - T1 (HORIZON) DET - ZERO/UP/START

P24 LDMK TRACKING
TGT: RP-5

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<td><em>P</em></td>
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N or S NM ___ / SA ___ TA ___ (T2 ACQ)
N89
LAT -10.567
LONG/2 +49.700
ALT +000.00

P24 LDMK TRACKING
TGT: DAGUERRE 66

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<td><em>Y</em></td>
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N or S NM ___ / SA ___ TA ___ (T2 ACQ)
N89
LAT -11.717
LONG/2 +16.600
ALT +000.00

MISSION EDITION DATE PAGE
APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 3-122
LM FLIGHT PLAN

0423 CST

CDR

LMP

NOTES

MCC-H

UPDATE TO LM
P22 ACQ TIME

00

110:00

(22112)

:05

:10

:20

:25

110:15

MSFN

EAT PERIOD

110:30

CONFIGURE FOR PARTIAL POWER DOWN (BIOMED - AS DESIRED)

DESCRIBE AND PHOTOGRAPH LUNAR SURFACE
REPORT FEATURES SEEN DURING DESCENT
DETERMINE LM LOCATION WITH MCC-H
REPORT ANGLE OF +Z WITH RESPECT TO WEST

RECORD PCM LBR ON DSE DURING P24

MISSION | EDITION | DATE               | TIME            | DAY/REV | PAGE  
---------|---------|--------------------|-----------------|---------|------- 
APOLLO 14| CHANGE A (JAN) | DECEMBER 23, 1970 | 110:00 - 110:30 | 5/15   | 3-123 |
CSM FLIGHT PLAN

1:00:40

3:50 - DAC - ON
4:50 - T2 (LMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART
6:30 - TCA
7:18 - T3 (LMK LOSS) DAC - OFF

P24 L/S LMK 14-X
V79E, PFO, PRO
OPT ZERO - OFF, OPT MODE - CMC

0:00 - T1 (HORIZ) DET - ZERO/UP/START

110:50

3:50 - DAC - ON
4:50 - T2 (LMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART
6:30 - TCA
7:18 - T3 (LMK LOSS) DAC - OFF

V49 MNVR TO ANTI-SOLAR PT ATT (111:05)
(197,251,346) HGA P -41, Y 156

RNDZ XPNDR - OFF

RECORD MAG % ___

P24 LMK TRACKING

TGT: L/S LMK 14-X (1/60)

T1 __________ __________ __________
T2 __________ __________ __________
TCA __________ __________ __________
T3 __________ __________ __________
R __________ __________ __________

N or S NM __ / SA __ TA __ T2 ACQ)

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APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 3-124
**LM FLIGHT PLAN**

**0453 CST**

**CDR**

**NOTES**

**LMP**

---

**UPDATE TO LM**

**LM CONSUMABLES**

- **110:30 (22112)**
- **110:45**
- **111:00**

**UPDATE TO LM**

**DAP LOAD**

- **0453 CST**
- **110:30**
- **110:45**
- **111:00**

---

**RR-ON**

**P22 LUNAR SURFACE NAVIGATION**

**EAT PERIOD**

**TERMINATE P22 LUNAR SURFACE NAVIGATION**

**DESIGNATE THEN POWER DOWN RR**

**V48 (12102) & LM WEIGHT**

**E-MEMORY DUMP**

---

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 110:30 - 111:00 | 5/15 | 3-125
CSM FLIGHT PLAN

111:00

CONFIGURE CAMERA: (GEGENSCHEIN)
INSTALL SHIELD (CM/3UM/18/VIA/8-95, MRR, CONT 1/500, WAS) 24fps (7.4% MAG)

MAG (J) _____, MAG % _____

UTILITY PWR - ON

111:10

MAP UPDATE: REV 16
V48 (11101)

LOS: ______  ______  ______
180°: ______  ______  ______
AOS: ______  ______  ______

MSFN UPDATE:
MAP UPDATE REV 16
ZERO PHASE PADS (111:45, 111:40)

GEGENSCHEIN PHOTOGRAPHY

111:20

VERIFY DSE TAPE MOTION (LBR/RCD/FWD/CMR RESET)

INHIBIT - A3, C4, B3, 04 THRUSTERS
DSS - ON AT 24fps FOR 2 SEC, CHANGE TO TIME 8 1/60
DIM INTERIOR LIGHTS
2 FRAMES, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC
CHANGE TO 24fps & 1/500, RUN DAC FOR 2 SEC, LIGHTS UP

ENABLE - A3, C4, B3, 04 THRUSTERS
V49 MNVR TO MIDWAY PT ATT (111:27)
(197,261,346)

INHIBIT - A3, C4, B3, 04 THRUSTERS
DSS - ON AT 24fps FOR 2 SEC, CHANGE TO TIME 8 1/60
DIM INTERIOR LIGHTS
2 FRAMES, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC

111:30

MISSION | EDITION | DATE | PAGE
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APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 5-126
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<td>111:00 - 111:30</td>
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</table>
CHANGE TO 24fps & 1/500, RUN DAC FOR 2 SEC, LIGHTS UP

ENABLE - A3, C4, B3, D4 THRUSTERS
V48 MNVR TO MOUNTON PT ATT (111:34)
(197, 272, 346)

INHIBIT - A3, C4, B3, D4 THRUSTERS
DAC - ON AT 24fps FOR 2 SEC, CHANGE TO TIME & 1/60
DIM INTERIOR LIGHTS
2 FRAMES, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC
CHANGE TO 24fps & 1/500, RUN DAC FOR 2 SEC, LIGHTS UP

ENABLE - A3, C4, B3, D4 THRUSTERS

RECORD MAG %

V48 (111:02)
V49 MNVR TO ZERO PHASE TGT 1 & 2 ATT (111:50)
(196.8, 358.1, 359.3)
O₂ FUEL CELL PURGE
WASTE WATER DUMP

CONFIGURE CAMERA: (ZERO PHASE)
CM3/DC/80/MSW-BRKT, IVL, PCM CABLE (F5.6.1/250,•) (46 FR)
MAG (R) ___, FR # ___

SC CONT - CM/AUTO (VERIFY)
V79 (-0.0507)
(+000.50)
(+00000)
PRO TO START PITCH RATE (196.8, 258/358.1, 359.3)

SELECT OMNI A

111:50 - Permanently Waste Water: Dump

111:58 - DET - ZERO/UP/START (T START)
REVIEW TGT 1 & 2 MAPS

TYPICAL ZERO PHASE OBSERVATION PASS - BACKWARD LOOKING

TARGET AREA A:
(3 OR 4 TARGETS)
TARGET AREA B:
(3 OR 4 TARGETS)

ZERO PHASE PAD (BACKWARD)
R ----- • ---- ---- • ---- •
T START: ---- • ---- •
START DET AT 1ST TGT AREA ACQ - 5 MIN
LM FLIGHT PLAN

0553 CST

MCC-H

CDR

LMP

111:30

CABIN PREP FOR EVA-1

STOW ALL LOOSE ITEMS NOT REQUIRED FOR EVA

UNSTOW EVA-1 PREP & POST CARD

STOW LUNAR SURFACE CHECKLIST

111:45

EQUIPMENT PREP FOR EVA-1

SET DET

UNSTOW BSLSS

UNSTOW LMP PLSS FROM LM FLOOR

PREPARE LUNAR SURFACE 16MM CAMERA

112:00

NOTES

-1:45

-1:40

-1:30

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 111:30 - 112:00 | 5/15-16 | 3-129
CSM FLIGHT PLAN

5:00 - DC - ON, START OBSERVATIONS (TGT AREA 1)
6:40 - ZERO PHASE POINT (TGT AREA 1)
ACQ MSFN OMNI A
8:24 - STOP OBSERVATIONS
START OBSERVATIONS (TGT AREA 2)
8:54 - ZERO PHASE POINT (TGT AREA 2)
11:54 - STOP OBSERVATIONS
DEBRIEF (~30 SEC)
12:24 - DC - OFF
ACQ MSFN HGA P -76, Y 80

TYPICAL ZERO PHASE OBSERVATION PASS - FORWARD LOOKING

11:12:00
(0.0507)
(+0.50)

11:20

11:20:00

11:12:30
(0.0507)
(+0.50)

5:00 - DC - ON, START OBSERVATIONS (TGT AREA 3)
8:40 - ZERO PHASE POINT (TGT AREA 3)
9:32 - STOP OBSERVATIONS
START OBSERVATIONS (TGT AREA 4)
11:16 - ZERO PHASE POINT (TGT AREA 4)
12:02 - STOP OBSERVATIONS
DEBRIEF (~30 SEC)
12:32 - DC - OFF, REMOVE CAMERA FROM WINDOW
RECORD FR #

V48 (11111)

V49 MNVR TO ZODIACAL LIGHT ATT (113:10)
(180,200,000) OMNI C

CONFIGURE CAMERA: (ZODIACAL LIGHT)
CMA/DAC/18/WHB-W/BKRT, MIR, CONT (T1,1/500,-) 24 fps (3% MAG)
MAG (J), MAG %
UTILITY PER - ON
LM FLIGHT PLAN

MCC-H 0623 CST

CDR

LMP

NOTES

DEPLOY EVA ANTENNA
UNSTOW AND DON LUNAR BOOTS
UNSTOW AND CHECK BOTH OPS

POWER DOWN IMU LGC TO STANDBY
UPDATA LINK - OFF

PLSS DONNING
CONFIGURE LMP PLSS/OPS FOR DONNING
LMP DON PLSS/OPS
CONFIGURE CDR PLSS/OPS FOR DONNING
CDR DON PLSS/OPS
UNSTOW RCU'S
VERIFY RCU CONTROLS AND CONNECT TO PLSS/PGA

PLSS COMM CHECK
TV - ON, FM VOICE CHECK, CONFIGURE EVA COMM MODE
BIOMET - OFF, RECORDER - ON
VERIFY PLSS COMM AND TM WITH MCC-H
TV - OFF
FINAL SYSTEMS PREP

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 112:00 - 113:00 | 5/16 | 3-131
CSM FLIGHT PLAN

113:00

MISSION UPDATE:
ZODIACAL PHOTO PAD
MAP UPDATE REV 17

MAP UPDATE REV 12

105:00

ZODIACAL LIGHT PHOTO PAD (SR)
T START: ______
START DET AT SUNRISE -30 MIN

ZODIACAL LIGHT PHOTOGRAPHY

113:10

SC CONT = CMC/AUTO (VERIFY)
V79 (-.0507)
(-.0507)
(+005.00)
(+00001)

PRO TO START PITCH RATE (180,352/200,000)

ZODIACAL LIGHT PHOTOGRAPHY

113:17:34 - DET - ZERO/UP/START (T START) (SR-30 MIN)
INHIBIT - A3,C4,B3,04 THRUSTERS
DAC - ON AT 24FPS FOR 2 SEC
CHANGE FRAME RATE TO TIME & SHUTTER SPEED TO 1/60
VERIFY DSE TAPE MOTION (TBR/RCD/FWD/CMD RESET)
DIM INTERIOR LIGHTS

5:00 - 1 FRAME, 20 SEC EXP TIME (SR -25:00)
1 FRAME, 10 SEC EXP TIME
1 FRAME, 5 SEC EXP TIME

8:20 - 1 FRAME, 20 SEC EXP TIME (SR -21:40)
1 FRAME, 10 SEC EXP TIME
1 FRAME, 5 SEC EXP TIME

11:40 - 1 FRAME, 16 SEC EXP TIME (SR -18:20)
1 FRAME, 8 SEC EXP TIME
1 FRAME, 4 SEC EXP TIME

113:30

113:30

15:00 - 1 FRAME, 16 SEC EXP TIME (SR -15:00)
1 FRAME, 8 SEC EXP TIME
1 FRAME, 4 SEC EXP TIME

18:20 - 1 FRAME, 8 SEC EXP TIME (SR -11:40)
1 FRAME, 4 SEC EXP TIME
1 FRAME, 2 SEC EXP TIME

21:40 - 1 FRAME, 8 SEC EXP TIME (SR -8:20)
1 FRAME, 4 SEC EXP TIME
1 FRAME, 2 SEC EXP TIME

25:00 - 1 FRAME, 4 SEC EXP TIME (SR -5:00)
1 FRAME, 2 SEC EXP TIME
1 FRAME, 1 SEC EXP TIME
SET FRAME RATE TO 1fps

29:00 - DAC ON FOR 1 SEC (SR -1:00)
CHANGE SHUTTER TO 1/125

29:15 - DAC ON FOR 1 SEC (SR -0:45)
CHANGE SHUTTER TO 1/250

29:30 - DAC ON FOR 1 SEC (SR -0:30)
CHANGE SHUTTER TO 1/500

29:45 - DAC ON FOR 1 SEC (SR -0:15)
CHANGE TO 24 FPS AND RUN DAC FOR 2 SEC PRIOR TO SUNRISE LIGHTS UP

ENABLE - A3,C4,B3,04 THRUSTERS
RECORD MAG % ______

ZODIACAL LIGHT PHOTOGRAPHY

MISSION EDITION DATE PAGE
APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 3-132
# LM FLIGHT PLAN

**MCC-H**

- **0723 CST**
  - **113:00**
    - **CDR**
      - **OPS CONNECT**
      - **LMP UNSTOW OPS AND CONNECT TO RCU & PLSS**
      - **CDR UNSTOW OPS AND CONNECT TO RCU & PLSS**
    - **113:10**
      - **HELMET/GLOVES DONNING**
      - **DON HELMETS AND LEVA'S**
      - **STOW LM HOSES**
      - **VERIFY PGA CONFIGURATION**
      - **VERIFY CB CONFIGURATION FOR EVA**
    - **113:20**
      - **DON GLOVES**
      - **PRESSURE INTEGRITY CHECK**
      - **PLSS O₂ ON**
    - **113:30**
      - **CABIN DEPRESS**
      - **DEPRESS CABIN TO 3.5 PSIA**
      - **START EVA WATCH**
      - **FWD DUMP VALVE - OPEN**
      - **PARTIALLY OPEN FORWARD HATCH**
      - **FINAL PREP FOR EGRESS**
      - **PLSS FEEDWATER - OPEN, FORWARD HATCH - OPEN**
      - **VERIFY CWEA & PGA STATUS**
      - **RELEASE PLSS ANTENNAS, LOWER VISOR**
    - **113:40**
      - **CDR EGRESS**
      - **EQUIP JETT, DEPLOY LEC & MESA, DESCEND TO SURFACE**
      - **ASSIST AND MONITOR CDR**
      - **PASS LEC TO CDR, TV-ON**
    - **113:50**
      - **ENVIRONMENT FAMILIARIZATION**
      - **LMP EGRESS**
      - **CLOSE HATCH AND DESCEND**
      - **ENVIRONMENT FAMILIARIZATION**
    - **114:00**
      - **MET OFFLOAD**
      - **UNSTOW AND MOUNT TV ON TRIPOD**
      - **ENVIRONMENT FAMILIARIZATION**

**NOTES**

- **- :30**
- **- :20**
- **- :10**

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
**APOLLO 14** | **FINAL (JAN)** | **DECEMBER 2, 1970** | **113:00 - 114:00** | **5/16-17** | **3-133**
114:00
(-0507)
(+05,00)

ACQ MSFN OMNI C

MSFN UPDATE:
24 LM VISUAL TRK PAD (114:50)

MSFN UPLINK:
CSM S.V.

114:10

(11101)
(x1111)

CYCLE CMC MODE - FREE/AUTO
V48 (11101)
(x1111)

114:20

V49 MANVR TO LM VISUAL TRK ATT (114:36)
(000,304,000) OMNI D
# LM Flight Plan

<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
<th>LMP</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>114:00</td>
<td>POSITION TV 50 FT NORTH TO VIEW MESA AND LADDER AREAS</td>
<td>DEPLOY TV CABLE</td>
<td></td>
</tr>
<tr>
<td>114:05</td>
<td>S-BAND ERECT ANT DEPLOY</td>
<td>CONTINGENCY SAMPLE COLLECTION</td>
<td></td>
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<tr>
<td>114:10</td>
<td>UNSTOW S-BAND ANTENNA</td>
<td>SWC DEPLOYMENT</td>
<td></td>
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<tr>
<td>114:15</td>
<td>ORIENT ANTENNA TOWARD EARTH</td>
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<td>114:20</td>
<td>DEPLOY LEGS</td>
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<td>114:25</td>
<td>ERECT MAST</td>
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<td>114:30</td>
<td>DEPLOY DISH</td>
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<td>ALIGN S-BAND ANTENNA</td>
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<td>EXPENDABLES TRANSFER</td>
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<td>STOW CS IN ETB</td>
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<td>TRANSFER ETB INTO LM</td>
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<td>LM AND SITE INSPECTION</td>
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<td></td>
<td>TRANSFER ETB TO SURFACE</td>
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<td>ATTACH ETB TO MESA</td>
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<td>PHOTO LMP EGRESS</td>
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<td>S-BAND SWITCHING</td>
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<td>ASCEND LADDER</td>
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<td>SWITCH TO ERECTABLE ANTENNA</td>
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<td>TRANSFER ETB INTO LM</td>
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<td></td>
<td>REMOVE AND STOW CONTENTS</td>
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<td></td>
<td>FROM ETB AND REPACK</td>
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<td>TRANSFER ETB TO SURFACE</td>
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<td>EGRESS LM</td>
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<td></td>
<td>DESCEND LADDER</td>
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**Mission and Edition Details**

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<th>Date</th>
<th>Time</th>
<th>Day/Rev</th>
<th>Page</th>
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<tbody>
<tr>
<td>Apollo 14</td>
<td>Change A (Jan)</td>
<td>December 23, 1970</td>
<td>114:00 - 114:30</td>
<td>5/17</td>
<td>3-135</td>
</tr>
</tbody>
</table>
**CSM FLIGHT PLAN**

P24 (LM VISUAL)
OPT ZERO - OFF, OPT MODE - CMC
SC CONT - CMC/AUTO (VERIFY)
V79 (N16 LOAD ALL ZERO'S)
(-0.0507)
(+000.50)
(+000001)

PRO TO START PITCH RATE (000,000/304,000)

0:00 - T1 (HORIZON-LM ACQ) DET - ZERO/UP/START

5:00 - T2 OPT MODE = MAN, TAKE MARKS 10 SEC APART

6:30 - TCA
6:44 - T3 (LM LOSS)
V48 (11111)

V49 MNVR TO COMM ATT (114:56)
(060,268,000) HGA P 29, Y 236

P24 LOMK TRACKING
TGT: LM VISUAL

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>TCA</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

R: --- "P" --- "Y" --- "Z" (T2 ACQ)
N or S NM: / 5A --- TA (T2 ACQ)
N69
LAT: -03.672
LONG/2: -08.732
ALT: -000.76

---

MISSION: APOLLO 14
EDITION: 4th Ed. (JAN)
DATE: DECEMBER 6, 1970
PAGE: 3-136

---


**LM FLIGHT PLAN**

<table>
<thead>
<tr>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>114:30</td>
<td><strong>FLAG DEPLOYMENT</strong>&lt;br&gt;PLACE 16 MM CAMERA ON SRC TABLE AND TURN ON ASSIST CDR TURN 16 MM CAMERA OFF</td>
<td>1:00</td>
</tr>
<tr>
<td>114:35</td>
<td><strong>LM &amp; SITE INSPECTION AND PHOTOGRAPHY</strong></td>
<td>1:10</td>
</tr>
<tr>
<td>114:40</td>
<td><strong>MET DEPLOYMENT</strong>&lt;br&gt;CARRY TV 30 FT EAST OF LM POSITION TO VIEW ALSEP OFFLOAD</td>
<td><strong>MET DEPLOYMENT</strong>&lt;br&gt;PULL MET TO QUAD II</td>
</tr>
<tr>
<td>114:45</td>
<td><strong>ALSEP OFFLOAD</strong>&lt;br&gt;OFFLOAD ALSEP PKG NO. 1</td>
<td><strong>ALSEP OFFLOAD</strong>&lt;br&gt;OPEN SEQ BAY DOORS</td>
</tr>
<tr>
<td>114:50</td>
<td><strong>REMOVE AND ASSEMBLE BAR</strong></td>
<td><strong>OFFLOAD ALSEP PKG NO. 2</strong>&lt;br&gt;REMOVE AND EXPAND ALHTC REMOVE DRT &amp; FTT</td>
</tr>
<tr>
<td>115:00</td>
<td><strong>ATTACH CARRY BAR TO PACKAGE NO. 1</strong></td>
<td></td>
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</tbody>
</table>

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**MCC-H**

0853 CST

**RECORD PCM LBR ON DSE DURING P24**

**NOTES**

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<table>
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<th>EDITION</th>
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<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>114:30 - 115:00</td>
<td>5/17</td>
<td>3-137</td>
</tr>
</tbody>
</table>
LM FLIGHT PLAN

CDR

0923 CST

115:00

TIP PKG NO. 2 AND POSITION
FOR FUELING, TAKE 70MM
PHOTOS IF TIME PERMITS
CARRY TV 50 FT NORTH OF LM
BW TV CAM TO +Y FOOTPAD
POSITION TO VIEW ALSEP SITE
UNSTOW THUMPER/GEOPHONE
AND PLACE ON MET

ALSEP TRAVERSE
CARRY LR³, PULL MET
DESCRIBE MET HANDLING
AND STABILITY

ALSEP SITE SURVEY
16 MM CAMERA - ON

ALSEP DEPLOYMENT
PLACE SUBPALLAT ABOUT
10 FEET NE OF C/S
PACK SURFACE FOR PSE STOOL
10 FEET NORTH
PSE OFFLOAD
16 MM CAMERA - OFF

SUNSHIELD DEPLOYMENT

ALSEP ANTENNA INSTALLATION

LMP

REPORT: FUEL RTG, DRT, &
FIT TEMP
PULL MET TO MESA
DISCARD TV BRACKET
PUT 70MM CAMERA ON MET
PLACE 16MM CAMERA ON STAFF
UNSTOW AND OPEN SRC 1
UNSTOW CLOSEUP STEREO CAMERA

