NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MSC INTERNAL NOTE NO. 69-FM-100

May 15, 1969

NI

SPACECRAFT OPERATIONAL TRAJECTORY FOR MISSION G VOLUME III MISSION SUMMARIES: JULY 1969 LAUNCH WINDOW

Technical Library, Bellcomm, Inc.

MAY 26 1969

Lunar Mission Analysis Branch

MISSION PLANNING AND ANALYSIS DIVISION

MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

(NASA-TM-X-69659) SPACECRAFT OPERATIONAL TRAJECTORY FOR MISSION G. VOLUME 3: MISSION SUMMARIES, JULY 1969 LAUNCH WINDOW (NASA) 111 p

N74-70699

Unclas

00/99 16372

MSC INTERNAL NOTE NO. 69-FM-100

PROJECT APOLLO

SPACECRAFT OPERATIONAL TRAJECTORY FOR MISSION G
VOLUME III - MISSION SUMMARIES
JULY 1969 LAUNCH WINDOW

By Lunar Mission Analysis Branch

May 15, 1969

MISSION PLANNING AND ANALYSIS DIVISION
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

Approved: Ronald L. Berry
Ronald L. Berry, Chief
Lunar Mission Analysis Branch

Approved: John P. Mayer
John P. Mayer, Chief
Mission Planning and Analysis Division

Appellate

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

MAY 2 7 1969

NASA - Manned Spacecraft Center
Mission Planning & Analysis Division

TO : See attached list

DATE: MAY 1 2 1969
File No. 69-FM13-272

FROM : FM13/Chief, Mission Planning Support Office

SUBJECT: Apollo 11 (G) Mission Operational Trajectory, Volume III

The attached document presents the Apollo 11 (G) Mission Operational Trajectory, Volume III--Mission Summaries. Volume III contains a summary of the CSM trajectory parameters for the mission opportunities for the July launch window. The foreword in the document describes additional volumes of the O. T. that will be distributed separately.

The O. T. is an update to, and completely replaces, the Revised Reference Trajectory (I.N. 69-FM-5). There are no pending mission changes which will require revising Volume III. Assuming there are no major changes in the future, the mission summaries in Volume III are valid until launch time.

for J. R. Gurley
R. P. Parten

APPROVED BY:

John P. Mayer
Chief, Mission Planning
and Analysis Division

Enclosure

Addressees:
(See attached list)
(Distribution "D")

FM13:JRGurley:lg

5010-108

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

FOREWORD

The spacecraft operational trajectory for Mission G is composed of five volumes which summarize the lunar landing missions for a 3-month launch period, July, August, and September. The contents of each volume are briefly described below.

1. Volume I - Operational Mission Profile, Launched July 16, 1969: Detailed mission description of the first launch opportunity, first injection opportunity, of the July launch window. MSC IN 69-FM-98.

2. Volume II - Operational Mission Profile Trajectory Parameters, Launched July 16, 1969: Listing of significant trajectory parameters computed at selected time points during each phase of the same typical mission described in Volume I. MSC IN 69-FM-99.

3. Volume III - Mission Summaries: July 1969 Launch Window: Summaries of CSM trajectory parameters at selected time points for each launch date in the July 1969 launch window. MSC IN 69-FM-100.

4. Volume IV - Mission Summaries: August 1969 Launch Window: Summaries of CSM trajectory parameters at selected time points for each launch date in the August 1969 window. MSC IN 69-FM-101.

5. Volume V - Mission Summaries: September 1969 Launch Window: Summaries of CSM trajectory parameters at selected time points for each launch date in the September 1969 window. MSC IN 69-FM-102.

In addition to the five volumes of the operational trajectory described above, six additional documents supplement the operational trajectory.

6. Hybrid Operational Mission Profile, Launched September 13, 1969: Detailed mission description for a typical hybrid mission profile. MSC IN 69-FM-111.

7. Hybrid Operational Mission Profile Trajectory Parameters, Launched September 13, 1969: Same trajectory parameter data as Volume II except compiled from the hybrid mission. MSC IN 69-FM-112.

8. Preliminary Lunar Orbit Attitude Sequence: CSM and LM attitude sequence of events for the lunar orbit phase of the mission. MSC IN 69-FM-103. A more detailed attitude sequence for the entire mission will follow the preliminary document by 1 month.

9. TLI Ship Position and Coverage Data, July 1969 Launch Opportunities: Injection ship positions and the launch azimuth range coverage for each day for both injection opportunities. MSC IN 69-FM-104. Ship positions for the August and September opportunities will be presented in separate documents.

10. Flight Crew Simulator Data: Provides data to satisfy flight crew and flight controller training and simulation requirements. MSC IN 69-FM-105.

11. Operational Trajectory Consumables Analysis: Prediction of the consumables usage and margins. MSC IN 69-FM-106.

TABLES

Table		Page
I	DEFINITION OF SYMBOLS AND TERMS	4
II	SUMMARY OF MISSIONS FOR JULY 16 LAUNCH WINDOW	
	(a) Mission summaries for specific launch azimuths (72°, 81°, 90°, 99°, 108°)	12
	(b) Mission parameters across launch azimuth range (72° - 108°)	32
III	SUMMARY OF MISSIONS FOR JULY 18 LAUNCH WINDOW	
	(a) Mission summaries for specific launch azimuths (72°, 81°, 90°, 99°, 108°)	42
	(b) Mission parameters across launch azimuth range (72° - 108°)	62
IV	SUMMARY OF MISSIONS FOR JULY 21 LAUNCH WINDOW	
	(a) Mission summaries for specific launch azimuths (72°, 81°, 90°, 99°, 108°)	72
	(b) Mission parameters across launch azimuth range (72° - 108°)	102

DEFINITION OF SYMBOLS AND TERMS

SUMMARY OF MISSIONS FOR JULY 16 LAUNCH WINDOW

SUMMARY OF MISSIONS FOR JULY 18 LAUNCH WINDOW

SUMMARY OF MISSIONS FOR JULY 21 LAUNCH WINDOW

DEFINITION OF SYMBOLS AND TERMS

TABLE I.- DEFINITION OF SYMBOLS AND TERMS

ALT	geodetic altitude
ALTS	selenographic altitude (measured from mean sphere)
APF	argument of periapsis, geocentric
APFS	argument of periapsis, selenocentric
APOS	radius of apoapsis, selenocentric
AZ	inertial azimuth, geocentric
AZE	rotational geographic azimuth
AZR	selenographic azimuth
AZTD	azimuth at earth landing
BARC	burn arc
BETA	angle between the projection of the thrust acceleration vector and the velocity vector into the local horizontal plane
C3TLI	vis-viva energy at translunar injection cutoff (C3), $(e.r.)^2/hr^2$
DAZTLI	plane change during translunar injection - the angle between the earth parking orbit plane and the initial translunar trajectory plane
DEC	geocentric declination of vehicle
DELV	characteristic velocity gained during thrust
DEM	geocentric declination of the moon
DEMP	earth-moon plane latitude of the intersection of the lunar approach hyperbola with the lunar parking orbit plane
DES	geocentric declination of the sun

TABLE I.- DEFINITION OF SYMBOLS AND TERMS - Continued

DTBURN	burn time, sec
DTSUN	delta time to terminator: to sunrise when negative; to sunset when positive
DX, DY, DZ	components of vehicle velocity in inertial geocentric Cartesian coordinates
DXL, DYL, DZL	components of vehicle velocity in inertial selenocentric Cartesian coordinates
DXS, DYS, DZS	components of vehicle velocity in rotational selenographic Cartesian coordinates
ECC	eccentricity, geocentric
ECCS	eccentricity, selenocentric
ENERGY	vis-viva energy at translunar injection cutoff (C3), $(e.r.)^2/hr^2$
ENTDT	time from entry to earth landing
ENTRG	entry range - range from entry to touchdown
EPOI	earth parking orbit insertion
FUEL	propellant used, lb
PROP RESERVE	usable SPS propellant reserve prior to entry interface, lb
g.e.t.	ground elapsed time (time since lift-off)
G.m.t.	Greenwich mean time
HRS	hours

TABLE I.- DEFINITION OF SYMBOLS AND TERMS - Continued

ID	mission identification number. The sixth and seventh digits to the left of the decimal indicate the month of launch, the following two digits indicate the day of launch (G.m.t.), the next three digits indicate the launch azimuth, and the digit following the decimal indicates the translunar injection opportunity. (e.g., 204072.2 signifies a February 4 mission with a 72° launch azimuth designed to inject on the second opportunity.)
INC	inclination of the vehicle flight plane to the earth equatorial plane
INCS	selenocentric inclination of the vehicle flight plane
INJECTION OPPORTUNITY	an indicator: if = 1, indicates a mission designed for a translunar injection over the Pacific during the second earth orbit; if = 2, indicates a Pacific injection during the third earth orbit
INMP	inclination of the vehicle flight plane to the earth-moon plane
LAN	selenographic longitude of the ascending node
LAP	selenographic argument of periapsis
LAT	geodetic latitude
LATS	selenographic latitude
LATTD	geodedic latitude of earth landing
LAZ	inertial azimuth of launch
LIN	selenographic inclination of the vehicle flight plane
LNE	selenographic longitude of the earth

TABLE I.- DEFINITION OF SYMBOLS AND TERMS - Continued

DTBURN	burn time, sec
DTSUN	delta time to terminator: to sunrise when negative; to sunset when positive
DX, DY, DZ	components of vehicle velocity in inertial geocentric Cartesian coordinates
DXL, DYL, DZL	components of vehicle velocity in inertial selenocentric Cartesian coordinates
DXS, DYS, DZS	components of vehicle velocity in rotational selenographic Cartesian coordinates
ECC	eccentricity, geocentric
ECCS	eccentricity, selenocentric
ENERGY	vis-viva energy at translunar injection cutoff (C3), $(e.r.)^2/hr^2$
ENTDT	time from entry to earth landing
ENTRG	entry range - range from entry to touchdown
EPOI	earth parking orbit insertion
FUEL	propellant used, lb
PROP RESERVE	usable SPS propellant reserve prior to entry interface, lb
g.e.t.	ground elapsed time (time since lift-off)
G.m.t.	Greenwich mean time
HRS	hours

TABLE I.- DEFINITION OF SYMBOLS AND TERMS - Continued

ID	mission identification number. The sixth and seventh digits to the left of the decimal indicate the month of launch, the following two digits indicate the day of launch (G.m.t.), the next three digits indicate the launch azimuth, and the digit following the decimal indicates the translunar injection opportunity. (e.g., 204072.2 signifies a February 4 mission with a 72° launch azimuth designed to inject on the second opportunity.)
INC	inclination of the vehicle flight plane to the earth equatorial plane
INCS	selenocentric inclination of the vehicle flight plane
INJECTION OPPORTUNITY	an indicator: if = 1, indicates a mission designed for a translunar injection over the Pacific during the second earth orbit; if = 2, indicates a Pacific injection during the third earth orbit
INMP	inclination of the vehicle flight plane to the earth-moon plane
LAN	selenographic longitude of the ascending node
LAP	selenographic argument of periapsis
LAT	geodetic latitude
LATS	selenographic latitude
LATTD	geodedic latitude of earth landing
LAZ	inertial azimuth of launch
LIN	selenographic inclination of the vehicle flight plane
LNE	selenographic longitude of the earth

TABLE I.- DEFINITION OF SYMBOLS AND TERMS - Continued

LNS	selenographic longitude of the sun
LOI	lunar orbit insertion
LON	geographic longitude
LONS	selenographic longitude
LONTD	geographic longitude of earth landing
LOS	geographic longitude of the sun
LTE	selenographic latitude of the earth
LTS	selenographic latitude of the sun
MASS	instantaneous mass of the vehicle, lb
MINS	minutes
MONTH	month of the year
OPP	same as INJECTION OPPORTUNITY
PERNAD	angle between moon's nadir at TEI and vehicle earth perigee vector
PERS	period of the orbit, hours
PLCHNG	total orbital plane change since thrust initiation
PROP	SPS propellant used, lb
PTE	rotational geographic flight-path angle
PTH	inertial geocentric flight-path angle
PTR	selenographic flight-path angle
R	inertial geocentric radius vector magnitude
RA	inertial geocentric right ascension
RAM	inertial geocentric right ascension of the moon

TABLE I.- DEFINITION OF SYMBOLS AND TERMS - Continued

RAMP	earth-moon plane longitude of the intersection of the lunar approach hyperbola with the lunar parking orbit plane
RAN	inertial geocentric right ascension of the ascending node
RANS	right ascension of ascending node in selenocentric reference
RAS	inertial geocentric right ascension of the sun
RBVS	reference body-vehicle-sun angle
RMP	selenocentric radius of the intersection of the lunar approach hyperbola with the lunar parking orbit plane
RP	radius of periapsis
RPS	radius of periapsis in selenocentric reference
SECS	seconds
SEM	sun-earth-moon angle
SMA	semimajor axis
SMAS	semimajor axis, selenocentric
SPSFR	SPS propellant reserve at entry
TAS	true anamoly in selenocentric reference
TEI	transearth injection
THETA	angle between the thrust acceleration vector and the local horizontal plane
TLI	translunar injection

TABLE I.- DEFINITION OF SYMBOLS AND TERMS - Concluded

V	inertial geocentric velocity vector magnitude
VE	rotational geographic velocity vector magnitude
VRS	rotational selenographic velocity vector magnitude
X, Y, Z	components of vehicle position in inertial geocentric Cartesian coordinates
XL, YL, ZL	components of vehicle position in inertial selenocentric Cartesian coordinate
XS, YS, ZS	components of vehicle position in rotational selenographic Cartesian coordinates
YEAR	calendar year

SUMMARY OF MISSIONS FOR JULY 16 LAUNCH WINDOW

TABLE II.- SUMMARY OF MISSIONS FOR JULY 16 LAUNCH WINDOW

(a) Mission summaries for specific launch azimuths (72°, 81°, 90°, 99°, 108°)

```
*****************************************************************************************************************

ID    0716072.1
LAUNCH TIME     16   JULY 1969   13 HRS,   31 MINS,  45.274 SECS   G.M.T.
LAUNCH AZIMUTH   72.                          INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID    0716072.1
EARTH PARKING ORBIT INSERTION
 16   JULY 1969 13 HRS, 43 MINS,  9.317 SECS  G.M.T. ***  0. HRS, 11. MINS, 24.042 SECS  G.E.T. ***  T   1.90011727-01 HRS
X      2.1735578+02  Y      2.9753806+03  Z      1.9129378+03  DX    -2.5519457+04  DY     1.3644677+03  DZ     7.7733345+02
ALT    1.0337523+02  LAT    3.2838504+01  LON    3.0580793+02  V      2.5567727+04  PTH    5.8945157-08  AZ     8.7930236+01
R      3.5439334+03  DEC    3.2668535+01  RA     8.5821882+01  RAS    1.1572056+02  DES    2.1339186+01  RAN   -3.4770329-01
INC    3.2726785+01  MASS   2.9588213+05
*****************************************************************************************************************

ID    0716072.1
3.5 MINS PRIOR TO TLI INITIATION
 16   JULY 1969 16 HRS, 12 MINS, 33.054 SECS  G.M.T. ***  2. HRS, 40. MINS, 47.779 SECS  G.E.T. ***  T   2.67993870+00 HRS
X      3.2598109+03  Y     -1.1840581+03  Z     -7.1913570+02  DX     1.0018568+04  DY     1.9744385+04  DZ     1.2834797+04
ALT    9.8509662+01  LAT   -1.1788963+01  LON    1.6257240+02  V      2.5591883+04  PTH    3.1715159-02  AZ     5.9182780+01
*****************************************************************************************************************

ID    0716072.1
TRANSLUNAR INJECTION INITIATION
 16   JULY 1969 16 HRS, 16 MINS,  3.054 SECS  G.M.T. ***  2. HRS, 44. MINS, 17.779 SECS  G.E.T. ***  T   2.73827201+00 HRS
X      3.5013803+03  Y     -4.7200827+02  Z     -2.5778297+02  DX     3.8879411+03  DY     2.1245996+04  DZ     1.3723345+04
ALT    9.8571552+01  LAT   -4.2003272+00  LON    1.7397994+02  V      2.5589814+04  PTH    2.9851713-02  AZ     5.7469723+01
R      3.5424437+03  DEC   -4.1730918+00  RA    -7.6775504+00  RAS    1.1582770+02  DES    2.1321655+01  RAN   -1.1686689+00
INC    3.2767669+01  MASS   2.9265462+05
*****************************************************************************************************************

ID    0716072.1
TRANSLUNAR INJECTION TERMINATION
 16   JULY 1969 16 HRS, 21 MINS, 24.059 SECS  G.M.T. ***  2. HRS, 49. MINS, 38.785 SECS  G.E.T. ***  T   2.82744020+00 HRS
X      3.4462959+03  Y      8.8855848+02  Z      6.0716937+02  DX    -6.3617184+03  DY     2.9887360+04  DZ     1.8279823+04
ALT    1.6681622+02  LAT    9.7425297+00  LON    1.9477401+02  V      3.5607270+04  PTH    7.0287669+00  AZ     5.9754915+01
R      3.6104218+03  DEC    9.6815122+00  RA     1.4457696+01  RAS    1.1583145+02  DES    2.1321040+01  DEM    1.8630930+01
SEM    2.3055826+01  RBVS   8.3108365+01  RAN   -1.6311858+00  INC    3.1616589+01  ECC    9.7626752-01  SMA    1.4982433+05
RP     3.5557034+03  APF    4.4817336+00  INMP   3.1342844+00  C3TLI -4.5764394-01  DAZTLI 1.1771481+00  MASS   1.3700837+05
PROP   1.5564625+05
*****************************************************************************************************************

ID    0716072.1
TRANSLUNAR INJECTION + 2 HOURS
 16   JULY 1969 18 HRS, 21 MINS, 24.059 SECS  G.M.T. ***  4. HRS, 49. MINS, 38.785 SECS  G.E.T. ***  T   4.82744020+00 HRS
X     -1.5500660+04  Y      1.2625899+04  Z      7.4838268+03  DX    -1.3443745+04  DY     3.9408716+03  DZ     2.1794540+03
ALT    1.7904415+04  LAT    2.0543190+01  LON    2.9107000+02  V      1.4177968+04  PTH    6.5069540+01  AZ     1.1457757+02
R      2.1346930+04  DEC    2.0522851+01  RA     1.4083582+02  RAS    1.1591552+02  DES    2.1307231+01
*****************************************************************************************************************

ID    0716072.1
LUNAR ORBIT INSERTION BURN INITIATION
 19   JULY 1969 17 HRS, 26 MINS, 18.585 SECS  G.M.T. *** 75. HRS, 54. MINS, 33.308 SECS  G.E.T. ***  T   7.59092522+01 HRS
XL    -1.0055103+03  YL    -1.4266760+02  ZL    -8.0504371+01  DXL    -1.0388892+01  DYL    7.3325602+03  DZL    3.8297968+03
XS    -1.0061775+03  YS    -1.5790463+02  ZS    -2.3640523+01  DXS     2.2094983+01  DYS    8.2482460+03  DZS    8.1724960+02
ALTS   8.0273363+01  LATS  -1.3296701+00  LONS  -1.7108102+02  VRS     8.2886636+03  PTR   -9.1581874+00  AZR   -8.4482113+01
LIN    1.7431386+02  LAN    1.7543828+02  LAP    7.2481267+01  LTS     1.3151614+00  LNS    1.1648392+02  DEM    2.3426620+00
THETA  1.5501583+01  BETA  -1.7127981+02  MASS   9.5199404+04  DRTX   -2.8889973+03  DRTY  -4.2664693+02  DRTZ   1.2961321+01
*****************************************************************************************************************

ID    0716072.1
LUNAR ORBIT INSERTION BURN TERMINATION
 19   JULY 1969 17 HRS, 32 MINS, 24.270 SECS  G.M.T. *** 76. HRS,  0. MINS, 38.995 SECS  G.E.T. ***  T   7.60108318+01 HRS
XL    -9.6439738+02  YL     2.3162231+02  ZL     1.0156562+02  DXL    1.3648069+03  DYL    4.8860630+03  DZL    2.0866957+03
XS    -9.6302128+02  YS     2.5803901+02  ZS     5.7136247+00  DXS    1.3976348+03  DYS    5.3198607+03  DZS    1.1585890+02
ALTS   5.8515402+01  LATS   3.2835050-01  LONS   1.6500010+02  VRS    5.5016110+03  PTR    2.8664469-01  AZR   -8.8794951+01
LIN    1.7874760+02  LAN   -1.7980299+02  LAP    5.6108360+01  SMAS   1.0526200+03  ECCS   5.3068216-02  PERS   2.1454835+00
RPS    9.9675937+02  APOS   1.1084807+03  RANS  -1.7965557+02  INCS   1.5683890+02  LTS    1.3150857+00  LNS    1.1643214+02
LTE    9.5578908-02  LNE   -6.4384307+00  THETA -8.0392752+00  BETA  -1.6703091+02  PROP   2.3833469+04  BARC   2.3918887+01
DELV   2.9203572+03  MASS   7.1365936+04  PLCHNG-4.4393618+00
*****************************************************************************************************************

ID    0716072.1
CIRCULARIZATION BURN INITIATION
 19   JULY 1969 21 HRS, 47 MINS, 48.604 SECS  G.M.T. *** 80. HRS, 16. MINS,  3.329 SECS  G.E.T. ***  T   8.02675915+01 HRS
XL    -9.8491639+02  YL     1.3986433+02  ZL     6.2423643+01  DXL    8.4448682+02  DYL    4.9853252+03  DZL    2.1304410+03
XS    -9.7680011+02  YS     1.9841303+02  ZS     3.5826251+00  DXS    1.0970490+03  DYS    5.3912006+03  DZS    1.1815043+02
ALTS   5.8260721+01  LATS   2.0593817-01  LONS   1.6851798+02  VRS    5.5029555+03  PTR   -1.5562742-02  AZR   -8.8769655+01
LIN    1.7874901+02  LAN    1.7799174+02  LAP    1.7986037+02  LTS    1.3118879+00  LNS    1.1426186+02  DEM    2.6612677+00
THETA  3.8867020-01  BETA  -1.7999300+02  MASS   7.1316536+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID    0716072.1
CIRCULARIZATION BURN TERMINATION
 19   JULY 1969 21 HRS, 48 MINS,  3.456 SECS  G.M.T. *** 80. HRS, 16. MINS, 18.178 SECS  G.E.T. ***  T   8.02717161+01 HRS
XL    -9.8279464+02  YL     1.5188442+02  ZL     6.7560109+01  DXL    8.9150131+02  DYL    4.8493448+03  DZL    2.0721464+03
XS    -9.7406889+02  YS     2.1140804+02  ZS     3.8674610+00  DXS    1.1376007+03  DYS    5.2411852+03  DZS    1.1490895+02
ALTS   5.8260477+01  LATS   2.2231137-01  LONS   1.6775466+02  VRS    5.3644535+03  PTR    3.9823712-03  AZR   -8.8772602+01
LIN    1.7874903+02  LAN    1.7798948+02  LAP   -4.7091986+00  SMAS   9.9733806+02  ECCS   5.8974753-04  PERS   1.9787063+00
RPS    9.9674989+02  APOS   9.9792622+02  RANS  -1.7984762+02  INCS   1.5683895+02  LTS    1.3118846+00  LNS    1.1425976+02
LTE    3.4276010-01  LNE   -6.5745547+00  THETA -3.7074352-01  BETA   1.8000000+02  PROP   9.6799023+02  BARC   7.6125704-01
DELV   1.3850217+02  MASS   7.0348546+04  PLCHNG 1.0510869-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716072.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 20   JULY 1969 18 HRS, 18 MINS, 12.964 SECS  G.M.T. ***100. HRS, 46. MINS, 27.688 SECS  G.E.T. ***  T   1.00774358+02 HRS
XL     7.9[illegible]48052+02  YL     5.5970397+02  ZL     2.3708041+02  DXL    3.2592807+03  DYL   -3.8925752+03  DZL   -1.6748926+03
XS     9.1335715+02  YS     3.9993797+02  ZS     1.2783841+01  DXS    2.1521614+03  DYS   -4.9104369+03  DZS   -9.3736346+01
ALTS   5.867[illegible]+01  LATS   7.3456378-01  LONS   2.3647498+01  VRS    5.3621793+03  PTR    6.6855517-03  AZR   -9.1101798+01
LIN    1.7875532+02  LAN    1.6748259+02  SEASV  9.8517504+00
*****************************************************************************************************************

ID     0716072.1
CSM PLANE CHANGE BURN INITIATION
 20   JULY 1969 22 HRS, 41 MINS, 17.051 SECS  G.M.T. ***105. HRS,  9. MINS, 31.777 SECS  G.E.T. ***  T   1.05158827+02 HRS
XL     7.5620305+02  YL    -5.9667463+02  ZL    -2.5755283+02  DXL   -3.4852184+03  DYL   -3.7309838+03  DZL   -1.5854521+03
XS     5.4328104+02  YS    -8.3596144+02  ZS    -1.4535547+01  DXS   -4.4967985+03  DYS   -2.9197097+03  DZS   -8.5923788+01
ALTS   5.9600810+01  LATS  -8.3528206-01  LONS  -5.6980657+01  VRS    5.3622089+03  PTR   -1.0841406-02  AZR   -9.0918347+01
LIN    1.7875658+02  LAN    1.6521687+02  LAP    6.7657442+01  LTS    1.2926937+00  LNS    1.0157502+02  DEM   -4.9837803+00
THETA -4.0127361-05  BETA   8.9999997+01  MASS   3.6441847+04  DRTX   0.0000000     DRTY   1.6474890+01  DRTZ   0.0000000
*****************************************************************************************************************

ID     0716072.1
CSM PLANE CHANGE BURN TERMINATION
 20   JULY 1969 22 HRS, 41 MINS, 17.959 SECS  G.M.T. ***105. HRS,  9. MINS, 32.683 SECS  G.E.T. ***  T   1.05159079+02 HRS
XL     7.5568187+02  YL    -5.9723259+02  ZL    -2.5778859+02  DXL   -3.4884202+03  DYL   -3.7348980+03  DZL   -1.5691976+03
XS     5.4368865+02  YS    -8.3639765+02  ZS    -1.4547155+01  DXS   -4.4992366+03  DYS   -2.9164399+03  DZS   -6.9390147+01
ALTS   5.8603656+01  LATS  -8.3594326-01  LONS  -5.7026717+01  VRS    5.3622352+03  PTR   -1.0843194-02  AZR   -9.0741693+01
LIN    1.7888[illegible]+02  LAN    1.7130462+02  LAP    6.5178189+01  SMAS   9.9718853+02  ECCS   2.1209655-04  PERS   1.9782613+00
RPS    9.9[illegible]7734+02  APOS   9.9740[illegible]+02  RANS  -1.7929553+02  INCS   1.5697169+02  LTS    1.2926931+00  LNS    1.0157488+02
LTE    1.841[illegible]247+00  LNE   -7.1995874+00  THETA  1.3856746-03  BETA   9.9824124+01  PROP   5.9192383+01  BARC   4.5327043-02
DELV   1.6474994+01  MASS   3.6382654+04  PLCHNG 1.7556755-01
*****************************************************************************************************************

ID     0716072.1
CSM 2ND PASS OVER LUNAR LANDING SITE
 21   JULY 1969 15 HRS, 59 MINS, 19.563 SECS  G.M.T. ***122. HRS, 27. MINS, 34.287 SECS  G.E.T. ***  T   1.22459524+02 HRS
XL     5.4809140+02  YL    6.3871042+02  ZL     2.9338458+02  DXL    4.0634289+03  DYL   -3.1993853+03  DZL   -1.3777377+03
XS     9.1333858+02  YS    3.9992831+02  ZS     1.2773314+01  DXS    2.1522970+03  DYS   -4.9109010+03  DZS   -7.8125083+01
ALTS   5.8648998+01  LATS  7.3397434-01  LONS   2.3647418+01  VRS    5.3623177+03  PTR    8.6752228-03  AZR   -9.0834970+01
LIN    1.7888643+02  LAN    1.6241847+02
*****************************************************************************************************************

ID     0716072.1
TRANSEARTH INJECTION BURN INITIATION
 22   JULY 1969  1 HRS,  1 MINS, 35.453 SECS  G.M.T. ***131. HRS, 29. MINS, 50.174 SECS  G.E.T. ***  T   1.31497271+02 HRS
XL    -9.1[illegible]3901+02  YL    -3.7551738+02  ZL    -1.5446435+02  DXL   -2.1782213+03  DYL    4.4911566+03  DZL    1.9208832+03
XS    -3.8886911+02  YS    1.1690781+02  ZS    -5.1632971+00  DXS    6.2892056+02  DYS    5.3265253+03  DZS    9.9931464+01
ALTS   5.9258752+01  LATS  -2.9709482-01  LONS   1.7325432+02  VRS    5.3644569+03  PTR   -3.7838343-03  AZR   -8.8932652+01
LIN    1.7888896+02  LAN    1.5775693+02  LAP    7.1023578+00  LTS    1.2716144+00  LNS    8.8158096+01  DEM   -1.1523499+01
THETA -4.9422609+00  BETA   1.3321376+01  MASS   3.6451354+04  DRTX   3.0752483+03  DRTY   7.0844806+02  DRTZ   3.5400735+01
*****************************************************************************************************************

ID     0716072.1
TRANSEARTH INJECTION BURN TERMINATION
 22   JULY 1969  1 HRS,  4 MINS,  5.108 SECS  G.M.T. ***131. HRS, 32. MINS, 19.828 SECS  G.E.T. ***  T   1.31538841+02 HRS
XL    -9.6748843+02  YL    -2.3399496+02  ZL    -8.5021552+01  DXL   -2.5104494+03  DYL    7.1081235+03  DZL    3.8327511+03
XS    -3.5846597+02  YS    2.8163754+02  ZS     6.2768208+00  DXS    1.9495771+03  DYS    8.1857205+03  DZS    8.6780962+02
ALTS   6.0514957+01  LATS  3.5999498-01  LONS   1.6362500+02  VRS    8.4593123+03  PTR    2.9997494+00  AZR   -8.4122623+01
LIN    1.7410043+02  LAN    1.6711105+02  LAP   -1.8082603+02  SMAS  -2.0008221+03  ECCS   1.4981541+00  PERS   5.6225128+00
RPS    9.9571770+02  APOS  -4.9983619+03  RANS  -1.7580543+02  INCS   1.5239584+02  INMPS  1.7721037+02  SEM    8.4325503+01
RBVS   1.0451555+02  LTS   1.2715809+00  LNS    8.8136930+01  LTE    3.3589515+00  LNE   -7.4796453+00  THETA  4.5661880+00
BETA   9.1928582+00  PROP  9.7536821+03  BARC   9.6388804+00  DELV   3.1559987+03  MASS   2.6697672+04  PLCHNG 4.8067843+00
*****************************************************************************************************************

ID     0716072.1
ENTRY AND TOUCHDOWN
 24   JULY 1969 16 HRS, 36 MINS, 14.311 SECS  G.M.T. ***195. HRS,  4. MINS, 29.035 SECS  G.E.T. ***  T   1.95074732+02 HRS
X      3.5713615+03  Y      1.1214264+02  Z     -2.1380404+02  DX    -3.5660669+03  DY     2.7473611+04  DZ     2.3240112+04
R      3.5796753+03  DEC   -3.4925334+00  RA     1.8344589+00  V      3.6160816+04  PTH   -6.5100101+00  AZ     5.0129434+01
ALT    5.5784740+01  LAT   -3.5155442+00  LON    1.7254637+02  VE     3.4991655+04  PTE   -6.7334422+00  AZE    4.8487606+01
SMA    1.9423687+05  ECC    9.8119966-01  INC    4.0010781+01  RAN   6.0054291+00  APF    7.6871105+00  RP     3.4642692+03
INMP   1.2190510+01  SEM    1.1796834+02  RBVS   5.8777077+01  RAM   -1.2364038+02  DEM   -2.4694273+01  RAS    1.2383838+02
DES    1.9837927+01  SPSPR  4.0655725+03  DVPES  1.6958655+03  PERNAD 1.0875251+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  1.0662435+01  LONTD  1.8667270+02  AZTD   4.9595294+01  SEATD -7.8324217+00  DTSUN -5.6543913-01
*****************************************************************************************************************

ID     0716072.1
CIRCUMLUNAR PERICYNTHION
 19   JULY 1969 17 HRS, 29 MINS, 38.443 SECS  G.M.T. *** 75. HRS, 57. MINS, 53.163 SECS  G.E.T. ***  T   7.59647675+01 HRS
XL    -9.9073782+02  YL     9.9433403+01  ZL     4.6035147+01  DXL    9.1647751+02  DYL    7.3514130+03  DZL    3.8451694+03
XS    -3.9018768+02  YS     1.1438529+02  ZS     3.4591136+00  DXS    9.5783056+02  DYS    8.2665625+03  DZS    8.2648682+02
ALTS   5.8285097+01  LATS   1.9883353-01  LONS   1.7341047+02  VRS    8.3628093+03  PTR    3.6941051-08  AZR   -8.4328237+01
LIN    1.7431384+02  LAN    1.7543782+02  LAP   -2.6981266-01  LTS    1.3151201+00  LNS    1.1645562+02  DEM    2.3289277+00
SEM    5.6994670+01  RBVS   1.2303997+02  SMAS  -2.2837072+03  ECCS   1.4370480+00  INCS   1.5241998+02  RANS   1.7934678+02
APES   5.7248963+00  RPS    9.9677863+02  RM     2.1298700+05  DEMP   2.6206227-01  RAMP   1.7981579+02
*****************************************************************************************************************

ID     0716072.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22   JULY 1969 14 HRS, 36 MINS, 34.590 SECS  G.M.T. ***145. HRS,  4. MINS, 49.311 SECS  G.E.T. ***  T   1.45080364+02 HRS
X      3.0683247+03  Y     -1.4537379+03  Z     -8.8616983+02  DX    1.3869965+04  DY     2.7480060+04  DZ     1.8949248+04
R      3.5090265+03  DEC   -1.4627871+01  RA    -2.5351070+01  V     3.6146972+04  PTH   -6.4203209+00  AZ     5.8946654+01
ALT    5.5832641+01  LAT   -1.4720394+01  LON    1.7532946+02  VE    3.4875211+04  PTE   -6.7049679+00  AZE    5.7671953+01
SMA    1.6763758+05  ECC    9.7933228-01  INC    3.4012313+01  RAN  -2.5974630+00  APF   -1.3861406+01  RP     3.4646885+03
INMP   5.5148969+00  RAM   -1.5241045+02  DEM   -1.4761252+01  RAS   1.2177113+02  DES    2.0236676+01  SEM    9.1259105+01
RBVS   3.1808692+01  PERNAD 9.9947058+00  ENTDT  2.3333330-01  ENTRG 1.2850000+03  LATTD -2.6769447+00  LONTD  1.9328963+02
AZTD   5.4934714+01  SEATD -3.4230936+01  DTSUN -2.4364197+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716081.1
LAUNCH TIME      16   JULY 1969    14 HRS,    34 MINS,  35.208 SECS    G.M.T.
LAUNCH AZIMUTH    81.                          INJECTION OPPORTUNITY     1
*****************************************************************************************************************

ID     0716081.1
EARTH PARKING ORBIT INSERTION
 16    JULY 1969 14 HRS, 45 MINS, 56.535 SECS  G.M.T. ***  0. HRS, 11. MINS, 21.326 SECS  G.E.T. ***  T    1.89257342-01 HRS
X      -6.0656680+02  Y      3.0358067+03  Z      1.7249402+03  DX     -2.5190439+04  DY     -3.7945760+03  DZ     -2.1798348+03
ALT     1.0274514+02  LAT    2.9285035+01  LON    3.0554547+02  V       2.5567727+04  PTH    -1.1789031-07  AZ      9.5600884+01
R       3.5439334+03  DEC    2.9125906+01  RA     1.0129914+02  RAS     1.1576456+02  DES     2.1331996+01  RAN    -9.2315122-02
INC     2.9613119+01  MASS   2.9716536+05
*****************************************************************************************************************

ID     0716081.1
3.5 MINS PRIOR TO TLI INITIATION
 16    JULY 1969 17 HRS, 12 MINS,  3.059 SECS  G.M.T. ***  2. HRS, 37. MINS, 27.851 SECS  G.E.T. ***  T    2.62440312+00 HRS
X       3.2630762+03  Y     -1.2067948+03  Z     -6.5749927+02  DX      9.9501559+03  DY      2.0461211+04  DZ      1.1732945+04
ALT     9.7133708+01  LAT   -1.0770393+01  LON    1.4732306+02  V       2.5599389+04  PTH     3.8706596-02  AZ      6.2188131+01
*****************************************************************************************************************

ID     0716081.1
TRANSLUNAR INJECTION INITIATION
 16    JULY 1969 17 HRS, 15 MINS, 33.059 SECS  G.M.T. ***  2. HRS, 40. MINS, 57.851 SECS  G.E.T. ***  T    2.68273643+00 HRS
X       3.5020899+03  Y     -4.6948808+02  Z     -2.3573213+02  DX      3.8093050+03  DY      2.1982847+04  DZ      1.2546264+04
ALT     9.7391943+01  LAT   -3.8417660+00  LON    1.5910623+02  V       2.5596193+04  PTH     3.9371367-02  AZ      6.0574141+01
R       3.5412741+03  DEC   -3.8168328+00  RA    -7.6355135+00  RAS     1.1586939+02  DES     2.1314815+01  RAN    -9.0500292-01
INC     2.9650378+01  MASS   2.9396979+05
*****************************************************************************************************************

ID     0716081.1
TRANSLUNAR INJECTION TERMINATION
 16    JULY 1969 17 HRS, 20 MINS, 55.327 SECS  G.M.T. ***  2. HRS, 46. MINS, 20.119 SECS  G.E.T. ***  T    2.77225518+00 HRS
X       3.4384698+03  Y      9.4050590+02  Z      5.5861459+02  DX     -6.5991401+03  DY      3.0737169+04  DZ      1.6742580+04
ALT     1.6462317+02  LAT    8.9623811+00  LON    1.8069291+02  V       3.5617919+04  PTH     6.9585086+00  AZ      6.2599854+01
R       3.6082788+03  DEC    8.9060493+00  RA     1.5297626+01  RAS     1.1587315+02  DES     2.1314197+01  DEM     1.8445312+01
SEM     2.3502622+01  RBVS   8.3529722+01  RAN   -1.3314682+00  INC     2.8704275+01  ECC     9.7626866-01  SMA     1.4978820+05
RP      3.5546763+03  APF    4.7172562+00  INMP   2.1917383-01  C3TLI  -4.5775418-01  DAZTLI  9.6867155-01  MASS    1.3771164+05
PROP    1.5625815+05
*****************************************************************************************************************

ID     0716081.1
TRANSLUNAR INJECTION + 2 HOURS
 16    JULY 1969 19 HRS, 20 MINS, 55.327 SECS  G.M.T. ***  4. HRS, 46. MINS, 20.119 SECS  G.E.T. ***  T    4.77225518+00 HRS
X      -1.5617769+04  Y      1.2848855+04  Z      6.8223353+03  DX     -1.3481093+04  DY      3.9263965+03  DZ      1.9687230+03
ALT     1.7930910+04  LAT    1.8660059+01  LON    2.7586877+02  V       1.4178587+04  PTH     6.5069973+01  AZ      1.1221523+02
R       2.1343665+04  DEC    1.8641286+01  RA     1.4055561+02  RAS     1.1595721+02  DES     2.1300366+01
*****************************************************************************************************************

ID     0716081.1
LUNAR ORBIT INSERTION BURN INITIATION
 19    JULY 1969 18 HRS, 24 MINS, 37.664 SECS  G.M.T. *** 75. HRS, 50. MINS,  2.454 SECS  G.E.T. ***  T    7.58340149+01 HRS
XL     -1.0040584+03  YL    -1.5477362+02  ZL    -8.8431140+01  DXL    -1.0132095+02  DYL     7.2897857+03  DZL     3.9017494+03
XS     -1.0063421+03  YS    -1.6273504+02  ZS    -2.6474632+01  DXS     7.4037936+00  DYS     8.2360859+03  DZS     8.9972250+02
ALTS    9.1265326+01  LATS  -1.4876607+00  LONS  -1.7081425+02  VRS     8.2850869+03  PTR    -9.3427008+00  AZR    -8.3925596+01
LIN     1.7373486+02  LAN    1.7550235+02  LAP    1.8968039+02  LTS     1.3144340+00  LNS     1.1598836+02  DEM     2.1020285+00
THETA   1.6247391+01  BETA  -1.7014757+02  MASS   9.5199404+04  DRTX   -2.8941526+03  DRTY   -4.8201060+02  DRTZ   -2.5369101+01
*****************************************************************************************************************

ID     0716081.1
LUNAR ORBIT INSERTION BURN TERMINATION
 19    JULY 1969 18 HRS, 30 MINS, 44.835 SECS  G.M.T. *** 75. HRS, 56. MINS,  9.627 SECS  G.E.T. ***  T    7.59360075+01 HRS
XL     -9.6813497+02  YL     2.2020802+02  ZL     9.6914846+01  DXL     1.2802167+03  DYL     4.9024767+03  DZL     2.0937229+03
XS     -9.6449422+02  YS     2.5473198+02  ZS     5.6472657+00  DXS     1.3626250+03  DYS     5.3257687+03  DZS     1.1604219+02
ALTS    5.9088246+01  LATS   3.2435058-01  LONS   1.6520546+02  VRS     5.4985475+03  PTR     4.4973264-01  AZR    -8.8793247+01
LIN     1.7874699+02  LAN   -1.7979461+02  LAP   -1.0036892+01  SMAS    1.0525860+03  ECCS    5.2844335-02  PERS    2.1453795+00
RPS     9.9696279+02  APOS   1.1082092+03  RANS  -1.7962529+02  INCS    1.5683806+02  LTS     1.3143576+00  LNS     1.1593636+02
LTE     1.4421722-01  LNE   -6.4701672+00  THETA -7.2620526+00  BETA   -1.6540967+02  PROP    2.3930330+04  BARC    2.3990569+01
DELV    2.9341220+03  MASS   7.1269074+04  PLCHNG-5.0174818+00
*****************************************************************************************************************

ID     0716081.1
CIRCULARIZATION BURN INITIATION
 19    JULY 1969 22 HRS, 45 MINS,  4.128 SECS  G.M.T. *** 80. HRS, 10. MINS, 28.919 SECS  G.E.T. ***  T    8.01746998+01 HRS
XL     -9.9350424+02  YL     7.5167135+01  ZL     3.4995480+01  DXL     4.5748624+02  DYL     5.0264643+03  DZL     2.1490304+03
XS     -9.8740562+02  YS     1.3766080+02  ZS     2.2567218+00  DXS     7.6126101+02  DYS     5.4476016+03  DZS     1.1917524+02
ALTS    5.8464571+01  LATS   1.2969527-01  LONS   1.7206317+02  VRS     5.5018256+03  PTR    -1.5493826-02  AZR    -8.8758766+01
LIN     1.7874844+02  LAN    1.7801016+02  LAP   -3.0551835-01  LTS     1.3111674+00  LNS     1.1377534+02  DEM     1.0237128+00
THETA   3.8798377-01  BETA   1.7999300+02  MASS   7.1219675+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0716081.1
CIRCULARIZATION BURN TERMINATION
 19    JULY 1969 22 HRS, 45 MINS, 18.960 SECS  G.M.T. *** 80. HRS, 10. MINS, 43.751 SECS  G.E.T. ***  T    8.01788197+01 HRS
XL     -9.9231756+02  YL     8.7275534+01  ZL     4.0172101+01  DXL     5.1476128+02  DYL     4.8939212+03  DZL     2.0921643+03
XS     -9.8548672+02  YS     1.5077935+02  ZS     2.5437548+00  DXS     8.1089513+02  DYS     5.3003999+03  DZS     1.1599964+02
ALTS    5.8464327+01  LATS   1.4619131-01  LONS   1.7130121+02  VRS     5.3633241+03  PTR     3.8524958-03  AZR    -8.8760699+01
LIN     1.7874840+02  LAN    1.7800789+02  LAP   -1.1200575+01  SMAS    9.9732323+02  ECCS    3.7252184-04  PERS    1.9786621+00
RPS     9.9695171+02  APOS   9.9769474+02  RANS  -1.7961733+02  INCS    1.5683814+02  LTS     1.3111639+00  LNS     1.1377323+02
LTE     4.0042835-01  LNE   -6.6039793+00  THETA -3.6997512-01  BETA   -1.7999011+02  PROP    9.6667773+02  BARC    7.5990625-01
DELV    1.3850225+02  MASS   7.0252997+04  PLCHNG 7.9863211-07
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716081.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 20    JULY 1969 19 HRS, 16 MINS, 36.579 SECS  G.M.T. ***100. HRS, 42. MINS,  1.369 SECS  G.E.T. ***  T   1.00700380+02 HRS
XL      7.8464117+02  YL      5.6641156+02  ZL      2.3979545+02  DXL     3.2994868+03  DYL    -3.8652911+03  DZL    -1.6641245+03
XS      9.1319682+02  YS      3.9986717+02  ZS      1.2794639+01  DXS     2.1516961+03  DYS    -4.9116038+03  DZS    -9.3814421+01
ALTS    5.8494760+01  LATS    7.3473880-01  LONS    2.3647467+01  VRS     5.3630634+03  PTR    -2.8557972-03  AZR    -9.1002336+01
LIN     1.7875479+02  LAN     1.6749093+02  SEASV   1.0347523+01
*****************************************************************************************************************

ID     0716081.1
CSM PLANE CHANGE BURN INITIATION
 20    JULY 1969 23 HRS, 39 MINS, 39.571 SECS  G.M.T. ***105. HRS,  5. MINS,  4.362 SECS  G.E.T. ***  T   1.05084545+02 HRS
XL      7.6205343+02  YL     -5.8998024+02  ZL     -2.5488497+02  DXL    -3.4475672+03  DYL    -3.7620173+03  DZL    -1.5980975+03
XS      5.4315218+02  YS     -8.3578867+02  ZS     -1.4541269+01  DXS    -4.4974160+03  DYS    -2.9207714+03  DZS    -8.5974772+01
ALTS    5.8385836+01  LATS   -8.3579112-01  LONS   -5.6981455+01  VRS     5.3633055+03  PTR    -4.1098677-03  AZR    -9.0918614+01
LIN     1.7875605+02  LAN     1.6522544+02  LAP     3.4179165+01  LTS     1.2919278+00  LNS     1.0107926+02  DEM    -5.2283819+00
THETA -1.2038208-04   BETA    9.0000050+01  MASS    3.6346298+04  DRTX    0.0000000     DRTY    1.6474890+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0716081.1
CSM PLANE CHANGE BURN TERMINATION
 20    JULY 1969 23 HRS, 39 MINS, 40.477 SECS  G.M.T. ***105. HRS,  5. MINS,  5.265 SECS  G.E.T. ***  T   1.05084796+02 HRS
XL      7.6153923+02  YL     -5.9054136+02  ZL     -2.5512199+02  DXL    -3.4507842+03  DYL    -3.7659653+03  DZL    -1.5818566+03
XS      5.4248160+02  YS     -8.3622380+02  ZS     -1.4552851+01  DXS    -4.4998483+03  DYS    -2.9175102+03  DZS    -6.9441282+01
ALTS    5.8385772+01  LATS   -8.3645689-01  LONS   -5.7027405+01  VRS     5.3633312+03  PTR    -4.1031006-03  AZR    -9.0741991+01
LIN     1.7888043+02  LAN     1.7130976+02  LAP     2.4152778+01  SMAS    9.9716889+02  ECCS    2.9916075-04  PERS    1.9782028+00
RPS     9.9687357+02  APOS    9.9746719+02  RANS   -1.7926829+02  INCS    1.5697215+02  LTS     1.2919278+00  LNS     1.0107913+02
LTE     1.8988448+00  LNE    -7.2174596+00  THETA  1.1347831-03   BETA    8.9824290+01  PROP    5.9037109+01  BARC    4.5327043-02
DELV    1.6474844+01  MASS    3.6287261+04  PLCHNG 1.7653103-01
*****************************************************************************************************************

ID     0716081.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 21    JULY 1969 16 HRS, 57 MINS, 49.937 SECS  G.M.T. ***122. HRS, 23. MINS,  5.726 SECS  G.E.T. ***  T   1.22384924+02 HRS
XL      6.4791496+02  YL      7.3418063+02  ZL      2.9560862+02  DXL     4.0954536+03  DYL    -3.1551935+03  DZL    -1.3641587+03
XS      9.1321557+02  YS      3.9987603+02  ZS      1.2776271+01  DXS     2.1515989+03  DYS    -4.9118291+03  DZS    -7.8192533+01