ALSEP TRAVERSE
CARRY ALSEP

ALSEP SITE SURVEY

ALSEP DEPLOYMENT
POSITION PKG NO. 1 & BAR
10 FEET WEST OF PKG NO. 2
THUMPER/GEOPHONE OFFLOAD
MORTAR PACKAGE DEPLOYMENT

CPLÉE DEPLOYMENT
SIDE/CCIG DEPLOYMENT

NOTES

1:30
1:40
1:50
2:00
2:10
2:20
2:30

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 115:00 - 116:00 | 5/17-18 | 3-139
CSM FLIGHT PLAN

3:50 - DAC - ON
ACQ MSFN OMNI D
4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART
6:30 - TCA
7:18 - T3 (LDMK LOSS) DAC - OFF

P24 LDMK TRACKING
TGT: DOLLOND E (1/250)

T1  
T2  
TCA 
T3  
R   "P" "Y" "T2 ACQ"

N or S NM / SA TA (T2 ACQ)

M89
LAT -10.433
LON/2 +07.866
ALT +000.00

MSFN UPDATE:
MAP UPDATE REV 19 (117:10)
MVNR PAD (PLANE CHANGE) (117:45)

P24 (DOLLOND E)
V79E, PRO, PRO
OPT ZERO - OFF, OPT MODE - CMC

MISSION EDITION DATE PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 3-140
### LM Flight Plan

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<th>CDR</th>
<th>LMP</th>
<th>NOTES</th>
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</thead>
<tbody>
<tr>
<td>116:00</td>
<td>SWITCH NO. 1 - CW</td>
<td>ALIGN AND LEVEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SWITCH NO. 5 - CCW</td>
<td></td>
<td>2:30</td>
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<tr>
<td>:05</td>
<td>PSE DEPLOYMENT</td>
<td></td>
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<tr>
<td>:10</td>
<td>CONFIRM ALSEP DATA WITH MCC-H</td>
<td></td>
<td>2:40</td>
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<tr>
<td>:15</td>
<td>DEPLOY LR(^3) 100 FT W OF C/S</td>
<td></td>
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<tr>
<td>:20</td>
<td>ALSEP PHOTOGRAPH</td>
<td></td>
<td>2:50</td>
</tr>
<tr>
<td></td>
<td>PHOTOGRAPH PSE, MORTAR PKG, CPLEE, SIDE/CCIG, RTG &amp; LM, C/S, LR(^3)</td>
<td></td>
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</tr>
<tr>
<td>:25</td>
<td>GEOPHONES AND THUMPER</td>
<td></td>
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<tr>
<td>:30</td>
<td>SAMPLE COLLECTION</td>
<td></td>
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<td></td>
<td>COLLECT COMPREHENSIVE SAMPLE</td>
<td></td>
<td>3:00</td>
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</tbody>
</table>

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**MCC-H**
- RECORD PCM LBR ON DSE DURING P24
- CONFIRM ALSEP DATA
- UPDATE TO CSM
- MAP UPDATE REV 19
- PLAN CHANGE MNVR PAD

---

**Mission Details**

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<th>DAY/REV</th>
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<td>DECEMBER 2, 1970</td>
<td>116:00 - 116:30</td>
<td>5/18</td>
<td>3-141</td>
</tr>
</tbody>
</table>
CSM FLIGHT PLAN

0:00 - T1 (HORIZON) DET - ZERO/UP/START

3:50 - DAC - ON

4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART

6:30 - TCA

7:18 - T3 (LDMK LOSS) DAC - OFF

P24 (FM-1)

V79E, PRO, PRO
OPT ZERO - OFF, OPT MODE - CMC

0:00 - T1 (HORIZON) DET - ZERO/UP/START

3:50 - DAC - ON

4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART

6:30 - TCA

7:18 - T3 (LAST MARK) DAC - OFF

P48 (11112)

49V MVIR TO P52 ATT (116:55)

49B-1114.040 HAP P=99F 1.066

(194 602 045) HEA P5 2 229

CONFIRME CRERA: (GALACTIC SURVEY)
CM/DOC/18/HABN-BRICK, MIR, CONT (T1,1/500,) 24fps (2.55 MAG)

MAG (3) MAG X

UTILITY MVIR - ON

MSFN UPLINK:
CSM SV
PLANE CHANGE TGT LOAD
WANTED OIENT (PLANE CHANGE)

P52 (OPTION 3)
(LOG SITE ORIENT)

P52 IMU REALIGN

N71:  

N05:  

N93:
X
Y
Z

GET

P24 LDMK TRACKING

TGT: FM-1

T1

T2

TCA

T3

R

N or 5 NM / SA / TA (T2 ACQ)

N89

LAT -03.246
LONG/2 -06.859
ALT +000.00
LM FLIGHT PLAN

MCC-H  1053 CST

CDR

LMP

NOTES

116:30

116:35

116:40

116:45

117:00

GO/NO-GO FOR EVA-1 EXTENSION

COLLECT 4 KILOGRAM SOIL SAMPLE

SAMPLE COLLECTION

UPLINK TO CSM

CSM S.V.

PLANE CHANGE TGT LOAD

DESERVED ORIENT (PLANE CHANGE)

GO/NO-GO FOR EVA-1 EXTENSION

MISSION | EDITION | DATE       | TIME        | DAY/REV | PAGE
---------|---------|------------|-------------|---------|-----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 116:30 - 117:00 | 5/18 | 3-143
CSM FLIGHT PLAN

117:10

REPORT: CYNO TORSION ANGLES

GDC ALIGN
VERIFY ORDEAL
CYCLE CMC MODE - FREE/AUTO
VAF (11110)(X1111)
VAF MNVR TO N. ECLIPTIC POLE ATT (117:16)
(272,009,356)

GALACTIC SURVEY PHOTOGRAPHY

VERIFY USE TAPE MOTION (LBL/RCD/FWD/CMD RESET)

DAMP RATES:
VERIFY FDAO SCALE - 5/1
DISABLE ALL JETS ON TWO ADJACENT QUADS
WAIT 5 MINUTES FOR RATES TO DAMP
CMC MODE - FREE
VERIFY RATES ON FDAO ARE < 0.2°/SEC IN ALL AXIS
DAC - ON AT 24 fps FOR 2 SEC
CHANGE FRAME RATE TO TIME & SHUTTER SPEED TO 1/60
DIM INTERIOR LIGHTING

117:20

START PHOTO SEQUENCE:
2 FRAMES, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC

VERIFY RATES NOT > 0.2°/SEC IN ANY AXIS,
IF RATES > 0.2°/SEC, AND TIME PERMITS -
DAMP RATES FOR 60 SEC AND REPEAT EXPOSURE SEQUENCE

CHANGE TO 24fps & 1/500, RUN DAC FOR 2 SEC
LIGHTS UP, CMC MODE - AUTO, ENABLE ALL QUADS
REMOVE DAC FROM WINDOW

RECORD MAG %

REMOVE CAMERA SHIELD

117:30

MAP UPDATE REV 19

LOS : ___ ___ ___ ___

180°: ___ ___ ___ ___

AOS : ___ ___ ___ ___
LM FLIGHT PLAN

MCC-H

1123 CST

CDR

LMP

NOTES

00213-H S 1-209261

117:00

COLLECT FOOTBALL SIZE ROCK

MORTAR PACK ACTIVATION

RETURN TRAVERSE

RETURN TRAVERSE

PULL MET ON TRAVERSE BACK TO LM

EVA CLOSEOUT

EVA CLOSEOUT

POSITION TV TO VIEW MESA AND LADDER AREAS

PULL MET NEAR MESA

STOW DOCUMENTED SAMPLES IN SRC NO. 1

STOW 70MM CAMERA IN ETB

COLLECT ADDITIONAL SAMPLES TO FILL SRC NO. 1

STOW 16MM CAMERA ON MET

REMOVE SKIRT AND SEAL SRC NO. 1

UNSTOW AND PLACE SRC NO. 2 ON MET

CLEAN AND CHECK EMU'S

3:00

3:30

IF EXTENSION GRANTED MORTAR PACK ACTIVATION WILL BE DELAYED UNTIL AFTER TRAVERSE

3:40

4:00

MISSON EDITION DATE TIME DAY/REV PAGE

APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 117:00 - 117:30 5/18 3-145
CSM FLIGHT PLAN

P30: VERIFY PC-1 TIG AND 4V'S
—V49 MNVR TO PC-1 BURN PAD ATT (117:38)

SXT STAR CHECK

SET DET COUNTING UP TO PLANE CHANGE

SECURE EQUIPMENT FOR PC-1

P30 MANEUVER

<table>
<thead>
<tr>
<th>SET STARS</th>
<th>C</th>
<th>S</th>
<th>M</th>
<th>P</th>
<th>C</th>
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<td>TRIM</td>
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<tr>
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<td>+</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>+</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
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<td>+</td>
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</table>

| ULLAGE    |   |   |   |   |   |   |         |
|           |   |   |   |   |   |   |         |
|           |   |   |   |   |   |   |         |
|           |   |   |   |   |   |   |         |

| HORIZON/ WINDOW |   |   |   |   |   |   |         |
|                 |   |   |   |   |   |   |         |
|                 |   |   |   |   |   |   |         |
|                 |   |   |   |   |   |   |         |

| OTHER       |   |   |   |   |   |   |         |
|             |   |   |   |   |   |   |         |
|             |   |   |   |   |   |   |         |
|             |   |   |   |   |   |   |         |

<table>
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<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>PAGE</th>
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<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>3-146</td>
</tr>
</tbody>
</table>
LM FLIGHT PLAN

1153 CST

CDR

LMP

NOTES

4:00

117:30

EVA TERMINATION
INGRESS
CHECK LM & EMU
ASSIST CDR

117:35

TRANSFER ETB INTO LM
TRANSFER SRC INTO LM
ASCEND LADDER
STOW LEC AND INGRESS
CLOSE HATCH

117:40

TRANSFER LEC TO CDR

117:45

REPRESSURIZE CABIN

POST-EVA SYSTEMS CONFIGURATION
CONFIGURE LM ECS

117:50

DOFF HELMETS AND GLOVES
CONNECT LM ECS HOSES TO SUIT
CONNECT TO LM COMM AND RECONFIGURE COMM
BIOMED-LEFT, RECORDER-OFF

117:55

PLSS O₂ RECHARGE

118:00

CONNECT LMP PLSS TO LM O₂ SUPPLY AND FILL (2 MIN)
CONNECT CDR PLSS TO LM O₂ SUPPLY AND FILL (2 MIN)

---

MISSION | EDITION | DATE       | TIME         | DAY/REV | PAGE
--------|---------|------------|--------------|---------|-----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 117:30 - 118:00 | 5/18-19 | 3-147
CSM FLIGHT PLAN

ACQ MSFN HGA P 3, Y 274
GO/NO-GO FOR PLANE CHANGE 1

CSM PLANE CHANGE 1 BURN TABLE

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC</td>
<td>± 10°</td>
<td>BT + 1 SEC</td>
<td>NO TRIM</td>
</tr>
</tbody>
</table>

TERMINATE TERMINATE

CSM PLANE CHANGE (180, 354, 003)
TIG: 118:00:40
BT: 18.4 SEC
ULLAGE: 4 JET, 11 SEC
ORBIT: 61.7 X 57.4

POG REPORT: BURN STATUS

MSFN UPLINK:
- DESIRED ORIENT (LIFT-OFF)
- RLS UPDATE (IF REQ'D)

MSFN UPDATE:
- REFSSMAT GO TIME
- EARTHSHINE PHOTO PAD (118:45)
- MAP UPDATE REV 20 (119:10)

W49 MVNR TO P52 ATT (118:26)
(329, 335, 319) HGA P -27, Y 135

CONFIGURE CAMERAS: (EARTHSHINE)
CM4/DAC/18/VHWH-BRKT, MIR, CONT (T1, 1/500, -) 24 fps (25% MAG)
MAG (X) MAG %
UTILITY PWR: ON
DAC-ON AT 24 FPS for 2 SEC (COVER LENS)
CHANGE FRAME RATE TO 1 FPS & SHUTTER SPEED TO 1/500
CM4/DC/80/VHWH-BRKT, IVE (T2.8, 1/60, -) (51 FR)
MAG (S), FR #
COVER LENS, CYCLE 3 FRAMES

P52 (OPTION 1) GYRO TORQUE
(LIFT-OFF ORIENT)

BURN STATUS REPORT

*ITEMS TO BE REPORTED TO MSFN

MIN HRS
+ 0 0
+ 0 0
+ 0 0
+ 0

MAP UPDATE REV 20 (119:10)

APOLLO 14 EDITION DATE PAGE
CHRONO (JAN) DECEMBER 20, 1976 3-148

Jan 11, 1976
## LM FLIGHT PLAN

### MCC-H
- GO/NO-GO FOR PLANE CHANGE

### CDR
- 118:00
  - PLSS/OPS DOFFING
    - REMOVE RCU'S, DOFF PLSS/OPS
    - REPLACE LMP PLSS BAT & LiOH CARTRIDGE
    - REMOVE OPS, CHECK PRESSURE, AND STOW ON ENGINE COVER
    - STOW PLSS (RECHARGE STATION)
    - REPLACE LMP PLSS BAT & LiOH CARTRIDGE
    - REMOVE OPS AND STOW PLSS ON FLOOR
    - CHECK OPS PRESSURE
    - STOW LMP OPS ON FLOOR
    - STOW PLSS ON FLOOR
    - STOW RCU'S ON DATA FILE
    - STOW DISP CONT ON MID-STEP
    - STOW LEVA'S ON LH FORWARD FLOOR

### LMP
- 118:15
  - POST-EVA CABIN CONFIGURATION
  - UNSTOW SCALE

### NOTES
- 0:20
- 0:30
- 0:40

### MISSION
- APOLLO 14

### EDITION
- FINAL (JAN)

### DATE
- DECEMBER 2, 1970

### TIME
- 118:00 - 118:30

### DAY/REV
- 5/19

### PAGE
- 3-149
CSM FLIGHT PLAN

GNC ALIGN
VERIFY ORACLE
-V49 MVVR TO EARTHSHINE ATT (118:41)
(000,164,000) HGA P -27, Y 180

118:40

SC CONT - CMC/AUTO (VERIFY)
V79 (-0.0507)
(+005.00)
(+00001)

PRO TO START PITCH RATE (000.006/164,000)

118:44:39 - DET-ZERO/UP/START (T START)(SS -13 MIN)
INHIBIT - A3,C4,B3,D4 THRUSTERS
DIM INTERIOR LIGHTS

118:50

5:20 - DAC - ON (SS -7:40)
5:30 - DC - ON (SS -7:30)

7:30 - CHANGE DC SHUTTER TO 1/15 SEC (SS -5:30)
CHANGE DAC SHUTTER TO 1/60 SEC

MISSION  EDITION  DATE  PAGE
APOLLO 14  CHANGE A (JAN)  DECEMBER 23, 1970  3-150
## LM FLIGHT PLAN

<table>
<thead>
<tr>
<th>MCC-H</th>
<th>1253 CST</th>
<th>CDR</th>
<th>LMP</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>118:30</td>
<td>POST-EVA CABIN CONFIGURATION (CONT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECORD SAMPLE BAG WEIGHT</td>
<td>:35</td>
<td>WEIGH SAMPLE BAG, REPORT: WEIGHT</td>
<td></td>
<td>0:50</td>
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<tr>
<td>RECORD SRC WEIGHT</td>
<td>:40</td>
<td>EMPTY ETB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>118:45</td>
<td>RECONFIGURE CAMERAS</td>
<td></td>
<td>1:00</td>
</tr>
<tr>
<td></td>
<td>:50</td>
<td>STOW CSRC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>:55</td>
<td>REPACK ETB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>119:00</td>
<td>WEIGH SRC, REPORT: WEIGHT</td>
<td></td>
<td>1:10</td>
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<tr>
<td></td>
<td></td>
<td>VERIFY CB CONFIGURATION</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td>MODULATE-PM</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td>UNSTOW LUNAR SURFACE CHECKLIST</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td>STOW EVA-1 PREP &amp; POST CARD</td>
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</table>

### EAT PERIOD

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>118:30 - 119:00</td>
<td>5/19</td>
<td>3-151</td>
</tr>
</tbody>
</table>
CSM FLIGHT PLAN

20:30 - DC - OFF, DAC - OFF (SS +7:30)
REMOVE DC FROM WINDOW, COVER LENS,  
CYCLE 3 FRAMES
REMOVE DAC FROM WINDOW, COVER LENS, AND 
RUN DAC AT 24 fps AND SHUTTER SPEED 1/500 FOR 2 SEC  
LIGHTS UP, ENABLE - A3, 04, 03, 04 THRUSTERS
RECORD MAG %, FR #

119.10
V49 MVR TO REST ATT (119:16)  
(050, 272, 000) HGA P 32, Y 258

VERIFY DSE TAPE MOTION (LBR/RCF/TWD/CMR RESET)

PS2 (OPTION 3)  
(LIFT-OFF ORIENT)

GCO ALIGN
VERIFY ORDEAL

MAN ATT (3) - ACCEL CMD  
SC CONT - CMC/AUTO (VERIFY)
V79 (-0.0000)  
(+010.00)
PRO  
MAN ATT (3) - RATE CMD

119:30

LION CANISTER CHANGE:  
(11 INTO A, STOW 9 IN A3)

119:40

EAT PERIOD
REST ATTITUDE

119:50
CONFIGURE FOR VHF BI-STATIC RADAR TEST  
VHF AM T/R (3) - RCY (VERIFY)  
VHF AM A - OFF (VERIFY)  
VHF AM B - DIXEXIT (VERIFY)  
VHF RNG - RNG  
VHF ANT - RIGHT

THIS TEST WILL BE RUN UNTIL ~ 131:00

120:00
CSM FLIGHT PLAN

REPORT: GYRO TORQUING ANGLES
(FROM P52 AT 079:16)

EAT PERIOD

REST PERIOD
(9.5 HOURS)

CSM SYSTEMS CHECKLIST
PERFORM PRE-SLEEP CHECKLIST PAGE S 1-26

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

16MM & 70MM CAMERA MAGAZINES USED FROM 079:50 TO 107:00

<table>
<thead>
<tr>
<th>CAMERA MAGAZINES</th>
<th>TYPE (DEGAL-COLOR)</th>
<th>STORAGE LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL</td>
<td>M, N</td>
<td>CEX (BLUE)</td>
</tr>
<tr>
<td>DC</td>
<td>Q</td>
<td>BW (BLACK)</td>
</tr>
<tr>
<td>DAC</td>
<td>B, D, E</td>
<td>CEX (BLUE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VHBW (SILVER/BLACK)</td>
</tr>
</tbody>
</table>

*Should be left in B2 or kept out of direct sunlight.

MISSION EDITION DATE PAGE
APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 3-154
LM FLIGHT PLAN

CDR

1423 CST

120:00

LCG PUMP CB - OPEN
CONNECT LM O₂ SUPPLY TO PLSS AND FILL (10 MIN)
CONNECT LM H₂O SUPPLY TO PLSS AND FILL (3 MIN)
CONNECT LM O₂ SUPPLY TO 2ND PLSS AND FILL (10 MIN)
CONNECT LM H₂O SUPPLY TO 2ND PLSS AND FILL (3 MIN)

120:10

EVA DEBRIEFING (5 MIN)
CREW STATUS (RADIATION, MEDICATION)
VOICE - DN VOICE BU
S-BD PWR AMPL - OFF
VHF ANT - AFT

120:30

CONFIGURE SLEEP STATIONS

120:40

REST PERIOD (10 HOURS)

121:00

LMP

MCC-H

DUMP DSE

UPDATE TO LM
FLIGHT PLAN FOR
POSSIBLE EVA-2
EXTENSION

NOTES

2:20

2:30

2:40

2:50

MISSION | EDITION | DATE       | TIME       | DAY/REV | PAGE
--------|----------|------------|------------|---------|------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 120:00 - 121:00 | 5/20     | 3-155

MSC FORM 809B (APRIL 1970) OT
FLIGHT PLANNING BRANCH
NASA — MSC
MCC-H
1723 CST

LM FLIGHT PLAN

CDR

LMP

NOTES

123:00

:10

:20

123:00

:40

:50

124:00

REST PERIOD
(10 HOURS)

DUMP DSE

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>123:00 - 124:00</td>
<td>5/21-22</td>
<td>3-161</td>
</tr>
</tbody>
</table>
LM FLIGHT PLAN

MCC-H 1823 CST

CDR

LMP

NOTES

124:00

124:10

124:20

124:30

124:40

124:50

125:00

REST PERIOD
(10 HOURS)

MISSION | EDITION   | DATE             | TIME            | DAY/REV | PAGE  
--------|-----------|------------------|-----------------|---------|------- 
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 124:00 - 125:00 | 5/22    | 3-163
# LM FLIGHT PLAN

<table>
<thead>
<tr>
<th>MCC-H</th>
<th>1923 CST</th>
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<th>TIME</th>
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<td>125:00</td>
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<td>125:40</td>
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<tr>
<td>125:50</td>
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<tr>
<td>126:00</td>
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- **MSFN**: REST PERIOD (10 HOURS)

### MISSION
- **APOLLO 14**

### EDITION
- **FINAL (JAN)**

### DATE
- **DECEMBER 2, 1970**

### TIME
- 125:00 - 126:00

### DAY/REV
- 5/22-23

### PAGE
- 3-165
LM FLIGHT PLAN

2123 CST

MCC-H

CDR

LMP

NOTES

127:00

:10

:20

127:30

:40

:50

128:00

REST PERIOD
(10 HOURS)

DUMP DSE

<table>
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<tr>
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<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>127:00 - 128:00</td>
<td>5/23-24</td>
<td>3-169</td>
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</table>
LM FLIGHT PLAN

MCC-H  2223 CST

CDR

LMP

NOTES

128:00

128:10

128:20

128:30

128:40

128:50

129:00

REST PERIOD
(10 HOURS)

MISSION | EDITION  | DATE       | TIME       | DAY/REV | PAGE
---------|----------|------------|------------|---------|-----
APOLLO 14| FINAL (JAN) | DECEMBER 2, 1970 | 128:00 - 129:00 | 5/24   | 3-171
CSM FLIGHT PLAN

WAKE UP

CSM SYSTEMS CHECKLIST
PERFORM POST-SLEEP CHECKLIST PAGE S 1-26
CONFIGURE CAMERA: (ORB SCIENCE)
CM/EL/250/CEX (f11,1/250,m) (102 FR)
MAG (M) ____, FR # ____,

REST PERIOD
(9.5 HOURS)

REST ATTITUDE

DAP LOAD STATUS
11112
11111

129:00
(-0.000)
(+10.00)

129:10

129:20

129:30

129:40

129:50

130:00

MISSION | EDITION | DATE | PAGE
---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 3-172
CSM FLIGHT PLAN

130:00  CSM UPLINK:
       CSM S.V.
       MSFN UPDATE:
       CONSUMABLES
       MAP UPDATE REV 26 (131:05)  
       VERTICAL STEREO PAD (131:35)

130:10  CYCLE MVC MODE - FREE/AUTO
       V48 (11102)
       (X1111)

130:20  V49 MNVR TO ORB SCIENCE/S-BD BI-STATIC RADAR ATT (130:11)
       (228,013,000)

130:30  MCC CMD:
       S-BD MODE RANGING - OFF
       S-BD AUX TAPE - OFF
       PCM BIT RATE - LD
       TAPE RECORDER - FWD

130:40  VERIFY USE TAPE MOTION (IF TB NOT GRAY - S-BD MODE RNG-OFF,
       AUX TAPE-OFF/LBR/RCO/FWD/CMC RESET)
ON MCC CUE, SELECT:
VHF ANT - LEFT, S-BD ANT - Omni  
NOTE: MCC WILL TURN OFF UPLINK (>130:08)

130:50  SC CONT - MVC/AUTO (VERIFY)
V79 (-0.0830)
(+005.08)
(+00001)

130:00  PRO TO START PITCH RATE (228,043/013,000)

ORBITAL SCIENCE PHOTOGRAPHY

130:20  PHOTO TGT 1G, SOUTH ((1111)250,-1) 102 FR AT 10 SEC (250mm)
       (180° + :49)

130:30  CHANGE TO F8

130:40  NOTE: DURING BI-STATIC RADAR
       TEST MSFN HAS NO TLM FROM
       -130:10 TO -130:55 AND NO VOICE
       CAPABILITY DURING TEST

CHANGE TO F5.6

CSM CONSUMABLES UPDATE
GET:  

RCS TOTAL  
QUAD A  
B  
C  
D  
H₂ TANK 1  
2  
O₂ TANK 1  
2  
3  

EAT PERIOD

MISSION  EDITION  DATE  PAGE
APOLLO 14  CHANGE A (JAN)  DECEMBER 23, 1970  3-174
LM FLIGHT PLAN

0023 CST

CDR

LMP

MCC-H

UPLINK TO CSM
CSM S.V.
UPDATE TO CSM
CONSUMABLES
MAP UPDATE REV 26
VERTICAL STEREO PAD

130:00

130:30

131:00

STAY/NO-STAY FOR EVA-2 PREP

STOW HAMMOCKS

CHANGE LIOH CANISTER

REST PERIOD (10 HOURS)

BIOMED - RIGHT

EAT PERIOD

STAY/NO-STAY FOR EVA PREP

CREW STATUS REPORT (SLEEP DOSIMETER)

NOTES

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
--------|---------|------|------|---------|-----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 130:00 - 131:00 | 6/25 | 3-175
CSM FLIGHT PLAN

131:00

(-.0830)
(05.00)

131:10

(11102)
(X1111)

131:20

131:30

131:40

131:50

132:00

CONFIRGURE CAMERA: (VERT STEREO)
CM/DC/BD/BN-DBXT, IVL, PCM CABLE (f4,1/250,=) (174 FR)
MAG (Q), FR 

VERTICAL STEREO PHOTO
T START:
T STOP:

BOOTSTRAP (VERT STEREO) & ORBITAL SCIENCE PHOTOGRAPHY

ADJUST COAS FOR +12° ELEVATION

V646 (DO NOT ENTER)
CONFIRGURE DSE (HBR/RCD/FWD/CMO RESET)
131:43:19 - ENTER, DC - ON (T START)
RECORD TIME FROM V646

PCM BIT RATE - LO
CHANGE DC f-STOP TO (f8)

V64; ACQ MSFH FGA P -57, Y 356
REPORT: GYRO TORQUING ANGLES
(FROM PS2 AT 131:18)

CONFIRGURE CAMERA: (ORB SCIENCE)
CM/EL/250/CHE (f8,1/250,=) (43 FR)
MAG (M), FR 

EAT PERIOD

PS2 IMU REALIGN
N7: __________
N5: __________
N3: __________
X __________
Y __________
Z __________
GET ________

PS2 (OPTION 3)
(LIFT-OFF ORIENT)

SC CONT - CMC/AUTO (VERIFY)
V79 (-.0507)
(+000.50)
(+000001)

PRO TO START PITCH RATE (180,282/201,000)

DISCONTINUE BI-STATIC RADAR TEST
VHF RNG - OFF
S-BD MODE RANGING - RANGING (VERIFY)
S-BD AUX TAPE - DNX VOICE BU (VERIFY)

PS2 IMU REALIGN
N7: __________
N5: __________
N3: __________
X __________
Y __________
Z __________
GET ________

GDC ALIGN
VERIFY ORDEAL
V49 MNVR TO VERT STEREO ATT (131:26)
(180,021,000)

V46
V49 MNVR TO PS2 ATT (131:17)
(180,114,000)

MISSION EDITION DATE PAGE
APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 3-176
PGS 3-177 ½
3-178 missing
LM FLIGHT PLAN

CDR

EVA PLANNING PERIOD

LMP

CABIN PREP FOR EVA-2
CLEAN AND LUBRICATE SEALS AS REQUIRED
STOW ALL LOOSE ITEMS NOT REQUIRED FOR EVA
UNSTOW EVA-2 PREP & POST CARD
STOW LUNAR SURFACE CHECKLIST

EQUIPMENT PREP FOR EVA-2
SET DET
CDR DON BOOTS
UNSTOW AND CHECK BOTH OPS
VERIFY EQUIPMENT IN ETB AND STOW FOR EVA
LMP DON BOOTS

UPDATE TO CSM
LTC PHOTO PAD
MAP UPDATE REV 27

MCC-H 0223 CST
132:00 (12102)
:10
:20
132:30:40
133:00

-1:30
-1:20

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 132:00 - 133:00 6/26 3-179
CSM FLIGHT PLAN

START PHOTO SEQUENCE:
2 FRAMES, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC
VERIFY RATES NOT > 0.2°/SEC IN ANY AXIS
IF RATES > 0.2°/SEC, AND TIME PERMITS -
DAMP RATES FOR 60 SEC AND REPEAT EXPOSURE SEQUENCE
CHANGE TO 24 fps & 1/500, RUN DAC FOR 2 SEC
LIGHTS UP, CMD MODE - AUTO, ENABLE ALL QUADS
V49 MIVR TO LUNAR LIBRATION ATT (133:20)
(180,320,349)

CONFIGURE CAMERA: (BOOTSTRAP/ORB SCIENCE)
CM3/LTC/MBI/SEF (SHUT 1/50, RNG 1-PAD, INT 8.1) (436 FR)
MAG (U) - , FR #
LTC INSTALLATION (DECAL)
LTC CHECKOUT (DECAL)

LUNAR LIBRATION PHOTOGRAPHY

INHIBIT - A3, C4, B3, D4 THRUSTERS
DAC - ON AT 24 fps FOR 2 SEC, CHANGE TO TIME & 1/60 SEC
DIM INTERIOR LIGHTING
1 FRAME, EXP TIME 60 SEC
2 FRAMES, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC
CHANGE TO 24 fps & 1/500, RUN DAC FOR 2 SEC
LIGHTS UP, ENABLE - A3, C4, B3, D4 THRUSTERS
REMOVE CAMERA FROM WINDOW
RECORD MAG %
REMOVE CAMERA SHIELD

BOOTSTRAP (VERT LTC) & ORB SCIENCE PHOTOGRAPHY
SC CONT - CM3/AUTO (VERIFY)
V79 (-0.050) (+000.50) (+00001)
PRO TO START PITCH RATE AT ORDEAL P 328
CONFIGURE DSE (HBR/RCD/FWD/CMD RESET)
VERIFY: LTC MODE - STBY/PUR - ON, ZERO DET (T START -1 MIN)
LTC TGT 2/8 (SHUT 1/50, RNG 1-PAD, INT 8.1) (424 FR)
LTC MODE - AUTO, DET - UP/START (T START)

PCM BIT RATE - LO
ACQ MSFN OMN 8

LTC PHOTO PAD TGT: 2/8 (180,032,000)
R: - - - - - - - - - - Y: - - - - - - -
T START: - - - - - - - - - -
T STOP: - - - - - - - - - -
RNG 1: (91.0) T START
RNG 2: (91.1) T START +21:25
RNG 3: (90.9) T START +39:50
RNG 4: (91.0) T START +44:10
RNG 5: (91.1) T START +47:30

V64; ACQ MSFN HGA P -47, Y 367

MISSION: APOLLO 14
EDITION: CHANGE A (JAN)
DATE: DECEMBER 23, 1970
PAGE: 3-180
LM FLIGHT PLAN

CDR

PREPARE VISORS & HELMETS FOR EVA
UNLOCK FORWARD HATCH HANDLE

LMP

PLSS DONNING
CONFIGURE LMP PLSS FOR DONNING
LMP DON PLSS
CONFIGURE CDR PLSS FOR DONNING
CDR DON PLSS
UNSTOW RCU'S AND VERIFY CONFIGURATION
CONNECT RCU TO PLSS

PLSS COMM CHECK
FM VOICE CHECK (TV ON)
CONFIGURE FOR EVA COMM, BIOMED-OFF
RECORDER - ON
VERIFY PLSS COMM & TM

FINAL SYSTEMS PREP
OPS CONNECT
LMP UNSTOW OPS AND CONNECT TO RCU & PLSS
CDR UNSTOW OPS AND CONNECT TO RCU & PLSS
VERIFY ITEMS PREPARED FOR JETTISON

HELMET/GLOVE DONNING
DON HELMETS & LEVA'S
STOW LM HOSES

DUMP DSE

MCC-H

0323 CST

133:00
(12102)

:10

:20

133:30

MSFN

:40

:50

134:00

NOTES

-1:10

-1:00

-0:05

-0:40

-0:30

-0:20
CSM FLIGHT PLAN

134:00
(±.0507)
(+00.50)
CHANGE TO RNG 2 (T START +21:25)
CHANGE SHUTTER TO 1/200 SEC

134:10
CHANGE SHUTTER TO 1/100 SEC

134:20
CHANGE TO RNG 3 (T START +39:50)
CHANGE SHUTTER TO 1/50 SEC
CHANGE TO RNG 4 (T START +44:10)

134:30
(±.1507)
(+00.50)
CHANGE TO RNG 5 (T START +47:30)

LTC MODE = STBY/PWR - OFF (AT TERMINATOR OR WHEN MAGAZINE IS DEPLETED)

MSFN UPDATE:
MAP UPDATE REV 28 (135:05)
LTC PHOTOS PAD (TGT 6) (135:16)

ACQ MSFN OMNI C

134:40
134:50
135:00
135:10
135:20
135:30
135:40
135:50
135:60

CONFIGURE CAMERAS: (ORBITAL SCIENCE & BOOTSTRAP)
CM/EL/250/CEX (FB,1/250,W) (83 FR)
MAG (N) _____, FR # _____
CM3/LTC/MBW/SEF (SHUT 1/100, RNG 1-PAD, INT 5,9) (191 FR)
LTC FILM MAG CHANGE (DECAL)
ADVANCE 4 FRAMES (IF END-OF-FILM LT - OUT), RECORD FR #
PUT MAG (V) ON LTC, RESET FRAME COUNTER
MAG (V) _____, FR # _____
LTC CHECKOUT (DECAL) _____

MISSION EDITION DATE PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 3-182
<table>
<thead>
<tr>
<th>CDR</th>
<th>LMP</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERIFY PGA CONFIGURATION</td>
<td></td>
<td>-0:10</td>
</tr>
<tr>
<td>VERIFY CB CONFIGURATION FOR EVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DON GLOVES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRESSURE INTEGRITY CHECK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSS O₂ - ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CABIN DEPRESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPRESS CABIN TO 3.5 PSIA, START EVA WATCH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVHD OR FWD DUMP VALVE - OPEN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARTIALLY OPEN FWD HATCH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FINAL PREP FOR EGRESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSS FEEDWATER - OPEN, FWD HATCH - OPEN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERIFY CWEA &amp; PGA STATUS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RELEASE PLSS ANTENNAS, LOWER VISOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDR EGRESS AND TRANSFER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DESCEND TO SURFACE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPLOY LEC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRANSFER ETB TO SURFACE AND STOW ON MESA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECEIVE AND HOOK UP LEC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOAD ETB FOR TRANSFER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MET LOAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOVE MET NEAR MESA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPEN SRC AND STOW EQUIPMENT ON MET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LMP EGRESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOSE HATCH AND DESCEND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MET LOAD ASSIST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOW CAMERAS AND TOOLS ON MET. PULL MET TO SEQ BAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAGNETOMETER OFFLOAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MET TRACK &amp; FOOTPRINT EVAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAGNETOMETER OFFLOAD, STOW ON MET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAVERSE TO STATION A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHOTOGRAPH AND COMMENT ON MET TRACKS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAVERSE TO STATION A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATION A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDS EXPERIMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATION A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LMP POINT MEASUREMENT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 134:00 - 135:00 | 6/27 | 3-183
<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
<th>LMP</th>
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</thead>
<tbody>
<tr>
<td>135:00</td>
<td>REBAG AND STOW TDS SAMPLES</td>
<td>REPORT X,Y,Z READINGS AT EACH OF THREE POSITIONS</td>
</tr>
<tr>
<td></td>
<td>PHOTO PANORAMA</td>
<td>PHOTOGRAPH SITE</td>
</tr>
<tr>
<td></td>
<td>SITE DESCRIPTION</td>
<td>STOW SENSOR/TRIPOD ON MET</td>
</tr>
<tr>
<td></td>
<td>COLLECT SAMPLES</td>
<td>REWIND CABLE, STOW ON MET</td>
</tr>
<tr>
<td>1:10</td>
<td>TRAVERSE TO STATION B</td>
<td></td>
</tr>
<tr>
<td>135:30</td>
<td>STATION B</td>
<td>STATION B</td>
</tr>
<tr>
<td></td>
<td>SAMPLE COLLECTION</td>
<td>PHOTO PANORAMA</td>
</tr>
<tr>
<td></td>
<td>TRAVERSE TO BEND AREA</td>
<td>SITE DESCRIPTION</td>
</tr>
<tr>
<td></td>
<td>BEND AREA: PHOTO PANORAMA AND SITE DESCRIPTION</td>
<td>SAMPLE COLLECTION</td>
</tr>
<tr>
<td>1:20</td>
<td>TRAVERSE TO CONE CRATER VIA STATION D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REST EN ROUTE</td>
<td></td>
</tr>
<tr>
<td>1:30</td>
<td>CONE CRATER RIM</td>
<td>CONE CRATER RIM</td>
</tr>
<tr>
<td></td>
<td>SITE DESCRIPTION</td>
<td>PHOTO PANORAMA</td>
</tr>
<tr>
<td></td>
<td>SAMPLE COLLECTION</td>
<td>SAMPLE COLLECTION</td>
</tr>
<tr>
<td></td>
<td>PROCEED TO SOUTH RIM</td>
<td>PROCEED TO SOUTH RIM</td>
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**Mission Information**

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<tr>
<th>Mission</th>
<th>Edition</th>
<th>Date</th>
<th>Time</th>
<th>Day/Rev</th>
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<tr>
<td>Apollo 14</td>
<td>Final (Jan)</td>
<td>December 2, 1970</td>
<td>135:00 - 136:00</td>
<td>6/27-28</td>
<td>3-185</td>
</tr>
</tbody>
</table>
MSC FLIGHT PLAN

136:00
(0.0507)
(+00.50)

RECORD FR #
VERIFY: LTC MODE - STBY/PWR - ON, ZERO DET (T START -1 MIN)

LTC TGT 6 (SHUT 1/100, RNG 1-PAD, INT 5.9) (183 FR)
LTC MODE - AUTO, DET - UP/START (T START)

136:10

CHANGE TO RNG 2 (T START +4:50)

CHANGE BATTERY A

136:20

CHANGE SHUTTER TO 1/50 SEC
CHANGE TO RNG 3 (T START +12:00)

136:30

CHANGE TO RNG 4 (T START +19:40)

136:30
(0.0507)
(+00.50)

ACQ MSFN OMNI 0

136:40

LTC MODE - STBY/PWR - OFF (T STOP)
RECORD FR #

V48 (11111)
(X1111)

136:50

MSFN UPDATE:
MAP UPDATE REV 29
LDMK TRK PADS (RF-4, ANSGARIIUS N, DE-2, ENCKE E)
(137:30 - 138:30)

137:00

MSFN UPLINK:
CSM S.V.

MAP UPDATE REV 29

LOS:

180°:

AOS:

STOP ORB RATE AT INERTIAL P 122
VERIFY DSE TAPE MOTION (LBR/REO/FWD/CMO RESET)

MISSION EDITION DATE PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 3-186
### LM FLIGHT PLAN

<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
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</tr>
</thead>
<tbody>
<tr>
<td>136:00</td>
<td>SAMPLE COLLECTION</td>
<td>SAMPLE COLLECTION</td>
</tr>
<tr>
<td></td>
<td>SAMPLE BOULDER TRACKS</td>
<td>SAMPLE BOULDER TRACKS</td>
</tr>
<tr>
<td></td>
<td>ROLL BOULDERS INTO CRATER</td>
<td>PARTIAL PANORAMA TO WEST</td>
</tr>
<tr>
<td></td>
<td>EVA COMM EVALUATION</td>
<td>PHOTO PANORAMA</td>
</tr>
<tr>
<td>:10</td>
<td>SITE DESCRIPTION</td>
<td>PHOTO PANORAMA</td>
</tr>
<tr>
<td>:20</td>
<td>TRAVERSE TO STATION D</td>
<td></td>
</tr>
<tr>
<td>136:30</td>
<td>SAMPLE COLLECTION</td>
<td></td>
</tr>
<tr>
<td>:40</td>
<td>STATION D</td>
<td>STATION D</td>
</tr>
<tr>
<td></td>
<td>SITE DESCRIPTION</td>
<td>PHOTO PANORAMA</td>
</tr>
<tr>
<td></td>
<td>SAMPLE COLLECTION</td>
<td>SAMPLE COLLECTION</td>
</tr>
<tr>
<td>:50</td>
<td>TRAVERSE TO STATION E</td>
<td></td>
</tr>
<tr>
<td>137:00</td>
<td>REST EN ROUTE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STATION E</td>
<td>STATION E</td>
</tr>
<tr>
<td></td>
<td>DIG TRENCH 10° OFF DOWNSUN</td>
<td>LPM MEASUREMENT (SINGLE)</td>
</tr>
<tr>
<td></td>
<td>PHOTOGRAPH TRENCH</td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:**
- UPDATE TO CSM
- MAP UPDATE REV 29
- LDMK TRACK PADS
- UPLINK TO CSM
- CSM S.V.