ALTS    5.8515389+01  LATS    7.3424266-01  LONS    2.3447501+01  VRS     5.3629793+03  PTR    -2.6544959-03  AZR    -9.0835409+01
LIN     1.7888593+02  LAN     1.6242416+02
*****************************************************************************************************************

ID     0716081.1
TRANSEARTH INJECTION BURN INITIATION
 22    JULY 1969  2 HRS,  0 MINS, 23.450 SECS  G.M.T. ***131. HRS, 25. MINS, 49.241 SECS  G.E.T. ***  T   1.31430367+02 HRS
XL     -9.1672348+02  YL     -3.6246455+02  ZL     -1.4869049+02  DXL    -2.1015558+03  DYL     4.5210304+03  DZL     1.9334424+03
XS     -9.3679533+02  YS      1.4171868+02  ZS     -4.7319376+00  DXS     7.6150716+02  DYS     5.3082101+03  DZS     1.0062100+02
ALTS    5.8437437+01  LATS   -2.7023153-01  LONS    1.7182734+02  VRS     5.3634981+03  PTR     3.7258090-03  AZR    -8.8925024+01
LIN     1.7888846+02  LAN     1.5775872+02  LAP    -9.7628831+00  LTS     1.2708166+00  LNS     8.7659041+01  DEM    -1.1761543+01
THETA -5.0934061+00   BETA    1.2911764+01  MASS    3.6355961+04  DRTX    3.1066824+03  DRTY    7.0926438+02  DRTZ    4.2420472+01
*****************************************************************************************************************

ID     0716081.1
TRANSEARTH INJECTION BURN TERMINATION
 22    JULY 1969  2 HRS,  2 MINS, 53.956 SECS  G.M.T. ***131. HRS, 28. MINS, 18.747 SECS  G.E.T. ***  T   1.31471874+02 HRS
XL     -9.7171347+02  YL     -2.1900218+02  ZL     -7.8370459+01  DXL    -2.3824667+03  DYL     7.1730094+03  DZL     3.8308189+03
XS     -9.5086374+02  YS      3.0682622+02  ZS      6.8367188+00  DXS     2.1727003+03  DYS     8.1607829+03  DZS     8.6986917+02
ALTS    6.7671592+01  LATS    3.9204550-01  LONS    1.6211606+02  VRS     8.4897393+03  PTR     2.9999975+00  AZR    -8.4131497+01
LIN     1.7412731+02  LAN     1.6591740+02  LAP     1.7408828+02  SMAS   -1.9298593+03  ECCS    1.5165587+00  PERS    5.3260617+00
RPS     9.9688565+02  APOS   -4.8566041+03  RANS   -1.7594969+02  INCS    1.5238616+02  INMPS   1.7727711+02  SEM     8.4823394+01
RAVS    1.0552575+02  LTS     1.2707826+00  LNS     8.7637751+01  LTE     3.4127108+00  LNE    -7.4812844+00  THETA   4.5133298+00
BETA    3.0911092+00  PROP    9.8092314+03  BARC    9.7108831+00  DELV    3.1869033+03  MASS    2.6546729+04  PLCHNG  4.7950633+00
*****************************************************************************************************************

ID     0716081.1
ENTRY AND TOUCHDOWN
 24    JULY 1969 16 HRS, 37 MINS, 26.703 SECS  G.M.T. ***194. HRS,  2. MINS, 50.789 SECS  G.E.T. ***  T   1.94047441+02 HRS
X       3.5711221+03  Y       1.3022238+02  Z      -2.0899497+02  DX     -3.7388573+03  DY      2.7456931+04  DZ      2.3243346+04
R       3.5097653+03  DEC    -3.4121593+00  RA      2.1301042+00  V       3.6167875+04  PTH    -6.5000030+00  AZ      5.0121264+01
ALT     6.5872618+01  LAT    -3.4346640+00  LON     1.7054248+02  VE      3.4998677+04  PTE    -6.7330502+00  AZE     4.8482361+01
SMA     1.4257337+ 5  ECC     9.8201010-01  INC     4.0000150+01  RAN     6.2047832+03  APF     7.8367766+00  RP      3.4643764+03
INMP    1.2227771+01  SEM     1.1797933+02  RAVS    5.9380538+01  RAM    -1.2362750+02  DEM    -2.4697281+01  RAS     1.2383920+02
DES     1.9807752+01  SPSPR   3.9146296+03  OVPES   1.6377224+03  PERNAD 1.1128261+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   1.6741347+01  LONTD   1.8666976+02  AZTD    4.9522892+01  SEATD -7.5016237+00  DTSUN -5.4368982-01
*****************************************************************************************************************

ID     0716081.1
CIRCUMLUNAR PERICYNTHION
 19    JULY 1969 18 HRS, 28 MINS,  1.598 SECS  G.M.T. *** 75. HRS, 53. MINS, 26.487 SECS  G.E.T. ***  T   7.5890698+01 HRS
XL     -9.9174106+02  YL      9.1140362+01  ZL      4.3278240+01  DXL     8.4374441+02  DYL     7.3186016+03  DZL     3.9224328+03
XS     -9.9327734+02  YS      1.1490595+02  ZS      3.9919266+00  DXS     9.6179912+02  DYS     8.2567269+03  DZS     9.1020972+02
ALTS    5.8366501+01  LATS    2.2944160-01  LONS    1.7338087+02  VRS     8.3622412+03  PTR    -1.1788265-07  AZR    -8.3751063+01
LIN     1.7373484+02  LAN     1.7547125+02  LAP    -3.2689554-01  LTS     1.3143915+00  LNS     1.1595946+02  DEM     2.0879885+00
SEM     5.7459919+01  RAVS    1.2257432+02  SMAS   -2.2815384+03  ECCS    1.4369245+00  INCS    1.5183798+02  RANS    1.7940532+02
APFS    5.2779015+00  RPS     9.9686002+02  PM      2.1299700+05  DEMP    3.5100636-01  RAMP    1.7980762+02
*****************************************************************************************************************

ID     0716081.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22    JULY 1969 15 HRS, 31 MINS, 34.919 SECS  G.M.T. ***144. HRS, 56. MINS, 59.707 SECS  G.E.T. ***  T   1.44949919+02 HRS
X       3.0704434+03  Y      -1.4746621+03  Z      -8.4351129+02  DX      1.3723441+04  DY      2.8279387+04  DZ      1.7847500+04
R       3.5099971+03  DEC    -1.3908877+01  RA     -2.5653884+01  V       3.6146781+04  PTH    -6.6187060+00  AZ      6.1096012+01
ALT     6.5833718+01  LAT    -1.3997228+01  LON     1.6123763+02  VE      3.4842344+04  PTE    -6.9119897+00  AZE     5.9896930+01
SMA     1.4779250+05  ECC     9.7936745-01  INC     3.1814140+01  RAN    -2.1268674+00  APF    -1.3750695+01  RP      3.4619872+03
INMP    3.3020416+00  RAM    -1.5192937+02  DEM    -1.4974480+01  RAS     1.2180913+02  DES     2.0229031+01  SEM     9.1732924+01
RAVS    3.1681788+01  PERNAD 9.9985694+00  ENTDT  2.3333330-01  ENTRG   1.2850000+03  LATTD -2.6667421+00  LONTD   1.7964052+02
AZTD    5.7210175+01  SEATD -3.4134589+01  DTSUN -2.4293682+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716090.1
LAUNCH TIME     16   JULY 1969    15 HRS,    44 MINS,  45.995 SECS    G.M.T.
LAUNCH AZIMUTH   90.                          INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID     0716090.1
EARTH PARKING ORBIT INSERTION
 16   JULY 1969 15 HRS, 56 MINS,  6.323 SECS  G.M.T. ***  0. HRS, 11. MINS, 20.328 SECS  G.E.T. ***  T   1.88980063-01 HRS
X     -1.5094926+03  Y      2.8156418+03  Z      1.5339682+03  DX    -2.3132471+04  DY    -9.5578171+03  DZ    -5.2197331+03
ALT    1.0217145+02  LAT    2.5794248+01  LON    3.0485371+02  V      2.5567727+04  PTH   -9.4312248-08  AZ     1.0308917+02
R      3.5439334+03  DEC    2.5648144+01  RA     1.1819619+02  RAS    1.1581373+02  DES    2.1323946+01  RAN   -4.6920553-02
INC    2.8592229+01  MASS   2.9764633+05
*****************************************************************************************************************

ID     0716090.1
3.5 MINS PRIOR TO TLI INITIATION
 16   JULY 1969 18 HRS, 18 MINS, 31.519 SECS  G.M.T. ***  2. HRS, 33. MINS, 45.524 SECS  G.E.T. ***  T   2.56264561+00 HRS
X      3.2722884+03  Y     -1.1945978+03  Z     -6.2595760+02  DX     9.7725610+03  DY     2.0745627+04  DZ     1.1395169+04
ALT    9.5745232+01  LAT   -1.0252184+01  LON    1.3089970+02  V      2.5607300+04  PTH    3.9868040-02  AZ     6.3111920+01
*****************************************************************************************************************

ID     0716090.1
TRANSLUNAR INJECTION INITIATION
 16   JULY 1969 18 HRS, 22 MINS,  1.519 SECS  G.M.T. ***  2. HRS, 37. MINS, 15.524 SECS  G.E.T. ***  T   2.62097892+00 HRS
X      3.5048217+03  Y     -4.4790739+02  Z     -2.1670777+02  DX     3.6138160+03  DY     2.2238354+04  DZ     1.2163329+04
ALT    9.6075723+01  LAT   -3.5326435+00  LON    1.4279489+02  V      2.5603722+04  PTH    4.3725812-02  AZ     6.1575483+01
R      3.5399658+03  DEC   -3.5096974+00  RA    -7.2827795+00  RAS    1.1591596+02  DES    2.1307158+01  RAN   -8.2984105-01
INC    2.8627426+01  MASS   2.9448662+05
*****************************************************************************************************************

ID     0716090.1
TRANSLUNAR INJECTION TERMINATION
 16   JULY 1969 18 HRS, 27 MINS, 24.328 SECS  G.M.T. ***  2. HRS, 42. MINS, 38.333 SECS  G.E.T. ***  T   2.71064806+00 HRS
X      3.4271910+03  Y      9.7787449+02  Z      5.5378278+02  DX    -6.9219675+03  DY     3.0962403+04  DZ     1.6204641+04
ALT    1.6307684+02  LAT    8.8881050+00  LON    1.6465389+02  V      3.5625474+04  PTH    6.9411910+00  AZ     6.3589373+01
R      3.6067370+03  DEC    8.8322011+00  RA     1.5924946+01  RAS    1.1591973+02  DES    2.1306539+01  DEM    1.8236450+01
SEM    2.4002253+01  RBVS   8.4028630+01  RAN   -1.2547174+00  INC    2.7747353+01  ECC    9.7625065-01  SMA    1.4968483+05
RP     3.5534211+03  APF    5.2039587+00  INMP   7.4068806-01  C3TLI -4.5807070-01  DAZTLI 8.9778130-01  MASS   1.3796597+05
PROP   1.5652065+05
*****************************************************************************************************************

ID     0716090.1
TRANSLUNAR INJECTION + 2 HOURS
 16   JULY 1969 20 HRS, 27 MINS, 24.328 SECS  G.M.T. ***  4. HRS, 42. MINS, 38.333 SECS  G.E.T. ***  T   4.71064806+00 HRS
X     -1.5757685+04  Y      1.2819667+04  Z      6.5483129+03  DX    -1.3522589+04  DY     3.8376547+03  DZ     1.8536451+03
ALT    1.7900275+04  LAT    1.7885265+01  LON    2.5951673+02  V      1.4178293+04  PTH    6.5073327+01  AZ     1.1157339+02
R      2.1343123+04  DEC    1.7867173+01  RA     1.4086992+02  RAS    1.1600378+02  DES    2.1292686+01
*****************************************************************************************************************

ID     0716090.1
LUNAR ORBIT INSERTION BURN INITIATION
 19   JULY 1969 19 HRS, 29 MINS, 16.487 SECS  G.M.T. *** 75. HRS, 44. MINS, 30.491 SECS  G.E.T. ***  T   7.57418032+01 HRS
XL    -1.3021424+03  YL    -1.6512169+02  ZL    -9.3374336+01  DXL   -1.8726087+02  DYL    7.2781348+03  DZL    3.9197502+03
XS    -1.0063275+03  YS    -1.6382491+02  ZS    -2.7195487+01  DXS    6.1888260+00  DYS    8.2335310+03  DZS    9.2053299+02
ALTS   8.1444365+01  LATS  -1.5279081+00  LONS  -1.7075366+02  VRS    8.2848325+03  PTR   -9.4000895+00  AZR   -8.3785711+01
LIN    1.7358919+02  LAN    1.7551356+02  LAP    1.8985990+02  LTS    1.3136261+00  LNS    1.1543902+02  DEM    1.8349113+00
THETA  1.6720148+01  BETA  -1.6984913+02  MASS   9.5199404+04  DRTX  -2.8959642+03  DRTY  -4.9599575+02  DRTZ  -4.9409287+01
*****************************************************************************************************************

ID     0716090.1
LUNAR ORBIT INSERTION BURN TERMINATION
 19   JULY 1969 19 HRS, 35 MINS, 24.136 SECS  G.M.T. *** 75. HRS, 50. MINS, 38.139 SECS  G.E.T. ***  T   7.58439274+01 HRS
XL    -9.7112153+02  YL     2.1042141+02  ZL     9.2979706+01  DXL    1.2040989+03  DYL    4.9167585+03  DZL    2.0997639+03
XS    -9.6506280+02  YS     2.5420732+02  ZS     5.6389778+00  DXS    1.3416682+03  DYS    5.3288762+03  DZS    1.1611824+02
ALTS   5.9504158+01  LATS   3.2373958-01  LONS   1.6524292+02  VRS    5.4964059+03  PTR    6.3194443-01  AZR   -8.8792964+01
LIN    1.7874688+02  LAN   -1.7978743+02  LAP   -1.3334199+01  SMAS   1.0525963+03  ECCS   5.3033712-02  PERS   2.1454110+00
RPS    9.9677323+02  APOS   1.1084194+03  RANS  -1.7959184+02  INCS   1.5683783+02  LTS    1.3135494+00  LNS    1.1538696+02
LTE    2.0923966-01  LNE   -6.5048772+00  THETA -6.7885565+00  BETA  -1.6501546+02  PROP   2.3961428+04  BARC   2.4016462+01
DELV   2.9385452+03  MASS   7.1237977+04  PLCHNG-5.1630039+00
*****************************************************************************************************************

ID     0716090.1
CIRCULARIZATION BURN INITIATION
 19   JULY 1969 23 HRS, 48 MINS, 32.659 SECS  G.M.T. *** 80. HRS,  3. MINS, 46.662 SECS  G.E.T. ***  T   8.00629616+01 HRS
XL    -9.9673159+02  YL     6.1901615+00  ZL     5.7451228+00  DXL    4.5259458+01  DYL    5.0443829+03  DZL    2.1578745+03
XS    -9.9408106+02  YS     7.3125321+01  ZS     8.4949703-01  DXS    4.0519870+02  DYS    5.4866069+03  DZS    1.1976411+02
ALTS   5.8273859+01  LATS   4.8830451-02  LONS   1.7579286+02  VRS    5.5028523+03  PTR   -1.5550859-02  AZR   -8.8752887+01
LIN    1.7874832+02  LAN    1.7802826+02  LAP   -1.7960023+02  LTS    1.3103669+00  LNS    1.1323600+02  DEM    7.6007497-01
THETA  3.8796072-01  BETA  -1.7999300+02  MASS   7.1188577+04  DRTX  -1.3850000+02  DRTY   0.0000000    DRTZ   0.0000000
*****************************************************************************************************************

ID     0716090.1
CIRCULARIZATION BURN TERMINATION
 19   JULY 1969 23 HRS, 48 MINS, 47.485 SECS  G.M.T. *** 80. HRS,  4. MINS,  1.486 SECS  G.E.T. ***  T   8.00670795+01 HRS
XL    -9.9653825+02  YL     1.8342266+01  ZL     1.0943260+01  DXL    1.1321093+02  DYL    4.9161923+03  DZL    2.1028227+03
XS    -9.9302024+02  YS     8.6337609+01  ZS     1.1379437+00  DXS    4.6430398+02  DYS    5.3429475+03  DZS    1.1667181+02
ALTS   5.8273602+01  LATS   6.5410854-02  LONS   1.7503094+02  VRS    5.3643525+03  PTR    3.9306973-03  AZR   -8.8753750+01
LIN    1.7874832+02  LAN    1.7802599+02  LAP    1.7224093+02  SMAS   9.9732648+02  ECCS   5.6508760-04  PERS   1.9786718+00
RPS    9.9676291+02  APOS   9.9789005+02  RANS  -1.7958388+02  INCS   1.5683794+02  LTS    1.3103638+00  LNS    1.1323390+02
LTE    4.6437607-01  LNE   -6.6361327+00  THETA -3.6996146-01  BETA   1.7999300+02  PROP   9.6625195+02  BARC   7.5993844-01
DELV   1.3850172+02  MASS   7.0222325+04  PLCHNG 1.0672170-07
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716090.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 20    JULY 1969 20 HRS, 21 MINS, 18.329 SECS  G.M.T. ***100. HRS, 36. MINS, 32.332 SECS  G.E.T. ***  T   1.00608981+02 HRS
XL      7.7835453+02  YL      5.7397555+02  ZL      2.4285548+02  DXL     3.3418235+03  DYL    -3.8324995+03  DZL    -1.6510589+03
XS      9.1332443+02  YS      3.9992186+02  ZS      1.2784639+01  DXS     2.1519991+03  DYS    -4.9106599+03  DZS    -9.3804709+01
ALTS    5.8633589+01  LATS    7.3463650-01  LONS    2.3647406+01  VRS     5.3623203+03  PTR     4.2205527-03  AZR    -9.1002457+01
LIN     1.7875475+02  LAN     1.6749812+02  SEASV   1.0896760+01
*****************************************************************************************************************

ID     0716090.1
CSM PLANE CHANGE BURN INITIATION
 21    JULY 1969  0 HRS, 44 MINS, 21.846 SECS  G.M.T. ***104. HRS, 59. MINS, 35.851 SECS  G.E.T. ***  T   1.04993292+02 HRS
XL      7.6876498+02  YL     -5.8272364+02  ZL     -2.5199226+02  DXL    -3.4051124+03  DYL    -3.7939004+03  DZL    -1.6110112+03
XS      5.4323135+02  YS     -8.3591544+02  ZS     -1.4545823+01  DXS    -4.4970753+03  DYS    -2.9198273+03  DZS    -8.5945292+01
ALTS    5.8535327+01  LATS   -8.3592755-01  LONS   -5.6981610+01  VRS     5.3625054+03  PTR    -1.0431116-02  AZR    -9.0918561+01
LIN     1.7875601+02  LAN     1.6523257+02  LAP     5.2466676+01  LTS     1.2910778+00  LNS     1.0052977+02  DEM    -5.4993870+00
THETA  -1.2550472-14  BETA    8.9999983+01  MASS    3.6315626+04  DRTX    0.0000000     DRTY    1.6474890+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0716090.1
CSM PLANE CHANGE BURN TERMINATION
 21    JULY 1969  0 HRS, 44 MINS, 22.751 SECS  G.M.T. ***104. HRS, 59. MINS, 36.754 SECS  G.E.T. ***  T   1.04993543+02 HRS
XL      7.6825754+02  YL     -5.8328995+02  ZL     -2.5223102+02  DXL    -3.4083502+03  DYL    -3.7978827+03  DZL    -1.5947840+03
XS      5.4254126+02  YS     -8.3635017+02  ZS     -1.4557396+01  DXS    -4.4995054+03  DYS    -2.9165696+03  DZS    -6.9411736+01
ALTS    5.8535186+01  LATS   -8.3659274-01  LONS   -5.7027517+01  VRS     5.3625316+03  PTR    -1.0430941-02  AZR    -9.0741892+01
LIN     1.7888039+02  LAN     1.7131857+02  LAP     5.0463954+01  SMAS    9.9716853+02  ECCS    2.3022518-04  PERS    1.9782018+00
RPS     9.9693896+02  APOS    9.9739809+02  RANS   -1.7923816+02  INCS    1.5697339+02  LTS     1.2910774+00  LNS     1.0052964+02
LTE     1.9628185+00  LNE    -7.2366410+00  THETA  1.7438445-03  BETA    8.9824435+01  PROP    5.8987305+01  BARC    4.6393707-02
DELV    1.6474844+01  MASS    3.6256639+04  PLCHNG 1.7655864-01
*****************************************************************************************************************

ID     0716090.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 21    JULY 1969 18 HRS,  2 MINS, 22.599 SECS  G.M.T. ***122. HRS, 17. MINS, 36.593 SECS  G.E.T. ***  T   1.22293498+02 HRS
XL      6.3306035+02  YL      7.1035467+02  ZL      2.9811331+02  DXL     4.1378030+03  DYL    -3.1148112+03  DZL    -1.3480168+03
XS      9.1331428+02  YS      3.9991808+02  ZS      1.2775030+01  DXS     2.1521098+03  DYS    -4.9109774+03  DZS    -7.8183089+01
ALTS    5.8622658+01  LATS    7.3409234-01  LONS    2.3647440+01  VRS     5.3624050+03  PTR     6.0560173-03  AZR    -9.0935556+01
LIN     1.7888593+02  LAN     1.6243334+02
*****************************************************************************************************************

ID     0716090.1
TRANSEARTH INJECTION BURN INITIATION
 22    JULY 1969  3 HRS,  5 MINS, 36.599 SECS  G.M.T. ***131. HRS, 20. MINS, 50.601 SECS  G.E.T. ***  T   1.31347389+02 HRS
XL     -9.2310188+02  YL     -3.4809195+02  ZL     -1.4232882+02  DXL    -2.0175367+03  DYL     4.5542601+03  DZL     1.9473658+03
XS     -9.8237820+02  YS      1.6869530+02  ZS     -4.1833839+00  DXS     9.0741010+02  DYS     5.2861005+03  DZS     1.0129073+02
ALTS    5.8272524+01  LATS   -2.4046861-01  LONS    1.7025612+02  VRS     5.3643743+03  PTR    -1.1074904-03  AZR    -9.9918105+01
LIN     1.7888850+02  LAN     1.5776313+02  LAP     1.8151906+02  LTS     1.2699337+00  LNS     8.7105522+01  DEM    -1.2024671+01
THETA  -5.2859542+00  BETA    1.2797446+01  MASS    3.6325339+04  DRTX    3.1429766+03  DRTY    7.1082148+02  DRTZ    5.1000018+01
*****************************************************************************************************************

ID     0716090.1
TRANSEARTH INJECTION BURN TERMINATION
 22    JULY 1969  3 HRS,  8 MINS,  8.416 SECS  G.M.T. ***131. HRS, 23. MINS, 22.419 SECS  G.E.T. ***  T   1.31389561+02 HRS
XL     -9.7574134+02  YL     -2.0209772+02  ZL     -7.0847154+01  DXL    -2.2391530+03  DYL     7.2460251+03  DZL     3.8628984+03
XS     -9.4125483+02  YS      3.3454021+02  ZS      7.4918987+00  DXS     2.4225253+03  DYS     8.1289293+03  DZS     3.7264757+02
ALTS    6.0472925+01  LATS    4.2970232-01  LONS    1.6043380+02  VRS     8.5269943+03  PTR     2.9998030+00  AZR    -8.4140481+01
LIN     1.7411373+02  LAN     1.6460547+02  LAP    -4.4407028+01  SMAS   -1.8519131+03  ECCS    1.5382005+00  PERS    5.0066661+00
RPS     9.9670346+02  APOS   -4.7005266+03  RANS   -1.7610646+02  INCS    1.5237526+02  INMPS   1.7734971+02  SEM     8.5376404+01
RRVS    1.0665483+02  LTS     1.2698364+00  LNS     8.7084045+01  LTE     3.4720617+00  LNE    -7.4823173+00  THETA   4.4373358+00
BETA    7.9829930+00  PROP    9.8946494+03  BARC    9.8220011+00  DELV    3.2227600+03  MASS    2.6430689+04  PLCHNG  4.7845971+00
*****************************************************************************************************************

ID     0716090.1
ENTRY AND TOUCHDOWN
 24    JULY 1969 16 HRS, 38 MINS, 43.659 SECS  G.M.T. ***192. HRS, 53. MINS, 57.657 SECS  G.E.T. ***  T   1.92899349+02 HRS
X       3.5106652+03  Y       1.4986831+02  Z      -2.0387157+02  DX     -3.9268016+03  DY      2.7438526+04  DZ      2.3247718+04
R       3.5[illegible]97978+03  DEC    -3.8299808+00  RA      2.4514145+00  V       3.6176634+04  PTH    -6.5000393+00  AZ      5.0115722+01
ALT     5.6[illegible]3335+01  LAT    -3.3519458+00  LON     1.7053934+02  VE      3.5007422+04  PTE    -5.7325790+00  AZE     4.8476836+01
SMA     2.[illegible]349972+05  ECC     9.8297575-01  INC     3.9999900+01  RAN     6.4276100+00  APF     7.9284535+00  RP      3.4644299+03
INMP    1.2270883+01  SEM     1.1799125+02  RRVS    5.9438508+01  RAM    -1.2361387+02  DEM    -2.4700541+01  RAS     1.2384009+02
DES     1.980756+01   SPSPR   3.7985896+03  DVRES   1.5927958+03  PERNAD 1.1419431+01  ENTDT  2.3333330-01  ENTRG   1.2453000+03
LATTD   1.[illegible]822376+01  LONTD   1.8666962+02  AZTD    4.9540738+01  SEATD -7.1767969+00  DTSUN -5.2018901-01
*****************************************************************************************************************

ID     0716090.1
CIRCUMLUNAR PERICYNTHION
 19    JULY 1969 19 HRS, 32 MINS, 41.763 SECS  G.M.T. *** 75. HRS, 47. MINS, 55.768 SECS  G.E.T. ***  T   7.57998243+01 HRS
XL     -9.9257417+02  YL      8.2059874+01  ZL      3.9819567+01  DXL     7.6311667+02  DYL     7.3163618+03  DZL     3.9445474+03
XS     -9.2004060+02  YS      1.1543458+02  ZS      4.1677297+00  DXS     9.6636504+02  DYS     8.2545374+03  DZS     9.3133767+02
ALTS    5.3262658+01  LATS    2.3957115-01  LONS    1.7334958+02  VRS     9.3629323+03  PTR    -2.4853501-07  AZR    -8.3605933+01
LIN     1.7358317+02  LAN     1.7548227+02  LAP    -5.0477979-01  LTS     1.3135830+00  LNS     1.1540995+02  DEM     1.8207642+00
SEM     5.7975697+01  RRVS    1.2205651+02  SMAS   -2.2935006+03  ECCS    1.4370778+00  INCS    1.5168874+02  RANS    1.7953018+02
APFS    4.8320074+00  RPS     9.9675615+02  RM      2.1279662+05  DEMP    4.2606943-01  RAMP    1.7980235+02
*****************************************************************************************************************

ID     0716090.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22    JULY 1969 16 HRS, 32 MINS, 39.872 SECS  G.M.T. ***144. HRS, 47. MINS, 52.877 SECS  G.E.T. ***  T   1.44798021+02 HRS
X       3.3952873+03  Y      -1.4388900+03  Z      -8.1416714+02  DX      1.3315899+04  DY      2.8535601+04  DZ      1.7747900+04
R       3.5091418+03  DEC    -1.3415624+01  RA     -2.4932057+01  V       3.6146668+04  PTH    -6.4698555+00  AZ      6.1252072+01
ALT     6.5832538+01  LAT    -1.3501082+01  LON     1.4665119+02  VE      3.4837045+04  PTE    -6.7568365+00  AZE     6.0056132+01
SMA     1.6789731+05  ECC     9.7936764-01  INC     3.1480258+01  RAN    -2.0065869+00  APF    -1.3301655+01  RP      3.4641172+03
INMP    2.9634829+00  RAM    -1.5139353+02  DEM    -1.5210290+01  RAS     1.2185132+02  DES     2.0220535+01  SEM     9.2259616+01
RRVS    3.2453518+01  PERNAD 1.0007659+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03  LATTD  -2.2462115+00  LONTD   1.6507874+02
AZTD    5.7513044+01  SEATD -3.3325124+01  DTSUN -2.3722299+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************
ID     0716099.1
LAUNCH TIME      16   JULY 1969   16 HRS,   53 MINS,  54.603 SECS   G.M.T.
LAUNCH AZIMUTH   99.                          INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID     0716099.1
EARTH PARKING ORBIT INSERTION
 16    JULY 1969 17 HRS,  5 MINS, 15.657 SECS  G.M.T. ***  0. HRS, 11. MINS, 21.055 SECS  G.E.T. ***  T   1.89181888-01 HRS
X     -2.2969450+03  Y      2.3413788+03  Z      1.3421824+03  DX    -1.9470472+04  DY    -1.4359608+04  DZ    -8.2710979+03
ALT    1.0166273+02  LAT    2.2386137+01  LON    3.0377244+02  V      2.5567727+04  PTH   -5.6587348-07  AZ     1.1045887+02
R      3.5439334+03  DEC    2.2254835+01  RA     1.3445114+02  RAS    1.1586218+02  DES    2.1315997+01  RAN   -1.1750863-01
INC    2.9873116+01  MASS   2.9729818+05
*****************************************************************************************************************

ID     0716099.1
3.5 MINS PRIOR TO TLI INITIATION
 16    JULY 1969 19 HRS, 24 MINS,  6.007 SECS  G.M.T. ***  2. HRS, 30. MINS, 11.404 SECS  G.E.T. ***  T   2.50316778+00 HRS
X      3.2859728+03  Y     -1.1494948+03  Z     -6.3229651+02  DX     9.5100349+03  DY     2.0584290+04  DZ     1.1912448+04
ALT    9.4621969+01  LAT   -1.0360468+01  LON    1.1523569+02  V      2.5613672+04  PTH    3.5392412-02  AZ     6.1783594+01
*****************************************************************************************************************

ID     0716099.1
TRANSLUNAR INJECTION INITIATION
 16    JULY 1969 19 HRS, 27 MINS, 36.007 SECS  G.M.T. ***  2. HRS, 33. MINS, 41.404 SECS  G.E.T. ***  T   2.56150112+00 HRS
X      3.5089999+03  Y     -4.0969704+02  Z     -2.0514247+02  DX     3.3289969+03  DY     2.2002708+04  DZ     1.2676589+04
ALT    3.4892675+01  LAT   -3.3450230+00  LON    1.2697961+02  V      2.5610492+04  PTH    4.2040095-02  AZ     6.0273991+01
R      3.5387873+03  DEC   -3.3232827+00  RA    -6.6594786+00  RAS    1.1596189+02  DES    2.1299594+01  RAN   -8.6240985-01
INC    2.9894319+01  MASS   2.9417327+05
*****************************************************************************************************************

ID     0716099.1
TRANSLUNAR INJECTION TERMINATION
 16    JULY 1969 19 HRS, 32 MINS, 58.591 SECS  G.M.T. ***  2. HRS, 39. MINS,  3.988 SECS  G.E.T. ***  T   2.65110779+00 HRS
X      3.4139190+03  Y      9.9750019+02  Z      5.9514970+02  DX    -7.2866029+03  DY     3.0563410+04  DZ     1.6797754+04
ALT    1.6249555+02  LAT    9.5594921+00  LON    1.4857894+02  V      3.5628375+04  PTH    6.9777805+00  AZ     6.2541031+01
R      3.6061132+03  DEC    9.4995062+00  RA     1.6287635+01  RAS    1.1596566+02  DES    2.1298974+01  DEM    1.8328891+01
SEM    2.4495587+01  RBVS   8.4573045+01  RAN   -1.3318091+00  INC    2.8934519+01  ECC    9.7624477-01  SMA    1.4953528+05
RP     3.5522461+03  APF    5.8191379+00  INMP   4.4817049-01  C3TLI -4.5852939-01  DAZTLI 9.8709075-01  MASS   1.3776159+05
PROP   1.5641169+05
*****************************************************************************************************************

ID     0716099.1
TRANSLUNAR INJECTION + 2 HOURS
 16    JULY 1969 21 HRS, 32 MINS, 58.591 SECS  G.M.T. ***  4. HRS, 39. MINS,  3.988 SECS  G.E.T. ***  T   4.65110779+00 HRS
X     -1.5901591+04  Y      1.2553687+04  Z      6.7205234+03  DX    -1.3562740+04  DY     3.6885165+03  DZ     1.8548728+03
ALT    1.7902493+04  LAT    1.8370161+01  LON    2.4391945+02  V      1.4177222+04  PTH    6.5078682+01  AZ     1.1275539+02
R      2.1345282+04  DEC    1.8351649+01  RA     1.4171028+02  RAS    1.1604970+02  DES    2.1285093+01
*****************************************************************************************************************

ID     0716099.1
LUNAR ORBIT INSERTION BURN INITIATION
 19    JULY 1969 20 HRS, 32 MINS, 13.450 SECS  G.M.T. *** 75. HRS, 38. MINS, 18.845 SECS  G.E.T. ***  T   7.56385679+01 HRS
XL    -1.0005059+03  YL    -1.7187323+02  ZL    -9.4392534+01  DXL   -2.5695118+02  DYL    7.2995464+03  DZL    3.8799127+03
XS    -1.0065175+03  YS    -1.6039596+02  ZS    -2.5617356+01  DXS    1.9470075+01  DYS    8.2404098+03  DZS    8.7538229+02
ALTS   8.1045876+01  LATS  -1.4397883+00  LONS  -1.7094563+02  VRS    8.2867982+03  PTR   -9.2890421+00  AZR   -8.4090223+01
LIN    1.7390641+02  LAN    1.7543698+02  LAP    1.7443343+02  LTS    1.3128372+00  LNS    1.1490412+02  DEM    1.5744543+00
THETA  1.5754739+01  BETA  -1.7049897+02  MASS   9.5199404+04  DRTX  -2.8934135+03  DRTY  -4.6557253+02  DRTZ   1.3513517-01
*****************************************************************************************************************

ID     0716099.1
LUNAR ORBIT INSERTION BURN TERMINATION
 19    JULY 1969 20 HRS, 38 MINS, 20.245 SECS  G.M.T. *** 75. HRS, 44. MINS, 25.640 SECS  G.E.T. ***  T   7.57404556+01 HRS
XL    -9.7188353+02  YL     2.0362531+02  ZL     9.0334913+01  DXL    1.2011606+03  DYL    4.9219360+03  DZL    2.1016783+03
XS    -9.6347733+02  YS     2.5662214+02  ZS     5.6891008+00  DXS    1.3923000+03  DYS    5.3207581+03  DZS    1.1592819+02
ALTS   5.8590161+01  LATS   3.2691663-01  LONS   1.6538553+02  VRS    5.5011276+03  PTR    2.5732464-01  AZR   -8.8793917+01
LIN    1.7874699+02  LAN   -1.7979285+02  LAP   -5.9605815+00  SMAS   1.0525799+03  ECCS   5.2915574-02  PERS   2.1453610+00
RPS    9.9688207+02  APOS   1.1082778+03  RANS  -1.7955998+02  INCS   1.5683795+02  LTS    1.3127604+00  LNS    1.1485218+02
LTE    2.7256884-01  LNE   -6.5381945+00  THETA -7.7709290+00  BETA  -1.6588165+02  PROP   2.3905760+04  BARC   2.3975997+01
DELV   2.9306285+03  MASS   7.1293645+04  PLCHNG-4.8461471+00
*****************************************************************************************************************

ID     0716099.1
CIRCULARIZATION BURN INITIATION
 20    JULY 1969  0 HRS, 53 MINS, 54.769 SECS  G.M.T. *** 80. HRS,  0. MINS,   .165 SECS  G.E.T. ***  T   8.00000458+01 HRS
XL    -9.8805120+02  YL     1.2046228+02  ZL     5.4838781+01  DXL    7.2968171+02  DYL    4.9999983+03  DZL    2.1365600+03
XS    -9.7517941+02  YS     2.0681994+02  ZS     3.7723167+00  DXS    1.1431738+03  DYS    5.3808596+03  DZS    1.1800966+02
ALTS   5.8383424+01  LATS   2.1681547-01  LONS   1.6832591+02  VRS    5.5022197+03  PTR   -1.5515458-02  AZR   -8.8770968+01
LIN    1.7874846+02  LAN    1.7800058+02  LAP   -1.7442636+02  LTS    1.3095409+00  LNS    1.1268059+02  DEM    4.8826961-01
THETA  3.8817672-01  BETA  -1.7999300+02  MASS   7.1244245+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID     0716099.1
CIRCULARIZATION BURN TERMINATION
 20    JULY 1969  0 HRS, 54 MINS,  9.606 SECS  G.M.T. *** 80. HRS,  0. MINS, 15.003 SECS  G.E.T. ***  T   8.00041676+01 HRS
XL    -9.8620826+02  YL     1.3250720+02  ZL     5.9985437+01  DXL    7.7972428+02  DYL    4.8649890+03  DZL    2.0786355+03
XS    -9.7234001+02  YS     2.1977618+02  ZS     4.0565075+00  DXS    1.1823496+03  DYS    5.2305204+03  DZS    1.1475855+02
ALTS   5.8383167+01  LATS   2.3314960-01  LONS   1.6726356+02  VRS    5.3637172+03  PTR    3.8944144-03  AZR   -8.8774057+01
LIN    1.7874848+02  LAN    1.7799831+02  LAP   -7.9778436+00  SMAS   9.9730803+02  ECCS   4.3784222-04  PERS   1.9786169+00
RPS    9.9687135+02  APOS   9.9774468+02  RANS  -1.7955202+02  INCS   1.5683811+02  LTS    1.3095377+00  LNS    1.1267849+02
LTE    5.3024593-01  LNE   -6.6687261+00  THETA -3.7018856-01  BETA   1.8000000+02  PROP   9.6700977+02  BARC   7.6035678-01
DELV   1.3850217+02  MASS   7.0277235+04  PLCHNG 1.2559653-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID      716099.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 21    JULY 1969 21 HRS, 24 MINS,  6.454 SECS  G.M.T. ***100. HRS, 30. MINS, 11.855 SECS  G.E.T. ***  T   1.00503293+02 HRS
XL     7.7199113+02  YL      5.8112916+02  ZL      2.4574850+02  DXL     3.3835237+03  DYL    -3.8017223+03  DZL    -1.6388027+03
XS     9.1323692+02  YS      3.9988573+02  ZS     -1.2782673+01  DXS     2.1518635+03  DYS    -4.9112454+03  DZS    -9.3798743+01
ALTS   5.8539906+01  LATS    7.3459326-01  LONS    2.3647520+01  VRS     5.3628021+03  PTR     2.7089539-04  AZR    -9.1002286+01
LIN    1.7875495+02  LAN     1.6749426+02  SMASV   1.1430088+01
*****************************************************************************************************************

ID     716099.1
CSM PLANE CHANGE BURN INITIATION
 21    JULY 1969  1 HRS, 47 MINS,  9.438 SECS  G.M.T. ***104. HRS, 53. MINS, 14.835 SECS  G.E.T. ***  T   1.04887454+02 HRS
XL     7.7502335+02  YL     -5.7547454+02  ZL     -2.4909101+02  DXL    -3.3635900+03  DYL    -3.8259367+03  DZL    -1.6240213+03
XS     5.4318793+02  YS     -8.3583125+02  ZS     -1.4540865+01  DXS    -4.4972472+03  DYS    -2.9204437+03  DZS    -8.5950196+01
ALTS   5.9441063+01  LATS   -8.3572163-01  LONS   -5.6981066+01  VRS     5.3629852+03  PTR    -6.4574722-03  AZR    -9.2918455+01
LIN    1.7875619+02  LAN     1.6522884+02  LAP     2.6492810+01  LTS     1.2902518+00  LNS     9.9996523+01  DEM    -5.7622569+00
THETA -1.2 38208-04  BETA    8.9999954+01  MASS    3.6370536+04  DRTX    0.0000000     DRTY    1.6474890+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     716099.1
CSM PLANE CHANGE BURN TERMINATION
 21    JULY 1969  1 HRS, 47 MINS, 10.344 SECS  G.M.T. ***104. HRS, 53. MINS, 15.741 SECS  G.E.T. ***  T   1.04887706+02 HRS
XL     7.7452133+02  YL     -5.7604557+02  ZL     -2.4933207+02  DXL    -3.3668570+03  DYL    -3.8299455+03  DZL    -1.6378047+03
XS     5.4251680+02  YS     -8.3626670+02  ZS     -1.4552450+01  DXS    -4.4996813+03  DYS    -2.9171799+03  DZS    -6.9416706+01
ALTS   5.9443913+01  LATS   -8.3638759-01  LONS   -5.7027050+01  VRS     5.3630111+03  PTR    -6.4530206-03  AZR    -9.3741825+01
LIN    1.7888063+02  LAN     1.7131482+02  LAP     2.5498743+01  SMAS    9.9715945+02  ECCS    2.5234076-04  PERS    1.9781747+00
RPS    9.9690782+02  APOS    9.9741106+02  RANS   -1.7920964+02  INCS    1.5597488+02  LTS     1.2902514+00  LNS     9.9996391+01
LTE    2.0247794+00  LNE    -7.2546165+00  THETA  1.7152312-03  BETA    8.9824441+01  PROP    5.9076172+01  BARC    4.6393707-02
DELV   1.6474844+01  MASS    3.6311463+04  PLCHNG 1.7654130-01
*****************************************************************************************************************

ID     716099.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 21    JULY 1969 19 HRS,  5 MINS,  9.593 SECS  G.M.T. ***122. HRS, 11. MINS, 15.989 SECS  G.E.T. ***  T   1.22187525+02 HRS
XL     6.2525671+02  YL      7.1614537+02  ZL      3.0046177+02  DXL     4.1546259+03  DYL    -3.6767517+03  DZL    -1.3328045+03
XS     9.1324371+02  YS      3.9988772+02  ZS      1.2772082+01  DXS     2.1519416+03  DYS    -4.9115171+03  DZS    -7.8173169+01
ALTS   5.8545783+01  LATS    7.3397953-01  LONS    2.3647469+01  VRS     5.3627915+03  PTR     1.0923381-03  AZR    -9.0835321+01
LIN    1.7888617+02  LAN     1.6242991+02
*****************************************************************************************************************

ID     716099.1
TRANSEARTH INJECTION BURN INITIATION
 22    JULY 1969  4 HRS,  8 MINS, 52.883 SECS  G.M.T. ***131. HRS, 14. MINS, 59.277 SECS  G.E.T. ***  T   1.31249521+02 HRS
XL    -9.2922793+02  YL     -3.3423413+02  ZL     -1.3619519+02  DXL    -1.9360644+03  DYL     4.5835566+03  DZL     1.9595904+03
XS    -9.7745558+02  YS      1.9467943+02  ZS     -3.6837813+01  DXS     1.0468306+03  DYS     5.2597231+03  DZS     1.1181124+02
ALTS   5.8364564+01  LATS   -2.1173394-01  LONS    1.6873803+02  VRS     5.3638518+03  PTR     1.5432415-03  AZR    -8.8912399+01
LIN    1.7888879+02  LAN     1.5775524+02  LAP     1.2860213+02  LTS     1.2690703+00  LNS     8.5568536+01  DEM    -1.2279239+01
THETA -5.5191215+00  BETA    1.2683170+01  MASS    3.6390160+04  DRTX    3.1811540+03  DRTY    7.1256955+02  DRTZ    6.1494335+01
*****************************************************************************************************************

ID     716099.1
TRANSEARTH INJECTION BURN TERMINATION
 22    JULY 1969  4 HRS, 11 MINS, 26.442 SECS  G.M.T. ***131. HRS, 17. MINS, 31.838 SECS  G.E.T. ***  T   1.31292177+02 HRS
XL    -9.7963961+02  YL     -1.8534796+02  ZL     -6.3372473+01  DXL    -2.0934916+03  DYL     7.3166481+03  DZL     3.8342240+03
XS    -9.3126211+02  YS      3.6159088+02  ZS      8.1598608+00  DXS     2.6683323+03  DYS     8.0912245+03  DZS     8.7543748+02
ALTS   5.7537843+01  LATS    4.6798410-01  LONS    1.5877978+02  VRS     8.5647030+03  PTR     3.0010723+00  AZR    -8.4149673+01
LIN    1.7412004+02  LAN     1.6332879+02  LAP    -2.1602196+00  SMAS   -1.7771864+03  ECCS    1.5609733+00  PERS    4.7067077+00
RPS    9.9677634+02  APOS   -4.5511492+03  RANS   -1.7625942+02  INCS    1.5236540+02  INMPS   1.7742025+02  SEM     8.5913697+01
RBVS   1.0777214+02  LTS     1.2690354+00  LNS     8.6546819+01  LTE     3.5293573+00  LNE    -7.4825255+00  THETA   4.3148277+00
BETA   7.8727635+00  PROP    1.0008144+04  BARC    9.9580334+00  DELV    3.2635667+03  MASS    2.6372017+04  PLCHNG  4.7752672+00
*****************************************************************************************************************

ID     716099.1
ENTRY AND TOUCHDOWN
 24    JULY 1969 16 HRS, 39 MINS, 57.269 SECS  G.M.T. ***191. HRS, 46. MINS,  2.663 SECS  G.E.T. ***  T   1.91767406+02 HRS
X      3.6502265+03  Y      1.6848806+02  Z     -1.9943414+02  DX     -4.1028406+03  DY      2.7421089+04  DZ      2.3252731+04
R      3.6597503+03  DEC   -3.2574661+00  RA      2.7560386+00  V      3.6186170+04  PTH    -6.5000023+00  AZ      5.0110763+01
ALT    6.5854195+01  LAT   -3.2789552+00  LON     1.7053641+02  VE     3.5016975+04  PTE    -6.7322638+00  AZE     4.8472015+01
SMA    2.1627058+05  ECC    9.8398114-01  INC     3.9999868+01  RAN    6.6453278+00  APF    8.0346665+00  RP      3.4644098+03
INMP   1.2314256+01  SEM    1.1800254+02  RBVS    5.9717534+01  RAM   -1.2360094+02  DEM   -2.4703630+01  RAS     1.2384393+02
DES    1.9807382+01  SPSPR  3.7399167+03  DVRES   1.5700038+03  PERNAD 1.1713249+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03
LATTD  1.2893296+01  LONTD  1.8666938+02  AZTD    4.9556543+01  SEATD -6.8709729+00  DTSUN -4.9804981-01
*****************************************************************************************************************

ID     716099.1
CIRCUMLUNAR PERICYNTHION
 19    JULY 1969 20 HRS, 35 MINS, 36.235 SECS  G.M.T. *** 75. HRS, 41. MINS, 41.632 SECS  G.E.T. ***  T   7.56948977+01 HRS
XL    -9.9357635+02  YL      7.3124751+01  ZL      3.5877805+01  DXL     6.8162717+02  DYL     7.3447369+03  DZL     3.9367761+03
XS    -3.9017036+02  YS      1.5665515+02  ZS      3.8408310+00  DXS     9.6817007+02  DYS     8.2594878+03  DZS     8.3548085+02
ALTS   5.8415819+01  LATS    2.2074621-01  LONS    1.7333785+02  VRS     8.3630477+03  PTR    -3.2531865-09  AZR    -8.3922079+01
LIN    1.7891638+02  LAN     1.7540604+02  LAP    -2.0345535+00  LTS     1.3127947+00  LNS     1.1487540+02  DEM     1.5504592+00
SEM    5.4477922+01  RBVS    1.2153339+02  SMAS   -2.2785844+03  ECCS    1.4375126+00  INCS    1.5200294+02  RANS    1.7967482+02
APFS   4.3969529+00  RPS     9.9690933+02  PM      2.1269827+05  DEMP    4.7275268-01  RAMP    1.7981866+02
*****************************************************************************************************************

ID     716099.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22    JULY 1969 17 HRS, 32 MINS, 43.815 SECS  G.M.T. ***144. HRS, 38. MINS, 49.211 SECS  G.E.T. ***  T   1.44647103+02 HRS
X      3.1001227+03  Y     -1.4119994+03  Z     -8.4217748+02  DX      1.3096869+04  DY      2.8084819+04  DZ      1.8609374+04
R      3.5099975+03  DEC   -1.3886439+01  RA     -2.4487633+01  V       3.6146682+04  PTH    -6.6668954+00  AZ      5.9666406+01
ALT    6.5832025+01  LAT   -1.3974660+01  LON     1.3203390+02  VE      3.4861426+04  PTE    -6.9600804+00  AZE     5.8413443+01
SMA    1.6770771+05  ECC    9.7936110-01  INC     3.3983698+01  RAN    -2.1863730+00  APF    -1.2607700+01  RP      3.4613022+03
INMP   4.5691165+00  RAM   -1.5086450+02  DEM    -1.5441347+01  RAS     1.2189282+02  DES     2.0212166+01  SEM     9.2778519+01
RBVS   3.2696416+01  PERNAD 1.0067237+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03  LATTD  -2.1927728+00  LONTD   1.5013799+02
AZTD   5.5948395+01  SEATD -3.3232886+01  DTSUN -2.3656169+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716108.1
LAUNCH TIME     16   JULY 1969   17 HRS,   54 MINS,  12.080 SECS   G.M.T.
LAUNCH AZIMUTH  108.                                INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID     0716108.1
EARTH PARKING ORBIT INSERTION
 16   JULY 1969 18 HRS,  5 MINS, 35.593 SECS  G.M.T. ***  0. HRS, 11. MINS, 23.513 SECS  G.E.T. ***  T   1.89864811-01 HRS
X      -2.8467441+03  Y      1.7688750+03  Z      1.1517784+03  DX    -1.5228378+04  DY    -1.7171270+04  DZ    -1.1267329+04
ALT     1.0122463+02  LAT    1.9080753+01  LON    3.0234145+02  V      2.5567727+04  PTH   -5.6587348-07  AZ     1.1777379+02
R       3.5439334+03  DEC    1.8965575+01  RA     1.4814451+02  RAS    1.1590445+02  DES    2.1309052+01  RAN   -1.7668423-01
INC     3.3200204+01  MASS   2.9613124+05
*****************************************************************************************************************

ID     0716108.1
3.5 MINS PRIOR TO TLI INITIATION
 16   JULY 1969 20 HRS, 21 MINS, 25.559 SECS  G.M.T. ***  2. HRS, 27. MINS, 13.479 SECS  G.E.T. ***  T   2.45374417+00 HRS
X      3.3025196+03  Y     -1.0756776+03  Z     -6.7990058+02  DX     9.1897903+03  DY     1.9964972+04  DZ     1.3159769+04
ALT    9.3972224+01  LAT   -1.1002576+01  LON    1.0210461+02  V      2.5617022+04  PTH    2.8258286-02  AZ     5.8445932+01
*****************************************************************************************************************

ID     0716108.1
TRANSLUNAR INJECTION INITIATION
 16   JULY 1969 20 HRS, 24 MINS, 55.559 SECS  G.M.T. ***  2. HRS, 31. MINS, 43.479 SECS  G.E.T. ***  T   2.51207748+00 HRS
X      3.5140157+03  Y     -3.5934326+02  Z     -1.9987236+02  DX     2.9852861+03  DY     2.1271235+04  DZ     1.3954808+04
ALT    9.4094722+01  LAT   -3.2597379+00  LON    1.1342961+02  V      2.5614722+04  PTH    3.6345185-02  AZ     5.6927227+01
R      3.5379913+03  DEC   -3.2385448+00  RA    -5.8387709+00  RAS    1.1600204+02  DES    2.1292971+01  RAN   -8.8074943-01
INC    3.3213017+01  MASS   2.9303556+05
*****************************************************************************************************************

ID     0716108.1
TRANSLUNAR INJECTION TERMINATION
 16   JULY 1969 20 HRS, 30 MINS, 17.153 SECS  G.M.T. ***  2. HRS, 36. MINS,  5.073 SECS  G.E.T. ***  T   2.60140917+00 HRS
X      3.4000344+03  Y      9.9530401+02  Z      6.7556986+02  DX    -7.6526753+03  DY     2.9549647+04  DZ     1.8370111+04
ALT    1.6393101+02  LAT    1.0864048+01  LON    1.3424126+02  V      3.5625918+04  PTH    7.0643404+00  AZ     5.9647774+01
R      3.6065576+03  DEC    1.0796253+01  RA     1.6316222+01  RAS    1.1600580+02  DES    2.1292352+01  DEM    1.7946224+01
SEM    2.4027220+01  RBVS   8.5062767+01  RAN   -1.4221754+00  INC    3.2041834+01  ECC    9.7622516-01  SMA    1.4937408+05
RP     3.5513459+03  APF    6.3735600+00  INMP   3.5547430+00  C3TLI -4.5902377-01  DAZTLI 1.2070017+00  MASS   1.3710396+05
PROP   1.5593160+05
*****************************************************************************************************************

ID     0716108.1
TRANSLUNAR INJECTION + 2 HOURS
 16   JULY 1969 22 HRS, 30 MINS, 17.153 SECS  G.M.T. ***  4. HRS, 36. MINS,  5.073 SECS  G.E.T. ***  T   4.60140914+00 HRS
X     -1.5033804+04  Y      1.2067906+04  Z      7.2871818+03  DX    -1.3597380+04  DY     3.4929631+03  DZ     1.9639444+03
ALT    1.7937357+04  LAT    1.9977239+01  LON    2.3087551+02  V      1.4175564+04  PTH    6.5385369+01  AZ     1.1558707+02
R      2.1349947+04  DEC    1.9957367+01  RA     1.4303291+02  RAS    1.1608984+02  DES    2.1278457+01
*****************************************************************************************************************

ID     0716108.1
LUNAR ORBIT INSERTION BURN INITIATION
 19   JULY 1969 21 HRS, 26 MINS,  7.510 SECS  G.M.T. *** 75. HRS, 31. MINS, 55.429 SECS  G.E.T. ***  T   7.55320535+01 HRS
XL     -9.9894669+02  YL    -1.7557092+02  ZL    -9.2057977+01  DXL   -3.0723435+02  DYL    7.3513076+03  DZL    3.7885214+03
XS     -1.0344211+03  YS    -1.5434946+02  ZS    -2.2368307+01  DXS    4.0944310+01  DYS    8.2559664+03  DZS    7.7112601+02
ALTS    7.9933814+01  LATS  -1.2416397+00  LONS  -1.7128079+02  VRS    9.2920015+03  PTR   -9.0788041+00  AZR   -9.4794113+01
LIN     1.7463931+02  LAN    1.7536703+02  LAP    3.0441582+01  LTS    1.3121601+00  LNS    1.1444612+02  DEM    1.3511674+00
THETA   1.5307857+01  BETA  -1.7191515+02  MASS   9.5199404+04  DRTX  -2.8888521+03  DRTY  -3.9554070+02  DRTZ   2.3585910+01
*****************************************************************************************************************

ID     0716108.1
LUNAR ORBIT INSERTION BURN TERMINATION
 19   JULY 1969 21 HRS, 32 MINS, 12.713 SECS  G.M.T. *** 75. HRS, 38. MINS,   .631 SECS  G.E.T. ***  T   7.56335087+01 HRS
XL     -9.7272089+02  YL     2.3005691+02  ZL     8.8967408+01  DXL    1.1772163+03  DYL    4.9270621+03  DZL    2.1336337+03
XS     -9.6223705+02  YS     2.6113289+02  ZS     5.7757531+00  DXS    1.4142857+03  DYS    5.3151262+03  DZS    1.1575132+02
ALTS    5.8564104+01  LATS   3.3190472-01  LONS   1.6481670+02  VRS    5.5012878+03  PTR    2.8981411-01  AZR   -8.8795987+01
LIN     1.7874772+02  LAN   -1.7981643+02  LAP   -8.1388243+00  SMAS   1.0525904+03  ECCS   5.3000890-02  PERS   2.1453930+00
RPS     9.9680221+02  APOS   1.1083786+03  RANS  -1.7953382+02  INCS   1.5683872+02  LTS    1.3120838+00  LNS    1.1439440+02
LTE     3.2680525-01  LNE   -6.5663423+00  THETA -8.2624993+00  BETA  -1.6796214+02  PROP   2.3802057+04  BARC   2.3897161+01
DELV    2.9158973+03  MASS   7.1397348+04  PLCHNG-4.1152610+00
*****************************************************************************************************************

ID     0716108.1
CIRCULARIZATION BURN INITIATION
 20   JULY 1969  1 HRS, 47 MINS, 35.031 SECS  G.M.T. *** 79. HRS, 53. MINS, 22.951 SECS  G.E.T. ***  T   7.98897085+01 HRS
XL     -9.8986807+02  YL     1.0656296+02  ZL     4.9089900+01  DXL    6.4702050+02  DYL    5.0100015+03  DZL    2.1408982+03
XS     -9.7645076+02  YS     2.0033741+02  ZS     3.6196222+00  DXS    1.1075665+03  DYS    5.3887531+03  DZS    1.1809479+02
ALTS    5.8303495+01  LATS   2.0805593-01  LONS   1.6840558+02  VRS    5.5026638+03  PTR   -1.5542127-02  AZR   -8.8770192+01
LIN     1.7874918+02  LAN    1.7797890+02  LAP   -1.7922287+02  LTS    1.3088618+00  LNS    1.1222458+02  DEM    2.6488578-01
THETA   3.8880425-01  BETA  -1.7999300+02  MASS   7.1347948+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID     0716108.1
CIRCULARIZATION BURN TERMINATION
 20   JULY 1969  1 HRS, 47 MINS, 49.889 SECS  G.M.T. *** 79. HRS, 53. MINS, 37.806 SECS  G.E.T. ***  T   7.98938351+01 HRS
XL     -9.8822173+02  YL     1.1865078+02  ZL     5.4255024+01  DXL    6.9940086+02  DYL    4.8756990+03  DZL    2.0832604+03
XS     -9.7369293+02  YS     2.1333222+02  ZS     3.9044461+00  DXS    1.1478486+03  DYS    5.2386524+03  DZS    1.1485184+02
ALTS    5.8303264+01  LATS   2.2442774-01  LONS   1.6764199+02  VRS    5.3641612+03  PTR    3.9615391-03  AZR   -8.8773160+01
LIN     1.7874920+02  LAN    1.7797663+02  LAP   -1.0520479+01  SMAS   9.9731428+02  ECCS   5.2351510-04  PERS   1.9786355+00
RPS     9.9679218+02  APOS   9.9783636+02  RANS  -1.7952587+02  INCS   1.5683892+02  LTS    1.3088582+00  LNS    1.1222247+02
LTE     5.8433612-01  LNE   -6.6950891+00  THETA -3.7083744-01  BETA  -1.7999011+02  PROP   9.6841992+02  BARC   7.6154619-01
DELV    1.3850210+02  MASS   7.0379528+04  PLCHNG 1.5593790-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716108.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 20    JULY 1969 22 HRS, 17 MINS, 54.675 SECS   G.M.T. ***100. HRS, 23. MINS, 42.592 SECS   G.E.T. ***   T    1.00395164+02 HRS
XL      7.5659061+02  YL      5.8729337+02  ZL      2.4824305+02  DXL     3.4190110+03  DYL    -3.7741755+03  DZL    -1.6277315+03
XS      9.1329468+02  YS      3.9991084+02  ZS      1.2782664+01  DXS     2.1520411+03  DYS    -4.9108179+03  DZS    -9.3704495+01
ALTS    5.8631887+01  LATS    7.3454630-01  LONS    2.3647510+01  VRS     5.3624802+03  PTR     3.8634832-03  AZR    -9.1001359+01
LIN     1.7875571+02  LAN     1.6747145+02  SEASV   1.1896881+01
*****************************************************************************************************************

ID     0716108.1
CSM PLANE CHANGE BURN INITIATION
 21    JULY 1969  2 HRS, 40 MINS, 58.006 SECS   G.M.T. ***104. HRS, 46. MINS, 45.925 SECS   G.E.T. ***   T    1.04779424+02 HRS
XL      7.9045422+02  YL     -5.6930629+02  ZL     -2.4661154+02  DXL    -3.3276086+03  DYL    -3.8522099+03  DZL    -1.6346593+03
XS      5.4324564+02  YS     -8.3588805+02  ZS     -1.4526374+01  DXS    -4.4969803+03  DYS    -2.9201085+03  DZS    -8.5919782+01
ALTS    5.8519867+01  LATS   -8.3482265-01  LONS   -5.6980064+01  VRS     5.3625784+03  PTR    -8.9267984-03  AZR    -9.0918295+01
LIN     1.7875697+02  LAN     1.6523597+02  LAP     4.6613398+01  LTS     1.2895433+00  LNS     9.9539578+01  DEM    -5.9873992+00
THETA  -1.3062737-04  BETA    8.9999949+01  MASS    3.6472829+04  DRTX    0.0000000     DRTY    1.6474890+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0716108.1
CSM PLANE CHANGE BURN TERMINATION
 21    JULY 1969  2 HRS, 40 MINS, 58.915 SECS   G.M.T. ***104. HRS, 46. MINS, 46.832 SECS   G.E.T. ***   T    1.04779675+02 HRS
XL      7.7995614+02  YL     -5.6988287+02  ZL     -2.4685487+02  DXL    -3.3309046+03  DYL    -3.8562386+03  DZL    -1.6184504+03
XS      5.4257269+02  YS     -8.3632468+02  ZS     -1.4537988+01  DXS    -4.4994208+03  DYS    -2.9168351+03  DZS    -6.9385989+01
ALTS    5.8519739+01  LATS   -8.3549027-01  LONS   -5.7026168+01  VRS     5.3626046+03  PTR    -8.9257908-03  AZR    -9.0741627+01
LIN     1.7888146+02  LAN     1.7129421+02  LAP     4.4820570+01  SMAS    9.9716496+02  ECCS    2.1807645-04  PERS    1.9781911+00
RPS     9.9694751+02  APOS    9.9738240+02  RANS   -1.7918636+02  INCS    1.5697685+02  LTS     1.2895426+00  LNS     9.9539447+01
LTE     2.0777744+00  LNE    -7.2695152+00  THETA   1.7416982-03  BETA    8.9824503+01  PROP    5.9243164+01  BARC    4.6393707-02
DELV    1.6474994+01  MASS    3.6413586+04  PLCHNG  1.7655667-01
*****************************************************************************************************************

ID     0716108.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 21    JULY 1969 19 HRS, 58 MINS, 58.534 SECS   G.M.T. ***122. HRS,  4. MINS, 46.451 SECS   G.E.T. ***   T    1.22079570+02 HRS
XL      6.1359208+02  YL      7.2113268+02  ZL      3.0248264+02  DXL     4.1933349+03  DYL    -3.0430112+03  DZL    -1.3192224+03
XS      9.1328734+02  YS      3.9990615+02  ZS      1.2767977+01  DXS     2.1521065+03  DYS    -4.9111425+03  DZS    -7.8379266+01
ALTS    5.8593099+01  LATS    7.3370877-01  LONS    2.3647432+01  VRS     5.3625533+03  PTR     5.3427518-03  AZR    -9.0834414+01
LIN     1.7888705+02  LAN     1.6240934+02
*****************************************************************************************************************

ID     0716108.1
TRANSEARTH INJECTION BURN INITIATION
 22    JULY 1969  5 HRS,  3 MINS,  7.595 SECS   G.M.T. ***131. HRS,  8. MINS, 55.515 SECS   G.E.T. ***   T    1.31148754+02 HRS
XL     -9.3404617+02  YL     -3.2247391+02  ZL     -1.3099360+02  DXL    -1.8671386+03  DYL     4.6082784+03  DZL     1.9597207+03
XS     -9.7297917+02  YS      2.1654522+02  ZS     -3.2624491+00  DXS     1.1648811+03  DYS     5.2352195+03  DZS     1.0214769+02
ALTS    5.8296811+01  LATS   -1.8752680-01  LONS    1.6745281+02  VRS     5.3642236+03  PTR    -8.2192456-04  AZR    -8.8908873+01
LIN     1.7888969+02  LAN     1.5773062+02  LAP     8.2574868-01  LTS     1.2683315+00  LNS     8.6109173+01  DEM    -1.2496915+01
THETA  -5.7470278+00  BETA    1.2589209+01  MASS    3.6482286+04  DRTX    3.2155402+03  DRTY    7.1451189+02  DRTZ    7.1710243+01
*****************************************************************************************************************

ID     0716108.1
TRANSEARTH INJECTION BURN TERMINATION
 22    JULY 1969  5 HRS,  5 MINS, 42.951 SECS   G.M.T. ***131. HRS, 11. MINS, 30.868 SECS   G.E.T. ***   T    1.31191908+02 HRS
XL     -9.8257557+02  YL     -1.7079046+02  ZL     -5.6865256+01  DXL    -1.9671539+03  DYL     7.3777605+03  DZL     3.9212303+03
XS     -9.2187584+02  YS      3.8461161+02  ZS      8.7513415+00  DXS     2.8809329+03  DYS     8.0549370+03  DZS     8.7810759+02
ALTS    6.0434783+01  LATS    5.0195930-01  LONS    1.5735384+02  VRS     8.5995846+03  PTR     3.0017319+00  AZR    -8.4157441+01
LIN     1.7412505+02  LAN     1.6223809+02  LAP    -1.8355707+02  SMAS   -1.7139329+03  ECCS    1.5815187+00  PERS    4.4576757+00
RPS     9.9668406+02  APOS   -4.4245499+03  RANS   -1.7638951+02  INCS    1.5235720+02  INMPS   1.7748014+02  SEM     8.6374957+01
RBVS    1.0873793+02  LTS     1.2682963+00  LNS     8.6386200+01  LTE     3.5732502+00  LNE    -7.4820771+00  THETA   4.2309803+00
BETA    7.7799476+00  PROP    1.0125290+04  BARC    1.0098745+01  DELV    3.2947516+03  MASS    2.6355997+04  PLCHNG  4.7688992+00
*****************************************************************************************************************

ID     0716108.1
ENTRY AND TOUCHDOWN
 24    JULY 1969 16 HRS, 40 MINS, 58.870 SECS   G.M.T. ***190. HRS, 46. MINS, 46.787 SECS   G.E.T. ***   T    1.90779653+02 HRS
X       3.4994134+03  Y       1.8408265+02  Z      -1.9690797+02  DX     -4.2484528+03  DY      2.7406240+04  DZ      2.3257479+04
R       3.5097292+03  DEC    -3.2014652+00  RA      3.0112037+00  V       3.6194773+04  PTH    -6.5000409+00  AZ      5.0106710+01
ALT     6.5831768+01  LAT    -3.2225865+00  LON     1.7053420+02  VE      3.5025590+04  PTE    -6.7320055+00  AZE     4.8468114+01
SMA     2.2943794+05  ECC     9.8490046-01  INC     4.0000138+01  RAN     6.8333520+00  APF     8.1158999+00  RP      3.4644073+03
INMP    1.2352825+01  SEM     1.1801198+02  RBVS    5.9974700+01  RAM    -1.2359013+02  DEM    -2.4706213+01  RAS     1.2384164+02
DES     1.9807232+01  SPSPR   3.7248967+03  DVRES   1.5641639+03  PERNAD 1.1974483+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   1.9948343+01  LONTD   1.8666923+02  AZTD    4.9568579+01  SEATD -5.6166928+00  DTSUN  -4.7963211-01
*****************************************************************************************************************

ID     0716108.1
CIRCUMLUNAR PERICYNTHION
 19    JULY 1969 21 HRS, 29 MINS, 25.473 SECS   G.M.T. *** 75. HRS, 35. MINS, 13.392 SECS   G.E.T. ***   T    7.55870533+01 HRS
XL     -9.9416874+02  YL      6.5335588+01  ZL      3.2117395+01  DXL     6.0963645+02  DYL     7.4008352+03  DZL     3.8154912+03
XS     -9.9013906+02  YS      1.1556551+02  ZS      3.2557668+00  DXS     9.6807119+02  DYS     8.2719546+03  DZS     7.7965846+02
ALTS    5.8337327+01  LATS    1.8713509-01  LONS    1.7334253+02  VRS     8.3648228+03  PTR    -1.0934167-07  AZR    -8.4651851+01
LIN     1.7463829+02  LAN     1.7533684+02  LAP     7.8130960-01  LTS     1.3121191+00  LNS     1.1441808+02  DEM     1.3374908+00
SEM     5.8907985+01  RBVS    1.2107072+02  SMAS   -2.2740721+03  ECCS    1.4383462+00  INCS    1.5273242+02  RANS    1.7982581+02
APFS    4.0326968+00  RPS     9.9683082+02  RM      2.1261357+05  DEMP    4.9698769-01  RAMP    1.7984890+02
*****************************************************************************************************************

ID     0716108.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22    JULY 1969 18 HRS, 24 MINS, 41.344 SECS   G.M.T. ***144. HRS, 30. MINS, 29.258 SECS   G.E.T. ***   T    1.44508127+02 HRS
X       3.1245043+03  Y      -1.3316510+03  Z      -8.8175630+02  DX     1.2678104+04  DY      2.7037968+04  DZ      2.0366673+04
R       3.5090334+03  DEC    -1.4553376+01  RA     -2.3083505+01  V      3.6146748+04  PTH    -6.4963969+00  AZ      5.6198207+01
ALT     6.5832230+01  LAT    -1.4645469+01  LON     1.2041276+02  VE     3.4914591+04  PTE    -6.7797592+00  AZE     5.4823594+01
SMA     1.6747236+05  ECC     9.7931813-01  INC     3.6456845+01  RAN   -2.5106395+00  APF    -1.1885871+01  RP      3.4636421+03
INMP    7.9467139+00  RAM    -1.5040553+02  DEM    -1.5640379+01  RAS    1.2192871+02  DES     2.0204919+01  SEM     9.3227818+01