**Mission Tab:**
- **Mission:** APOLLO 14
- **Edition:** FINAL (JAN)
- **Date:** DECEMBER 2, 1970
- **Time:** 136:00 - 137:00
- **Day/Rev:** 6/28
- **Page:** 3-187
CSM FLIGHT PLAN

137:00

P52 (OPTION 3)  
(LIFT-OFF ORIENT)

P52 IMU REALIGN

N71: ___ ___ ___

N93: ___ ___ ___ ___ ___ ___

X ___ ___ ___

Y ___ ___ ___ ___ ___

Z ___ ___ ___ ___ ___

GET ___ ___ ___ ___ ___

GDC ALIGN

VERIFY ORDEAL

CYCLE CMC MODE - FREE/AUTO

V48 (11101)

V49 MNVR TO LDMK TRK ATT (137:30)

V(000,053,000)

CONFIGURE CAMERA (LDMK TRK)

CM/DAC/STX/CEX (EXP - PAD) 1 fps (15.2% MAG)

MAG (8) , MAG % ___

UTILITY POWER - ON ___

LTC REMOVAL (DECAL) & STOW

137:20

137:30
<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>137:00 - 137:30</td>
<td>6/28-29</td>
<td>3-189</td>
</tr>
</tbody>
</table>
CSM FLIGHT PLAN

P24 (RP-4)
OPT ZERO - OFF, OPT MODE - CMC
SEC CMOD - CMC/AUTO
V79 (N16 LOAD ALL ZERO'S)
(-0.0507)
(+030.50)
(+0000)

PRO TO START PITCH RATE (000.338/053.000)

0:00 - T1 (HORIZON) DET - ZERO/UP/START

3:50 - DAC - ON
4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART

6:30 - TCA
7:18 - T3 (LDMK LOSS) DAC - OFF

ACQ MSFN OMNI 0

P24 (ANSGARIUS N)
V79E, PRO, PRO
OPT ZERO - OFF, OPT MODE - CMC

0:00 - T1 (HORIZON) DET - ZERO/UP/START

3:50 - DAC - ON
4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART

6:30 - TCA
7:18 - T3 (LDMK LOSS) DAC - OFF

P24 LDMK TRACKING
TGT: RP-4
(1/125)

T1
T2
TCA
T3
R

P24 LDMK TRACKING
TGT: ANSGARIUS N
(1/250)

T1
T2
TCA
T3
R

N or S NM ___ / SA ___ TA ___ (T2 ACQ)

N99
LAT -06.850
LONG/2 +60.125
ALT +000.00

MISSION EDITION DATE PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 3-190
# LM Flight Plan

**MCC-H** 0753 CST

<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
<th>LMP</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>137:30 (12102)</td>
<td>Traverse to Station G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>137:35</td>
<td>Traverse to LM</td>
<td>Traverse to LM</td>
<td>3:20</td>
</tr>
<tr>
<td>137:40</td>
<td>Station G</td>
<td>Station G</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site Description</td>
<td>Photo Panorama</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sample Collection</td>
<td>Sample Collection</td>
<td></td>
</tr>
<tr>
<td>137:45</td>
<td>Traverse to LM</td>
<td>Traverse to LM</td>
<td>3:30</td>
</tr>
<tr>
<td>137:50</td>
<td>At LM</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Contaminated Sample Collection</td>
<td></td>
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<tr>
<td>137:55</td>
<td>EVA Closeout</td>
<td>EVA Closeout</td>
<td>3:40</td>
</tr>
<tr>
<td></td>
<td>Stow Camera Film</td>
<td>Stow Camera Film</td>
<td></td>
</tr>
<tr>
<td>138:00</td>
<td>Stow Documented Samples</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Record PCM LBR ON DSE DURING P24's

---

**Mission:** Apollo 14  
**Edition:** Final (Jan)  
**Date:** December 2, 1970  
**Time:** 137:30 - 138:00  
**Day/Rev:** 6/29  
**Page:** 3-191
CSM FLIGHT PLAN

138:00
P24 (DE-2)
V79E, PRO, PRO
OPT ZERO - OFF, OPT MODE - CMC

138:10
0:00 - T1 (HORIZON) DET - ZERO/UP/START

3:50 - DAC - ON
4:50 - T2 (LDMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART
6:30 - TCA
7:18 - T3 (LDMK LOSS) DAC - OFF

138:20
P24 (ENCKE E)
V79E, PRO, PRO
OPT ZERO - OFF, OPT MODE - CMC

REPORT: SYRO TORQUING ANGLES
(FROM P22 AT 137:00)

P24 LDMK TRACKING
TGT: DE-2

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>TCA</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R       *P       *Y     ° (T2 ACQ)
N or S NM / SA    TA (T2 ACQ)
N89
LAT   \-09.250
LONG/2 \+09.796
ALT   \+000.00

P24 LDMK TRACKING
TGT: ENCKE E

<table>
<thead>
<tr>
<th>T1</th>
<th>T2</th>
<th>TCA</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R       *P       *Y     ° (T2 ACQ)
N or S NM / SA    TA (T2 ACQ)
N89
LAT   \+00.283
LONG/2 \-20.150
ALT   \+000.00
LM FLIGHT PLAN

MCC-H 0823 CST

CDR

138:00
(PACK AND SEAL SRC
STOW WEIGH BAGS IN ETB
CLEAN AND CHECK EMU'S
HAND SRC TO LMP
TRANSFER ETB VIA LEC

LMP

RETrieve AND STow SWC FOIL
ASSIST CDR
EVA TERMINATION
CLEAN EMU'S
ASCEND TO MIDDLE LADDER RUNG
RIG LEC FOR ETB AND TRANSFER
INGRESS
TRACKING LIGHT TEST
PLACE ETB ON ASC ENG COVER
CHECK EMU & LM SYSTEMS
PASS LEC TO CDR
STOW SRC ON ASC ENG COVER
ASSIST CDR
CLOSE HATCH

NOTES

3:50
4:00
4:10
4:15/0:00

REPRESSURIZE CABIN

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 138:00 - 138:30 6/29 3-193
0:00 - T1 (HORIZON) DET - ZERO/UP/START

3:50 - DAC - ON
4:50 - T2 (LOMK ACQ) OPT MODE - MAN, TAKE MARKS 10 SEC APART

6:30 - TCA
7:18 - T3 (LOMK LOSS) DAC - OFF
V46 (11112)
(x1111)
V49 MNVR TO COMM ATT (138:42)
(110,216,000) HGA P -2, Y 194

RECORD MAG %

MSFN UPDATE:
MAP UPDATE REV 30
ZERO PHASE PADS (139:20, 140:15)

MAP UPDATE REV 30

LOS : - - - - - - - -
180°: - - - - - - - -
AOS : - - - - - - - -

VERIFY DSE TAPE MOTION (LB/RCD/FRD/CMD RESET)

1/2 PURGE LINE HEATERS - ON

MISSION  EDITION  DATE  PAGE
APOLLO 14  FINAL (JAN)  DECEMBER 2, 1970  3-194
LM FLIGHT PLAN

CDR

POST-EVA SYSTEMS CONFIGURATION
CONFIGURE LM ECS, DOFF GLOVES

CONNECT LM ECS HOSES TO SUIT

CONNECT TO LM COMM AND RECONFIGURE
BIOMED - LEFT, RECORDER - OFF

LMP

PLSS/OPS DOFFING

DISCONNECT OPS & RCU FROM PLSS

DISCONNECT AND DOFF PLSS/OPS (LMP FIRST)

CDR, THEN LMP, DISASSEMBLE PLSS/OPS
CHECKOUT AND STOW OPS

VERIFY POWER DOWN CB CONFIGURATION

PREP FOR EQUIPMENT JETTISON

DOFF LUNAR BOOTS, STOW IN DISPOSABLE CONTAINER
STOW RCU'S IN DISPOSABLE CONTAINER
STOW PLSS CONDENSATE CONTAINER IN DISPOSABLE CONTAINER

MCC-H
0853 CST

138:30
(12102)

:35

DUMP DSE

:40

UPDATE TO CSM
MAP UPDATE REV 30
ZERO PHASE PADS

138:45

:50

138:50

:55

139:00

0:10

0:20

0:30

4:15/0:00

NOTES

0:10

0:20

0:30

0:10

0:20

0:30

MISSION
APOLLO 14

EDITION
FINAL (JAN)

DATE
DECEMBER 2, 1970

TIME
138:30 - 139:00

DAY/REV
6/29

PAGE
3-195
CONFIGURE CAMERA: [ZERO PHASE]
CMS/DC/80/MBW-BKRT, IVL, PCM CABLE (16.6, 1/250, +) (41 FR)
MAG (R) _____, FR # _____

RR XPNDR ACTIVATION AND SELF-TEST (DECAL)

ZERO PHASE PAD (BACKWARD)
R ___ "p" ___ "y" ___ "o"
T START: _____ _____ _____
START DET AT 1ST TGT AREA ACQ - 5 MIN

V48 (11101)
(11101) (X1111)
V49 MNVR TO ZERO PHASE TGT 5 & 6 ATT (139:30)
(196.1, 341.6, 359.3)

H2 & O2 FUEL CELL PURGE
WASTE WATER DUMP
H2 PURGE LINE HEATERS - OFF
TYPICAL ZERO PHASE OBSERVATION PASS - BACKWARD LOOKING

CONFIRGURE CAMERA: [ORBITAL SCIENCE]
- CML/150/60K (F11.1/200, -) (31 FR)
- CML/EL/250/60K (F11, 1/250, +) (31 FR)
MAG (H) _____, FR # _____
V48 (11102)
(11102) (X1111)
**LM FLIGHT PLAN**

**MCC-H** 0923 CST

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<tr>
<td>139:00 (12102)</td>
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<tr>
<td>REMOVE AND STOW ARMREST IN DISPOSABLE CONTAINER</td>
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<td>POSITION PLSS'S FOR JETTISON</td>
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<td>DON EV GLOVES</td>
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<td>PRESSURE INTEGRITY CHECK</td>
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<td>CABIN DEPRESS FOR JETTISON</td>
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<td>0:40</td>
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<td>OPEN HATCH, JETTISON DISPOSABLE CONTAINER AND PLSS'S CLOSE HATCH</td>
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<td>DUMP VALVES - AUTO</td>
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<td>REPRESSURIZE CABIN</td>
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<tr>
<td>POST-EVA CABIN CLEANUP</td>
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<td>SECURE OPS ON CABIN FLOOR</td>
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<td>1:00</td>
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<td>:40</td>
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<tr>
<td>STOW EQUIPMENT FOR RETURN</td>
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<tr>
<td>WEIGH SRC, ISA, &amp; WEIGH BAGS, REPORT TO MCC-H</td>
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<tr>
<td>STOW SCALE &amp; SRC</td>
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<tr>
<td>STOW LM EVA ANTENNA</td>
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<tr>
<td>INSTALL ISA IN AFT CABIN</td>
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<td>STOW EVA ONBOARD DATA IN FLIGHT DATA FILE</td>
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<td>1:30</td>
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**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 139:00 - 140:00 | 6/29-30 | 3-197
CSM FLIGHT PLAN

PHOTO TGT 7, NORTH (--1/250.,--) 31 FR AT 10 SEC (250mm) (180° + 1:15)

SC CONT - CMC/AUTO (VERIFY)
V79 (-0.0507)
(+000.50)
(+000001)

PRO TO START PITCH RATE (347.0,276/222.4,358.7)

ZERO PHASE OBSERVATIONS - FORWARD LOOKING

140:17:24 - DET - ZERO/UP/START (T START)
REVIEW TGT 7 & 8 MAPS

5:00 - DC-ON, START OBSERVATIONS (TGT AREA 7)

8:40 - ZERO PHASE POINT (TGT AREA 7)
9:00 - STOP OBSERVATIONS
START OBSERVATIONS (TGT AREA B)
9:56 - ZERO PHASE POINT (TGT AREA B)
10:38 - STOP OBSERVATIONS
DEBRIEF (~ 30 SEC)
11:08 - DC-OFF, REMOVE CAMERA FROM WINDOW
RECORD FR #

TYPICAL ZERO PHASE OBSERVATION PASS - FORWARD LOOKING

ZERO PHASE PAD (FORWARD)
R ----- *P----- *Y----- *
T START: ----- ----- ----- ----- ----- ...
START DET AT 1ST TGT AREA ACO - 5 MIN

MISSION EDITION DATE PAGE
APOLLO 14 3 April (JAN) DECEMBER 2, 1970 3-198
CSM FLIGHT PLAN

V40 (11112)
V49 MNVR TO P52 COAS CALIB ATT (140:38)
(180,254,348)

V64; ACQ MSFN HGA P -52, Y 173
MSFN UPLINK:
LM S.V. (INS + 18)
CSM S.V. (L/D)
RESET SURFACE FLAG

MSFN UPDATE:
CONSUMABLES (IF REQ'D)
MAP UPDATE REV 31
CSM S.V. (L/D) COPY AT 141:15

MSFN UPDATE TO LM WITH CSM COPY:
ASCENT PADS AND CSM WEIGHT COPY AT 142:10

P52 (OPTION 3)
(LIFT-OFF ORIENT)
REPORT: GYRO TORQUING ANGLES

P52 (COAS CALIB)
USE STAR NO. 22

VERIFY OSE TAPE MOTION (LBR/RCD/FWD/CMD RESET)
MSFN ENABLES MSFN S-BAND RELAY

CSM CONSUMABLES UPDATE
GET: _______ _______ _______

RCS TOTAL
QUAD A _______ _______ _______
C _______ _______ _______
H2 TANK 1 _______ _______ _______
O2 TANK 1 _______ _______ _______

P52(IMU REALIGN)
N71: _______ _______ _______
N95: _______ _______ _______
N93:
X _______ _______ _______
Y _______ _______ _______
Z _______ _______ _______
GET _______ _______ _______

COAS CALIB = N92
SHAFT: _______ _______ _______
TRUN: _______ _______ _______

MAP UPDATE REV 31
LOS: _______ _______ _______
180°: _______ _______ _______
ADS: _______ _______ _______

MISSION EDITION DATE PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 3-200
**CSM FLIGHT PLAN**

**CONFIGURE CAMERAS FOR DOCKING:**
CM2/DAC/18/CEX-BRKT, MIR (76,1/250,7) 6 fps (100% MAG)

MAG (D) ______, MAG % ______
UTILITY PWR - ON

CM/EL/80/CEX (78,1/250,FOCUS) (10 FR)
MAG (N) ______, FR # ______

CM4/TV/PEAK, BRKT
(744) 11 MIN

---

**CSM S.V. (L/O) P27 UPDATE**

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**Diagram**

- 140:49
  - (180,49/254,348)
  - ACQ MSFN

- 140:38
  - (180,15/254,348)
  - MSFN UPLINK P52 (OPT 3)

- 140:32
  - (347,226/170,359)
  - START MNVR TO P52 (COAS CALIB ATT)

- 141:42
  - (180,203/254,348)
  - ACQ MSFN

- 142:00
  - (180,263/254,348)
  - START MNVR TO P20 ATT

- 142:05
  - (180,70/46,0)
  - P20 ATT

---

**Mission Information**

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<td>DECEMBER 2, 1970</td>
<td>3-202</td>
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</tbody>
</table>
LM FLIGHT PLAN

C DR

L MP

EAT PERIOD

1123 CST

141:00

(12102)

:05

:10

141:15

MSFN

141:30

VERIFY GUIDANCE CONFIGURATION

CONFIGURE CB'S (TV-OFF)

V63 RR SELF-TEST

CONFIGURE COMM

CONFIGURE CB'S FOR L/O PREP

AGS STATUS-OPERATE

ALIGN AGS TO PGNS

AGS GYRO CALIBRATION

LOAD AGS ASCENT TARGETING

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<td>6/30-31</td>
<td>3-203</td>
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</table>
CSM FLIGHT PLAN

DOH PGA WITHOUT HELMET AND GLOVES
UNSTOW JETTISON BAG (R13)
PACK JETTISON ITEMS
INSTALL CABIN FAH LUNAR DUST FILTER (PGA BAG)
INSTALL SPRINGS AND CLIPS ON A8, A6, A3, AND PNL 350
INSTALL TEMP STOWAGE BAGS ON LH AND RH SIDES OF LEB
REMOVE B5 AND B6 POUCHES
REMOVE COVERALLS, CNG AND INSTALL T-ADAPTERS
UNSTOW AND ASSEMBLE:
   VACUUM CLEANER, PWR CABLE, HOSE AND BAG (SIDE A12, SIDE A8)
   REMOVE DECONTAMINATION BAGS (A8, U1)

ACQ MSFN HGA P - 52, Y 173
MSFN UPDATE TO EV WITH CSM COPY:
   ASCENT UPDATE PAD (IF REQ'D) COPY AT 142:15

EAT PERIOD

VHF AM B - DUPLEX (VERIFY)
VHF AM A - OFF (VERIFY)
VHF RANGING - ON (UP)
VHF AM T/R - OFF (PANEL 9)
VHF ANT - LEFT
RNDZ XPMR - PWR (VERIFY)
EXT RNDZ LT - ON
EXT RUN/EVA LT - ON

MISSION EDITION DATE PAGE
APOLLO 14 CHANGE B (JAN) JANUARY 11, 1971 3-204
LM FLIGHT PLAN

MCC-H

1153 CST
141:30
(12102)

CDR

LMP

UPDATE TO LM
AGS K-FACTOR :35

UPDATE TO CSM
ASCENT PAD (IF REQ'D)
UPLINK TO LM
CSM S.V. (L/O) (IF REQ'D)
RLS (IF REQ'D)
LGC GYRO COMP (IF REQ'D)

RATE GYRO TEST
LGC CLOCK SYNC
V47 AGS INITIALIZATION (SET BIAS)

RCS CHECKOUT

P57 LUNAR SURFACE ALIGN
OPTION 4 LANDING SITE
A/T 3 - GRAVITY AND CELESTIAL BODY (LIFT-OFF ORIENTATION)

P12 POWERED ASCENT
ALIGN AGS TO PGNS
BATS 5&6-ON, 1&3-OFF/RESET
SET CAMERA: LM3/DAC

PRELAUNCH SWITCH CHECKS
AGS LUNAR ALIGN
PRELAUNCH SWITCH CHECKS

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 141:30 - 142:00 6/31 3-205
CSM FLIGHT PLAN

142:00
CYCLE CMC MODE - FREE/AUTO
V46 (11)21
V49 MVNR TO P20 ATT (142:05)
180,46,0 OMNI 0

GDC ALIGN
VERIFY ORDEAL

GO/NO GO FOR LM LIFT-OFF
AND DIRECT ASCENT RNDZ
MSFN UPDATE:
NAV UPDATE REV 32
COPY AT 142:50

V67 (+10000, +00100, +00001)
LOAD N37 AND N55

-15
142:10

VHF VOICE CHECK

-5
142:20

VHF ANT - RIGHT
VHF RNG - RESET
LM LIFT-OFF

0
142:24:29

CONFgURE SWITCHES FOR BAILOUT:
FDAN SCALE - 5/5
MAIN ATT (3) - RATE CMD
ATT DB - MIN
THC PWR - ON (UP)
RHC PWR DIR (BOTH) - MAN/MNB
SMAG MODE (3) - RATE 2

DIREcT ASCENT RNDZ PAD UPDATE (IF REQ'D)
GETI HRS + 0 0 + 0 0
LIFT-OFF MIN + 0 0 0 + 0 0 0
SEC + 0 + 0 + 0

GETI HRS + 0 0 + 0 0
TPI MIN + 0 0 0 + 0 0 0
N37 SEC + 0 + 0

CSM WT +
LM WT + 0 5 7 0 0

COELLIPTIC RNDZ PAD UPDATE (IF REQ'D)
GETI HRS + 0 0 + 0 0
LIFT-OFF MIN + 0 0 0 + 0 0 0
SEC + 0 + 0 + 0

GETI HRS + 0 0 + 0 0
CSI MIN + 0 0 0 + 0 0 0
N11 SEC + 0 + 0 + 0

GETI HRS + 0 0 + 0 0
TPI MIN + 0 0 0 + 0 0 0
N37 SEC + 0 + 0 + 0

MISSION EDITION DATE PAGE
APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 3-206
## LM FLIGHT PLAN

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<td>142:00</td>
<td>VENT DPS FUEL, OXID, &amp; She DON HELMET &amp; GLOVES PRESSURIZE APS</td>
<td>DON HELMET &amp; GLOVES</td>
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<td>:05</td>
<td>CONFIGURE ASCENT FEEDS</td>
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<td>142:15</td>
<td>V47 VERIFY AGS BIAS LIFT-OFF COMM, RECORDER - ON BATS 2 &amp; 4 - OFF/RESET DEADFACE DES BATS VERIFY CB STATUS FOR LIFT-OFF</td>
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<td>CHECK APS BURN CARD</td>
<td>CHECK APS, RCS, EPS, ECS VHF VOICE CHECK</td>
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<td></td>
<td>:25</td>
<td>LM LUNAR LIFT-OFF</td>
<td>DAC-ON</td>
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<td>142:30</td>
<td>YAW RIGHT 30°</td>
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**GO/NO-GO FOR LIFT-OFF ON REV 31, GUIDANCE RECOMMENDATION & DIRECT ASCENT UPDATE TO CSM MAP UPDATE REV 32**

**TIG:** 142:24:29  
**BT:** 7 MIN 10.7 SEC  
**ΔVT:** 6053.4 FPS  
**ULLAGE:** NONE  
**ORBIT:** 50.96x9.14 NM

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<td>142:00 - 142:30</td>
<td>6/31</td>
<td>3-207</td>
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CSM FLIGHT PLAN

BACKUP RR CHECK

\[ \dot{r} = \frac{100 \times \Delta r}{\text{MIN}} \]

P30 MANEUVER

N/A

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P34 INPUT

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MISSION

APOLLO 14

EDITION

CHANGE A (JAN)

DATE

DECEMBER 23, 1970

PAGE

3-208
CSM FLIGHT PLAN

P40 (66°) (180.111/271.0)

COMPARE SOLUTIONS
COPY LM TPI P76
SPS CHECKLIST

COMPARISON LIMITS: VGX=3, VGY=7, VGZ=9
(LM VGX + 1.0, LM VGZ - 2.0)
PRIORITIES: LGC, ACO, CMC
VHF/AR COMPARISON LIMIT:
\[ AR = 105 + 0.5 \] (AR > 1.0)NM

P76
P35; V58 (36°) (180.173/308.0)
(IF SXT OR VHF ONLY OR VHF/COAS, NO V67)
V67 (+02000, +00020, +00001)
V57; V67

TPI
143:02:40
LM 163.0, 161.1, 162.3
CSM 164.0, 162.0, 165.3
180, 134/271.0

TPI P76
ADD FOR LM RCS TPI : 21.00
33 LM GETI-TPI
84 LM TPI ∆V-LV

P35 FINAL COMP
COPY LM MCC-1 P76

MCC-1
143:24:40
LM +00.0, +00.0, +00.0
CSM +00.0, +00.0, +00.0
180, 194/286.0

P35 FINAL COMP
81 MCC1 ∆V-LV
59 MCC1 ∆V-LOS

MCC1 P76
33 LM GETI-MCC1
84 LM MCC1 ∆V-LV

GROUND TPI FOR LM

P34 FINAL COMP

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TPI P76

143:15
LM 25.63
CS 125.6

AUTO RCS SEL (16) - MNA/MNB (VERIFY)

REV 32
143:20
+11
+12 (P47) (0.8° DB)
+15 (111°) (X111)

143:30

MISSION EDITION DATE PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 3-210
LM FLIGHT PLAN

CDR

143:00
(11002)

143:00
(12012)

05

143:10

143:15

143:30

143:30

FINAL TPI COMPUTATION

V48 (12012)

P42 APS THRUSTING

MANUAL ULLAGE

TPI

NULL RESIDUALS

P35 TARGET MCC-1

RENDZVOUS RADAR TRACKING

LOAD AGS TPI EXTERNAL ΔV

LOAD AGS MCC-1 EXTERNAL ΔV

TIG: 143:09:40

BT: 4.0 SEC

ΔVT: 92.2 FPS

ULLAGE: 4 JET, 10 SEC

ORBIT: 61.0 x 44.6 NM

LMP

NOTES

TIG: 143:24:40

ΔVT: NOM ZERO

EXTERNAL LTG - OFF

MISSION | EDITION | DATE       | TIME       | DAY/REV | PAGE
---------|---------|------------|------------|---------|------
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 143:00 - 143:30 | 6/31-32 | 3-211
DOCKING ATTITUDE
VERIFY HGA P -73, Y 349

BMAG MODE (3) - ATT 1/RATE 2
CUE MSFN FOR LOGIC ARM
SECS LOGIC (BOTH) - ON (UP)
MSFN GO FOR PYRO ARM
SECS PYRO ARM (2) - ON (UP)

AT 144:10
DAC/TV - ON
LM PITCH DOWN 90°

TRANSLATE TO CAPTURE LATCH
PERFORM DOCKING CHECKLIST
V DOCKING

AT 144:10:00
DAC/TV - OFF
POO
V4B (61111)
(11111)

CNC MODE - AUTO
SC CONT - CNC
BMAG MODE (3) - RATE 2

RNDZ XPNDR - OFF
REMOVE DECONTAMINATION BAGS (A8)

UNSTOW AND ASSEMBLE:
VACUUM CLEANER, PWR CABLE, HOSE, AND BAG (SIDE A12, SIDE A8)
CONNECT PWR CABLE (PHL 201)

DOCKING CHECKLIST

AT CAPTURE

PROBE EXTD/SEL TB (2) - BP
(IF TB NOT BP, GO TO PG 5/2-11, A)
REPORT CAPTURE TO LM
SC CONT - CNC
CNC MODE - FREE
ALLOW PROBE TO DAMP SC MOTION (10 SEC)
WHEN WITHIN ± 3° OF DOCKING ATTITUDE
PROBE RETRACT SEC - 1 (PRIM - 2 IF REQ'D)

AT DOCK LATCH

PROBE EXTD/SEL TB (2) - GRAY

AFTER HARD DOCK

SECS PYRO ARM (2) - SAFE
SECS LOGIC (BOTH) - OFF
CB SECS ARM (2) - OPEN
CB DOCK PROBE (2) - OPEN
THC - LOCKED
RHC - LOCKED
BMAG MODE (3) - RATE 2
PROBE EXTD/SEL - OFF
PROBE RETRACT (2) - OFF

EQUALIZE CSM/LM PRESSURE (LOD DECAL)
REMOVE HATCH AND STOW (DECAL)
VERIFY DOCKING LATCHES (AT LEAST 3)
REMOVE AND TEMP STOW PROBE AND DROGUE (DECAL)
LM FLIGHT PLAN

MCC-H

1353 CST

143:30
(12012)

:35

FINAL MCC-2 COMPUTATION
P41 RCS THRUSTING

CDR

LMP

:40

MCC-2

NULL RESIDUALS
TPI BURN REPORT (IF REQ'D)

LOAD AGS MCC-2 EXTERNAL ΔV

:50

V48 (11002)

BRAKING GATES

BIOMED - RIGHT, PCM-HIGH
STEERABLE ANTENNA
P 114, Y -46

:55

144:00

CSM PHOTOGRAPHY
LM 3/DC, LM 3/DAC

NOTES

TIG: 143:39:40
ΔVT: NOM ZERO

DUMP DSE

TIG: 143:48:44 to 143:54:44
TOTAL ΔV: 32.6 FPS
ORBIT: 60.2x58.1 NM

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---------|---------|------|------|---------|------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 143:30 - 144:00 | 6/32 | 3-213
LM FLIGHT PLAN

1423 CST

CDR

COAS TO OVHD WINDOW

RR-OFF

PITCH 90°, YAW TO DOCK ATT

144:00

(11002)

:05

LMP

DOCKING

144:10:00

NOTES

GO/NO-GO FOR PYRO ARM

UPLINK TO LM
LM S.V. (TIG-10)
P30 TARGET LOAD
P99 LM DEORBIT
UPDATE TO LM
DEORBIT BURN PAD
DAP LOAD (WEIGHTS)

144:15

(12021)

144:30

MSFN

CONFIGURE PGNS
V48 (12021)
PREP FOR TRANSFER

:10

:20

VERIFY TUNNEL PRESSURIZED FROM CSM
OVHD DUMP VALVE-OPEN
DOFF HELMETS & GLOVES

:25

WHEN TUNNEL/LM Pressures EQUAL, OVHD DUMP VALVE - AUTO
VERIFY PRESS REGS A&B - EGRESS
OPEN HATCH

144:30

LM S.V. IS TIME
TAGGED FOR DEORBIT
BURN MINUS 10 MIN

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 144:00 - 144:30 6/32 3-215
CSM FLIGHT PLAN

TRANSFER TO CDR AT HIS REQUEST:
DRDROQUE
VACUUM CLEANER (ASSEMBLED)
DECONTAMINATION BAG (2) (R6)

MSFN UPLINK:
CSM SV. (CSM SEP-10)
LM SV. (TIG LM DEORBIT -10)
MSFN UPDATE:
MAP UPDATE REV 33
DAP LOAD - UPDATE WEIGHTS COPY AT 145:25
CSM SEPARATION PAD COPY AT 145:35
LM JETTISON PAD COPY AT 145:45

VERIFY DSE TAPE MOTION (LBR/RCG/FND/CMD RESET)

144:30
(11111)

144:40

MAP UPDATE REV 33

LOS:

180°:

AOS:

145:00

145:39
(180,194/310,0)
MSFN UPLINK
START MANU TO JETTISON ATT

145:28:31
CSM SEPARATION
(300,122/355.349)

146:23:31
LM JETTISON
(300,30/355.349)

146:28:31
XYX,XXX/XXX,XXX

145:32
(180,264/310,0)

SUN

EARTH

YAW

PITCH

ORDEAL

ROLL

MISSION: APOLLO 14
EDITION: JAN
DATE: DECEMBER 25, 1970
PAGE: 3

JAN 11, 1971
LM FLIGHT PLAN

1453 CST

RECEIVE PROBE FROM CMP AND STOW

RECEIVE DROGUE FROM CMP AND STOW OVER PROBE

RECEIVE DECONTAMINATION BAGS & VACUUM CLEANER FROM CSM

UNSTOW, VACUUM/WET-WIPE, BAG AND TRANSFER TO CSM:

70 MM MAG BAG (3 MAGS)

SURFACE 16 MM BAG (6 MAGS)

2 SAMPLE ROCK BAGS

HELMETS (WITH IV GLOVES)

ISA

NOTES

LM S.V. IS
TIME TAGGED FOR
DEORBIT BURN MINUS
10 MIN

CSM S.V. IS
TIME TAGGED FOR
CSM SEP MINUS
10 MIN

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>144:30 - 145:00</td>
<td>6/32</td>
<td>3-217</td>
</tr>
</tbody>
</table>
RECEIVE ITEMS FROM LM & STOW

TRANSFER B5 & B6 CONTAINERS TO LM

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CM STORAGE LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>16MM MAGS (6) w/DECOM BAG</td>
<td>R13</td>
</tr>
<tr>
<td>70MM MAGS (3) w/DECOM BAG</td>
<td>R13</td>
</tr>
<tr>
<td>B1 BAG</td>
<td>TEMP STOR AGE (ON AB)</td>
</tr>
<tr>
<td>PURSE</td>
<td>TEMP STOR AGE (ON AB)</td>
</tr>
<tr>
<td>ISA w/DECOM BAG</td>
<td>ON A1</td>
</tr>
<tr>
<td>ROCK BOXES w/DECOM BAG (2)</td>
<td>ON A10, ON A13</td>
</tr>
<tr>
<td>VACUUM CLEANER</td>
<td>SIDE A12</td>
</tr>
<tr>
<td>VACUUM HOSE, BRUSH, CABLE</td>
<td>SIDE AB</td>
</tr>
<tr>
<td>PGA (2)</td>
<td>PGA BAG</td>
</tr>
<tr>
<td>UCTA (2)</td>
<td>PGA BAG</td>
</tr>
<tr>
<td>FCS (2)</td>
<td>PGA BAG</td>
</tr>
<tr>
<td>LCG (2)</td>
<td>U1</td>
</tr>
<tr>
<td>HELMET &amp; ACCESSORY BAGS (2)</td>
<td>PGA BAG</td>
</tr>
<tr>
<td>GLOVES (2 PR.)</td>
<td></td>
</tr>
<tr>
<td>HELMET (2)</td>
<td></td>
</tr>
<tr>
<td>BIO INSTRUMENTATION EQUIP (2)</td>
<td>ON CREW</td>
</tr>
<tr>
<td>COMM. CARRIER (2)</td>
<td>ON CREW</td>
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</table>

CSM WT

<table>
<thead>
<tr>
<th></th>
<th>+</th>
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<tbody>
<tr>
<td>LM WT</td>
<td>+</td>
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</table>

CYCLE CMC MODE - FREE/AUTO

LOAD CSM & LM WEIGHTS

MISSION | EDITION | DATE       | PAGE |
--------|---------|------------|------|
APOLLO 14| CHANGE B | JANUARY 11, 1971 | 3-218 |
LM FLIGHT PLAN

UNSTOW SRC'S, VACUUM AND BAG, TRANSFER TO CSM

RECEIVE B5 & B6 FROM CMP AND STOW IN SRC RACK

VACUUM PGA'S

TRANSFER VACUUM CLEANER TO CSM
### CSM Flight Plan

**P30 Maneuver**

<table>
<thead>
<tr>
<th>SET STARS</th>
<th>C</th>
<th>S</th>
<th>M</th>
<th>S</th>
<th>E</th>
<th>P</th>
<th>PURPOSE</th>
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<tr>
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<td>MT N47</td>
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<td>RALIGN</td>
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<td>PTRIM N48</td>
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<td>TRIM</td>
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<td>YALIGN</td>
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<td>MIN N33</td>
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<td>ULLAGE</td>
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<td>ΔV_b</td>
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<td>ΔV_h</td>
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<td></td>
<td></td>
<td>ΔV_v</td>
</tr>
</tbody>
</table>

**LM Jettison Pad**

<table>
<thead>
<tr>
<th></th>
<th>R (300)</th>
<th>P (355)</th>
<th>Y (349)</th>
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<tbody>
<tr>
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</tr>
</tbody>
</table>

---

**V49 MNVR to LM Jettison Pad ATT (145:38)**
- Doff PGA
- Zip suit & install electrical cover prior to stowing (PGA bag)
- Stow Comm carriers & UCTA (PGA bag)

**ACQ MSFN Omni D**

---

**145:50**
- CDR - Transfer CM jettison items to LM

**Warning**
- Do not urinate/feces
- All opened food must be treated and stored in beta bag

**Go/No-Go for LM closeout**
- LMP - Close LM hatch
- Direct O₂ VLV - closed (CW)

**Unstow and install forward hatch (Decal)**

**Perform hatch integrity check (Decal)**

---

**Mission EDITION Date Page**

| APOLLO 14 | CHANGE A (Jan) | DECEMBER 23, 1970 | 3-220 |
LM FLIGHT PLAN

1553 CST

CDR

145:30
(12021)

:35

:40

145:45

DISABLE AUDIO COMM
DISCONNECT LM HOSE AND STOW

DOFF SUIT

IVT TO CSM WITH SUITS

LMP

NOTES

VERIFY LM JETTISON ATTITUDE

STEERABLE ANTENNA P -40, Y 49
CONFIGURE S-BAND
VERIFY COMM

INITIALIZE AGS
ALIGN AGS TO PGNS
DOFF SUIT

P30 TARGET PGNS
TARGET AGS ΔV FOR DEORBIT
CONFIGURE LM FOR JETTISON
STOW CSM JETTISON ITEMS

CLOSE HATCH, IVT TO CSM

GO/NO-GO FOR
LM CLOSEOUT

146:00

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
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</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>145:30 - 146:00</td>
<td>6/33</td>
<td>3-221</td>
</tr>
</tbody>
</table>
CSM FLIGHT PLAN

LM PWR - OFF (VERIFY)
CB SECS ARM (2) - CLOSED
CUF MSFN FOR LOGIC ARM
SECS LOGIC (BOTH) - ON (UP)
MSFN GO FOR PYRO ARM

146:10

CONFIGURE CAMERA FOR LM JETTISON PHOTOS
CMZ/DAC/18/CEL-BK1, MIR (78,250,7) 12 fps (50% MAG)
MAG (E) _________, MAG % _______
UTILITY PWR - ON

LOAD ΔV IN EMS TO +100.0
CHECK NULL BIAS
DAC ALIGN
VERIFY ORDEAL

146:20

PERFORM PRE-JETTISON CHECKLIST
V4B (11102)
(11111)
SECS PYRO ARM (2) - ARM
P47 (JETT - 1 MIN)
EMS MODE NORMAL (JETT - 30 SEC)
DAC - ON

CSM/LM FINAL SEP (BOTH) - ON (0.4 FPS SEP)

146:23:31

LM JETTISON

146:28:31

POO
DAC - OFF

PERFORM PRE-SEPARATION CHECKLIST
EMS MODE - NORMAL (SEP - 30 SEC)

CSM SEPARATION

146:30

POO:V46;V49 MNVR TO PS2 ATT (146:36)
(180,245,0) HGA =39, Y=36

MISSION EDITION DATE PAGE
APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 3-222
CSM FLIGHT PLAN

146:30
(11102)
(11111)

EMS MODE - STBY
EMS FUNC - OFF
THC PWR - OFF
AUTO RCS SEL B/D ROLL (4) - OFF
RHC PWR DIR - OFF
THC - LOCKED
RHC - LOCKED

SC CLEAN-UP
MSFN: DUMP DSE
MSFN UPLINK:
DESIRED ORIENT (TEI)

MSFN UPDATE:
LTC PHOTO PAD (TGT 11) (COPY IN FLIGHT PLAN AT 147:00)
MAP UPDATE REV 34

P52 (OPTION 3)
(LIFT-OFF ORIENT)
REPORT: GYRO TORQUING ANGLES

P52 (OPTION 1)
(TEI ORIENT)

146:40

146:50

GDC ALIGN
VERIFY ORDEAL
VERIFY DSE TAPE MOTION (LBR/RCD/FWD/CMO/CMO) RESET

WIPE EXCESSIVE MOISTURE FROM TUNNEL HATCH AREA

147:00

PERFORM CONTAMINATION CONTROL PROCEDURE

P52 IMU REALIGN

N71: ___ ___
N85: ___ ___
N93:
X ___ ___
Y ___ ___
Z ___ ___
GET ___ ___

MAP UPDATE REV 34

LOS: ___ ___
180°: ___ ___
160°: ___ ___

CONTAMINATION CONTROL
NOTE: IF WATER IS TO BE COLLECTED,
USE WATER COLLECTION PROCEDURE,
UNSTOW VAC CLEANER & COMPONENTS
AC UTIL PWR - OFF (VERIFY)
ASSEMBLE COMPONENTS & CONNECT PWR CABLE
AC UTIL PWR - ON (UP)
VAC CLEANER PWR SW - ON
VACUUM/BRUSH CM INTERIOR WITH SPECIAL
ATTENTION TO THE FOLLOWING;
TRANSFER TUNNEL WALL AND TOP HATCH SURFACES
OPEN B5 AND B6 COVER AND CLEAN COMPARTMENT
AND SRC BAGS SURFACES
OPEN AS AND CLEAN COMPARTMENT AND CSC BAG AND
FILM CASSETTE BAGS SURFACES
OPEN R13 AND CLEAN COMPARTMENT AND FILM
MAGAZINE BAG SURFACE
OPEN FOOD CONTAINERS AND CLEAN COMPARTMENT
AND HELMET STORAGE BAGS SURFACES
PDA BAG SURFACES
MOVE VACUUM CLEANER BRUSH INTO ALL POTENTIAL
"DEAD AIR" POCKETS TO ENSURE THOROUGH
MIXING OF CM ATMOSPHERE,
VAC CLEANER PWR SW - OFF
AC UTIL PWR - OFF
DISCONNECT PWR CABLE & DISASSEMBLE COMPONENTS
STOW VAC CLEANER & COMPONENTS
FLIGHT PLAN

L1OH CANISTER CHANGE
(12 INTO B, STOW 10 IN A3)

V49 MNVR TO LTC PHOTO PAD ATTITUDE (147:30)

EAT PERIOD

ACQ MSFN HGA P-31, Y178

CONFIGURE CAMERA: (S-IVB/LM IMPACT)
CM3/LTC/MBW/SEF (SHUT 1/50, RNG 90.5, INT 8.1)
(73 FR), MAG (V), FR #
LTC INSTALLATION (DECAL)
LTC CHECKOUT (DECAL)

LTC PHOTO PAD
TARGET 11

T START: __:__:__:
APOLLO 12 LM (208.8, 126.1, 014.4)
R ___, P ___, Y ___
RNG (90.5) __________

T START +2:33
APOLLO 13 S-IVB (213.1, 120.6, 010.3)
R ___, P ___, Y ___
RNG (90.6) __________

T START +4:31
APOLLO 14 S-IVB (214.3, 115.6, 008.0)
R ___, P ___, Y ___
RNG (90.6) __________

T STOP: __:__:__:

MAP UPDATE REV 35
LOS: __:__:__:
180°: __:__:__:
AOS W/TEI: __:__:__:
AOS W/O TEI: __:__:__:

LM DEORBIT BURN
TIG: 147:52:58.9
BT: 77 SEC
ΔV: 183.7 FPS
FLIGHT PLAN

CSM SYSTEMS CHECKLIST

- C&W SYSTEMS OPERATIONAL CHECKS (PAGE S 1-17)
- CM RCS MONITORING CHECK (PAGE S 1-1)
- SM RCS MONITORING CHECK (PAGE S 1-1)
- SPS MONITORING CHECK (PAGE S 1-1)

- CABIN FAN (2) - OFF; REMOVE AND STOW
- CABIN FAN LUNAR DUST FILTER WITH BAG (PGA BAG)
- LTC MODE-STANDBY/POWER-ON
- ZERO DET (T START - 1 MIN)
- LTC MODE - AUTO, DET - UP/START (T START)
- PHOTO TGT 11 (APOLLO 12 LM, APOLLO 13 S-IVB, APOLLO 14 S-IVB)
- MNVR BETWEEN TARGETS PER LTC PHOTO PAD
- LTC MODE-STANDBY, RECORD FR #
- LTC REMOVAL (DECAL), AND STOW
- P30 EXTERNAL ΔV
- V49 MNVR TO PAD BURN ATTITUDE (148:35) (180,000,000) OMNI D

- P40 SPS THRUSTING

VERIFY DSE TAPE MOTION (LBR/RCD/FWD/CMD RESET)

NOTES

LM LUNAR IMPACT
GET: 148:20:58
LAT: 3.5°S
LONG: 19.27°W

NOTE: IF APOLLO 14 ALSEP IS INOPERABLE, THE LM WILL BE IMPACTED NEAR APOLLO 12 ALSEP AT:
LAT 3.32°E 3.04°S
LONG 23.38°W 24.64°W

MISSION |
---|
APOLLO 14 |

EDITION |
CHANGE A (JAN) |

DATE |
DECEMBER 23, 1970 |

TIME |
148:00 - 149:00 |

DAY/REV |
6/34 |

PAGE |
3-225 |
# FLIGHT PLAN

## TEI

**BURN TABLE**

<table>
<thead>
<tr>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°/SEC COMPLETE</td>
<td>+10° COMPLETE</td>
<td>FOR G&amp;N C/O &gt;3 SEC EARLY &amp; ΔVC &gt;+50 FPS SWITCH TO SCS AUTO &amp; RESTART SPS</td>
<td>BT + 2 SEC &amp; ΔVC = -40 FPS</td>
</tr>
</tbody>
</table>

**TABLE 3-8**

3-226
POST-TEI PHOTO SEQUENCE

TEI + 26 MIN

TEI + 32 MIN

FIGURE 3-3
3-228
POST-TEI PHOTO SEQUENCE

TEI + 42 MIN
(TWO PHOTOS, CENTER LUNAR DISC IN FRAME)

TEI + 1 HR

FIGURE 3-4
3-229
FLIGHT PLAN

P52 IMU ALIGN
OPTION 3 REFSSMAT
(TEI ORIENTATION)
REPORT GYRO TORQUE ANGLES
OPTION 1 PREFERRED
(PTC ORIENTATION)

V49 MNVR TO PHOTOGRAPH LUNAR SURFACE (150:15)
(040,314,352) HGA P -33, Y 29
LUNAR PHOTOGRAPHY TEI + 1 HR (150:15)
CM3/EL/250/MBW (f5.6,1/250,∞) (4 FR)
HAND-HELD, COVER VISIBLE DISC
STOW EL CAMERA, RECORD FR #

VISUAL ASSESSMENT OF VISUAL TARGETS 1 & 2

V48 (11101)(X1111)

V49 MNVR LTC PHOTO PAD ATTITUDE (150:50)
(046.8,315.7,359.1)
CONFIGURE CAMERA: (LUNAR SURFACE PHOTOS)
CM3/LTC/MBW/SEF-(SHUT 1/200, RNG 99.9 CW, INT-SINGLE FRAME) (12 FR)
MAG (V) , FR #
LTC INSTALLATION (DECLAL)
LTC CHECKOUT (DECLAL)
VERIFY LTC MODE-STANDBY/POWER-ON (T START -1 MIN)
LTC MODE-SINGLE
TEI +1 HR 40 MIN (150:55) SINGLE FRAME
GET OF EXPOSURE: :
V49 MNVR TO LTC PHOTO PAD ATTITUDE (151:00)
(047.8,315.8,000.1)

NOTES

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

LTC PHOTO PAD (TEI +01:40)
R ___, P ___, Y ___

LTC PHOTO PAD (TEI +01:50)
R ___, P ___, Y ___

MISSION | EDITION | DATE | TIME | DAY/REV |
---------|---------|------|------|--------|
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 150:00 - 151:00 | 6/TEC |

MSC Form 26 (May 89)
FLIGHT PLANNING BRANCH
NASA — MSC
FLIGHT PLAN

MCC-H

2123 CST

151:00

(11101)

(X1111)

TEI + 1 HR 50 MIN (151:05) SINGLE FRAME
GET OF EXPOSURE ___:___:

V49 MNVR TO LTC PHOTO PAD ATTITUDE (151:10)
(048.6,315.9,001.0)
TEI + 2 HR (151:15) SINGLE FRAME
GET OF EXPOSURE ___:___:

V49 MNVR TO LTC PHOTO PAD ATTITUDE (151:20)
(049.3,316.0,001.7)
TEI + 2 HR 10 MIN (151:25) SINGLE FRAME
GET OF EXPOSURE ::

LTC MODE-STANDBY, RECORD FR #

LTC REMOVAL (DECAL), AND STOW

CSM G&C CHECKLIST

PASSIVE THERMAL CONTROL (G&N) PAGE G 8-2

V49 MNVR TO PTC ATTITUDE
(N29.270,000)
V79 (-0.3750)
(+030.00)
(+00000)

CSM SYSTEMS CHECKLIST

PRE-SLEEP CHECKLIST PAGE S 1-26
COMM - OMNI'S

NOTES

LTC PHOTO PAD (TEI + 02:00)
R , P , Y

LTC PHOTO PAD (TEI + 02:10)
R , P , Y

UPDATE TO CSM
QUADS TO ENABLE FOR PTC SPINUP
CSM S.V.