RBVS    3.3799430+01  PERNAD 1.0006082+01  ENTDT   2.3333330-01  ENTRG  1.2850000+03  LATTD  -1.7669259+00  LONTD   1.3775597+02
AZTD    5.2328678+01  SEATD -3.2509966+01  DTSUN  -2.3148190+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0716072.2
LAUNCH TIME      16   JULY 1969   13 HRS,   31 MINS,  45.274 SECS   G.M.T.
LAUNCH AZIMUTH   72.                          INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID    0716072.2
EARTH PARKING ORBIT INSERTION
 16   JULY 1969 13 HRS, 43 MINS,  9.317 SECS  G.M.T. ***  0. HRS, 11. MINS, 24.042 SECS  G.E.T. ***  T   1.90011727-01 HRS
X      2.1735578+02  Y      2.9753806+03  Z      1.9129378+03  DX    -2.5519457+04  DY     1.3644677+03  DZ     7.7733345+02
ALT    1.0337523+02  LAT    3.2838504+01  LON    3.0580793+02  V      2.5567727+04  PTH    5.8945157-08  AZ     8.7930236+01
R      3.5439334+03  DEC    3.2668535+01  RA     8.5821882+01  RAS    1.1572756+02  DES    2.1339186+01  RAN   -3.4770329-01
INC    3.2726785+01  MASS   2.9588213+05
*****************************************************************************************************************

ID    0716072.2
3.5 MINS PRIOR TO TLI INITIATION
 16   JULY 1969 17 HRS, 40 MINS, 39.777 SECS  G.M.T. ***  4. HRS,  8. MINS, 54.503 SECS  G.E.T. ***  T   4.14847296+00 HRS
X      3.2605406+03  Y     -1.1899485+03  Z     -7.0582830+02  DX    1.0001909+04  DY     1.9727808+04  DZ     1.2873723+04
ALT    9.8460960+01  LAT   -1.1567989+01  LON    1.4039679+02  V      2.5592133+04  PTH    3.1552644-02  AZ     5.9106610+01
*****************************************************************************************************************

ID    0716072.2
TRANSLUNAR INJECTION INITIATION
 16   JULY 1969 17 HRS, 44 MINS,  9.777 SECS  G.M.T. ***  4. HRS, 12. MINS, 24.503 SECS  G.E.T. ***  T   4.20680630+00 HRS
X      3.5015143+03  Y     -4.7828110+02  Z     -2.4355762+02  DX    3.8702975+03  DY     2.1240549+04  DZ     1.3737258+04
ALT    9.8532140+01  LAT   -3.9682085+00  LON    1.5179112+02  V      2.5590083+04  PTH    2.9791696-02  AZ     5.7443649+01
R      3.5424109+03  DEC   -3.9424681+00  RA    -7.7780473+00  RAS    1.1588943+02  DES    2.1311520+01  RAN   -1.6315815+00
INC    3.2768101+01  MASS   2.9179817+05
*****************************************************************************************************************

ID    0716072.2
TRANSLUNAR INJECTION TERMINATION
 16   JULY 1969 17 HRS, 49 MINS, 29.153 SECS  G.M.T. ***  4. HRS, 17. MINS, 43.878 SECS  G.E.T. ***  T   4.29552180+00 HRS
X      3.4406875+03  Y      8.7052067+02  Z      6.2315670+02  DX   -6.5757861+03  DY     2.9514212+04  DZ     1.8863149+04
ALT    1.5983902+02  LAT    1.0021382+01  LON    1.7243312+02  V      3.5642312+04  PTH    6.6288227+00  AZ     5.8619838+01
R      3.6033957+03  DEC    9.9585660+00  RA     1.4198322+01  RAS    1.1589316+02  DES    2.1310908+01  DEM    1.8355776+01
SEM    2.3717205+01  RBVS   8.2923924+01  RAN   -1.6315820+00  INC    3.2768101+01  ECC    9.7626501-0.  HA     1.4977024+05
RP     3.5547946+03  APF    5.2142205+00  INMP   4.2843602+00  C3TLI -4.5780902-01  DAZTLI 0.0000000     MASS   1.3694212+05
PROP   1.5495605+05
*****************************************************************************************************************

ID    0716072.2
TRANSLUNAR INJECTION + 2 HOURS
 16   JULY 1969 19 HRS, 49 MINS, 29.153 SECS  G.M.T. ***  6. HRS, 17. MINS, 43.878 SECS  G.E.T. ***  T   6.29552180+00 HRS
X     -1.5673687+04  Y      1.2303389+04  Z      7.6123124+03  DX   -1.3506600+04  DY     3.7555467+03  DZ     2.1583781+03
ALT    1.7886187+04  LAT    2.0930943+01  LON    2.7002857+02  V      1.4184180+04  PTH    6.5262085+01  AZ     1.1580618+02
R      2.1328650+04  DEC    2.0910272+01  RA     1.4187590+02  RAS    1.1597722+02  DES    2.1297068+01
*****************************************************************************************************************

ID    0716072.2
LUNAR ORBIT INSERTION BURN INITIATION
 19   JULY 1969 18 HRS, 50 MINS, 54.385 SECS  G.M.T. *** 77. HRS, 19. MINS,  9.108 SECS  G.E.T. ***  T   7.73191967+01 HRS
XL    -1.0032570+03  YL    -1.5558365+02  ZL    -8.3995275+01  DXL  -1.1830040+02  DYL    7.3555173+03  DZL    3.7867417+03
XS    -1.0042083+03  YS    -1.5762108+02  ZS    -2.2055162+01  DXS   2.5615776+01  DYS    8.2543403+03  DZS    7.6843707+02
ALTS   8.0224303+01  LATS  -1.2405461+00  LONS  -1.7199705+02  VRS   8.2900714+03  PTR   -9.1556406+00  AZR   -8.4812134+01
LIN    1.7465612+02  LAN    1.7551720+02  LAP    4.6844595+01  LTS   1.3141056+00  LNS    1.1576506+02  DEM    1.9934944+00
THETA  1.6020465+01  BETA  -1.7192408+02  MASS   9.5199404+04  DRTX -2.8891922+03  DRTY  -3.9373504+02  DRTZ  -1.3218403+01
*****************************************************************************************************************

ID    0716072.2
LUNAR ORBIT INSERTION BURN TERMINATION
 19   JULY 1969 18 HRS, 56 MINS, 59.592 SECS  G.M.T. *** 77. HRS, 25. MINS, 14.314 SECS  G.E.T. ***  T   7.74206429+01 HRS
XL    -9.6844189+02  YL     2.1947190+02  ZL     9.6686577+01  DXL   1.2666985+03  DYL    4.9039989+03  DZL    2.0942470+03
XS    -9.6373955+02  YS     2.5801038+02  ZS     5.7084447+00  DXS   1.3714393+03  DYS    5.3218794+03  DZS    1.1591826+02
ALTS   5.9201763+01  LATS   3.2782713-01  LONS   1.6501236+02  VRS   5.4969703+03  PTR    5.4380298-01  AZR   -8.8794708+01
       1.7874752+02  LAN   -1.7981639+02  LAP   -1.2442351+01  SMAS  1.0521659+03  ECCS   5.2635563-02  PERS   2.1441954+00
       9.9678460+02  APOS   1.1075473+03  RANS  -1.7961311+02  INCS  1.5683853+02  LTS    1.3140296+00  LNS    1.1571333+02
       1.7060803-01  LNE   -6.4843162+00  THETA -7.5405979+00  BETA -1.6803908+02  PROP   2.3802270+04  BARC   2.3984918+01
DELV   2.9159276+03  MASS   7.1397135+04  PLCHNG-4.0969214+00
*****************************************************************************************************************

ID    0716072.2
CIRCULARIZATION BURN INITIATION
 19   JULY 1969 23 HRS, 10 MINS, 30.047 SECS  G.M.T. *** 81. HRS, 38. MINS, 45.171 SECS  G.E.T. ***  T   8.16458807+01 HRS
XL    -9.9567921+02  YL     4.1917766+01  ZL     2.0867581+01  DXL   2.5908805+02  DYL    5.0381855+03  DZL    2.1545354+03
XS    -9.9115355+02  YS     1.0574444+02  ZS     1.5509237+00  DXS   5.8552453+02  DYS    5.4692261+03  DZS    1.1946398+02
ALTS   5.8286124+01  LATS   8.9148510-02  LONS   1.7391025+02  VRS   5.5017764+03  PTR   -1.9006186-02  AZR   -8.8755754+01
LIN    1.7874895+02  LAN    1.7799590+02  LAP    6.4806785-01  LTS   1.3108464+00  LNS    1.1355919+02  DEM    9.1809148-01
THETA  1.0843[illegible]-01  BETA   1.8000000+02  MASS   7.1347735+04  DRTX -1.3727341+02  DRTY   0.0000000     DRTZ   6.6335902-01
*****************************************************************************************************************

ID    0716072.2
CIRCULARIZATION BURN TERMINATION
 19   JULY 1969 23 HRS, 10 MINS, 45.175 SECS  G.M.T. *** 81. HRS, 38. MINS, 59.899 SECS  G.E.T. ***  T   8.16499720+01 HRS
XL    -9.9497512+02  YL     5.3973610+01  ZL     2.6022908+01  DXL   3.2183132+02  DYL    4.9087675+03  DZL    2.0989853+03
XS    -9.8966792+02  YS     1.1882706+02  ZS     1.8367309+00  DXS   6.4021921+02  DYS    5.3248996+03  DZS    1.1635639+02
ALTS   5.8284212+01  LATS   1.0557719-01  LONS   1.7315341+02  VRS   5.3645107+03  PTR   -6.9492299-03  AZR   -8.8757131+01
LIN    1.7874895+02  LAN    1.7799364+02  LAP    1.1370934+01  SMAS  9.9740675+02  ECCS   6.4227527-04  PERS   1.9789107+00
RPS    9.9676614+02  APOS   9.9804735+02  RANS  -1.7960514+02  INCS  1.5683862+02  LTS    1.3108436+00  LNS    1.1355710+02
LTE    4.2605269-01  LNE   -6.6169237+00  THETA -6.4420380-01  BETA  1.8000000+02  PROP   9.5991211+02  BARC   7.5486785-01
DELV   1.3727747+02  MASS   7.0387823+04  PLCHNG 6.0840733-07
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716072.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 20   JULY 1969 19 HRS, 42 MINS, 47.192 SECS  G.M.T. ***102. HRS, 11. MINS,  1.916 SECS  G.E.T. ***  T   1.02183866+02 HRS
XL      7.8217446+02  YL      5.6952882+02  ZL      2.4105897+02  DXL     3.3170421+03  DYL    -3.8511061+03  DZL    -1.6583689+03
XS      9.1332675+02  YS      3.9992509+02  ZS      1.2787180+01  DXS     2.1530364+03  DYS    -4.9104257+03  DZS    -9.3715350+01
ALTS    5.8637040+01  LATS    7.3477994-01  LONS    2.3647521+01  VRS     5.3625207+03  PTR     1.5268677-02  AZR    -9.1001603+01
LIN     1.7875538+02  LAN     1.6746973+02  SEASV   1.0569832+01
*****************************************************************************************************************

ID     0716072.2
CSM PLANE CHANGE BURN INITIATION
 21   JULY 1969  0 HRS,  5 MINS, 52.796 SECS  G.M.T. ***106. HRS, 34. MINS,  7.519 SECS  G.E.T. ***  T   1.06568755+02 HRS
XL      7.6505768+02  YL     -5.8724210+02  ZL     -2.5378529+02  DXL    -3.4290808+03  DYL    -3.7740622+03  DZL    -1.6029520+03
XS      5.4338643+02  YS     -8.3611807+02  ZS     -1.4534200+01  DXS    -4.4957211+03  DYS    -2.9198197+03  DZS    -8.5935562+01
ALTS    5.8789534+01  LATS   -8.3504659-01  LONS   -5.6980483+01  VRS     5.3613654+03  PTR    -3.7595014-03  AZR    -9.0918534+01
LIN     1.7875660+02  LAN     1.6523379+02  LAP     1.1751567+02  LTS     1.2915834+00  LNS     1.0085659+02  DEM    -5.3382155+00
THETA  -1.2806605-05  BETA    8.9999994+01  MASS    3.6481124+04  DRTX    0.0000000     DRTY    1.6474890+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0716072.2
CSM PLANE CHANGE BURN TERMINATION
 21   JULY 1969  0 HRS,  5 MINS, 53.705 SECS  G.M.T. ***106. HRS, 34. MINS,  8.428 SECS  G.E.T. ***  T   1.06569008+02 HRS
XL      7.6454433+02  YL     -5.8780711+02  ZL     -2.5402393+02  DXL    -3.4323175+03  DYL    -3.7780156+03  DZL    -1.5867130+03
XS      5.4271348+02  YS     -8.3655477+02  ZS     -1.4545820+01  DXS    -4.4981609+03  DYS    -2.9165473+03  DZS    -6.9401792+01
ALTS    5.8789495+01  LATS   -8.3571430-01  LONS   -5.7026577+01  VRS     5.3613912+03  PTR    -3.7662878-03  AZR    -9.0741793+01
LIN     1.7888111+02  LAN     1.7129135+02  LAP     1.0995816+02  SMAS    9.9725014+02  ECCS    7.3700006-05  PERS    1.9784446+00
RPS     9.9717665+02  APOS    9.9732362+02  RANS   -1.7925739+02  INCS    1.5697324+02  LTS     1.2915836+00  LNS     1.0085646+02
LTE     1.9247842+00  LNE    -7.2253177+00  THETA   1.7314529-03  BETA    8.9824343+01  PROP    5.9256836+01  BARC    4.6917946-02
DELV    1.4474995+01  MASS    3.6421867+04  PLCHNG  1.7659681-01
*****************************************************************************************************************

ID     0716072.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 21   JULY 1969 17 HRS, 24 MINS,  1.074 SECS  G.M.T. ***123. HRS, 52. MINS, 15.797 SECS  G.E.T. ***  T   1.23871055+02 HRS
XL      5.8774368+02  YL      7.0672119+02  ZL      2.9663758+02  DXL     4.1108474+03  DYL    -1.1738860+03  DZL    -1.3571410+03
XS      9.1328019+02  YS      3.9990222+02  ZS      1.2774344+01  DXS     2.1531113+03  DYS    -4.9109984+03  DZS    -7.8097142+01
ALTS    5.8585042+01  LATS    7.3409058-01  LONS    2.3647390+01  VRS     5.3628250+03  PTR     1.5827531-02  AZR    -9.0834705+01
LIN     1.7888657+02  LAN     1.6240453+02
*****************************************************************************************************************

ID     0716072.2
TRANSEARTH INJECTION BURN INITIATION
 22   JULY 1969  2 HRS, 27 MINS,  .810 SECS  G.M.T. ***132. HRS, 55. MINS, 15.530 SECS  G.E.T. ***  T   1.32920980+02 HRS
XL     -9.1910071+02  YL     -3.5720576+02  ZL     -1.4635937+02  DXL    -2.0695664+03  DYL     4.5340571+03  DZL     1.9388403+03
XS     -9.9520139+02  YS      1.5205589+02  ZS     -4.5091448+00  DXS     8.1880536+02  DYS     5.3001830+03  DZS     1.0082484+02
ALTS    5.8383167+01  LATS   -2.5916531-01  LONS    1.7122620+02  VRS     5.3640048+03  PTR    -1.3059078-02  AZR    -8.8923045+01
LIN     1.7888918+02  LAN     1.5773630+02  LAP     2.4579821+01  LTS     1.2704552+00  LNS     8.7433089+01  DEM    -1.1869039+01
THETA  -5.1986285+00  BETA    1.2871790+01  MASS    3.6490567+04  DRTX    3.1209676+03  DRTY    7.1017279+02  DRTZ    4.6435328+01
*****************************************************************************************************************

ID     0716072.2
TRANSEARTH INJECTION BURN TERMINATION
 22   JULY 1969  2 HRS, 29 MINS, 32.446 SECS  G.M.T. ***132. HRS, 57. MINS, 47.168 SECS  G.E.T. ***  T   1.32963102+02 HRS
XL     -9.7338452+02  YL     -2.1214981+02  ZL     -7.5288692+01  DXL    -2.3240138+03  DYL     7.2027167+03  DZL     3.8440534+03
XS     -9.4794243+02  YS      3.1814007+02  ZS      7.1320422+00  DXS     2.2743323+03  DYS     8.1485059+03  DZS     8.7116816+02
ALTS    6.0582721+01  LATS    4.0901723-01  LONS    1.6143125+02  VRS     8.5046849+03  PTR     3.0000040+00  AZR    -8.4133957+01
LIN     1.7410864+02  LAN     1.6539831+02  LAP     6.8180026+00  SMAS   -1.8979223+03  ECCS    1.5252070+00  PERS    5.1944000+00
RPS     9.9680212+02  APOS   -4.7926467+03  RANS   -1.7600948+02  INCS    1.5238075+02  INMPS   1.7730519+02  SEM     8.5049124+01
RBVS    1.7599478+02  LTS     1.2704210+00  LNS     8.7411643+01  LTE     3.4369833+00  LNE    -7.4819061+00  THETA   4.4677761+00
BETA    8.0514712+00  PROP    9.8828135+03  BARC    9.7945970+00  DELV    3.2010868+03  MASS    2.6607754+04  PLCHNG  4.7927826+00
*****************************************************************************************************************

ID     0716072.2
ENTRY AND TOUCHDOWN
 24   JULY 1969 16 HRS, 37 MINS, 57.917 SECS  G.M.T. ***195. HRS,  6. MINS, 12.636 SECS  G.E.T. ***  T   1.95103510+02 HRS
X       3.5109326+03  Y       1.3830689+02  Z      -2.0679781+02  DX     -3.8163875+03  DY      2.7449286+04  DZ      2.3245362+04
R       3.5097610+03  DEC    -3.3778676+00  RA      2.2623359+00  V       3.6171466+04  PTH    -6.5000315+00  AZ      5.0118479+01
ALT     6.5867743+01  LAT    -3.4001473+00  LON     1.7754137+02  VE      3.5002276+04  PTE    -6.7329067+00  AZE     4.8479571+01
SMA     1.9679775+05  ECC     9.8239624-01  INC     4.0000499+01  RAN     6.2958505+00  APF     7.8577437+00  RP      3.4543823+03
INMP    1.2245688+01  SEM     1.1798423+02  RBVS    5.9215676+01  RAM    -1.2362190+02  DEM    -2.4698620+01  RAS     1.2383957+02
DES     1.9307674+01  SPSPR   3.9756541+03  DVRES   1.6612692+03  PERNAD 1.1245742+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03
LATTD   1.775168+01   LONTD   1.8666978+02  AZTD    4.9529864+01  SEATD -7.3678195+00  DTSUN -5.3401083-01
*****************************************************************************************************************

ID     0716072.2
CIRCUMLUNAR PERICYNTHION
 19   JULY 1969 18 HRS, 54 MINS, 14.104 SECS  G.M.T. *** 77. HRS, 22. MINS, 28.829 SECS  G.E.T. ***  T   7.73746748+01 HRS
XL     -9.4206579+02  YL      8.7297662+01  ZL      4.1102668+01  DXL     8.0762450+02  DYL     7.3859825+03  DZL     3.8760219+03
XS     -9.9512218+02  YS      1.1467909+02  ZS      3.4059018+00  DXS     9.6080553+02  DYS     8.2723762+03  DZS     7.7596587+02
ALTS    5.8253601+01  LATS    1.9578104-01  LONS    1.7339326+02  VRS     8.3641515+03  PTR     1.5640800-07  AZR    -8.4669941+01
LIN     1.7465610+02  LAN     1.7548675+02  LAP    -3.1860272-01  LTS     1.3140642+00  LNS     1.1573677+02  DEM     1.9797411+00
SEM     5.7668877+01  RBVS    1.2233848+02  SMAS   -2.2769790+03  ECCS    1.4377498+00  INCS    1.5275632+02  RANS    1.7956870+02
APFS    5.1682551+00  RPS     9.9674709+02  RM      2.1285641+05  DEMP    3.4681928-01  RAMP    1.7983482+02
*****************************************************************************************************************

ID     0716072.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22   JULY 1969 15 HRS, 57 MINS, 10.499 SECS  G.M.T. ***146. HRS, 25. MINS, 25.218 SECS  G.E.T. ***  T   1.46423672+02 HRS
X       3.0854869+03  Y      -1.4031890+03  Z      -9.0765802+02  DX      1.3471159+04  DY      2.6954403+04  DZ      1.9964869+04
R       3.5089901+03  DEC    -1.4990950+01  RA     -2.4454648+01  V       3.6147032+04  PTH    -6.5089405+00  AZ      5.6979360+01
ALT     6.5832486+01  LAT    -1.5085556+01  LON     1.5602110+02  VE      3.4905782+04  PTE    -6.7948614+00  AZE     5.5635772+01
SMA     1.6752416+05  ECC     9.7932582-01  INC     3.5910096+01  RAN    -2.7522186+00  APF    -1.3013247+01  RP      3.4634253+03
INMP    7.4125225+00  RAM    -1.5170503+02  DEM    -1.5073426+01  RAS     1.2182681+02  DES     2.0225472+01  SEM     9.1953576+01
RBVS    3.2503175+01  PERNAD 9.9956281+00  ENTDT  2.3333330-01  ENTRG   1.2850000+03  LATTD -2.4218938+00  LONTD  1.7354887+02
AZTD    5.2947228+01  SEATD -3.3758508+01  DTSUN -2.4029927+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716081.2
LAUNCH TIME      16   JULY 1969    14 HRS,    34 MINS,  35.208 SECS    G.M.T.
LAUNCH AZIMUTH    81.                                INJECTION OPPORTUNITY     2
*****************************************************************************************************************

ID     0716081.2
EARTH PARKING ORBIT INSERTION
 16    JULY 1969 14 HRS, 45 MINS, 56.535 SECS  G.M.T. ***  0. HRS, 11. MINS, 21.326 SECS  G.E.T. ***  T   1.89257342-01 HRS
X      -6.065668C+02  Y      3.0358067+03  Z      1.7249402+03  DX    -2.5190439+04  DY    -3.7945760+03  DZ    -2.1798348+03
ALT     1.3274514+02  LAT    2.9285035+01  LON    3.0554547+02  V      2.5567727+04  PTH   -1.1789031-07  AZ     9.5600884+01
R       3.543933+03   DEC    2.912590+01   RA     1.0129914+02  RAS    1.1576456+02  DES    2.1331996+01  RAN   -9.2315122-02
INC     2.9613119+01  MASS   2.9716536+05
*****************************************************************************************************************

ID     0716081.2
3.5 MINS PRIOR TO TLI INITIATION
 16    JULY 1969 18 HRS, 40 MINS, 10.750 SECS  G.M.T. ***  4. HRS,  5. MINS, 35.542 SECS  G.E.T. ***  T   4.05320617+00 HRS
X       3.268530+03   Y     -1.2018825+03  Z     -6.3930466+02  DX     9.8528569+03  DY     2.0477743+04  DZ     1.1786500+04
ALT     9.7795725+01  LAT   -1.0464179+01  LON    1.2533763+02  V      2.5599577+04  PTH    3.8494553-02  AZ     6.2080673+01
*****************************************************************************************************************

ID     0716081.2
TRANSLUNAR INJECTION INITIATION
 16    JULY 1969 18 HRS, 43 MINS, 40.750 SECS  G.M.T. ***  4. HRS,  9. MINS,  5.542 SECS  G.E.T. ***  T   4.15153950+00 HRS
X       3.5040445+03  Y     -4.6416137+02  Z     -2.1598144+02  DX     3.7051241+03  DY     2.1990169+04  DZ     1.2565014+04
ALT     9.7355352+01  LAT   -3.5195065+00  LON    1.3710366+02  V      2.5596386+04  PTH    3.9269291-02  AZ     6.0537902+01
R       3.5412457+03  DEC   -3.4966536+00  RA    -7.5457245+00  RAS    1.1593113+02  DES    2.1304663+01  RAN   -1.3835710+00
INC     2.9550368+01  MASS   2.9311318+05
*****************************************************************************************************************

ID     0716081.2
TRANSLUNAR INJECTION TERMINATION
 16    JULY 1969 18 HRS, 49 MINS,  1.606 SECS  G.M.T. ***  4. HRS, 14. MINS, 26.398 SECS  G.E.T. ***  T   4.24066609+00 HRS
X       3.4335215+03  Y      9.3583733+02  Z      5.7971433+02  DX    -6.8731981+03  DY     3.0439047+04  DZ     1.7227677+04
ALT     1.5919032+02  LAT    9.3180400+00  LON    1.5856768+02  V      3.5645045+04  PTH    6.6601511+00  AZ     6.1705832+01
R       3.6028236+03  DEC    9.2594616+00  RA     1.5258858+01  RAS    1.1593487+02  DES    2.1354046+01  DEM    1.8163181+01
SEM     2.4164862+01  RRVS   8.3573380+01  RAN   -1.3835701+00  INC    2.9650368+01  ECC    9.7625750-01  SMA    1.4967874+05
RP      3.5537731+03  APE    5.4979796+00  INMP   1.1640725+00  C3TLI -4.5808617-01  DAZTLI 0.0000000     PERS   1.3753356+05
PROP    1.5557365+05
*****************************************************************************************************************

ID     0716081.2
TRANSLUNAR INJECTION + 2 HOURS
 16    JULY 1969 20 HRS, 49 MINS,  1.606 SECS  G.M.T. ***  6. HRS, 14. MINS, 26.398 SECS  G.E.T. ***  T   6.24066609+00 HRS
X      -1.5793140+04  Y      1.2558389+04  Z      6.9161925+03  DX    -1.3540883+04  DY     3.7483375+03  DZ     1.9374011+03
ALT     1.7987307+04  LAT    1.8938962+01  LON    2.5473567+02  V      1.4183055+04  PTH    6.5064984+01  AZ     1.1324907+02
R       2.1337028+04  DEC    1.8919946+01  RA     1.4150898+02  RAS    1.1601892+02  DES    2.1290185+01
*****************************************************************************************************************

ID     0716081.2
LUNAR ORBIT INSERTION BURN INITIATION
 19    JULY 1969 19 HRS, 49 MINS, 26.706 SECS  G.M.T. *** 77. HRS, 14. MINS, 51.496 SECS  G.E.T. ***  T   7.72476377+01 HRS
XL     -1.0314497+03  YL    -1.6747360+02  ZL    -9.2024761+01  DXL   -2.0851208+02  DYL    7.3092847+03  DZL    3.8643264+03
XS     -1.0062074+03  YS    -1.6227919+02  ZS    -2.5064300+01  DXS    1.1801374+01  DYS    8.2422532+03  DZS    8.5742770+02
ALTS    8.1024039+01  LATS  -1.4087284+00  LONS  -1.7083834+02  VRS    8.2867396+03  PTR   -9.3385236+00  AZR   -8.4212048+01
LIN     1.7403231+02  LAN    1.7555515+02  LAP    1.8734192+02  LTS    1.3133731+00  LNS    1.1526763+02  DEM    1.7514938+00
THETA   1.6349274+01  BETA  -1.7070843+02  MASS   9.5199404+04  DRTX  -2.8922128+03  DRTY  -4.5359214+02  DRTZ  -3.0653695+01
*****************************************************************************************************************

ID     0716081.2
LUNAR ORBIT INSERTION BURN TERMINATION
 19    JULY 1969 19 HRS, 55 MINS, 33.187 SECS  G.M.T. *** 77. HRS, 20. MINS, 57.976 SECS  G.E.T. ***  T   7.73494377+01 HRS
XL     -9.7122280+02  YL     2.0792178+02  ZL     9.1982308+01  DXL    1.2038387+03  DYL    4.9193904+03  DZL    2.1707842+03
XS     -9.6441712+02  YS     2.5462455+02  ZS     5.6452996+00  DXS    1.3585876+03  DYS    5.3273636+03  DZS    1.1607515+02
ALTS    5.8986276+01  LATS   3.2427280-01  LONS   1.6521030+02  VRS    5.4990941+03  PTR    4.8977016-01  AZR   -8.8793247+01
LIN     1.7874699+02  LAN   -1.7979333+02  LAP   -1.0434790+01  SMAS   1.0525928+03  ECCS   5.3054597-02  PERS   2.1454002+00
RPS     9.9474789+02  APOS   1.1384377+03  RANS  -1.7958187+02  INCS   1.5683794+02  LTS    1.3132969+00  LNS    1.1521572+02
LTF     2.2951398-01  LNE   -6.5155962+00  THETA -7.1780190+03  BETA  -1.6625969+02  PROP   2.3885328+04  BARC   2.3956235+01
DELV    2.0277246+03  MASS   7.1314076+04  PLCHNG-4.7199964+03
*****************************************************************************************************************

ID     0716081.2
CIRCULARIZATION BURN INITIATION
 20    JULY 1969  0 HRS,  9 MINS, 37.699 SECS  G.M.T. *** 81. HRS, 35. MINS,  2.488 SECS  G.E.T. ***  T   8.15840244+01 HRS
XL     -9.9517509+02  YL     5.0167985+01  ZL     2.4628107+01  DXL    3.0871909+02  DYL    5.0369761+03  DZL    2.1538484+03
XS     -9.8898552+02  YS     1.2409920+02  ZS     1.9607435+00  DXS    6.8670062+02  DYS    5.4586454+03  DZS    1.1935576+02
ALTS    5.8249598+01  LATS   1.1270948-01  LONS   1.7284783+02  VRS    5.5029640+03  PTR   -1.5558030-02  AZR   -8.8757131+01
LIN     1.7874846+02  LAN    1.7801381+02  LAP    4.3338284-01  LTS    1.3101006+00  LNS    1.1305686+02  DEM    6.7244132-01
THETA   3.8839273-01  BETA   1.8000000+02  MASS   7.1264677+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID     0716081.2
CIRCULARIZATION BURN TERMINATION
 20    JULY 1969  0 HRS,  9 MINS, 52.540 SECS  G.M.T. *** 81. HRS, 35. MINS, 17.330 SECS  G.E.T. ***  T   8.15881472+01 HRS
XL     -9.9434618+02  YL     6.2311520+01  ZL     2.9820503+01  DXL    3.6996861+02  DYL    4.9059210+03  DZL    2.0975878+03
XS     -9.8724495+02  YS     1.3725397+02  ZS     2.2484190+00  DXS    7.3842077+02  DYS    5.3121273+03  DZS    1.1619658+02
ALTS    5.8249328+01  LATS   1.2924600-01  LONS   1.7208506+02  VRS    5.3644630+03  PTR    3.9608279-03  AZR   -8.8758864+01
LIN     1.7874844+02  LAN    1.7801153+02  LAP   -6.5170688+00  SMAS   9.9731929+02  ECCS   5.8213691-04  PERS   1.9786504+00
RPS     9.9673871+02  APOS   9.9789986+02  RANS  -1.7957391+02  INCS   1.5683807+02  LTS    1.3100976+00  LNS    1.1305475+02
LTF     4.8562102-01  LNE   -6.6467034+00  THETA -3.7041225-01  BETA  -1.8000000+02  PROP   9.6728711+02  BARC   7.6067843-01
DELV    1.3850202+02  MASS   7.0297390+04  PLCHNG 8.2321114-07
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716081.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 20   JULY 1969 20 HRS, 41 MINS, 24.738 SECS  G.M.T. ***102. HRS,  6. MINS, 49.529 SECS  G.E.T. ***  T   1.02113758+02 HRS
XL      7.7635562+02  YL      5.7629337+02  ZL      2.4379360+02  DXL     3.3552547+03  DYL    -3.8224142+03  DZL    -1.6470224+03
XS      9.1333142+02  YS      3.9992456+02  ZS      1.2784858+01  DXS     2.1520787+03  DYS    -4.9105679+03  DZS    -9.3784697+01
ALTS    5.8641082+01  LATS    7.3464350-01  LONS    2.3647385+01  VRS     5.3622676+03  PTR     5.4153760-03  AZR    -9.1002286+01
LIN     1.7875491+02  LAN     1.6749270+02  SEASV   1.1067454+01
*****************************************************************************************************************

ID     0716081.2
CSM PLANE CHANGE BURN INITIATION
 21   JULY 1969  1 HRS,  4 MINS, 28.201 SECS  G.M.T. ***106. HRS, 29. MINS, 52.989 SECS  G.E.T. ***  T   1.06498053+02 HRS
XL      7.7081694+02  YL     -5.8043559+02  ZL     -2.5107507+02  DXL    -3.3917981+03  DYL    -3.8039291+03  DZL    -1.6150776+03
XS      5.4324653+02  YS     -8.3592740+02  ZS     -1.4542696+01  DXS    -4.4969867+03  DYS    -2.9197615+03  DZS    -8.5940207+01
ALTS    5.8553571+01  LATS   -8.3573251-01  LONS   -5.6981254+01  VRS     5.3623952+03  PTR    -1.0865967-02  AZR    -9.0918481+01
LIN     1.7875617+02  LAN     1.6522718+02  LAP     5.8975485+01  LTS     1.2908134+00  LNS     1.0035903+02  DEM    -5.5835708+00
THETA  -7.9409948-05  BETA    8.9999930+01  MASS    3.6390690+04  DRTX    0.0000000     DRTY    1.6474890+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0716081.2
CSM PLANE CHANGE BURN TERMINATION
 21   JULY 1969  1 HRS,  4 MINS, 29.107 SECS  G.M.T. ***106. HRS, 29. MINS, 53.899 SECS  G.E.T. ***  T   1.06498305+02 HRS
XL      7.7031044+02  YL     -5.8100365+02  ZL     -2.5131492+02  DXL    -3.3950501+03  DYL    -3.8079161+03  DZL    -1.5988521+03
XS      5.4257507+02  YS     -8.3636301+02  ZS     -1.4554291+01  DXS    -4.4994216+03  DYS    -2.9164965+03  DZS    -6.9406500+01
ALTS    5.8553430+01  LATS   -8.3639900-01  LONS   -5.7027253+01  VRS     5.3624214+03  PTR    -1.0866641-02  AZR    -9.0741892+01
LIN     1.7888058+02  LAN     1.7131357+02  LAP     5.6837977+01  SMAS    9.9716381+02  ECCS    2.2342540-04  PERS    1.9781877+00
RPS     9.9694102+02  APOS    9.9738658+02  RANS   -1.7922925+02  INCS    1.5697394+02  LTS     1.2908136+00  LNS     1.0035890+02
LTE     1.9826714+00  LNE    -7.2424654+00  THETA  1.4223869-03  BETA    8.9824219+01  PROP    5.9109375+01  BARC    4.6393707-02
DELV    1.6474944+01  MASS    3.6331581+04  PLCHNG 1.7656276-01
*****************************************************************************************************************

ID     0716081.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 21   JULY 1969 18 HRS, 22 MINS, 28.440 SECS  G.M.T. ***123. HRS, 47. MINS, 53.230 SECS  G.E.T. ***  T   1.23798120+02 HRS
XL      5.3058655+02  YL      7.1223543+02  ZL      2.9887605+02  DXL     4.1417289+03  DYL    -3.1023866+03  DZL    -1.3430316+03
XS      9.1331657+02  YS      3.9991900+02  ZS      1.2774215+01  DXS     2.1522125+03  DYS    -4.9109045+03  DZS    -7.8162536+01