151:00

151:30

152:00

UPLINK TO CSM
CSM S.V. (MSFN) (NO V47)

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 CHANGE A (JAN) DECEMBER 23, 1970 151:00 - 152:00 6/TEC 3-232

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

EARTH DISTANCE
~206 148 NM
DAP LOAD STATUS
(11101)(X1111)

MSC FOF 79B (APRIL 1970) OT FLIGHT PLING BRANCH

NA MSC
REST PERIOD
(10 HOURS)

MISSION | EDITION       | DATE          | TIME      | DAY/REV | PAGE
--------|---------------|---------------|-----------|---------|------
APOLLO 14 | FINAL (JAN)  | DECEMBER 2, 1970 | 154:00 - 156:00 | 6/TEC | 3-234

MCC-H 0023 CST

FLIGHT PLANNING BRANCH

DAP LOAD STATUS
(11101)(X1111)
FLIGHT PLAN

REST PERIOD
(10 HOURS)

PTC

DAP LOAD STATUS
(11101)(X1111)

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 156:00 - 158:00 | 6/TEC | 3-235
FLIGHT PLAN

0823 CST

CSM SYSTEMS CHECKLIST
POST-SLEEP CHECKLIST
COMM - HGA REACQ MODE
LiOH CANISTER CHANGE
(13 INTO A, STOW 11 IN A3)
O₂ HEATER 2 (1) - OFF

EAT PERIOD

CSM CONSUMABLES UPDATE
GET:

RCS TOTAL
QUAD A B C D
H₂ TANK 1 2 3
O₂ TANK 1 2 3

NOTES
DAP LOAD STATUS
(11101)(X1111)

EARTH DISTANCE
≈ 184 381 NM

DURING PTC CREW
AWAKE PERIODS,
THE ANTENNA
CONFIGURATION
WILL BE HGA/OMNI
COMMANDED FROM
MCC-H

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>162:00 - 163:00</td>
<td>7/TEC</td>
<td>3-238</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

GET: 164:00  F.O.V. 3°

P52 IMU REALIGN
OPTION 3 REF SMMAT
(PTC ORIENT)

REPORT:  gyro torquing angles

EXIT G&N PTC  PAGE G 8-3

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
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<th>DAY/REV</th>
<th>PAGE</th>
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<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>163:00 - 164:00</td>
<td>7/TEC</td>
<td>3-239</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

MCC-H 1023 CST

164:00
(11101)
(X1111)

164:10

164:20

164:30

164:40

164:50

165:00

V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(113,323,002) HGA P -68, Y -73
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00033)
P00
V49 MNVR TO SIGHTING ATTITUDE
(094,325,335) HGA P -55, Y -3
V67 (+99000) (+00020) (+00003)

P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00040) (00000) (00110)
2. N70 (00000) (00000) (00120)
   N88 (+07234) (-86438) (-49761)
3. N70 (00033) (00000) (00120)

*4. N70 (00035) (00000) (00120)

*5. N70 (00000) (00000) (00120)
   N88 (-07804) (-99375) (+07982)

*6. N70 (00000) (00000) (00110)
   N88 (+22712) (-83641) (-49884)

V49 MNVR TO THERMAL ATTITUDE (165:00)
(184,325,335) OMNI A

NOTES

EARTH HORIZON
LOAD W MATRIX

40 ALTAIR (ENH)

212 DELTA
SAGITTARIUS (EFH)

33 ANTARES (EFH)

35 RASALHAGUE (EFH)

211 BETA
OPHIUCHI (EFH)

214 ZETA
SAGITTARIUS (ENH)

*OPTIONAL TEST STARS, DO NOT UPDATE S.V.
FLIGHT PLAN

MCC-H

1123 CST

UPLINK TO CSM
CSM S.V. & V47E
MCC-5 TGT LOAD

UPDATE TO CSM
MCC-5 MNVR PAD

165:00

(1101)
(x111)

165:30

MSFN

166:00

P30 EXTERNAL ΔV
V49 MNVR TO PAD ATT

SXT STAR CHECK
P40 SPS THRUSTING OR
P41 RCS THRUSTING

NOTES

THE TEI CMC S.V. WILL BE UPDATED BY ONBOARD NAVIGATION (P-23's) DURING TEC. MCC'S WILL BE PERFORMED WITH A MSFN CALCULATED S.V. REPLACING THE CMC CALCULATED S.V., WHICH WILL BE DOWN-LINKED PRIOR TO THE BURNS. AFTER THE MCC, THE PREVIOUS CMC S.V. (CORRECTED FOR THE BURN) WILL BE UPLINKED TO THE LM SLOT AND TRANSFERRED TO THE CSM SLOT, THUS PRESERVING THE ORIGINAL CMC S.V. AND THE W MATRIX. AFTER THE BURN, MCC-H WILL ALSO UPLINK A CURRENT MSFN S.V. TO THE LM SLOT FOR REFERENCE PURPOSES.

GET: 166:00

F.O.V. 3°
# FLIGHT PLAN

MCC-5
BURN TABLE

<table>
<thead>
<tr>
<th>MANEUVER</th>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORRIDOR CONTROL</td>
<td>10°/SEC COMPLETE</td>
<td>+10° COMPLETE</td>
<td>BT + 1 SEC AND $\Delta V_c = 0$</td>
<td>TRIM X AXIS ONLY TO 0.2 FPS</td>
</tr>
<tr>
<td>IP CONTROL</td>
<td>10°/SEC TERMINATE</td>
<td>+10° TERMINATE</td>
<td>BT + 1 SEC AND $\Delta V_c = 0$</td>
<td>TRIM X &amp; Z AXIS TO 0.2 FPS</td>
</tr>
</tbody>
</table>

---

TABLE 3-9
3-242
FLIGHT PLAN

0₂ FUEL CELL PURGE
WASTE WATER DUMP

1223 CST
166:00
(11101)
X1111
:10

TEI +17 HR
UPLINK TO CSM
CSM S.V. (CMC) V47E
CSM S.V. (MSFN)
(NO V47)

BURN STATUS REPORT
CHARGE BATTERY B

V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(290,019,034) OMNI C
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00016)
P00
V49 MNVR TO SIGHTING ATTITUDE
LUNAR HORIZON
(287,032,000) OMNI C
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH START
1. N70 (00016) (00000) (00220)
   16 PROCYON (MFH)

2. N70 (00000) (00000) (00220)
   50 POLLUX (MFH)
   N88 (-38513) (+79364) (+47097)

3. N70 (00022) (00000) (00210)
   22 REGULUS (MNH)

NOTES

TIG: 166:14:50
BT: NOM ZERO
ΔVR: NOM ZERO
ULLAGE: N/A
ORBIT: N/A

BURN STATUS REPORT

ΔTIG

BT

Trim

R

P

V gx

V gy

V gz

ΔV C

FUEL*

OX*

UNBAL

* ITEMS TO BE REPORTED TO MSFN

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
--- | --- | --- | --- | --- | ---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 166:00 - 167:00 | 7/TEC | 3-243

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

167:00

V49 MNVR TO OPTICS CALIBRATION ATTITUDE (057,098,359) HGA P -63, Y 261
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00035)
P00
V49 MNVR TO SIGHTING ATTITUDE (081,094,325) HGA P -57, Y 0
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00040) (00000) (00110)

:10

2. N70 (00000) (00000) (00120)
N88 (+07234)(-86438)(-49761)

:20

3. N70 (00033) (00000) (00120)

167:30

V49 (11111)(X1111)
V49 MNVR TO O₂ FLOW RATE TEST ATTITUDE (167:45)
(345,130,344) HGA P 10, Y 279
DISABLE RCS QUADS A&B

:40

:50

UNSTOW ELECTRICAL CABLE FROM R10
REMOVE PROTECTIVE PLUG FROM SIDE HATCH
DUMP NOZZLE
CONNECT CABLE TO HEATER CONNECTOR
PANEL 15 UTILITY PWR - OFF (VERIFY)
CONNECT CABLE TO UTILITY OUTLET
UTILITY PWR - ON

168:00

NOTES

EARTH DISTANCE ≈ 175 091 NM

EARTH HORIZON

40 ALTAIR (ENH)

212 DELTA SAGITTARI (EFH)

33 ANTARES (EFH)

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 CHANGE C (JAN) JANUARY 18, 1971 167:00 - 168:00 7/TEC 3-244

FLIGHT PLANNING BRANCH

MSC Form 29 (May 89)

NASA - MSC
FLIGHT PLAN

CREW EXERCISE PERIOD

168:00
O₂ HEATER 3 (1) - AUTO
REPRESS PKG VLV - OFF (VERIFY)
CB O₂ ISOL/AUX BAT - CLOSE
O₂ TANK 3 ISOL VLV - CLOSE (MOMENTARY)
O₂ TANK 3 ISOL VLV TB-BP
O₂ PRESS IND - SRG/3
UNSTOW SCREEN & ADAPTER FROM R6
REMOVE PLUG FROM SIDE HATCH ORIFICE AND STOW
INSTALL ADAPTER ON HATCH ORIFICE
INSTALL SCREEN ON ADAPTER

WHEN SURGE TANK PRESSURE REACHES 750 PSIA,
(CRYO O₂ PRESS 1/SRG IND ≤ 750 PSIA)
SURGE TANK O₂ VLV - OFF

169:00

TEST WILL BE TERMINATED 2.5 HOURS AFTER SURGE TANK REACHES 750 PSIA

<table>
<thead>
<tr>
<th>MISSION</th>
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<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE C (JAN)</td>
<td>JANUARY 18, 1971</td>
<td>168:00 - 169:00</td>
<td>7/TEC</td>
<td>3-245</td>
</tr>
</tbody>
</table>

MCC-H 1423 CST

NOTES
FLIGHT PLAN

NOTES

EARTH DISTANCE
≈ 168 662 NM

O₂ FLOW
RATE TEST

<table>
<thead>
<tr>
<th>MISSION</th>
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<th>DAY/REV</th>
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</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>170:00 - 171:00</td>
<td>7/TEC</td>
<td>3-247</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

ON CUE FROM MCC-H, APPROXIMATELY 10 MINUTES PRIOR TO TEST COMPLETION,
SURGE TANK O2 VLV - ON
UTILITY PWR - OFF
DISCONNECT CABLE FROM HEATER AND UTILITY OUTLET
AND STOW IN RIO
REMOVE AND STOW SCREEN & ADAPTER IN BAG IN R6
UNSTOW PLUG AND REPLACE IN SIDE HATCH ORIFICE
INSTALL PROTECTIVE PLUG ON HATCH NOZZLE
V48 (11101)(X1111)
ENABLE RCS QUADS A&B
V49 MNVR TO THERMAL ATTITUDE (171:30)
(144,002,027) HGA P -29, Y 116
O2 TANK 3 ISOL VLV - OPEN
O2 TANK 3 ISOL VLV TB - GRAY
CB O2 ISOL/AUX BAT - OPEN

WHEN SURGE TANK PRESSURE REACHES 865 PSIA,
O2 HEATER 1 - OFF
FLIGHT PLAN

CSM SYSTEMS CHECKLIST
CONTAMINATION CONTROL PAGE S 1-16

TV(GDS) 172:30 TO 173:00
CM/TG - AVG (f5.6)
USE MONITOR TO ADJUST APERTURE
FOR INFLIGHT DEMONSTRATION

MCC-H 1823 CST

172:00
(11101)
(X1111)

:10

:20

172:30

:40

:50

173:00

GET: 173:00
F.O.V. = 3°

<table>
<thead>
<tr>
<th>MISSION</th>
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<th>DAY/REV</th>
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</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>172:00 - 173:00</td>
<td>7/TEC</td>
<td>3-249</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

1920 CST
173:00 V49 MNVR TO OPTICS CALIBRATION ATTITUDE (094,103,358) HGA P -79, Y 101
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00040) P00
V49 MNVR TO SIGHTING ATTITUDE (082,098,325) HGA P -57, Y 0
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00040) (00000) (00110)

:20

:40

:50

174:00 L1OH CANISTER CHANGE
(14 INTO B, STOW 12 IN A3)

NOTES

EARTH DISTANCE
~162 018 NM

EARTH HORIZON

40 ALTAIR (ENH)

212 DELTA
SAGITTARI (EFH)

33 ANTARES (EFH)

35 RASALHAGUE (EFH)

211 BETA
OPHIUCHI (EFH)

42 PEACOCK (ENH)

*OPTIONAL TEST STARS, DO NOT UPDATE S.V.

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 173:00 - 174:00 | 7/TEC | 3-250

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

CSM G&C CHECKLIST
PASSIVE THERMAL CONTROL (G&N)  PAGE G 8-2
V49 MNVR TO PTC ATTITUDE
(N20,270,000)
V79 (-0.3750)
(+030.00)
(+00000)
REESTABLISH HGA REACQ MODE

MISSION | EDITION | DATE         | TIME          | DAY/REV | PAGE
---------|---------|--------------|---------------|---------|--------
APOLLO 14| FINAL (JAN)| DECEMBER 2, 1970 | 174:00 - 175:00 | 7/TEC   | 3-251

MCC-H 2023 CST
UPDATE TO CSM QUADS TO ENABLE FOR PTC SPINUP

NOTES
DAP LOAD STATUS (11101)(X1111)

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

MCC-H  0023 CST

178:00

179:00

REST PERIOD
(10 HOURS)

180:00

NOTES
DAP LOAD STATUS
(11101)(1111)

MISSION | EDITION | DATE   | TIME      | Y/REV | PAGE
---------|---------|--------|-----------|-------|-----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 178:00 - 180:00 | 7/TEC | 3-254

MSC Form 29 (May 89)
FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

CSM SYSTEMS CHECKLIST
POST-SLEEP CHECKLIST PAGE 1-26
COMM - HGA REACQ MODE

CHARGE BATTERY A

EAT PERIOD

P52 IMU REALIGN
OPTION 3 REFSMMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES

UPDATE TO CSM CONSUMABLES
FLIGHT PLAN

MCC-H
0823 CST

186:00
:10
:20
186:30
:40
:50
187:00

NOTES
DAP LOAD STATUS
(11101)(X1111)

CSM CONSUMABLES UPDATE
GET: ___ :___ :___

RCS TOTAL

QUAD A ___ B ___
C ___ D ___

H\textsubscript{2} TANK 1 ___ 2 ___
O\textsubscript{2} TANK 1 ___ 2 ___
3 ___

MSSFN

PTC

EARTH DISTANCE
\approx 127 376 NM

P52 IMU REALIGN
N71: ___ :___ :___
N05: ___ :___ :___
N93:
X ___ :___ :___
Y ___ :___ :___
Z ___ :___ :___
GET ___ :___ :___ :___

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 186:00 - 187:00 8/TEC 3-258

MSC Form 29 (May 89)

FLIGHT PLANNING BRANCH

NASA — MSC
FLIGHT PLAN

L10H CANISTER CHANGE
(15 INTO A, STOW 13 IN A4)

CSM ENTRY CHECKLIST
EMS ENTRY CHECK PAGE E 1-4

GET: 188:00  F.O.V. 3°

NOTES
DAP LOAD STATUS
(11101)(X1111)

MISSION | EDITION | DATE       | TIME       | DAY/REV | PAGE
---------|---------|------------|------------|---------|----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 187:00 - 188:00 | 8/TEC | 3-259

MSC Form 29 (May 89)
EXIT G&N PTC  PAGE G 8-3

V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(073,138,354) HGA P -75, Y 278
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00040)
P00
V49 MNVR TO SIGHTING ATTITUDE
(087,137,325) HGA P -57, Y 0
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00037) (00000) (00120)
2. N70 (00033) (00000) (00120)
3. N70 (00000) (00000) (00110)
N88 (+59879) (-32372) (-73257)

EARTH DISTANCE
≈ 121 814 MIN

EARTH HORIZON
37 NUNKI (EFH)
33 ANTARES (EFH)

120 AL NA'IR (ENH)
FLIGHT PLAN

*4. N70 (00040) (00000) (00110)

*5. N70 (00035) (00000) (00120)

*6. N70 (00000) (00000) (00120)
   N88 (-07804) (-99375) (+07982)

CSM G&C CHECKLIST
PASSIVE THERMAL CONTROL (G&N)
V49 MNVR TO PTC ATTITUDE
(N20, 270, 000)
V79 (-0.3750)
(+030.00)
(+00000)
REESTABLISH HGA REACQ MODE

<table>
<thead>
<tr>
<th>MISSION</th>
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<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>189:00 - 190:00</td>
<td>8/TEC</td>
<td>3-261</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

192:00

P52 IMU REALIGN
OPTION 3 REFMMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES

EXIT G&N PTC
V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(072,016,005) HGA P -73, Y 270
P23 CILUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00033)
P00
V49 MNVR TO SIGHTING ATTITUDE
(090,016,330) HGA P -55, Y 3
P23 CILUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00037) (00000) (00120)
2. N70 (00033) (00000) (00120)
3. N70 (00000) (00000) (00110)
N88 (+59879) (-32372) (-73257)

MCC-H 1423 CST

NOTES

DAP LOAD STATUS
(11101)(X1111)

PTC

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

EARTH DISTANCE
≈ 113 101 NM

EARTH HORIZON
37 NUNKI (EFH)
33 ANTARES (EFH)
120 AL NA'IR (ENH)

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 192:00 - 193:00 8/TEC 3-264

MSC Form 29 (May 89)

FLIGHT PLANNING BRANCH
FLIGHT PLAN

1523 CST

193:00

MCC-H

H₂ PURGE LINE HEATER-ON { IF MCC-6 NOT REQUIRED

H₂ & O₂ FUEL CELL PURGE
WASTE WATER DUMP
H₂ PURGE LINE HEATER - OFF { IF MCC-6 NOT REQUIRED

UPDATE TO CSM
MCC-6 MNVR PAD
ENTRY PAD (ASSUMES MCC-6)
CSM S.V.

UPDATE TO CSM
CSM S.V. & V47E
MCC-6 TGT LOAD

UPDATE TO CSM
QUADS TO ENABLE
FOR PTC SPINUP

193:30

194:00

PTC

RESTART PTC IF MCC-6 NOT REQ'D
DAP LOAD STATUS (11101)(X1111)

CSM G&C CHECKLIST

PASSIVE THERMAL CONTROL (G&N) PAGE G 8-2
V49 MNVR TO PTC ATTITUDE
(N20,270,000)
V79 (-0.3750)
(+030.00)
(+00000)

REESTABLISH HGA REACQ MODE
P30 EXTERNAL ΔV
V49 MNVR TO PAD BURN ATT
H₂ PURGE LINE HEATERS - ON { IF NOT PERFORMED AT 193:00

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 193:00 - 194:00 8/TEC 3-265
# FLIGHT PLAN

MCC-6

BURN TABLE

<table>
<thead>
<tr>
<th>MANEUVER</th>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORRIDOR CONTROL</td>
<td>10°/SEC COMPLETE</td>
<td>+10° COMPLETE</td>
<td>BT + 1 SEC AND ΔV&lt;sub&gt;c&lt;/sub&gt; = 0</td>
<td>TRIM X AXIS ONLY TO 0.2 FPS</td>
</tr>
<tr>
<td>IP CONTROL</td>
<td>10°/SEC TERMINATE</td>
<td>+10° TERMINATE</td>
<td>BT + 1 SEC AND ΔV&lt;sub&gt;c&lt;/sub&gt; = 0</td>
<td>TRIM X &amp; Z AXIS TO 0.2 FPS</td>
</tr>
</tbody>
</table>

TABLE 3-10
3-266
FLIGHT PLAN

MCC-H 1623 CST

194:00
(11101)
X1111

194:10

P40 SPS THRUSTING OR
P41 RCS THRUSTING

H₂ & O₂ FUEL CELL PURGE
WASTE WATER DUMP
H₂ PURGE LINE HEATERS-OFF

IF NOT PERFORMED AT 193:20

194:20

EI - 22 HR

194:30

UPLINK TO CSM
CSM S.V. (CMC) V47E
CSM S.V. (MSFN) (NO V47)

194:40

195:00

MCC-6

BURN STATUS REPORT

TIG: 194:26:59
BT: NOM ZERO
ΔVT: NOM ZERO
ULLAGE: N/A
ORBIT: N/A

ΔTIG
BT
V_gx

R
V_gx
V_gy
ΔV_c
FUEL*
OX*
UNBAL

*ITEMS TO BE REPORTED TO MSFN

NOTES

DAP LOAD STATUS
(11101)(X1111)

PTC
FLIGHT PLAN

CSM G&C CHECKLIST
PASSIVE THERMAL CONTROL (G&N) PAGE G 8-2
V49 MNVR TO PTC ATTITUDE (N20,270,000)
V79 (-0.3750)
(+030.00)
(+00000)
REESTABLISH HGA REACQ MODE

CSM SYSTEMS CHECKLIST
CONTAMINATION CONTROL PAGE S 1-16

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 FINAL (JAN) | DECEMBER 2, 1970 | 195:00 - 196:00 | 8/TEC | 3-268

MSC Form 29 (May 89)

FLIGHT PLANNING BRANCH

NOTES
DAP LOAD STATUS (11101) (X1111)