ALTS    5.8425094+01  LATS    7.3404372-01  LONS    2.3647436+01  VRS     5.3623792+03  PTR     7.3816700-03  AZR    -9.0935380+01
LIN     1.7888610+02  LAN     1.6242847+02
*****************************************************************************************************************

ID     0716081.2
TRANSEARTH INJECTION BURN INITIATION
 22   JULY 1969  3 HRS, 25 MINS, 51.524 SECS  G.M.T. ***132. HRS, 51. MINS, 16.316 SECS  G.E.T. ***  T   1.32854532+02 HRS
XL     -9.2492292+02  YL     -3.4392046+02  ZL     -1.4047980+02  DXL    -1.9933320+03  DYL     4.5635042+03  DZL     1.9512117+03
XS     -3.8094765+02  YS      1.7670225+02  ZS     -4.0304673+00  DXS     9.5063095+02  DYS     5.2786022+03  DZS     1.0145316+02
ALTS    5.8250303+01  LATS   -2.3168380-01  LONS    1.6978858+02  VRS     5.3644788+03  PTR    -2.0061538-03  AZR    -8.8916410+01
LIN     1.7888870+02  LAN     1.5775685+02  LAP     1.8301925+02  LTS     1.2696555+00  LNS     8.6933663+01  DEM    -1.2106220+01
THETA  -5.3789831+00  BETA    1.2764263+01  MASS    3.6400281+04  DRTX    3.1548230+03  DRTY    7.1148979+02  DRTZ    5.4973078+01
*****************************************************************************************************************

ID     0716081.2
TRANSEARTH INJECTION BURN TERMINATION
 22   JULY 1969  3 HRS, 28 MINS, 24.126 SECS  G.M.T. ***132. HRS, 53. MINS, 48.916 SECS  G.E.T. ***  T   1.32896921+02 HRS
XL     -9.7696147+02  YL     -1.9678479+02  ZL     -6.8461639+01  DXL    -2.1924398+03  DYL     7.2686705+03  DZL     3.8729865+03
XS     -3.3810725+02  YS      3.4316199+02  ZS      7.7173606+00  DXS     2.5007935+03  DYS     8.1176962+03  DZS     8.7364036+02
ALTS    6.0438375+01  LATS    4.4264939-01  LONS    1.5990735+02  VRS     8.5389814+03  PTR     2.9999735+00  AZR    -8.4142738+01
LIN     1.7411503+02  LAN     1.6420592+02  LAP    -4.4348670+00  SMAS   -1.8278900+03  ECCS    1.5452570+00  PERS    4.9095628+00
RPS     9.9666985+02  APOS   -4.6524498+03  RANS   -1.7615312+02  INCS    1.5237154+02  INMPS   1.7737145+02  SEM     8.5548313+01
RBVS    1.0700949+02  LTS     1.2696209+00  LNS     8.6912077+01  LTE     3.4904335+00  LNE    -7.4824694+00  THETA   4.3884332+00
BETA    7.9503722+00  PROP    9.9457969+03  BARC    9.8809270+00  DELV    3.2345286+03  MASS    2.6454484+04  PLCHNG  4.7823858+00
*****************************************************************************************************************

ID     0716081.2
ENTRY AND TOUCHDOWN
 24   JULY 1969 16 HRS, 39 MINS,  7.373 SECS  G.M.T. ***194. HRS,  4. MINS, 32.159 SECS  G.E.T. ***  T   1.94075600+02 HRS
X       3.5004778+03  Y       1.5587948+02  Z      -2.0240610+02  DX     -3.9838323+03  DY      2.7432844+04  DZ      2.3249318+04
R       3.5097878+03  DEC    -3.3060269+00  RA      2.5497490+00  V       3.6179588+04  PTH    -6.5000252+00  AZ      5.0113946+01
ALT     6.5892838+01  LAT    -3.3278347+00  LON     1.7053860+02  VE      3.5010383+04  PTE    -6.7325412+00  AZE     4.8475089+01
SMA     2.0732495+05  ECC     9.8328986-01  INC     4.0000015+01  RAN     6.4972166+03  APF     7.9636701+00  RP      3.4644335+03
INMP    1.2284755+01  SEM     1.1799489+02  RBVS    5.9598458+01  RAM    -1.2360970+02  DEM    -2.4701537+01  RAS     1.2384036+02
DES     1.9807503+01  SPSPR   3.8223845+03  DVPES   1.6020246+03  PERNAD 1.1512254+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   1.0845644+01  LONTD   1.8666972+02  AZTD    4.9545806+01  SEATD -7.0778795+03  DTSUN -5.1302961-01
*****************************************************************************************************************

ID     0716081.2
CIRCUMLUNAR PERICYNTHION
 19   JULY 1969 19 HRS, 52 MINS, 50.540 SECS  G.M.T. *** 77. HRS, 18. MINS, 15.330 SECS  G.E.T. ***  T   7.73042583+01 HRS
XL     -9.3276611+02  YL      7.9050169+01  ZL      3.8363789+01  DXL     7.3552388+02  DYL     7.3498256+03  DZL     3.8990385+03
XS     -3.8994841+02  YS      1.1529045+02  ZS      3.9391659+00  DXS     9.6570918+02  DYS     8.2624873+03  DZS     8.6727588+02
ALTS    5.8153491+01  LATS    2.2645748-01  LONS    1.7335719+02  VRS     8.3638184+03  PTR    -1.3966066-07  AZR    -8.4048039+01
LIN     1.7403229+02  LAN     1.7552407+02  LAP    -6.3129269-01  LTS     1.3133309+00  LNS     1.1523876+02  DEM     1.7374390+00
SEM     5.8136481+01  RBVS    1.2187744+02  SMAS   -2.2789801+03  ECCS    1.4373215+00  INCS    1.5213019+02  RANS    1.7962489+02
APES    4.7233106+00  RPS     9.9664700+02  RM      2.1276520+05  DEMP    4.3530124-01  RAMP    1.7981974+02
*****************************************************************************************************************

ID     0716081.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22   JULY 1969 16 HRS, 52 MINS, 15.721 SECS  G.M.T. ***146. HRS, 17. MINS, 40.510 SECS  G.E.T. ***  T   1.46294586+02 HRS
X       3.1012298+03  Y      -1.4064230+03  Z      -9.4738304+02  DX      1.3189221+04  DY      2.7911512+04  DZ      1.8803717+04
R       3.5090895+03  DEC    -1.3974043+01  RA     -2.4394525+01  V       3.6146754+04  PTH    -6.4670829+00  AZ      5.9249870+01
ALT     6.5832333+01  LAT    -1.4062775+01  LON     1.4227176+02  VE      3.4867188+04  PTE    -6.7525333+00  AZE     5.7982246+01
SMA     1.6773432+05  ECC     9.7934767-01  INC     3.3491117+01  RAN    -2.3026274+00  APF    -1.2881007+01  RP      3.4641060+03
INMP    4.9804533+00  RAM    -1.5122103+02  DEM    -1.5285825+01  RAS     1.2186487+02  DES     2.0217803+01  SEM     9.2428940+01
RBVS    3.2786150+01  PERNAD 1.0006818+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD  -2.1461564+00  LONTD   1.6028809+02
AZTD    5.5423038+01  SEATD -3.3183079+01  DTSUN  -2.3622794+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716090.2
LAUNCH TIME      16   JULY 1969    15 HRS,    44 MINS,  45.995 SECS   G.M.T.
LAUNCH AZIMUTH   90.                              INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID     0716090.2
EARTH PARKING ORBIT INSERTION
 16   JULY 1969 15 HRS, 56 MINS,  6.323 SECS  G.M.T. ***  0. HRS, 11. MINS, 20.328 SECS  G.E.T. ***  T   1.88980063-01 HRS
X      -1.5394926+03  Y      2.8156418+03  Z      1.5339682+03  DX    -2.3132471+04  DY    -9.5578171+03  DZ    -5.2197331+03
ALT     1.0217145+02  LAT    2.5794248+01  LON    3.0485371+02  V      2.5567727+04  PTH   -9.4312248-08  AZ     1.0308917+02
R       3.5439334+03  DEC    2.5648144+01  RA     1.1819619+02  RAS    1.1581373+02  DES    2.1323946+01  RAN   -4.6920553-02
INC     2.8592229+01  MASS   2.9764633+05
*****************************************************************************************************************

ID     0716090.2
3.5 MINS PRIOR TO TLI INITIATION
 16   JULY 1969 19 HRS, 46 MINS, 38.726 SECS  G.M.T. ***  4. HRS,  1. MINS, 52.731 SECS  G.E.T. ***  T   4.03131419+00 HRS
X       3.2799834+03  Y     -1.1861300+03  Z     -6.0605859+02  DX     9.6495316+03  DY     2.0772408+04  DZ     1.1451410+04
ALT     9.5700071+01  LAT   -9.9231097+00  LON    1.0897834+02  V      2.5607444+04  PTH    3.9585390-02  AZ     6.2998426+01
*****************************************************************************************************************

ID     0716090.2
TRANSLUNAR INJECTION INITIATION
 16   JULY 1969 19 HRS, 50 MINS,  8.726 SECS  G.M.T. ***  4. HRS,  5. MINS, 22.731 SECS  G.E.T. ***  T   4.08964747+00 HRS
X       3.5071953+03  Y     -4.3878583+02  Z     -1.9550544+02  DX     3.4823326+03  DY     2.2249201+04  DZ     1.2182113+04
ALT     9.6041698+01  LAT   -3.1366775+00  LON    1.2085609+02  V      2.5603857+04  PTH    4.3565771-02  AZ     6.1538925+01
R       3.5399398+03  DEC   -3.1659688+00  RA    -7.1312320+00  RAS    1.1597768+02  DES    2.1296992+01  RAN   -1.3138296+00
INC     2.8621975+01  MASS   2.9363009+05
*****************************************************************************************************************

ID     0716090.2
TRANSLUNAR INJECTION TERMINATION
 16   JULY 1969 19 HRS, 55 MINS, 30.188 SECS  G.M.T. ***  4. HRS, 10. MINS, 44.193 SECS  G.E.T. ***  T   4.17894250+00 HRS
X       3.4184061+03  Y      9.7748753+02  Z      5.7606264+02  DX    -7.2147263+03  DY     3.0685784+04  DZ     1.6651029+04
ALT     1.5814461+02  LAT    9.2615647+00  LON    1.4260202+02  V      3.5650054+04  PTH    6.6744754+00  AZ     6.2778718+01
R       3.5317815+03  DEC    9.2033120+00  RA     1.5957792+01  RAS    1.1598143+02  DES    2.1296373+01  DEM    1.7957229+01
SEM     2.4665202+01  PBVS   8.4143540+01  RAN   -1.3138288+00  INC    2.8621978+01  ECC    9.7624279-01  SMA    1.4953496+05
RP      3.5525349+03  APF    5.9923248+00  INMP   1.3759044-01  C3TLI -4.5852967-01  DAZTLI 0.0000000     MASS   1.3776254+05
PROP    1.5586755+05
*****************************************************************************************************************

ID     0716090.2
TRANSLUNAR INJECTION + 2 HOURS
 16   JULY 1969 21 HRS, 55 MINS, 30.188 SECS  G.M.T. ***  6. HRS, 10. MINS, 44.193 SECS  G.E.T. ***  T   6.17894250+00 HRS
X      -1.5932380+04  Y      1.2539131+04  Z      6.6285356+03  DX    -1.3580227+04  DY     3.6614545+03  DZ     1.8183302+03
ALT     1.7888098+04  LAT    1.8122612+01  LON    2.3835858+02  V      1.4182211+04  PTH    6.5369016+01  AZ     1.1253934+02
R       2.1332917+04  DEC    1.8104302+01  RA     1.4179648+02  RAS    1.1606548+02  DES    2.1282490+01
*****************************************************************************************************************

ID     0716090.2
LUNAR ORBIT INSERTION BURN INITIATION
 19   JULY 1969 20 HRS, 54 MINS, 11.979 SECS  G.M.T. *** 77. HRS,  9. MINS, 25.981 SECS  G.E.T. ***  T   7.71572170+01 HRS
XL     -9.9953370+02  YL    -1.7679084+02  ZL    -9.6621225+01  DXL   -2.9101857+02  DYL    7.2955388+03  DZL    3.8945452+03
XS     -1.0763062+03  YS    -1.6228943+02  ZS    -2.5848019+01  DXS    1.4171303+01  DYS    8.2395756+03  DZS    8.8108427+02
ALTS    8.1142791+01  LATS  -1.4526170+00  LONS  -1.7083865+02  VRS    8.2865623+03  PTR   -9.3604399+00  AZR   -8.4052540+01
LIN     1.7386670+02  LAN    1.7551158+02  LAP    1.7567148+02  LTS    1.3125612+00  LNS    1.1471739+02  DEM    1.4834491+00
THETA   1.6314902+01  BETA  -1.7039525+02  MASS   9.5199404+04  DRTX  -2.8937633+03  DRTY  -4.6946452+02  DRTZ  -2.8685587+01
*****************************************************************************************************************

ID     0716090.2
LUNAR ORBIT INSERTION BURN TERMINATION
 19   JULY 1969 21 HRS,  0 MINS, 18.893 SECS  G.M.T. *** 77. HRS, 15. MINS, 32.897 SECS  G.E.T. ***  T   7.72591381+01 HRS
XL     -9.7334574+02  YL     1.9894549+02  ZL     8.8390532+01  DXL    1.1541832+03  DYL    4.9299213+03  DZL    2.1351515+03
XS     -9.5942207+02  YS     2.5500647+02  ZS     5.6551688+00  DXS    1.3642800+03  DYS    5.3263787+03  DZS    1.1605807+02
ALTS    5.9[illegible]+01  LATS   3.2486575-01  LONS   1.6518637+02  VRS    5.4995489+03  PTR    4.5377465-01  AZR   -8.8793348+01
LIN     1.787[illegible]+02  LAN   -1.7979004+02  LAP   -9.7809480+00  SMAS   1.0525954+03  ECCS   5.3039953-02  PERS   2.1454083+00
RPS     9.967[illegible]+03  APOS   1.1084253+03  RANS  -1.7954858+02  INCS   1.5683790+02  LTS    1.3124845+00  LNS    1.1466543+02
LTE     2.9469183-[illegible]  LNE   -6.5497189+00  THETA -7.2105034+00  BETA  -1.6578728+02  PROP   2.3913539+04  BARC   2.3982908+01
DELV    2.9317345+03  MASS   7.1285865+04  PLCHNG-4.8856091+00
*****************************************************************************************************************

ID     0716090.2
CIRCULARIZATION BURN INITIATION
 20   JULY 1969  1 HRS, 14 MINS, 37.592 SECS  G.M.T. *** 81. HRS, 29. MINS, 51.506 SECS  G.E.T. ***  T   8.14976406+01 HRS
XL     -9.9503306+02  YL     5.2628619+01  ZL     2.5927525+01  DXL    3.2397396+02  DYL    5.0361335+03  DZL    2.1533481+03
XS     -9.8728397+02  YS     1.3713614+02  ZS     2.2465886+00  DXS    7.5849952+02  DYS    5.4490450+03  DZS    1.1920606+02
ALTS    5.8267623+01  LATS   1.2913841-01  LONS   1.7209378+02  VRS    5.5028740+03  PTR   -1.5554319-02  AZR   -8.8758707+01
LIN     1.7874938+02  LAN    1.7801503+02  LAP    4.8558204-01  LTS    1.3092786+00  LNS    1.1250461+02  DEM    4.0208698-01
THETA   3.8922624-01  BETA  -1.8000000+02  MASS   7.1236466+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID     0716090.2
CIRCULARIZATION BURN TERMINATION
 20   JULY 1969  1 HRS, 14 MINS, 52.337 SECS  G.M.T. *** 81. HRS, 30. MINS,  6.341 SECS  G.E.T. ***  T   8.15017614+01 HRS
XL     -9.9416775+02  YL     6.4765089+01  ZL     3.1116542+01  DXL    3.8479588+02  DYL    4.9049288+03  DZL    2.0970099+03
XS     -9.8537120+02  YS     1.5023130+02  ZS     2.5337645+00  DXS    8.0825542+02  DYS    5.3018634+03  DZS    1.1603097+02
ALTS    5.8267380+01  LATS   1.4564593-01  LONS   1.7133135+02  VRS    5.3643728+03  PTR    3.9454172-03  AZR   -8.8760601+01
LIN     1.7874840+02  LAN    1.7801275+02  LAP   -5.3623343+00  SMAS   9.9732164+02  ECCS   5.6647023-04  PERS   1.9786574+00
RPS     9.9675668+02  APOS   9.9788658+02  RANS  -1.7954062+02  INCS   1.5683808+02  LTS    1.3092758+00  LNS    1.1250251+02
LTE     5.5111887-01  LNE   -6.6789425+00  THETA -3.7022442-01  BETA   1.8000000+02  PROP   9.6690234+02  BARC   7.6048546-01
DELV    1.3850187+02  MASS   7.0269563+04  PLCHNG 9.7520515-07
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0716090.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 20   JULY 1969 21 HRS, 46 MINS, 10.045 SECS  G.M.T. ***102. HRS,  1. MINS, 24.049 SECS  G.E.T. ***  T   1.02023347+02 HRS
XL     7.6983765+02  YL      5.8369991+02  ZL     2.4678962+02  DXL    3.3981049+03  DYL   -3.7900292+03  DZL   -1.6341362+03
XS     9.1332368+02  YS      3.9992136+02  ZS     1.2783632+01  DXS    2.1520606+03  DYS   -4.9106339+03  DZS   -9.3790792+01
ALTS   5.8632691+01  LATS    7.3457927-01  LONS   2.3647396+01  VRS    5.3623210+03  PTR    4.9462803-03  AZR   -9.1002336+01
LIN    1.7875491+02  LAN     1.6749644+02  SEASV  1.1617254+01
*****************************************************************************************************************

ID    0716090.2
CSM PLANE CHANGE BURN INITIATION
 21   JULY 1969  2 HRS,  9 MINS, 13.546 SECS  G.M.T. ***106. HRS, 24. MINS, 27.550 SECS  G.E.T. ***  T   1.06407653+02 HRS
XL     7.7730618+02  YL     -5.7299865+02  ZL    -2.4810525+02  DXL   -3.3488886+03  DYL   -3.8362788+03  DZL   -1.6282075+03
XS     5.4324031+02  YS     -8.3592284+02  ZS    -1.4543559+01  DXS   -4.4970060+03  DYS   -2.9198182+03  DZS   -8.5935605+01
ALTS   5.8546373+01  LATS   -8.3578814-01  LONS  -5.6981410+01  VRS    5.3624421+03  PTR   -1.0313844-02  AZR   -9.0918455+01
LIN    1.7875617+02  LAN     1.6523095+02  LAP    5.5779809+01  LTS    1.2899611+00  LNS    9.9809116+01  DEM   -5.8546084+00
THETA -1.0842925-04  BETA    9.0000003+01  MASS   3.6362864+04  DRTX   0.0000000     DRTY   1.6474890+01  DRTZ   0.0000000
*****************************************************************************************************************

ID    0716090.2
CSM PLANE CHANGE BURN TERMINATION
 21   JULY 1969  2 HRS,  9 MINS, 14.453 SECS  G.M.T. ***106. HRS, 24. MINS, 28.457 SECS  G.E.T. ***  T   1.06407905+02 HRS
XL     7.7480646+02  YL     -5.7357111+02  ZL    -2.4834688+02  DXL   -3.3521624+03  DYL   -3.8432995+03  DZL   -1.6119955+03
XS     5.4256947+02  YS     -8.3635805+02  ZS    -1.4555144+01  DXS   -4.4994388+03  DYS   -2.9165564+03  DZS   -6.9401963+01
ALTS   5.8546232+01  LATS   -8.3645407-01  LONS  -5.7027368+01  VRS    5.3624684+03  PTR   -1.0314072-02  AZR   -9.0741825+01
LIN    1.7888058+02  LAN     1.7131775+02  LAP    5.3753675+01  SMAS   9.9716699+02  ECCS   2.2108638-04  PERS   1.9781972+00
RPS    9.9494654+02  APOS    9.9738743+02  RANS  -1.7919938+02  INCS   1.5697535+02  LTS    1.2899613+00  LNS    9.9809990+01
LTE    2.0465249+00  LNE    -7.2617834+00  THETA  1.1950378-03  BETA   8.9824194+01  PROP   5.9064453+01  BARC   4.6393707-02
DELV   1.6474844+01  MASS    3.6303804+04  PLCHNG 1.7656134-01
*****************************************************************************************************************

ID    0716090.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 21   JULY 1969 19 HRS, 27 MINS, 14.127 SECS  G.M.T. ***123. HRS, 42. MINS, 28.131 SECS  G.E.T. ***  T   1.23707814+02 HRS
XL     6.2256164+02  YL      7.1823543+02  ZL     3.0131963+02  DXL    4.1764550+03  DYL   -3.0625033+03  DZL   -1.3271024+03
XS     9.1331091+02  YS      3.9991648+02  ZS     1.2772429+01  DXS    2.1521769+03  DYS   -4.9139658+03  DZS   -7.8165607+01
ALTS   5.8618886+01  LATS    7.3394562-01  LONS   2.3647432+01  VRS    5.3624211+03  PTR    6.7742059-03  AZR   -9.0835351+01
LIN    1.7888617+02  LAN     1.6243289+02
*****************************************************************************************************************

ID    0716090.2
TRANSEARTH INJECTION BURN INITIATION
 22   JULY 1969  4 HRS, 31 MINS,  8.847 SECS  G.M.T. ***132. HRS, 46. MINS, 22.851 SECS  G.E.T. ***  T   1.32773014+02 HRS
XL    -9.3129117+02  YL     -3.2907848+02  ZL    -1.3391728+02  DXL   -1.9059500+03  DYL    4.5949007+03  DZL    1.9642654+03
XS    -9.7565220+02  YS      2.9409999+02  ZS    -3.5011624+00  DXS    1.0975412+03  DYS    5.2499289+03  DZS    1.3200814+02
ALTS   5.8266007+01  LATS   -2.0125440-01  LONS   1.6818955+02  VRS    5.3643970+03  PTR   -1.4755298-03  AZR   -8.8310398+01
LIN    1.7888879+02  LAN     1.5775645+02  LAP   -1.7535670+02  LTS    1.2687669+00  LNS    8.6379572+01  DEM   -1.2368653+01
THETA -5.5756533+00  BETA    1.7641565+01  MASS   3.6372510+04  DRTX   3.1948813+03  DRTY   7.1315751+02  DRTZ   6.3485328+01
*****************************************************************************************************************

ID    0716090.2
TRANSEARTH INJECTION BURN TERMINATION
 22   JULY 1969  4 HRS, 33 MINS, 42.914 SECS  G.M.T. ***132. HRS, 48. MINS, 56.913 SECS  G.E.T. ***  T   1.32815809+02 HRS
XL    -9.8983987+02  YL     -1.7925157+02  ZL    -6.0662383+01  DXL   -2.0416651+03  DYL    7.3420165+03  DZL    3.9051596+03
XS    -9.2737676+02  YS      3.7116001+02  ZS     8.3937542+00  DXS    2.7557382+03  DYS    8.0769308+03  DZS    8.7639796+02
ALTS   6.0434847+01  LATS    4.8144830-01  LONS   1.5818744+02  VRS    8.5789845+03  PTR    3.0071916+00  AZR   -8.4153746+01
LIN    1.7412304+02  LAN     1.6287004+02  LAP    9.6578496+01  SMAS  -1.7511361+03  ECCS   1.5691557+00  PERS   4.6336002+00
RPS    9.9566907+02  APOS   -4.4989413+03  RANS  -1.7631564+02  INCS   1.5236266+02  INMPS  1.7744590+02  SEM    9.6102937+01
RRVS   1.3817562+02  LTS     1.2687321+00  LNS    8.6357778+01  LTE    3.5494494+00  LNE   -7.4824117+00  THETA  4.3211413+00
BETA   7.8345463+00  PROP    1.0041314+04  BARC   1.0001867+01  DELV   3.2741366+03  MASS   2.6331186+04  PLCHNG 4.7712316+00
*****************************************************************************************************************

ID    0716090.2
ENTRY AND TOUCHDOWN
 24   JULY 1969 16 HRS, 40 MINS, 22.823 SECS  G.M.T. ***192. HRS, 55. MINS, 36.823 SECS  G.E.T. ***  T   1.92926895+02 HRS
X      3.4997412+03  Y       1.7493235+02  Z     -1.9798274+02  DX    -4.1632732+03  DY     2.7415073+04  DZ     2.3254828+04
R      3.5096996+03  DEC    -3.2337815+00  RA     2.8615118+00  V      3.6189861+04  PTH   -6.5000387+00  AZ     5.0108939+01
ALT    6.5802362+01  LAT    -3.2551154+00  LON    1.7053512+02  VE     3.5020687+04  PTE   -6.7321723+00  AZE    4.8470275+01
SMA    2.2139216+05  ECC     9.8435190-01  INC    4.0000082+01  RAN    6.7223895+00  APE    8.0691953+00  RP     3.4663659+03
INMP   1.2330074+01  SEM     1.1800446+02  RRVS   5.9824025+01  RAM   -1.2359646+02  DEM   -2.4704702+01  RAS    1.2384123+02
DES    1.9807319+01  SPSPR   3.6990857+03  DVPES  1.5541124+03  PERNAD 1.1819293+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  1.3916602+01  LONTD   1.8666894+02  AZTD   4.9551544+01  SEATD -6.7656648+00  DTSUN -4.9042341-01
*****************************************************************************************************************

ID    0716090.2
CIRCUMLUNAR PERICYNTHION
 19   JULY 1969 20 HRS, 57 MINS, 36.225 SECS  G.M.T. *** 77. HRS, 12. MINS, 50.300 SECS  G.E.T. ***  T   7.72139721+01 HRS
XL    -9.9358593+02  YL      7.0001827+01  ZL     3.4823914+01  DXL    6.5462526+02  DYL    7.3448765+03  DZL    3.9131642+03
XS    -9.8989368+02  YS      1.1584572+02  ZS     4.0277410+00  DXS    9.7023261+02  DYS    8.2595825+03  DZS    8.9127979+02
ALTS   5.8163870+01  LATS    2.3154717-01  LONS   1.7332512+02  VRS    8.3639962+03  PTR   -1.9046307-07  AZR   -8.3882811+01
LIN    1.7386667+02  LAN     1.7548043+02  LAP    7.1214213+00  LTS    1.3125187+00  LNS    1.1468845+02  DEM    1.4693414+00
SEM    5.8653683+01  RRVS    1.2135950+02  SMAS  -2.2783163+03  ECCS   1.4374535+00  INCS   1.5196201+02  RANS   1.7973408+02
APES   4.2628955+00  RPS     9.9665737+02  RM     2.1266371+05  DEMP   5.3534368-01  RAMP   1.7981368+02
*****************************************************************************************************************

ID    0716090.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22   JULY 1969 17 HRS, 53 MINS, 29.934 SECS  G.M.T. ***146. HRS,  8. MINS, 43.938 SECS  G.E.T. ***  T   1.46145538+02 HRS
X      3.1273123+03  Y      -1.3685256+03  Z     -8.1310738+02  DX     1.2758228+04  DY     2.8213751+04  DZ     1.8649037+04
R      3.5091435+03  DEC    -1.3397829+01  RA    -2.3634396+01  V      3.6146573+04  PTH   -6.2803954+00  AZ     5.9512517+01
ALT    6.5832692+01  LAT    -1.3483182+01  LON    1.2768075+02  VE     3.4859746+04  PTE   -6.5581356+00  AZE    5.8251278+01
SMA    1.6782149+05  ECC     9.7934289-01  INC    3.3040277+01  RAN   -2.1515882+00  APE   -1.2455569+01  RP     3.4667065+03
INMP   4.5243125+00  RAM    -1.5068121+02  DEM   -1.5520993+01  RAS    1.2190717+02  DES    2.0209270+01  SEM    9.2958049+01
RRVS   3.3615119+01  PERNAD 1.0016499+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD -1.6776588+00  LONTD  1.4574654+02
AZTD   5.5850268+01  SEATD -3.2296569+01  DTSUN -2.2998032+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716099.2
LAUNCH TIME      16   JULY 1969   16 HRS,   53 MINS,  54.603 SECS   G.M.T.
LAUNCH AZIMUTH   99.                          INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID     0716099.2
EARTH PARKING ORBIT INSERTION
 16   JULY 1969 17 HRS,  5 MINS, 15.657 SECS  G.M.T. ***  0. HRS, 11. MINS, 21.055 SECS  G.E.T. ***  T   1.89181888-01 HRS
X     -2.2969450+03  Y      2.3413788+03  Z      1.3421824+03  DX    -1.9470472+04  DY    -1.4359608+04  DZ    -8.2710979+03
ALT    1.0166273+02  LAT    2.2386137+01  LON    3.0377244+02  V      2.5567727+04  PTH   -5.6587348-07  AZ     1.1045887+02
R      3.5439334+03  DEC    2.2254835+01  RA     1.3445114+02  RAS    1.1586218+02  DES    2.1315997+01  RAN   -1.1750863-01
INC    2.9873116+01  MASS   2.9729818+05
*****************************************************************************************************************

ID     0716099.2
3.5 MINS PRIOR TO TLI INITIATION
 16   JULY 1969 20 HRS, 52 MINS, 11.244 SECS  G.M.T. ***  3. HRS, 58. MINS, 16.642 SECS  G.E.T. ***  T   3.97128934+00 HRS
X      3.2907991+03  Y     -1.1455143+03  Z     -6.1403170+02  DX     9.4187783+03  DY     2.0597492+04  DZ     1.1962339+04
ALT    9.4578606+01  LAT   -1.0058217+01  LON    9.3241558+01  V      2.5613817+04  PTH    3.4980455-02  AZ     6.1684240+01
*****************************************************************************************************************

ID     0716099.2
TRANSLUNAR INJECTION INITIATION
 16   JULY 1969 20 HRS, 55 MINS, 41.244 SECS  G.M.T. ***  4. HRS,  1. MINS, 46.642 SECS  G.E.T. ***  T   4.02962267+00 HRS
X      3.5105527+03  Y     -4.0538841+02  Z     -1.8574118+02  DX     3.2318163+03  DY     2.2008392+04  DZ     1.2692119+04
ALT    9.4857984+01  LAT   -3.0283941+00  LON    1.0496980+02  V      2.5610619+04  PTH    4.1766224-02  AZ     6.0244303+01
R      3.5387596+03  DEC   -3.0087035+00  RA    -6.5871734+00  RAS    1.1602359+02  DES    2.1289416+01  RAN   -1.3413743+00
INC    2.9893555+01  MASS   2.9331707+05
*****************************************************************************************************************

ID     0716099.2
TRANSLUNAR INJECTION TERMINATION
 16   JULY 1969 21 HRS,  1 MINS,  2.396 SECS  G.M.T. ***  4. HRS,  7. MINS,  7.793 SECS  G.E.T. ***  T   4.11883140+00 HRS
X      3.4060779+03  Y      9.9157334+02  Z      6.1571245+02  DX    -7.5549116+03  DY     3.0256258+04  DZ     1.7287156+04
ALT    1.5691753+02  LAT    9.9085553+00  LON    1.2644645+02  V      3.5656186+04  PTH    6.6704992+00  AZ     6.1632001+01
R      3.6705119+03  DEC    9.8463686+00  RA     1.6231272+01  RAS    1.1602734+02  DES    2.1288796+01  DEM    1.7747720+01
SEM    2.5159018+01  RBVS   8.4597445+01  RAN   -1.3413760+00  INC    2.9893555+01  ECC    9.7622566-01  SMA    1.4937698+05
RP     3.5513394+03  APF    6.5627722+00  INMP   1.4061827+00  C3TLI -4.5901455-01  DAZTLI 0.0000000     MASS   1.3760002+05
PROP   1.5571705+05
*****************************************************************************************************************

ID     0716099.2
TRANSLUNAR INJECTION + 2 HOURS
 16   JULY 1969 23 HRS,  1 MINS,  2.396 SECS  G.M.T. ***  6. HRS,  7. MINS,  7.793 SECS  G.E.T. ***  T   6.11883140+00 HRS
X     -1.6072475+04  Y      1.2257920+04  Z      6.8147955+03  DX    -1.3619325+04  DY     3.5089925+03  DZ     1.8236179+03
ALT    1.7988500+04  LAT    1.8649922+01  LON    2.2280153+02  V      1.4181841+04  PTH    6.5073480+01  AZ     1.1379428+02
R      2.1331256+04  DEC    1.8631155+01  RA     1.4266849+02  RAS    1.1611137+02  DES    2.1274889+01
*****************************************************************************************************************

ID     0716099.2
LUNAR ORBIT INSERTION BURN INITIATION
 19   JULY 1969 21 HRS, 56 MINS, 53.720 SECS  G.M.T. *** 77. HRS,  2. MINS, 59.115 SECS  G.E.T. ***  T   7.70497541+01 HRS
XL    -9.9773898+02  YL    -1.8358926+02  ZL    -9.7577642+01  DXL   -3.6105677+02  DYL    7.3176280+03  DZL    3.8419015+03
XS    -1.1064093+03  YS    -1.5894774+02  ZS    -2.4194685+01  DXS    2.6924492+01  DYS    8.2469123+03  DZS    8.3307650+02
ALTS   8.0677433+01  LATS  -1.3603052+00  LONS  -1.7102509+02  VRS    8.2889261+03  PTR   -9.2513635+00  AZR   -8.4376553+01
LIN    1.7420388+02  LAN    1.7544604+02  LAP   -8.0370299+01  LTS    1.3117736+00  LNS    1.1418466+02  DEM    1.2235903+00
THETA  1.6194829+01  BETA  -1.7104920+02  MASS   9.5199404+04  DRTX  -2.8920070+03  DRTY  -4.3701978+02  DRTZ  -2.2103271+01
*****************************************************************************************************************

ID     0716099.2
LUNAR ORBIT INSERTION BURN TERMINATION
 19   JULY 1969 22 HRS,  2 MINS, 59.898 SECS  G.M.T. *** 77. HRS,  9. MINS,  5.293 SECS  G.E.T. ***  T   7.71514702+01 HRS
XL    -9.7517877+02  YL     1.9231819+02  ZL     8.5788890+01  DXL    1.1073105+03  DYL    4.9377527+03  DZL    2.1083534+03
XS    -9.6380328+02  YS     2.5762440+02  ZS     5.7079067+00  DXS    1.3710125+03  DYS    5.3232209+03  DZS    1.1597395+02
ALTS   5.9163569+01  LATS   2.2780877-01  LONS   1.6503472+02  VRS    5.4981639+03  PTR    5.2924494-01  AZR   -8.8794363+01
LIN    1.7874713+02  LAN   -1.7979962+02  LAP   -1.1883392+01  SMAS   1.0525897+03  ECCS   5.3001771-02  PERS   2.1453909+00
RPS    9.9680063+02  APOS   1.1083788+03  RANS  -1.7951710+02  INCS   1.5683826+02  LTS    1.3116968+00  LNS    1.1413280+02
LTE    3.5780673-01  LNE   -6.5822712+00  THETA -7.3548782+00  BETA  -1.6674876+02  PROP   2.3865615+04  BARC   2.3942075+01
DELV   2.9249234+03  MASS   7.1333789+04  PLCHNG-4.5488566+00
*****************************************************************************************************************

ID     0716099.2
CIRCULARIZATION BURN INITIATION
 20   JULY 1969  2 HRS, 16 MINS, 48.652 SECS  G.M.T. *** 81. HRS, 22. MINS, 54.046 SECS  G.E.T. ***  T   8.13816795+01 HRS
XL    -9.9648938+02  YL     2.1180305+01  ZL     1.2712838+01  DXL    1.3619799+02  DYL    5.0430048+03  DZL    2.1568483+03
XS    -9.9036126+02  YS     1.1306158+02  ZS     1.7170667+00  DXS    6.2568372+02  DYS    5.4656938+03  DZS    1.1944813+02
ALTS   5.8301994+01  LATS   9.8697000-02  LONS   1.7348720+02  VRS    5.5026863+03  PTR   -1.5541539-02  AZR   -8.8756127+01
LIN    1.7874860+02  LAN    1.7801008+02  LAP    8.1455275-01  LTS    1.3084911+00  LNS    1.1197626+02  DEM    1.4316049-01
THETA  3.8846017-01  BETA   1.7999300+02  MASS   7.1284393+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID     0716099.2
CIRCULARIZATION BURN TERMINATION
 20   JULY 1969  2 HRS, 17 MINS,  3.497 SECS  G.M.T. *** 81. HRS, 23. MINS,  8.892 SECS  G.E.T. ***  T   8.13858032+01 HRS
XL    -9.9607630+02  YL     3.3344189+01  ZL     1.7914913+01  DXL    2.0192162+02  DYL    4.9138022+03  DZL    2.1013357+03
XS    -9.8876730+02  YS     1.2623776+02  ZS     2.0050651+00  DXS    6.7905274+02  DYS    5.3197601+03  DZS    1.1630334+02
ALTS   5.8301737+01  LATS   1.1525120-01  LONS   1.7272430+02  VRS    5.3641855+03  PTR    3.8860652-03  AZR   -8.8757624+01
LIN    1.7874862+02  LAN    1.7800781+02  LAP   -7.2289049+00  SMAS   9.9732033+02  ECCS   5.3085561-04  PERS   1.9786535+00
RPS    9.9679089+02  APOS   9.9784976+02  RANS  -1.7950915+02  INCS   1.5683848+02  LTS    1.3084877+00  LNS    1.1197416+02
LTE    6.1379164-01  LNE   -6.7092926+00  THETA -3.7235032-01  BETA   1.8000000+02  PROP   9.6755469+02  BARC   7.6093565-01
DELV   1.3850210+02  MASS   7.0316835+04  PLCHNG 6.4033023-07
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0716099.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 20   JULY 1969 22 HRS, 48 MINS, 48.422 SECS  G.M.T. ***101. HRS, 54. MINS, 53.818 SECS  G.E.T. ***  T   1.01914949+02 HRS
XL      7.6343829+02  YL      5.9079142+02  ZL      2.4965940+02  DXL     3.4391887+03  DYL    -3.7584616+03  DZL    -1.6215379+03
XS      9.1329686+02  YS      3.9990966+02  ZS      1.2783135+01  DXS     2.1519806+03  DYS    -4.9108323+03  DZS    -9.3763995+01
ALTS    5.8603426+01  LATS    7.3457228-01  LONS    2.3647398+01  VRS     5.3624701+03  PTR     3.3136548-03  AZR    -9.1002018+01
LIN     1.7875520+02  LAN     1.6748757+02  SEASV   1.2149071+01
*****************************************************************************************************************

ID     0716099.2
CSM PLANE CHANGE BURN INITIATION
 21   JULY 1969  3 HRS, 11 MINS, 51.737 SECS  G.M.T. ***106. HRS, 17. MINS, 57.134 SECS  G.E.T. ***  T   1.06299204+02 HRS
XL      7.8348827+02  YL     -5.6572397+02  ZL     -2.4519179+02  DXL    -3.3070339+03  DYL    -3.8673473+03  DZL    -1.6408213+03
XS      5.4322823+02  YS     -8.3588770+02  ZS     -1.4537048+01  DXS    -4.4970767+03  DYS    -2.9200507+03  DZS    -8.5932975+01
ALTS    5.8510232+01  LATS   -8.3544423-01  LONS   -5.6980892+01  VRS     5.3626283+03  PTR    -9.1658592-03  AZR    -9.0918401+01
LIN     1.7875646+02  LAN     1.6522214+02  LAP     4.5595810+01  LTS     1.2891355+00  LNS     9.9277212+01  DEM    -6.1166174+00
THETA  -1.4599529-04  BETA    9.0000003+01  MASS    3.6419136+04  DRTX    0.0000000     DRTY    1.6476770+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0716099.2
CSM PLANE CHANGE BURN TERMINATION
 21   JULY 1969  3 HRS, 11 MINS, 52.645 SECS  G.M.T. ***106. HRS, 17. MINS, 58.040 SECS  G.E.T. ***  T   1.06299456+02 HRS
XL      7.8299409+02  YL     -5.6633189+02  ZL     -2.4543565+02  DXL    -3.3103362+03  DYL    -3.8713959+03  DZL    -1.6246184+03
XS      5.4255644+02  YS     -8.3632354+02  ZS     -1.4548649+01  DXS    -4.4995133+03  DYS    -2.9167834+03  DZS    -6.9397428+01
ALTS    5.8510104+01  LATS   -8.3611111-01  LONS   -5.7026917+01  VRS     5.3626543+03  PTR    -9.1694206-03  AZR    -9.0741726+01
LIN     1.7888087+02  LAN     1.7131004+02  LAP     4.3911635+01  SMAS    9.9716431+02  ECCS    2.2743785-04  PERS    1.9781892+00
RPS     9.9693751+02  APOS    9.9739110+02  RANS   -1.7917124+02  INCS    1.5697709+02  LTS     1.2891356+00  LNS     9.9277089+01
LTE     2.1481587+00  LNE    -7.2778577+00  THETA  -5.2336324-04  BETA    8.9823175+01  PROP    5.9148437+01  BARC    4.6917946-02
DELV    1.6474953+01  MASS    3.6350987+04  PLCHNG 1.7657446-01
*****************************************************************************************************************

ID     0716099.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 21   JULY 1969 22 HRS, 29 MINS, 52.198 SECS  G.M.T. ***123. HRS, 35. MINS, 57.595 SECS  G.E.T. ***  T   1.23539332+02 HRS
XL      6.1477694+02  YL      7.2335345+02  ZL      3.0363045+02  DXL     4.2095952+03  DYL    -3.0237603+03  DZL    -1.3115907+03
XS      9.1329271+02  YS      3.9997779+02  ZS      1.2769885+01  DXS     2.1525551+03  DYS    -4.9111403+03  DZS    -7.8135095+01
ALTS    5.8596871+01  LATS    7.3381566-01  LONS    2.3647441+01  VRS     5.3625316+03  PTR     4.8320701-03  AZR    -9.0834970+01
LIN     1.7888654+02  LAN     1.6242541+02
*****************************************************************************************************************

ID     0716099.2
TRANSEARTH INJECTION BURN INITIATION
 22   JULY 1969  5 HRS, 34 MINS, 16.386 SECS  G.M.T. ***132. HRS, 42. MINS, 21.778 SECS  G.E.T. ***  T   1.32672716+02 HRS
XL     -9.3696649+02  YL     -3.1520955+02  ZL     -1.2778113+02  DXL    -1.8245827+03  DYL     4.6227178+03  DZL     1.9757412+03
XS     -9.6997726+02  YS      2.2962173+02  ZS     -3.0026245+00  DXS     1.2352014+03  DYS     5.2190631+03  DZS     1.0242417+02
ALTS    5.8295862+01  LATS   -1.7253193-01  LONS    1.6668161+02  VRS     5.3642178+03  PTR    -1.5606239-04  AZR    -8.8905917+01
LIN     1.7888916+02  LAN     1.5774444+02  LAP     9.1280391-02  LTS     1.2679072+00  LNS     8.5843847+01  DEM    -1.2621654+01
THETA  -5.8243729+00  BETA    1.2531746+01  MASS    3.6419687+04  DRTX    3.2362436+03  DRTY    7.1563800+02  DRTZ    7.5399999+01
*****************************************************************************************************************

ID     0716099.2
TRANSEARTH INJECTION BURN TERMINATION
 22   JULY 1969  5 HRS, 36 MINS, 52.292 SECS  G.M.T. ***132. HRS, 42. MINS, 57.688 SECS  G.E.T. ***  T   1.32716024+02 HRS
XL     -9.8419168+02  YL     -1.6237943+02  ZL     -5.3129025+01  DXL    -1.8934630+03  DYL     7.4128692+03  DZL     3.9367945+03
XS     -9.1625340+02  YS      3.9776927+02  ZS      9.0713941+00  DXS     3.0037738+03  DYS     8.0320787+03  DZS     8.7958349+02
ALTS    6.0417386+01  LATS    5.2032643-01  LONS    1.5653309+02  VRS     8.6203602+03  PTR     3.0000778+00  AZR    -8.4162704+01
LIN     1.7412873+02  LAN     1.6159974+02  LAP    -1.8426060+02  SMAS   -1.6779926+03  ECCS    1.5939692+00  PERS    4.3182605+00
RPS     9.9667597+02  APOS   -4.3526612+03  RANS   -1.7646719+02  INCS    1.5235327+02  INMPS   1.7751556+02  SEM     8.6639973+01
RRVS    1.0929451+02  LTS     1.2678717+00  LNS     8.5821796+01  LTE     3.6062170+00  LNE    -7.4815574+00  THETA   4.1797326+00
BETA    7.7254419+00  PROP    1.0161172+04  BARC    1.0148319+01  DELV    3.3152863+03  MASS    2.6258515+04  PLCHNG 4.7635670+00
*****************************************************************************************************************

ID     0716099.2
ENTRY AND TOUCHDOWN
 24   JULY 1969 16 HRS, 41 MINS, 33.414 SECS  G.M.T. ***191. HRS, 47. MINS, 38.807 SECS  G.E.T. ***  T   1.91794113+02 HRS
X       3.4990897+03  Y       1.9286661+02  Z      -1.9418824+02  DX     -4.3296967+03  DY      2.7397972+04  DZ      2.3259804+04
R       3.5097767+03  DEC    -3.1716692+00  RA      3.1548005+00  V       3.6199635+04  PTH    -6.5000095+00  AZ      5.0105332+01
ALT     6.5878674+01  LAT    -3.1925945+00  LON     1.7053348+02  VE      3.5030426+04  PTE    -6.7318181+00  AZE     4.8466830+01
SMA     2.3816172+05  ECC     9.8545330-01  INC     3.9999533+01  RAN     6.9413323+00  APF     8.1585112+00  RP      3.4544688+03
INMP    1.2374597+01  SEM     1.1801729+02  RRVS    6.0118815+01  RAM    -1.2358407+02  DEM    -2.4707664+01  RAS     1.2384204+02
DES     1.9807147+01  SPSPR   3.6264153+03  DVRES   1.5257672+03  PERNAD 1.2128621+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   1.0977413+01  LONTD   1.8666979+02  AZTD    4.9575758+01  SEATD -6.4741715+00  DTSUN -4.6930544-01
*****************************************************************************************************************

ID     0716099.2
CIRCUMLUNAR PERICYNTHION
 19   JULY 1969 22 HRS,  0 MINS, 15.554 SECS  G.M.T. *** 77. HRS,  6. MINS, 20.951 SECS  G.E.T. ***  T   7.71058197+01 HRS
XL     -9.9438506+02  YL      6.1038778+01  ZL      3.0875347+01  DXL     5.7287032+02  DYL     7.3738093+03  DZL     3.8725107+03
XS     -9.8995425+02  YS      1.1600554+02  ZS      3.7054742+03  DXS     9.7167845+02  DYS     8.2650824+03  DZS     8.4254016+02
ALTS    5.8241477+01  LATS    2.1300398-01  LONS    1.7331640+02  VRS     8.3645453+03  PTR     2.8177482-07  AZR    -8.4218893+01
LIN     1.7420385+02  LAN     1.7541527+02  LAP     5.0341469-01  LTS     1.3117311+00  LNS     1.1415608+02  DEM     1.2396401+00
SEM     5.9154540+01  RRVS    1.2083555+02  SMAS   -2.2758712+03  ECCS    1.4379576+00  INCS    1.5229691+02  RANS    1.7987108+02
APFS    3.8205562+00  RPS     9.9673498+02  PM      2.1256482+05  DEMP    5.5235327-01  RAMP    1.7983224+02
*****************************************************************************************************************

ID     0716099.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22   JULY 1969 18 HRS, 53 MINS, 26.209 SECS  G.M.T. ***145. HRS, 59. MINS, 31.600 SECS  G.E.T. ***  T   1.45992111+02 HRS
X       3.1395201+03  Y      -1.3275166+03  Z      -8.3365156+02  DX      1.2455743+04  DY      2.7731806+04  DZ      1.9554381+04
R       3.5091111+03  DEC    -1.3743029+01  RA     -2.2920615+01  V       3.6146540+04  PTH    -6.3417994+00  AZ      5.7780321+01
ALT     6.5832230+01  LAT    -1.3839411+01  LON     1.1336903+02  VE      3.4886214+04  PTE    -6.6201885+00  AZE     5.6457381+01
SMA     1.6764546+05  ECC     9.7932635-01  INC     3.4735649+01  RAN    -2.2659806+00  APF    -1.1823403+01  RP      3.4658456+03
INMP    6.2198569+00  RAM    -1.5015099+02  DEM    -1.5750179+01  RAS     1.2194857+02  DES     2.0200908+01  SEM     9.3476624+01
RRVS    3.4146201+01  PERNAD 1.3016675+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD -1.4700690+00  LONTD   1.3106221+02
AZTD    5.4084040+01  SEATD -3.1941531+01  DTSUN  -2.2747895+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0716108.2
LAUNCH TIME     16   JULY 1969   17 HRS,   54 MINS,  12.080 SECS   G.M.T.
LAUNCH AZIMUTH  108.                          INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID    0716108.2
EARTH PARKING ORBIT INSERTION
 16   JULY 1969 18 HRS,  5 MINS, 35.593 SECS  G.M.T. ***  0. HRS, 11. MINS, 23.513 SECS  G.E.T. ***  T   1.89864811-01 HRS
X     -2.8467441+03  Y      1.7688750+03  Z      1.1517784+03  DX    -1.5228378+04  DY    -1.7171270+04  DZ    -1.1267329+04
ALT    1.0122462+02  LAT    1.9080753+01  LON    3.0234145+02  V      2.5567727+04  PTH   -5.6587348-07  AZ     1.1777379+02
R      3.5439334+03  DEC    1.8965575+01  RA     1.4814451+02  RAS    1.1590445+02  DES    2.1309052+01  RAN   -1.7668423-01
INC    3.3200204+01  MASS   2.9613124+05
*****************************************************************************************************************

ID    0716108.2
3.5 MINS PRIOR TO TLI INITIATION
 16   JULY 1969 21 HRS, 49 MINS, 27.412 SECS  G.M.T. ***  3. HRS, 55. MINS, 15.332 SECS  G.E.T. ***  T   3.92092568+00 HRS
X      3.3024810+03  Y     -1.0834321+03  Z     -6.5837125+02  DX    9.1865515+03  DY     1.9944893+04  DZ     1.3192755+04
ALT    9.3933171+01  LAT   -1.0794777+01  LON    7.9914892+01  V     2.5617187+04  PTH    2.7658342-02  AZ     5.8382523+01
*****************************************************************************************************************

ID    0716108.2
TRANSLUNAR INJECTION INITIATION
 16   JULY 1969 21 HRS, 52 MINS, 57.412 SECS  G.M.T. ***  3. HRS, 58. MINS, 45.332 SECS  G.E.T. ***  T   3.97925898+00 HRS
X      3.5138651+03  Y     -3.6754298+02  Z     -1.8660584+02  DX    2.9820840+03  DY     2.1265677+04  DZ     1.3964255+04
ALT    9.4058184+01  LAT   -3.0431978+00  LON    9.1229101+01  V     2.5614883+04  PTH    3.5897630-02  AZ     5.6910063+01
R      3.5374594+03  DEC   -3.0234068+00  RA    -5.9713058+00  RAS   1.1606369+02  DES    2.1282784+01  RAN   -1.3438689+00
INC    3.3212121+01  MASS   2.9217990+05
*****************************************************************************************************************

ID    0716108.2
TRANSLUNAR INJECTION TERMINATION
 16   JULY 1969 21 HRS, 58 MINS, 17.336 SECS  G.M.T. ***  4. HRS,  4. MINS,  5.256 SECS  G.E.T. ***  T   4.06812674+00 HRS
X      3.3952142+03  Y      9.7504124+02  Z      6.9029889+02  DX   -7.8541870+03  DY     2.9161716+04  DZ     1.8965859+ 4
ALT    1.5575644+02  LAT    1.1126694+01  LON    1.1188680+02  V     3.5662272+04  PTH    6.6477446+00  AZ     5.8481739+01
R      3.5992634+03  DEC    1.1057202+01  RA     1.6023063+01  RAS   1.1606743+02  DES    2.1282166+01  DEM    1.7563471+01
SEM    2.5590812+01  RBVS   8.4840347+01  RAN   -1.3438701+00  INC   3.3212119+01  ECC    9.7621285-01  SMA    1.4325879+ 5
RP     3.5514422+03  APE    7.0380008+00  INMP   4.7242088+00  C3TLI -4.5937712-01  DAZTLI 0.0000000     MASS   1.3705803+05
PROP   1.5512187+05
*****************************************************************************************************************

ID    0716108.2
TRANSLUNAR INJECTION + 2 HOURS
 16   JULY 1969 23 HRS, 58 MINS, 17.336 SECS  G.M.T. ***  6. HRS,  4. MINS,  5.256 SECS  G.E.T. ***  T   6.06812674+00 HRS
X     -1.6197354+04  Y      1.1733185+04  Z      7.4154923+03  DX   -1.3654033+04  DY     3.3052753+03  DZ     1.9428544+03
ALT    1.7988457+04  LAT    2.0363198+01  LON    2.0986245+02  V     1.4182106+04  PTH    6.5077635+01  AZ     1.1582092+02
R      2.1333996+04  DEC    2.0342990+01  RA     1.4438084+02  RAS   1.1615145+02  DES    2.1268239+01
*****************************************************************************************************************

ID    0716108.2
LUNAR ORBIT INSERTION BURN INITIATION
 19   JULY 1969 22 HRS, 50 MINS,  7.629 SECS  G.M.T. *** 76. HRS, 55. MINS, 55.547 SECS  G.E.T. ***  T   7.69320965+01 HRS
XL    -9.9620232+02  YL    -1.8759845+02  ZL    -9.5159938+01  DXL  -4.1295668+02  DYL    7.3716434+03  DZL    3.7437786+03
XS    -1.2063562+03  YS    -1.5328418+02  ZS    -2.0449476+01  DXS   4.6166126+01  DYS    8.2627461+03  DZS    7.2173043+02
ALTS   7.9674937+01  LATS  -1.1508385+00  LONS  -1.7133950+02  VRS   8.2943352+03  PTR   -9.0458405+00  AZR   -8.5127985+01
LIN    1.7498470+02  LAN    1.7542759+02  LAP    1.6912334+00  LTS   1.3111036+00  LNS    1.1373236+02  DEM    1.0327146+00
THETA  1.5683814+01  BETA  -1.7257804+02  MASS   9.5199404+04  DRTX  -2.8892000+03  DRTY  -3.6213074+02  DRTZ   5.0383919+0
*****************************************************************************************************************

ID    0716108.2
LUNAR ORBIT INSERTION BURN TERMINATION
 19   JULY 1969 22 HRS, 56 MINS, 12.390 SECS  G.M.T. *** 77. HRS,  2. MINS,   .307 SECS  G.E.T. ***  T   7.70334187+01 HRS
XL    -9.7596237+02  YL     1.8863401+02  ZL     8.4400492+01  DXL   1.0864536+03  DYL    4.9410602+03  DZL    2.1095518+03
XS    -9.6258672+02  YS     2.6191993+02  ZS     5.7907140+00  DXS   1.3955116+03  DYS    5.3160972+03  DZS    1.1578023+02
ALTS   5.9107991+01  LATS   3.3258304-01  LONS   1.6477833+02  VRS   5.4974309+03  PTR    5.1988054-01  AZR   -8.8796190+01
LIN    1.7874770+02  LAN   -1.7982301+02  LAP   -1.5925601+01  SMAS  1.0521541+03  ECCS   5.2638956-02  PERS   2.1440593+00
RPS    9.9676985+02  APOS   1.1075384+03  RANS  -1.7949128+02  INCS  1.5683899+02  LTS    1.3110271+00  LNS    1.1368070+02
LTE    4.1139941-01  LNE   -6.6095307+00  THETA -7.9174144+00  BETA -1.6898120+02  PROP   2.3773242+04  BARC   2.3871394+01
DELV   2.9118079+03  MASS   7.1426162+04  PLCHNG-3.7688006+00
*****************************************************************************************************************

ID    0716108.2
CIRCULARIZATION BURN INITIATION
 20   JULY 1969  3 HRS,  9 MINS, 41.425 SECS  G.M.T. *** 81. HRS, 15. MINS, 29.344 SECS  G.E.T. ***  T   8.12581511+01 HRS
XL    -9.9670013+02  YL     9.0237006+00  ZL     7.7049605+00  DXL   6.6890363+01  DYL    5.0433105+03  DZL    2.1571324+03
XS    -9.9586230+02  YS     1.0835691+02  ZS     1.6056203+00  DXS   6.0266730+02  DYS    5.4673841+03  DZS    1.1941936+02
ALTS   5.8277220+01  LATS   9.2293344-02  LONS   1.7375915+02  VRS   5.5017958+03  PTR   -4.7429672-02  AZR   -8.8756207+01
LIN    1.7874916+02  LAN    1.7798985+02  LAP    4.5984620-01  LTS   1.3078197+00  LNS    1.1152699+02  DEM   -7.7204461-02
THETA  3.8468564-01  BETA  -1.8000000+02  MASS   7.1376763+04  DRTX  -1.3699545+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID    0716108.2
CIRCULARIZATION BURN TERMINATION
 20   JULY 1969  3 HRS,  9 MINS, 56.129 SECS  G.M.T. *** 81. HRS, 15. MINS, 44.048 SECS  G.E.T. ***  T   8.12622356+01 HRS
XL    -9.9645724+02  YL     2.1075363+01  ZL     1.2859395+01  DXL   1.3383728+02  DYL    4.9163195+03  DZL    2.1025508+03
XS    -9.8933895+02  YS     1.2141421+02  ZS     1.8908619+00  DXS   6.5625037+02  DYS    5.3232793+03  DZS    1.1631640+02
ALTS   5.8269522+01  LATS   1.0869030-01  LONS   1.7300350+02  VRS   5.3648388+03  PTR   -2.9062017-02  AZR   -8.8757604+01
LIN    1.7874916+02  LAN    1.7798759+02  LAP    3.4996474+01  SMAS  9.9749998+02  ECCS   8.9701486-04  PERS   1.9791882+00
RPS    9.9660522+02  APOS   9.9839474+02  RANS  -1.7948333+02  INCS  1.5683924+02  LTS    1.3078165+00  LNS    1.1152490+02
LTE    6.6708366-01  LNE   -6.7347140+00  THETA -3.6889766-01  BETA -1.8000000+02  PROP   9.5835742+02  BARC   7.5373282-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0716108.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 20   JULY 1969 23 HRS, 42 MINS,  3.852 SECS   G.M.T. ***101. HRS, 47. MINS, 51.771 SECS   G.E.T. ***  T    1.01797714+02 HRS
XL     7.5791112+02  YL      5.9675467+02  ZL      2.5237412+02  DXL     3.4766938+03  DYL    -3.7299063+03  DZL    -1.6100617+03
XS     9.1324291+02  YS      3.9988834+02  ZS      1.2783735+01  DXS     2.1550834+03  DYS    -4.9103365+03  DZS    -9.3666413+01
ALTS   5.8545462+01  LATS    7.3464946-01  LONS    2.3647519+01  VRS     5.3632603+03  PTR     3.5690109-02  AZR    -9.1001212+01
LIN    1.7875577+02  LAN     1.6746368+02  SEASV   1.2601346+01
*****************************************************************************************************************

ID    0716108.2
CSM PLANE CHANGE BURN INITIATION
 21   JULY 1969  4 HRS,  5 MINS, 11.886 SECS   G.M.T. ***106. HRS, 10. MINS, 59.805 SECS   G.E.T. ***  T    1.06183279+02 HRS
XL     7.8926063+02  YL     -5.5988236+02  ZL     -2.4285565+02  DXL    -3.2676389+03  DYL    -3.8920879+03  DZL    -1.6508516+03
XS     5.4361459+02  YS     -8.3645168+02  ZS     -1.4532914+01  DXS    -4.4933484+03  DYS    -2.9199685+03  DZS    -8.5903015+01
ALTS   5.9193526+01  LATS   -8.3463456-01  LONS   -5.6979937+01  VRS     5.3594565+03  PTR     1.0835171-02  AZR    -9.0918323+01
LIN    1.7875703+02  LAN     1.6519748+02  LAP    -1.5321255+02  LTS     1.2884315+00  LNS     9.8824301+01  DEM    -6.3395832+00
THETA -1.1013680-04  BETA    8.9999916+01  MASS    3.6511706+04  DRTX    0.0000000     DRTY    1.6476770+01  DRTZ    0.0000000
*****************************************************************************************************************

ID    0716108.2
CSM PLANE CHANGE BURN TERMINATION
 21   JULY 1969  4 HRS,  5 MINS, 12.796 SECS   G.M.T. ***106. HRS, 11. MINS,   .714 SECS   G.E.T. ***  T    1.06183532+02 HRS
XL     7.8877097+02  YL     -5.6046561+02  ZL     -2.4310169+02  DXL    -3.2709656+03  DYL    -3.8961595+03  DZL    -1.6546578+03
XS     5.4294148+02  YS     -8.3688873+02  ZS     -1.4544537+01  DXS    -4.4957885+03  DYS    -2.9166960+03  DZS    -6.9367338+01
ALTS   5.9193680+01  LATS   -8.3530203-01  LONS   -5.7026030+01  VRS     5.3594814+03  PTR     1.0809665-02  AZR    -9.0741562+01
LIN    1.7888159+02  LAN     1.7128996+02  LAP    -1.5254562+02  SMAS    9.9734333+02  ECCS    3.9330532-04  PERS    1.9787219+00
RPS    9.9695107+02  APOS    9.9773559+02  RANS   -1.7914818+02  INCS    1.5697905+02  LTS     1.2884316+00  LNS     9.8824178+01
LTE    2.1605346+00  LNE    -7.2918922+00  THETA  -5.4385381-04  BETA    8.9823226+01  PROP    5.9313477+01  BARC    4.6393707-02
DELV   1.6476958+01  MASS    3.6452393+04  PLCHNG  1.7668039-01
*****************************************************************************************************************

ID    0716108.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 21   JULY 1969 21 HRS, 23 MINS, 28.793 SECS   G.M.T. ***123. HRS, 29. MINS, 16.700 SECS   G.E.T. ***  T    1.23487972+02 HRS
XL     6.7877703+02  YL      7.2867232+02  ZL      3.0554260+02  DXL     4.2404386+03  DYL    -2.9890685+03  DZL    -1.2976329+03
XS     9.1312332+02  YS      3.9983472+02  ZS      1.2766654+01  DXS     2.1550670+03  DYS    -4.9113857+03  DZS    -7.8041439+01
ALTS   5.8418756+01  LATS    7.3366609-01  LONS    2.3647338+01  VRS     5.3639644+03  PTR     3.3365664-02  AZR    -9.0834120+01
LIN    1.7888731+02  LAN     1.6240263+02
*****************************************************************************************************************

ID    0716108.2
TRANSEARTH INJECTION BURN INITIATION
 22   JULY 1969  6 HRS, 28 MINS, 29.819 SECS   G.M.T. ***132. HRS, 34. MINS, 17.732 SECS   G.E.T. ***  T    1.32571592+02 HRS
XL    -9.4191896+02  YL     -3.0327514+02  ZL     -1.2250590+02  DXL    -1.7539188+03  DYL     4.6662858+03  DZL     1.9853471+03
XS    -9.6473921+02  YS      2.3155120+02  ZS     -2.5783816+00  DXS     1.3559503+03  DYS     5.1883352+03  DZS     1.0267904+02
ALTS   5.8535177+01  LATS   -1.4817527-01  LONS    1.6538579+02  VRS     5.3635776+03  PTR    -3.5348989-02  AZR    -9.8903149+01
LIN    1.7888996+02  LAN     1.5771577+02  LAP     5.0520270+01  LTS     1.2671672+00  LNS     8.5383678+01  DEM    -1.2838376+01
THETA -6.0133454+00  BETA    1.2431680+01  MASS    3.6521093+04  DRTX    3.2737751+03  DRTY    7.1775542+02  DRTZ    8.3566014+01
*****************************************************************************************************************

ID    0716108.2
TRANSEARTH INJECTION BURN TERMINATION
 22   JULY 1969  6 HRS, 31 MINS,  7.643 SECS   G.M.T. ***132. HRS, 36. MINS, 55.558 SECS   G.E.T. ***  T    1.32615433+02 HRS
XL    -9.8699051+02  YL     -1.4751246+02  ZL     -4.6483765+01  DXL    -1.7623494+03  DYL     7.4738392+03  DZL     3.9640100+03
XS    -9.0604961+02  YS      4.2077474+02  ZS      9.6754080+00  DXS     3.2195666+03  DYS     7.9881837+03  DZS     8.8232719+02
ALTS   6.0541461+01  LATS    5.5490422-01  LONS    1.5538957+02  VRS     8.6576664+03  PTR     3.0000380+00  AZR    -8.4171572+01
LIN    1.7413448+02  LAN     1.6049925+02  LAP    -1.5181346+02  SMAS   -1.6160937+03  ECCS    1.6168034+00  PERS    4.0914787+00
RPS    9.9681202+02  APOS   -4.2289993+03  RANS   -1.7659971+02  INCS    1.5234641+02  INMPS   1.7757598+02  SEM     8.7101968+01
PAVS   1.1027805+02  LTS     1.2671318+00  LNS     8.5361357+01  LTE     3.6547445+00  LNE    -7.4801922+00  THETA   4.1394557+00
BETA   7.6277685+00  PROP    1.0286190+04  BARC    1.0296064+01  DELV    3.3525796+03  MASS    2.6234913+04  PLCHNG  4.7571199+00
*****************************************************************************************************************

ID    0716108.2
ENTRY AND TOUCHDOWN
 24   JULY 1969 16 HRS, 42 MINS, 32.494 SECS   G.M.T. ***190. HRS, 48. MINS, 20.411 SECS   G.E.T. ***  T    1.90805670+02 HRS
X      3.4982944+03  Y       2.0788211+02  Z      -1.9133143+02  DX     -4.4671718+03  DY      2.7383828+04  DZ      2.3265725+04
R      3.5996846+03  DEC    -3.1250445+00  RA      3.4007365+00  V       3.6209441+04  PTH    -6.5000241+00  AZ      5.0101341+01
ALT    6.5785582+01  LAT    -3.1456640+00  LON     1.7053257+02  VE      3.5040277+04  PTE    -6.7315616+00  AZE     4.8463106+01
SMA    2.5593105+05  ECC     9.8646354-01  INC     4.0000453+01  RAN     7.1312920+00  APF     8.2245406+00  RP      3.4644024+03
INMP   1.2415378+01  SEM     1.1802635+02  RBVS    6.0364069+01  RAM    -1.2357369+02  DEM    -2.4710142+01  RAS     1.2384271+02
DES    1.9807002+01  SPSPR   3.6028132+03  DVRES   1.5165440+03  PERNAD 1.2404124+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03
LATTD  1.1023378+01  LONTD   1.8667049+02  AZTD    4.9585319+01  SEATD -6.2320277+00  DTSUN -4.5175331-01
*****************************************************************************************************************

ID    0716108.2
CIRCUMLUNAR PERICYNTHION
 19   JULY 1969 22 HRS, 53 MINS, 24.748 SECS   G.M.T. *** 76. HRS, 59. MINS, 12.666 SECS   G.E.T. ***  T    7.69868517+01 HRS
XL    -9.9495284+02  YL      5.3112616+01  ZL      3.1289522+01  DXL     4.9950567+02  DYL     7.4321035+03  DZL     3.7743823+03
XS    -9.8999651+02  YS      1.1564455+02  ZS      3.1480922+00  DXS     9.6964955+02  DYS     8.2781411+03  DZS     7.2954640+02
ALTS   5.8244119+01  LATS    1.8095306-01  LONS    1.7333501+02  VRS     8.3666047+03  PTR     3.3999708-07  AZR    -8.4997581+01
LIN    1.7498469+02  LAN     1.7539754+02  LAP     2.7041961-01  LTS     1.3110620+00  LNS     1.1370444+02  DEM     9.8307730-01
SEM    5.9579827+01  RBVS    1.2036467+02  SMAS   -2.2696721+03  ECCS    1.4391549+00  INCS    1.5307597+02  RANS   -1.7998685+02
APFS   3.4410376+00  RPS     9.9673761+02  RM      2.1248039+05  DEMP    5.7901563-01  RAMP    1.7987533+02
*****************************************************************************************************************

ID    0716108.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 22   JULY 1969 19 HRS, 44 MINS, 58.021 SECS   G.M.T. ***145. HRS, 50. MINS, 45.939 SECS   G.E.T. ***  T    1.45846094+02 HRS
X      3.1470626+03  Y      -1.2685628+03  Z      -8.9437919+02  DX      1.2206646+04  DY      2.6481321+04  DZ      2.1361617+04
R      3.5090124+03  DEC    -1.4766510+01  RA     -2.1954079+01  V       3.6146662+04  PTH    -6.4658729+00  AZ      5.4183224+01
ALT    6.5832281+01  LAT    -1.4859830+01  LON     1.0141775+02  VE      3.4946655+04  PTE    -6.7454018+00  AZE     5.2739493+01
SMA    1.6730227+05  ECC     9.7929470-01  INC     3.8361486+01  RAN    -2.5017433+00  APF    -1.1178939+01  RP      3.4640432+03
INMP   9.8476384+00  RAM    -1.4969368+02  DEM    -1.5946415+01  RAS     1.2198416+02  DES     2.0193710+01  SEM     9.3923011+01
RBVS   3.4751485+01  PERNAD 1.0005262+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03  LATTD -1.3761776+00  LONTD   1.1828787+02
AZTD   5.0338205+01  SEATD -3.1807082+01  DTSUN -2.2653128+00
*****************************************************************************************************************
```