GET: 196:00
F.O.V. 5°

PTC

MCC-H
UPDATE TO CSM QUADS TO ENABLE FOR PTC SPINUP

1723 CST
195:00
:10
:20
:40
:50
196:00
FLIGHT PLAN

P52 IMU REALIGN
OPTION 3 REFSMMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES
REPORT: CM RCS INJECTOR VALVE TEMPS
(SYS TEST METER 5C, 5D, 6A, 6B, 6C, 6D)

EXIT G&N PTC

V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(086,062,012) HGA P -72, Y 191
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00035)

V49 MNVR TO SIGHTING ATTITUDE
(090,062,329) HGA P -57, Y 3
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR

1. N70 (00037) (00000) (00120)
2. N70 (00033) (00000) (00120)
3. N70 (00000) (00000) (00110)

N88 (+59879) (-32372) (-73257)

EARTH DISTANCE
≈ 97 415 NM

EARTH HORIZON

37 NUNKI (EFH)
33 ANTARES (EFH)
120 AL NA'IR (ENH)
EARTH DARKSIDE DIM LIGHT PHOTOGRAPHY

CONFIGURE CAMERA
CM/DAC/SXT/VHBW, (EXP 1/500) 24 fps (2.5% MAG)
MAG (J) ___ MAG % ___

UTILITY POWER - ON

V49 MNVR TO EARTH DARKSIDE PHOTO ATTITUDE (197:20)
(122,270,000) HGA P -59, Y 90

DAMP VEHICLE RATES PER PTC PROCEDURE STEP 5
AFTER 20 MIN, DISABLE ALL JETS
P22 ORBIT NAVIGATION (NO MARKS)
LDMK: LAT + 10.000 SA +130.60
LONG/2 = 17.500 TA +44.800
ALT +000.00

VERIFY THRU SXT THAT OPTICS BORESIGHTED ON EARTH DARKSIDE
MOUNT DAC ON SXT, DAC-ON AT 24 fps FOR 2 SEC
CHANGE DAC TO TIME & 1/60

1 FRAME, EXP TIME 60 SEC
1 FRAME, EXP TIME 20 SEC
1 FRAME, EXP TIME 5 SEC

CHANGE DAC TO 24 fps & 1/500; DAC ON AT 24 fps for 2 SEC
CYCLE CMC MODE - FREE/AUTO
ENABLE JETS
RECORD MAG %
REMOVE AND STOW DAC

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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</thead>
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<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>197:20 - 198:00</td>
<td>8/TEC</td>
<td>3-270</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

**NOTES**

40 ALTAIR (ENH)

211 BETA

OPHIUCHI (EFH)

214 ZETA

SAGITTARI (EFH)

*OPTIONAL TEST STARS, DO NOT UPDATE S.V.*

---

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>197:00 - 198:00</td>
<td>8/TEC</td>
<td>3-271</td>
</tr>
</tbody>
</table>
**FLIGHT PLAN**

**CSM G&C CHECKLIST**

**BACKUP GDC AND/OR IMU ALIGNMENT**

*Page G 7-3*

VO6 N20 (DO NOT ENTER)

**AT RELEASE OF GDC ALIGN PB, KEY ENTER,**

**RECORD ANGLES AND REPORT TO MCC-H**

**CRESSENT ALIGN**

*Page G 7-11*

VO6 N20 (DO NOT ENTER)

**UPDATE TO CSM QUADS TO ENABLE FOR PTC SPINUP**

**DAP LOAD STATUS (11101)(X1111)**

**CSM G&C CHECKLIST**

**PASSIVE THERMAL CONTROL (G&N)**

*Page G 8-2*

V49 MNVR TO PTC ATTITUDE

(N20, 270, 000)

V79 (-0.3750)

(030.00)

(+00000)

**REESTABLISH HGA REACQ MODE**

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
APOLLO 14 | CHANGE A (JAN) | DECEMBER 23, 1970 | 198:00 - 199:00 | 8/TEC | 3-272

*FLIGHT PLANNING BRANCH*
FLIGHT PLAN

2123 CST

199:00
L1OH CANISTER CHANGE
(16 INTO B, STOW 14 IN A4)

199:10
MSFN

199:20

199:30
EAT PERIOD

199:40

199:50

200:00

NOTES
DAP LOAD STATUS
(11101)(X1111)

EARTH DISTANCE
≈ 87 143 NM

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

CSM SYSTEMS CHECKLIST
PRE-SLEEP CHECKLIST PAGE S 1-26
COMM - OMNI'S

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 199:00 - 200:00 | 8/TEC | 3-273

MSC Form 28 (May 69)
FLIGHT PLANNING BRANCH
NASA — MSC
FLIGHT PLAN

MCC-H  2223 CST

00:00

:20

:40

01:00

:20

:40

02:00

REST PERIOD (8 HOURS)

NOTES
DAP LOAD STATUS
(11101)(X1111)

MISSION   EDITION    DATE         TIME      DAY/REV  PAGE
---------- ----------- ----------- ----------- ----------- ----
APOLLO 14  FINAL (JAN) DECEMBER 2, 1970 200:00 - 202:00 8/TEC  3-274
FLIGHT PLAN

REST PERIOD
(8 HOURS)

GET: 208:00  F.O.V. 10°

DAP LOAD STATUS
(11101)(X1111)

MISSION   EDITION   DATE             TIME             DAY/REV   PAGE
---------   --------   ---------------   ---------------   --------   ----
APOLLO 14   FINAL (JAN)  DECEMBER 2, 1970  206:00 - 208:00  8/TEC    3-277
FLIGHT PLAN

CSM SYSTEMS CHECKLIST

POST-SLEEP CHECKLIST PAGE S 1-26

P52 IMU REALIGN
OPTION 3 REFSSMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES
EXIT G&N PTC PAGE G 8-3

V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(099,252,003) HGA P -73, Y 10
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00042)

V49 MNVR TO SIGHTING ATTITUDE
(078,245,325) HGA P -57, Y 354
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00044) (00000) (00110) 44 ENIF (ENH)
2. N70 (00000) (00000) (00120) 212 DELTA
   N88 (+07234) (-86438) (-49761) SAGITTARII (EFH)
3. N70 (00000) (00000) (00120) 213 LAMBDA
   N88 (+10293) (-89715) (-42956) SAGITTARII (EFH)
4. N70 (00045) (00000) (00110) 45 FOMALHAUT (ENH)

NOTES

DAP LOAD STATUS
(11101) (X1111)

CSM CONSUMABLES UPDATE
GET: __ __ __ __

RCS TOTAL
QUAD A __ __ B __ __
C __ __ D __ __

H₂ TANK 1 __ __ 2 __ __
O₂ TANK 1 __ __ 2 __ __
3 __ __

P52 IMU REALIGN
N71: __ __ __ __
N05: __ __ __ __ __
N93:
X __ __ __ __ __
Y __ __ __ __ __
Z __ __ __ __ __

GET __ __ __ __ __ __

MISSION | EDITION | DATE     | TIME     | DAY/REV | PAGE
---------|----------|----------|----------|---------|------
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 208:00 - 209:00 | 9/TEC | 3-278

NSC Form 28 (May 89)

FLIGHT PLANNING BRANCH
MCC-H 0723 CST

UPDATE TO CSM QUADS TO ENABLE FOR PTC SPINUP

209:00

:10

:20

209:30

:40

:50

210:00

FLIGHT PLAN

CSM G&C CHECKLIST
PASSIVE THERMAL CONTROL (G&N) PAGE G 8-2
V49 MNVR TO PTC ATTITUDE
(N20, 270, 000)
V79 (-0.3750)
(+030.00)
(+00000)
REESTABLISH HGA REACQ MODE

EAT PERIOD

PTC

EARTH DISTANCE
≈ 47 759 NM

NOTES
DAP LOAD STATUS (11101)(11111)

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 209:00 - 210:00 9/TEC 3-279

MSC Form 26 (May 89)
FLIGHT PLANNING BRANCH NASA — MSC
FLIGHT PLAN

LiOH CANISTER CHANGE
(17 INTO A, STOW 15 IN A4)

ENTRY CHECKLIST

GO/NO-GO FOR MCC-7
EI - 6 HR

REPORT: CM RCS INJECTOR VALVE TEMPS
(SYS TEST METER 5C, 5D, 6A, 6B, 6C, 6D)

GET: 211:00  F.O.V. 1°

MISSION | EDITION | DATE          | TIME          | DAY/REV | PAGE
---------|---------|---------------|---------------|---------|-----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 210:00 - 211:00 | 9/TEC  | 3-280

MSC Form 29 (May 69)

FLIGHT PLANNING BRANCH

NOTES
DAP LOAD STATUS
(11110) (X1111)
FLIGHT PLAN

P52 IMU REALIGN
OPTION 3 REFSSMAT
(PTC ORIENT)

REPORT: GYRO TORQUING ANGLES
P52 IMU REALIGN
OPTION 1 PREFERRED
(ENTRY ORIENT)
SC CONT - CMC
BMAG (3) - RATE 2

GET: 213:00 F.O.V. 1°

P30 EXTERNAL ΔV

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>212:00 - 213:00</td>
<td>9/TEC</td>
<td>J-282</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

VHF SIMPLEX A - ON
EXIT G&N PTC PAGE G 8-3
V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(299,041,337) OMNI C
P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00023)
P00
V49 MNVR TO SIGHTING ATTITUDE
(283,033,010) OMNI C
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00022) (00000) (00220)
2. N70 (00000) (00000) (00210)
   N88 (-15020) (+94736) (+28276)
3. N70 (00023) (00000) (00220)
4. N70 (00000) (00000) (00220)
   N88 (-84888) (+40318) (+34184)
5. N70 (00016) (00000) (00210)

ATT DEADBAND - MIN
RATE - LOW
BMAG (3) - ATT 1/RATE 2
SC CONT - SCS

NOTES
DAP LOAD STATUS
(11101)(x111)
LUNAR HORIZON
22 REGULUS (MFH)
64 ALHENA (MNH)
23 DENEBOLOA (MFH)
151 GAMMA PRIME LEONIS (MFH)
16 PROCYON (MNH)

UPDATE TO CSM
MCC-7 MNVR PAD
ENTRY PAD
UPLINK TO CSM
CSM S.V. & V47
MCC-7 TGT LOAD
DESIRED ORIENT (ENT)
ENTRY LAT & LONG

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>CHANGE A (JAN)</td>
<td>DECEMBER 23, 1970</td>
<td>211:00 - 212:00</td>
<td>9/TEC</td>
<td>3-281</td>
</tr>
</tbody>
</table>

MSC Form 29 (May 89)
THIS PAGE INTENTIONALLY LEFT BLANK
## FLIGHT PLAN

**MCC-7 BURN TABLE**

<table>
<thead>
<tr>
<th>MANEUVER</th>
<th>P OR Y RATES</th>
<th>ATT DEVIATION</th>
<th>SHUTDOWN TIME</th>
<th>RESIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORRIDOR CONTROL</td>
<td>10°/SEC COMPLETE</td>
<td>±10° COMPLETE</td>
<td>BT + 1 SEC AND $\Delta V_c = 0$</td>
<td>TRIM X AXIS ONLY TO 0.2 FPS</td>
</tr>
</tbody>
</table>

**TABLE 3-11**

3-284
FLIGHT PLAN

V49 MNVR TO PAD BURN ATT

SXT STAR CHECK
P40 SPS THRUSTING OR
P41 RCS THRUSTING

MCC-7

EI - 3 HR

UPLINK TO CSM
CSM S.V. (CMC) V47E
CSM S.V. (MSFN)
(NO V47)

213:00
(11101)
(X1111)

:10

:20

:50

V49 MNVR TO OPTICS CALIBRATION ATTITUDE
(019,258,355) OMNI C

BURN STATUS REPORT

TIG: 213:26:59
BT: NOM ZERO
ΔVT: NOM ZERO
ULLAGE: N/A
ORBIT: N/A

*ITEMS TO BE REPORTED TO MSFN

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>213:00 - 214:00</td>
<td>9/TEC</td>
<td>3-285</td>
</tr>
</tbody>
</table>
FLIGHT PLAN

P23 CISLUNAR NAVIGATION
OPTICS CALIBRATION STAR N70 (00022)
POO
V49 MNVR TO SIGHTING ATTITUDE
(017,270,000) OMNI_C
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
1. N70 (00022) (00000) (00220)

2. N70 (00023) (00000) (00220)

3. N70 (00016) (00000) (00210)
LOGIC SEQUENCE CHECK PAGE E1-2
GO/NO-GO FOR PYRO ARM SEQUENCE (CUE MSFN)
LOGIC ON
V49 MNVR TO ENTRY PAD ATTITUDE (214:45)

BORESIGHT AND SXT STAR CHECK

P52 IMU REALIGN OPTION 3 REFSMAT
(ENTRY ORIENT)

REPORT: GYRO TORQUING ANGLES

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>214:00 - 215:00</td>
<td>9/TEC</td>
<td>3-286</td>
</tr>
</tbody>
</table>
**FLIGHT PLAN**

**MCC-H**

1323 CST

215:00

(11101)

X(1111)

:10

215:30

MSFN

EI - 1 HR

GO/NO-GO FOR PYRO ARM

UPDATE TO CSM ENTRY PAD

RECOVERY PAD UPLINK TO CSM

CSM S.V. & V66

:40

:50

216:00

**GDC ALIGN** PAGE E 1-3

**EMS ENTRY CHECK** PAGE E 1-4

**PRIMARY WATER EVAP ACTIVATION** PAGE E 1-4

**CONFIGURATE CAMERA EQUIP FOR FIREBALL AND CHUTES PHOTOS** PAGE E 1-4

**SEC WATER EVAP ACTIVATION** PAGE E 1-4

**CM RCS PRE-HEAT (IF REQ'D)**

**FINAL STOWAGE** PAGE E 1-5

**TERMINATE CM RCS PRE-HEAT** PAGE E 1-5

**CM RCS ACTIVATION** PAGE E 1-6

**GO/NO-GO FOR PYRO ARM (CUE MSFN)**

**LOGIC - ON**

**SET DET (UP, TO EI)** PAGE E 2-1

**EMS INITIALIZATION** PAGE E 2-1

**RSI ALIGNMENT** PAGE E 2-1

**CM RCS CHECK** PAGE E 2-1

**MISSION** | **EDITION** | **DATE** | **TIME** | **DAY/REV** | **PAGE**
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 215:00 - 216:00 | 9/TEC | 3-287

**MSC Form 28 (May 89)**

**FLIGHT PLANNING BRANCH**
FLIGHT PLAN

SEPARATION CHECKLIST

MNVR TO HORIZON CHECK ATT
P61 ENTRY PREP
P62 CM/SM SEP & PRE-ENTRY MNVR
SECS PYRO ARM

CM/SM SEP 216:12

MNVR TO ENTRY ATT

P63 ENTRY INITIATE

EI 216:26:59

P64 ENTRY POST 0.05G

TRAJECTORY EVENTS
400 000 FT (GET 216:26:59)
ENTER S-BAND BLACKOUT
0.05G
KA - INITIATE CONSTANT DRAG
RDOT = -700 FPS
PEAK G (6.6)

SUBCIRCULAR VELOCITY
P64 TO P67
EXIT S-BAND BLACKOUT
GUIDANCE TERMINATION
DROGUE DEPLOYMENT
MAIN DEPLOYMENT
SPLASHDOWN

TIME FROM 400K FT,
MIN:SEC
00:00
00:18
00:30
00:52
07:18
01:20
02:06
02:10
03:32
07:16
08:17
09:04
13:54

NOTES

Y = 6.5
L/D = 2.9784
V = 36170
R = 1250
Propellant loading data were obtained from the Apollo 14 preflight data and were optimized for the nominal mission. The LM-8 data were used for engine performance, and ΔV requirements were coordinated with the Landing Analysis Branch and the Orbital Mission Analysis Branch. The ΔV requirement for the lunar ascent differs from that in the Operational Trajectory and Flight Plan because of an increase in the inert vehicle weight.

The budget shown in table 4-1 accounts for an APS TPI, engine valve-pair malfunction, and balanced couples. A touchdown abort was not considered because the nominal lift-off weight is heavier than the abort weight. The following data were used.

a. $I_{sp} = 309.97 \pm 3.77$ seconds

b. Mixture ratio = 1.605 ± 0.0258

c. Lift-off weight = 10 841.5 ± 38.7 pounds
### TABLE 4-1

**APS PROPELLANT SUMMARY**

<table>
<thead>
<tr>
<th>Item</th>
<th>Total propellant, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded</td>
<td>5224.8</td>
</tr>
<tr>
<td>Trapped and unavailable</td>
<td>-51.8</td>
</tr>
<tr>
<td>Outage</td>
<td>-10.3</td>
</tr>
<tr>
<td>Available for ΔV</td>
<td>5162.7</td>
</tr>
<tr>
<td>Required for ascent (6057.7 fps)</td>
<td>-4931.1</td>
</tr>
<tr>
<td>Remaining</td>
<td>231.6</td>
</tr>
<tr>
<td>Required for APS TPI&lt;sup&gt;a&lt;/sup&gt; (70.2 fps)</td>
<td>-41.4</td>
</tr>
<tr>
<td>Remaining</td>
<td>190.2</td>
</tr>
<tr>
<td>Dispersions (-3σ)</td>
<td>-66.2</td>
</tr>
<tr>
<td>Pad</td>
<td>124.0</td>
</tr>
<tr>
<td>Contingencies</td>
<td></td>
</tr>
<tr>
<td>Engine valve-pair malfunction</td>
<td>-24.5</td>
</tr>
<tr>
<td>(ΔMR = +.01 or -.018)</td>
<td></td>
</tr>
<tr>
<td>Balanced couples</td>
<td>-56.9</td>
</tr>
<tr>
<td>Half-degree out of plane</td>
<td>-10.6</td>
</tr>
<tr>
<td>(18 fps)</td>
<td></td>
</tr>
<tr>
<td>Margin</td>
<td>32.0</td>
</tr>
</tbody>
</table>

<sup>a</sup>The total TPI ΔV is 92.2 fps. It is assumed that 22 fps is obtained by 10-sec, 4-jet ullage.
ASSUMPTIONS FOR THE DPS ANALYSIS

Propellant loading data were obtained from the Apollo 14 preflight data and were optimized for the nominal mission. The LM-8 data were used for engine performance, and ΔV requirements were coordinated with the Landing Analysis Branch. The ΔV requirement for lunar descent differs from that in the Operational trajectory and Flight Plan because of an increase in the inert vehicle weight.

The 3σ dispersions represent total propellant cost based on 3σ uncertainties in propellant loading, trapped propellant, I_{sp}, ΔV, separation weight, non-ΔV consumables weight, mixture ratio, and physical location of the low-level sensor.

The following philosophy changes have been included in the budget.

a. A flying time of 2 minutes and 20 seconds below low gate will be called a nominal requirement.

b. A contingency of 5 seconds has been included for a possible early low-level light based on a Grumman Aircraft Corporation presentation to a September 17, 1970, meeting of the Configuration Control Board.

c. The separation weight is 34101.0 ± 36.9 pounds.

d. Integrated average I_{sp} is 302.5 ± 4.65 seconds.

e. Mixture ratio is 1.598 ± .0225.

f. Non-ΔV consumables from separation to PDI are 83.2 pounds.
<table>
<thead>
<tr>
<th>Item</th>
<th>Total propellant, lb</th>
<th>Hover time, sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded</td>
<td>18 414.7</td>
<td>--</td>
</tr>
<tr>
<td>Trapped and unavailable</td>
<td>-213.1</td>
<td>--</td>
</tr>
<tr>
<td>Outage</td>
<td>-33.4</td>
<td>--</td>
</tr>
<tr>
<td>Available for ΔV</td>
<td>18 168.2</td>
<td>--</td>
</tr>
<tr>
<td>Required for ΔV (140-sec flying time from low gate, ΔV = 6957.8)</td>
<td>-17 332.5</td>
<td>--</td>
</tr>
<tr>
<td>Remaining</td>
<td>835.7</td>
<td>90</td>
</tr>
<tr>
<td>Dispersions (-3σ)</td>
<td>-318.6</td>
<td>--</td>
</tr>
<tr>
<td>Pad</td>
<td>517.1</td>
<td>56</td>
</tr>
<tr>
<td>Operational allowances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-level (5 sec, 26.5 fps)</td>
<td>-44.7</td>
<td>--</td>
</tr>
<tr>
<td>Abort reserve (20 sec, 106 fps)</td>
<td>-179.5</td>
<td>--</td>
</tr>
<tr>
<td>Margin (hover time before abort decision point)</td>
<td>292.9</td>
<td>31</td>
</tr>
</tbody>
</table>
Ground Rules and Assumptions for the LM EPS Analysis

1. Energy available from the descent batteries is 1600 A-h and from the ascent batteries is 592 A-h.

2. Energy unusables caused by lack of continuous MSFN coverage for the descent and ascent stages are 6 and 3 A-h, respectively.

3. Energy unusables caused by TM inaccuracies for the descent and ascent stages were 77 and 11 A-h, respectively.

4. Energy unusables caused by checklist deviations (dispersion) for the descent and ascent stages were 25 and 4 A-h, respectively. This dispersion is obtained by calculating 2 percent of the energy used.

5. In accordance with the flight plan, the PGNCS was in standby mode from 1.3 hours following surface powerdown until 9.75 hours before powerup.

6. The RCS heaters were assumed to have a 100 percent duty cycle for 15 minutes after initial activation and then to decrease to a 7 percent duty cycle until undocking. From undocking until lunar landing plus 2 hours, the heaters were assumed to cycle at 0 percent, but, from landing plus 2 hours until lunar lift-off, the duty cycle was assumed to be 4.5 percent.

7. At the beginning of the analysis, it was assumed that a total of 10 A-h had been used from the descent batteries between 30 minutes before launch and the conclusion of transposition and docking.

8. The CDR and LMP forward window heaters were assumed not to be needed.

9. All floodlights were turned off at the beginning of EVA-1 and on again at powerup.

10. No duty cycle was assigned to the portable utility lights.

11. The liquid cooled garment pump was cycled as dictated by the timeline.

12. The short (M=1) rendezvous was considered nominal.

13. The TV camera was assumed to be on from the beginning of EVA-1 until surface powerup.
### TABLE 4-3
ASCENT STAGE EPS SUMMARY

<table>
<thead>
<tr>
<th>Item</th>
<th>A-h required</th>
<th>A-h remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial capacity</td>
<td>--</td>
<td>592</td>
</tr>
<tr>
<td>Total unasables</td>
<td>18</td>
<td>574</td>
</tr>
<tr>
<td>Available for mission planning</td>
<td>--</td>
<td>574</td>
</tr>
<tr>
<td>Total requirement through crew</td>
<td>216</td>
<td>358</td>
</tr>
<tr>
<td>transfer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total usable margin</td>
<td>--</td>
<td>358 (60%)</td>
</tr>
</tbody>
</table>
LM-8 ascent stage battery status (January 31 launch date)

Summary:
- Initial capacity: 592 A-h
- Lack of MSFN unusables: -3 A-h
- TM unusables: -11 A-h
- Dispersion: -4 A-h
- Actual requirements to crew transfer: 216 A-h
- Total usable margin (at crew transfer): 356 (60%)

Figure 4-1. LM-8 ascent stage amp hours remaining.
<table>
<thead>
<tr>
<th>Item</th>
<th>A-h required</th>
<th>A-h remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial capacity</td>
<td>--</td>
<td>1600</td>
</tr>
<tr>
<td>Total unusables</td>
<td>108</td>
<td>1492</td>
</tr>
<tr>
<td>Available for mission planning</td>
<td>--</td>
<td>1492</td>
</tr>
<tr>
<td>Total mission requirement</td>
<td>1229</td>
<td>263</td>
</tr>
<tr>
<td>Total usable margin</td>
<td>--</td>
<td>263 (16%)</td>
</tr>
</tbody>
</table>
Figure 4-2.- LM-8 descent stage amp hours remaining.
ASSUMPTIONS AND GROUND RULES FOR THE LM RCS PROPELLANT ANALYSIS

1. Data for the LM RCS engine performance and propellant requirements were obtained from the SODB, Volume II, and from postflight analyses of Apollo 9-12 missions.

2. It is assumed that there will be an RCS burn (tweak burn) of 30 fps following LM insertion. The tweak burn is nominally zero.

3. It is assumed that there will be a 10 fps trim following the APS TPI maneuver.

4. The ullage for PDI was defined, subsequent to this analysis, to be an 8-second, four-jet ullage. The increase in RCS propellant usage is approximately 1.0% and is negligible in view of the nominal RCS propellant remaining.
<table>
<thead>
<tr>
<th>Item</th>
<th>Propellant required, lb</th>
<th>Propellant remaining, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded</td>
<td>633.0</td>
<td></td>
</tr>
<tr>
<td>Trapped</td>
<td>40.6</td>
<td>592.4</td>
</tr>
<tr>
<td>Gaging inaccuracy and loading tolerance</td>
<td>43.5</td>
<td>548.9</td>
</tr>
<tr>
<td>Mixture ratio uncertainty</td>
<td>17.0</td>
<td>531.9</td>
</tr>
<tr>
<td>Usable</td>
<td></td>
<td>531.9</td>
</tr>
<tr>
<td>Nominal usage through lunar landing</td>
<td>158.8</td>
<td>373.1</td>
</tr>
<tr>
<td>Nominal usage from landing through docking</td>
<td>121.0</td>
<td>252.1</td>
</tr>
<tr>
<td>Nominal usage from docking through impact</td>
<td>110.0</td>
<td>142.1</td>
</tr>
<tr>
<td>Usable propellant remaining</td>
<td></td>
<td>142.1</td>
</tr>
</tbody>
</table>
Figure 4-3. - LM RCS propellant profile.
LM ECS Assumptions

a. The oxygen analyses were calculated using a cabin leak rate of 0.06 lb/hr based on previous Apollo postflight analyses.

b. Metabolic rates were varied using the time line of reference 4 and table 4.3-II of reference 2.

c. Metabolic oxygen consumed was calculated by 

\[
(1.643 \times 10^{-6} \text{ lb/Btu}) \times \text{ (metabolic rate, Btu/hr)}.
\]

d. The cabin regulator check and the suit integrity check were assumed to require 0.5 pound of oxygen.

e. The cabin was pressurized three times with 5.5 pounds required for each pressurization.

f. The dispersion in the oxygen profile was calculated as 5 percent of the nominal oxygen requirement.

g. The PLSS refill requires 15 pounds of water and 1.7 pounds of oxygen.

h. Water lost through crew micturition was 0.11 lb/hr per man.

i. Water required for thermal control was calculated by dividing the total spacecraft heat load by 1040 Btu/lb.

j. The dispersion in the water profile was calculated as 10 percent of the nominal usage.

k. The average glycol flow rate used in this analysis was 252 lb/hr.

l. It was assumed that the liquid cooled garments were used throughout the LM-active periods.
TABLE 4-6
LM ECS SUMMARY

(a) Water

<table>
<thead>
<tr>
<th>Description</th>
<th>Descent, lb</th>
<th>Ascent, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded</td>
<td>266.0</td>
<td>85.0</td>
</tr>
<tr>
<td>Sampling</td>
<td>16.0</td>
<td>--</td>
</tr>
<tr>
<td>Residual</td>
<td>6.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Loading uncertainty</td>
<td>7.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Available for mission</td>
<td>235.6</td>
<td>80.8</td>
</tr>
<tr>
<td>Required to lunar landing</td>
<td>35.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Required to lunar lift-off</td>
<td>108.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Required to LM/CSM docking</td>
<td>0.0</td>
<td>8.7</td>
</tr>
<tr>
<td>Required to LM close-out</td>
<td>0.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Remaining in tank(s)</td>
<td>92.1</td>
<td>66.1</td>
</tr>
<tr>
<td>Dispersion</td>
<td>14.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Margin</td>
<td>77.8</td>
<td>64.6</td>
</tr>
</tbody>
</table>

(b) Oxygen

<table>
<thead>
<tr>
<th>Description</th>
<th>Descent, lb</th>
<th>Ascent 1, lb</th>
<th>Ascent 2, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded</td>
<td>41.3</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Residual</td>
<td>0.8</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Loading uncertainty</td>
<td>1.5</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Available for mission</td>
<td>39.0</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Required to lunar landing</td>
<td>2.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Required to lunar lift-off</td>
<td>24.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Required to LM/CSM docking</td>
<td>0.0</td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Required to LM close-out</td>
<td>0.0</td>
<td>0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Remaining in tank(s)</td>
<td>12.6</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Dispersion</td>
<td>1.3</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Margin</td>
<td>11.3</td>
<td>1.2</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Swalin/GPB/MPAD (for LM Systems)
Data source FISH PLAN
Data confirmed Bull

Mission profile dependent

LM 9-6.- Ascent stage oxygen remaining. (January 31 launch date)

12/1/70 Final

Figure 4-4.- Ascent tank 1 oxygen remaining.

4-15
Figure 4.5- Descent oxygen remaining.

4-16
Swalin/GPB/MPAD (for LM Systems)
Data source: FLIGHT PLAN
Data confirmed: [Redacted]

Mission profile dependent

LM 9-7: Ascent stage water remaining, (January 31 launch date) 12/1/70 Final

Usable remaining water, lb/tank
Ascent water remaining, percent

Ground elapsed time, hr

Lift-off
Docking
LM close-out

Unusable

Figure 4-6: Ascent water remaining.

4-17
Figure 4-7.- Descent water remaining.
GROUND RULES AND ASSUMPTIONS FOR THE CSM CRYOGENICS

1. Three O\textsubscript{2} tanks and two H\textsubscript{2} tanks are available.

2. Fuel cell purging is included in the EPS requirements.

3. Both H\textsubscript{2} tanks and two of the three O\textsubscript{2} tanks are assumed to be fully loaded. The third O\textsubscript{2} tank is to be off-loaded to approximately 62 percent at lift-off.

4. No cryogenic venting was assumed in flight.

5. The EPS hydrogen consumption rate (\dot{\text{H}}\textsubscript{2}) (lb/hr) = 0.00257 \times I\textsubscript{fc} when I\textsubscript{fc} is the total fuel cell current.

6. The EPS oxygen consumption rate (\dot{\text{O}}\textsubscript{2}) (lb/hr) = 7.936 \times \dot{\text{H}}\textsubscript{2}.

7. The launch redlines for O\textsubscript{2} are defined as points on the curve. These points are contingent upon accomplishing DTO 4.6 which is greater than a tank loss requirement. However, if lift-off were to occur at these points, a somewhat different tank management scheme would have to be employed, even if no tank failed. If a tank failure were to occur then a nominal 40 Amp return level plus ECS would be employed on the remaining two tanks.
**TABLE 4-7**

APOLLO 14 CRYOGENIC SUMMARY

[31 Jan, 1971 Launch]

<table>
<thead>
<tr>
<th></th>
<th>$H_2$ (lbs)</th>
<th>$O_2$ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planning allowance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total loaded</td>
<td>58.6</td>
<td>990.3</td>
</tr>
<tr>
<td>Less residual</td>
<td>2.3</td>
<td>19.8</td>
</tr>
<tr>
<td>Less instrumentation error</td>
<td>1.5</td>
<td>21.8</td>
</tr>
<tr>
<td>Available for mission planning</td>
<td>54.8</td>
<td>948.7</td>
</tr>
<tr>
<td><strong>Prelaunch requirement</strong></td>
<td>3.7</td>
<td>130.4*</td>
</tr>
<tr>
<td><strong>Flight requirement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS (incl. F/C purge)</td>
<td>39.2</td>
<td>310.5</td>
</tr>
<tr>
<td>ECS (including cabin purge + EVA)</td>
<td>--</td>
<td>87.5</td>
</tr>
<tr>
<td>LM pressurization</td>
<td>--</td>
<td>12.5</td>
</tr>
<tr>
<td><strong>Nominal reserves</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS uncertainty (2.5%)</td>
<td>1.0</td>
<td>7.8</td>
</tr>
<tr>
<td>ECS uncertainty (.08 #/hr)</td>
<td>--</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Total requirement</strong></td>
<td>43.9</td>
<td>566.0</td>
</tr>
<tr>
<td><strong>Margin T = 0 (fill/launch)</strong></td>
<td>10.9</td>
<td>382.7</td>
</tr>
</tbody>
</table>

*Prelaunch requirement includes off-loading of tank 3.*
Figure 4-8. - CSM oxygen remaining.
Figure 4-9. - CSM hydrogen remaining in one tank.

- Predicted nominal
- Expected usage assuming:
  (a) Lift-off at launch redline quantity
  (b) Tank failure at critical point
  (c) Power down to 40 amp average after failure
THE SPS ANALYSIS

Assumptions for the SPS Propellant Analysis

1. The $3\sigma$ dispersions are the RSS of the penalties imposed on the SPS margin by $3\sigma$ dispersions in propellant loading, mixture ratio, engine $I_{sp}$, maneuver $\Delta V$, spacecraft weight, and consumable weight losses. The engine $I_{sp}$ and dispersion utilized in this analysis were taken from Table II of the Apollo Mission H3/CSM-110/SPS Preflight Performance Report, NAS 9-8166, dated November 1970. All spacecraft weights and consumable losses are from Volume III, Amendment 88, of the Spacecraft Operational Data Book, dated October 5, 1970.

2. The allowance for the TLMC is now debited from the nominal remaining propellant along with the $3\sigma$ dispersions. It is only a format change, not a budgeting technique change.

3. The ground rule for a contingency allowance is to budget for either a LM rescue or a maneuver to avoid adverse weather conditions at entry, whichever produces the least SPS propellant margin. The $\Delta V$ for the LM rescue allowance is 600 fps. The $\Delta V$ for weather avoidance for previous missions has been 500 fps. However, for this mission, the $\Delta V$ requirement for weather avoidance has been reduced to 300 fps. The propellant margin when considering either contingency, LM rescue or the 300 fps for weather avoidance, is approximately the same.
TABLE 4-8
APOLLO 14 SPS PROPELLANT SUMMARY

[Jan. 31, 1971, launch; 72° launch azimuth]

<table>
<thead>
<tr>
<th>Item</th>
<th>Propellant required, lb</th>
<th>Propellant remaining, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total loaded</td>
<td>40 796.0</td>
<td></td>
</tr>
<tr>
<td>Trapped and unavailable</td>
<td>441.4</td>
<td>40 354.6</td>
</tr>
<tr>
<td>Outage</td>
<td>59.8</td>
<td>40 294.8</td>
</tr>
<tr>
<td>Unbalance meter</td>
<td>100.0</td>
<td>40 194.8</td>
</tr>
<tr>
<td>Available for ΔV</td>
<td></td>
<td>40 194.8</td>
</tr>
<tr>
<td>Requirement for ΔV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hybrid (73.4 fps)</td>
<td>724.2</td>
<td>39 470.6</td>
</tr>
<tr>
<td>LOI (2986 fps)</td>
<td>24 777.8</td>
<td>14 692.8</td>
</tr>
<tr>
<td>DOI (206.6 fps)</td>
<td>1 470.8</td>
<td>13 222.0</td>
</tr>
<tr>
<td>CIRC (72.5 fps)</td>
<td>272.8</td>
<td>12 949.2</td>
</tr>
<tr>
<td>LOPC (360.7 fps)</td>
<td>1 269.2</td>
<td>11 680.0</td>
</tr>
<tr>
<td>TEI (3449.5 fps)</td>
<td>10 059.4</td>
<td>1 620.6</td>
</tr>
<tr>
<td>Nominal remaining</td>
<td></td>
<td>1 620.6</td>
</tr>
<tr>
<td>Dispersions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-3σ performance</td>
<td>473.0</td>
<td>1 147.6</td>
</tr>
<tr>
<td>TLMC (33 fps)</td>
<td>346.2</td>
<td>801.4</td>
</tr>
<tr>
<td>Contingency (326 fps)*</td>
<td>301.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Propellant margin</td>
<td></td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Available for weather avoidance.
SM RCS BUDGET

Ground Rules and Assumptions

1. Following transposition and docking, the S-IVB performs the evasive maneuver.

2. Two midcourse corrections (translunar) are executed as SPS burns with one MCC followed by an RCS trim.

3. One midcourse correction (transearth) is executed as an RCS burn of 5 fps.

4. Quad management is to be determined during the mission.

5. Redlines have been defined by the Flight Control Division as an aid in assuring that mission rules are not violated during the mission. They are subject to review during the mission as mission phases are completed and systems capabilities are evaluated. In the event the rescue redline is violated prior to rendezvous, lunar orbit photography activities can be curtailed to conserve propellant. The lunar orbit redline includes a nominal transearth coast phase (with all navigational sightings) plus a 3 sigma G&N TEI cutoff error MCC. If a rescue is required and the lunar orbit redline is violated prior to the nominal TEI, TEI can be performed early and navigational sighting activity cut-tailed during the transearth phase. The rescue redline is based on the minimized activity during the transearth phase.
<table>
<thead>
<tr>
<th>Item</th>
<th>Propellant required, lb</th>
<th>Propellant remaining, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected loading</td>
<td>--</td>
<td>1342.4</td>
</tr>
<tr>
<td>Initial outage caused by loading mixture ratio</td>
<td>15.6</td>
<td>--</td>
</tr>
<tr>
<td>Total trapped</td>
<td>26.4</td>
<td>--</td>
</tr>
<tr>
<td>Gaging inaccuracy</td>
<td>80.4</td>
<td>--</td>
</tr>
<tr>
<td>Deliverable</td>
<td>--</td>
<td>1220.0</td>
</tr>
<tr>
<td>Nominal usage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Translunar coast</td>
<td>199</td>
<td>--</td>
</tr>
<tr>
<td>Lunar orbit</td>
<td>431</td>
<td>--</td>
</tr>
<tr>
<td>Transearth coast</td>
<td>220</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td>850</td>
<td>--</td>
</tr>
<tr>
<td>Nominal remaining usable propellant</td>
<td>--</td>
<td>370</td>
</tr>
</tbody>
</table>
C6M 11-5. Total SM RCS propellant profile. (January 31 launch date)

Launch day dependent
Launch month dependent
Mission profile dependent

12/1/70 Final

Figure 4-10. Total SM RCS propellant usage profile.
Figure 4-11. SM RCS propellant profile - quad A.

4-28
Figure 4-12. SM RCS propellant profile - quad B.
Figure 4-13. SM RCS propellant profile - quad C.
Figure 4-14.- SM RCS propellant profile - quad D.
<table>
<thead>
<tr>
<th>Item</th>
<th>Propellant required, lb</th>
<th>Propellant remaining, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded</td>
<td>--</td>
<td>245.0</td>
</tr>
<tr>
<td>Trapped</td>
<td>36.4</td>
<td>208.6</td>
</tr>
<tr>
<td>Available for mission planning</td>
<td>--</td>
<td>208.6</td>
</tr>
<tr>
<td>Nominal usage</td>
<td>38.9</td>
<td>169.7</td>
</tr>
<tr>
<td>Nominal remaining</td>
<td>--</td>
<td>169.7</td>
</tr>
</tbody>
</table>
SECTION 5 - ABBREVIATED TIMELINE
FLIGHT PLAN

1423 CST FEB 2

48:00
49:00
50:00
51:00
52:00
53:00
54:00

CSM

54:00
55:00
56:00
57:00
58:00
59:00
60:00

CSM

LIFT-OFF TIME UPDATE (IF REQUIRED)

REST PERIOD (10 HR)

EAT PERIOD

PTC

PTC

EAT PERIOD

P52 IMU REALIGN, OPT 3

MISSION EDITION DATE TIME DAY/REV PAGE
APOLLO 14 FINAL (JAN) DECEMBER 2, 1970 48:00 - 60:00 2-3/TLC 5-5
FLIGHT PLAN

CSM

P52 IMU REALIGN, OPT 3

0223 CST

FEB 4

84:00

REV 2

85:00

86:00

REV 3

87:00

88:00

REV 4

89:00

90:00

91:00

92:00

93:00

94:00

95:00

96:00

90:00

91:00

92:00

93:00

94:00

95:00

96:00

CSM

EAT PERIOD

REST PERIOD

REST ATTITUDE

P24 TRACK LDMK MöSTING A
PRE-DOI SYSTEMS CHECK
P52 IMU REALIGN, OPT 3

PREP FOR DOI

86:57

IF REQ'D 87:28

BAILOUT BURN

P24 TRACK LDMK H-3 (NO MARKS)
P52 IMU REALIGN, OPT 3

PHOTO DESCARTES

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 84:00 - 96:00 | 4/1-7 | 5-8
FLIGHT PLAN

CSM

144:00
PREP FOR DOCKING
DOCKING 144:10
CLEAR TUNNEL

145:00
REV 33

146:00
PREP FOR LM JETTISON
LM JETTISON 146:24
CSM SEPARATION 146:29
P52 IMU REALIGN, OPT 3
P52 IMU REALIGN, OPT 1
CONTAMINATION CONTROL

147:00
REV 34

148:00
PRE-TEI CHECKS
LM DEORBIT BURN 147:52
LM IMPACT 148:21
LTC PHOTOS OF S-IVB/LM IMPACT SITES

149:00
REV 35

150:00
TEI BURN PREP
TEI 149:15
LUNAR PHOTOGRAPHY

LM

150:00
STOW DROGUE AND PROBE
TRANSFER EQUIP TO CSM
DECONTAMINATION
PREP FOR LM JETTISON
DOFF PGA & LCG
CDR AND LMP IVT TO CSM

151:00

152:00

153:00

154:00

155:00

156:00

CSM

P52 IMU REALIGN, OPT 3
P52 IMU REALIGN, OPT 1
LUNAR PHOTOGRAPHY

REST PERIOD
(10 HR)

PTC

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
---|---|---|---|---|---
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 144:00 - 156:00 | 6 /32-TEC | 5-13
FLIGHT PLAN

0223 CST
FEB 7

156:00
157:00
158:00
159:00
160:00
161:00
162:00

CSM
CSM

162:00
163:00
164:00
165:00
166:00
167:00
168:00

EAT PERIOD
PTC

P52 IMU REALIGN, OPT 3
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR

REST PERIOD
(10 HR)
PTC

PREP FOR MCC-5 (IF REQ'D)

(THERMAL
ATTITUDE
(EXCEPT
FOR MCC-5))

MCC-5 166:15
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR
(3 LUNAR & 3 EARTH HORIZON SIGHTINGS)

168:00

O₂ FLOW RATE TEST
O₂ FLOW RATE TEST ATTITUDE

<table>
<thead>
<tr>
<th>MISSION</th>
<th>EDITION</th>
<th>DATE</th>
<th>TIME</th>
<th>DAY/REV</th>
<th>PAGE</th>
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<td>APOLLO 14</td>
<td>FINAL (JAN)</td>
<td>DECEMBER 2, 1970</td>
<td>156:00 - 168:00</td>
<td>6-7/TEC</td>
<td>5-14</td>
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FLIGHT PLAN

CSM

1423 CST
FEB 8

192:00
P52 IMU REALIGN, OPT 3

PTC

198:00
BACKUP GDC ALIGNMENT
CRESCENT ALIGN

CSM

192:00

193:00
P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR

199:00

EAT PERIOD

194:00
PREP FOR MCC-6 (IF REQ'D)

194:27
MCC-6

199:00

PTC IF
NO MCC-6

200:00

REST PERIOD
(8 HR)

195:00

CONTAMINATION CONTROL

201:00

PTC

MSFN

196:00

202:00

PTC

MSFN

197:00

P23 CISLUNAR NAVIGATION
3 MARKS ON EACH STAR

203:00

EARTH DARKSIDE
DIM LIGHT PHOTOS

204:00

MISSION | EDITION | DATE | TIME | DAY/REV | PAGE
----- | ------- | ---- | ---- | ------- | ----
APOLLO 14 | FINAL (JAN) | DECEMBER 2, 1970 | 192:00 - 204:00 | 8/TEC | 5-17
SECTION 6 - ALTERNATE MISSION TIMELINES