TABLE II.- SUMMARY OF MISSIONS FOR JULY 16 LAUNCH WINDOW - Concluded

(b) Mission parameters across launch azimuth range (72° - 108°)

LAUNCH TIME

LAZ	DAY	MONTH	YEAR	HRS	MINS	SECS
72.	16	JULY	1969	13	31	45.274
81.	16	JULY	1969	14	34	35.208
90.	16	JULY	1969	15	44	45.995
99.	16	JULY	1969	16	53	54.603
108.	16	JULY	1969	17	54	12.080

EARTH PARKING ORBIT INSERTION

LAZ	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	HRS	G.E.T. MINS	SECS **	MASS	LAT	LON
72.	16	JULY	13	43	9.317	0.	11.	24.042	2.95882+05	3.2839+01	3.0581+02
81.	16	JULY	14	45	56.535	0.	11.	21.326	2.97165+05	2.9285+01	3.0555+02
90.	16	JULY	15	56	6.323	0.	11.	20.328	2.97646+05	2.5794+01	3.0485+02
99.	16	JULY	17	5	15.657	0.	11.	21.055	2.97298+05	2.2386+01	3.0377+02
108.	16	JULY	18	5	35.593	0.	11.	23.513	2.96131+05	1.9081+01	3.0234+02

3.5 MINS PRIOR TO TLI INITIATION

LAZ	OPP	** G.E.T. HRS	MINS	SECS **	ALT	LAT	LON	V	PTH	AZ
72.	1	2.	40.	47.779	9.8510+01	-1.1789+01	1.6257+02	2.55919+04	3.1715-02	5.9183+01
81.	1	2.	37.	27.851	9.7134+01	-1.0770+01	1.4732+02	2.55994+04	3.8707-02	6.2188+01
90.	1	2.	33.	45.524	9.5745+01	-1.0252+01	1.3090+02	2.56073+04	3.9868-02	6.3112+01
99.	1	2.	30.	11.404	9.4622+01	-1.0360+01	1.1524+02	2.56137+04	3.5392-02	6.1784+01
108.	1	2.	27.	13.479	9.3972+01	-1.1003+01	1.0210+02	2.56170+04	2.8258-02	5.8446+01
72.	2	4.	8.	54.503	9.8461+01	-1.1568+01	1.4040+02	2.55921+04	3.1553-02	5.9107+01
81.	2	4.	5.	35.542	9.7086+01	-1.0464+01	1.2534+02	2.55996+04	3.8495-02	6.2081+01
90.	2	4.	1.	52.731	9.5700+01	-9.9231+00	1.0898+02	2.56074+04	3.9585-02	6.2998+01
99.	2	3.	58.	16.642	9.4579+01	-1.0058+01	9.3242+01	2.56138+04	3.4980-02	6.1684+01
108.	2	3.	55.	15.332	9.3933+01	-1.0795+01	7.9915+01	2.56172+04	2.7658-02	5.8383+01

TRANSLUNAR INJECTION INITIATION

LAZ	** OPP	DAY	G.M.T. MONTH	HRS	MINS	SECS **	HRS	G.E.T. MINS	SECS **	DELTA T FROM EPOI ** HRS	MINS	SECS	MASS	LAT	LON	AZ
72.	1	16	JULY 16	16	3.054	2.	44.	17.779	2.	32.	53.737	2.92655+05	-4.2003+00	1.7398+02	5.7470+01	
81.	1	16	JULY 17	15	33.159	2.	40.	57.851	2.	29.	36.525	2.93970+05	-3.8418+00	1.5911+02	6.0574+01	
90.	1	16	JULY 18	22	1.519	2.	37.	15.524	2.	25.	55.196	2.94487+05	-3.5326+00	1.4279+02	6.1575+01	
99.	1	16	JULY 19	27	36.007	2.	33.	41.404	2.	22.	20.349	2.94173+05	-3.3450+00	1.2698+02	6.0274+01	
108.	1	16	JULY 20	24	55.559	2.	30.	43.479	2.	19.	19.966	2.93336+05	-3.2597+00	1.1343+02	5.6927+01	
72.	2	16	JULY 17	44	9.777	4.	12.	24.503	4.	1.	.461	2.91798+05	-3.9682+00	1.5179+02	5.7444+01	
81.	2	16	JULY 18	43	40.750	4.	9.	5.542	3.	57.	44.216	2.93113+05	-3.5195+00	1.3710+02	6.0538+01	
90.	2	16	JULY 19	50	8.726	4.	5.	22.731	3.	54.	2.403	2.93630+05	-3.1867+00	1.2086+02	6.1539+01	
99.	2	16	JULY 20	55	41.244	4.	1.	46.642	3.	50.	25.587	2.93317+05	-3.0284+00	1.0497+02	6.0244+01	
108.	2	16	JULY 21	52	57.412	3.	58.	45.332	3.	47.	21.819	2.92180+05	-3.0432+00	9.1229+01	5.6910+01	

TRANSLUNAR INJECTION CUTOFF

LAZ	** OPP	DAY	G.M.T. MONTH	HRS	MINS	SECS **	HRS	G.E.T. MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	ENERGY	PLCHNG
72.	1	16	JULY 16	21	24.059	2.	49.	38.785	3.2101+02	1.37008+05	1.55646+05	-4.5764-01	1.1771+00	
81.	1	16	JULY 17	20	55.327	2.	46.	20.119	3.2227+02	1.37712+05	1.56258+05	-4.5775-01	9.6867-01	
90.	1	16	JULY 18	27	24.328	2.	42.	38.333	3.2281+02	1.37966+05	1.56521+05	-4.5807-01	8.9778-01	
99.	1	16	JULY 19	32	58.591	2.	39.	3.988	3.2258+02	1.37762+05	1.56412+05	-4.5853-01	9.8709-01	
108.	1	16	JULY 20	30	17.153	2.	36.	5.073	3.2159+02	1.37104+05	1.55932+05	-4.5902-01	1.2070+00	
72.	2	16	JULY 17	49	29.153	4.	17.	43.878	3.1938+02	1.36942+05	1.54856+05	-4.5781-01	0.0000	
81.	2	16	JULY 18	49	1.606	4.	14.	26.398	3.2086+02	1.37540+05	1.55574+05	-4.5809-01	0.0000	
90.	2	16	JULY 19	55	30.188	4.	10.	44.193	3.2146+02	1.37763+05	1.55868+05	-4.5853-01	0.0000	
99.	2	16	JULY 21	1	2.396	4.	7.	7.793	3.2115+02	1.37600+05	1.55717+05	-4.5901-01	0.0000	
108.	2	16	JULY 21	58	17.336	4.	4.	5.256	3.1992+02	1.37058+05	1.55122+05	-4.5938-01	0.0000	

TRANSLUNAR INJECTION CUTOFF - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INMP
72.	1	1.6682+02	9.7425+00	1.9477+02	3.56073+04	7.0288+00	5.9755+01	3.1343+00
81.	1	1.6462+02	8.9624+00	1.8069+02	3.56179+04	6.9585+00	6.2600+01	2.1917-01
90.	1	1.6308+02	8.8881+00	1.6465+02	3.56255+04	6.9412+00	6.3589+01	7.4069-01
99.	1	1.6250+02	9.5595+00	1.4858+02	3.56284+04	6.9778+00	6.2541+01	4.4817-01
108.	1	1.6303+02	1.0864+01	1.3424+02	3.56259+04	7.0643+00	5.9648+01	3.5547+00
72.	2	1.5981+02	1.0021+01	1.7243+02	3.56423+04	6.6288+00	5.8620+01	4.2844+00
81.	2	1.5919+02	9.3180+00	1.5857+02	3.56450+04	6.6602+00	6.1707+01	1.1641+00
90.	2	1.5814+02	9.2616+00	1.4260+02	3.56501+04	6.6745+00	6.2779+01	1.3759-01
99.	2	1.5692+02	9.9086+00	1.2645+02	3.56562+04	6.6705+00	6.1632+01	1.4062+00
108.	2	1.5576+02	1.1127+01	1.1189+02	3.56623+04	6.6477+00	5.8482+01	4.7242+00

TRANSLUNAR INJECTION CUTOFF + 2 HOURS

LAZ	OPP	** HRS	G.E.T. MINS	** SECS	ALT	LAT	LON	V	PTH	AZ
72.	1	4.	49.	38.785	1.7904+04	2.0543+01	2.9107+02	1.41780+04	6.5070+01	1.1458+02
81.	1	4.	46.	20.119	1.7901+04	1.8660+01	2.7587+02	1.41786+04	6.5070+01	1.1222+02
90.	1	4.	42.	38.333	1.7900+04	1.7985+01	2.5952+02	1.41783+04	6.5073+01	1.1157+02
99.	1	4.	39.	3.988	1.7902+04	1.8370+01	2.4392+02	1.41772+04	6.5079+01	1.1276+02
108.	1	4.	36.	5.073	1.7907+04	1.9977+01	2.3088+02	1.41756+04	6.5085+01	1.1559+02
72.	2	6.	17.	43.878	1.7886+04	2.0931+01	2.7003+02	1.41842+04	6.5062+01	1.1581+02
81.	2	6.	14.	26.398	1.7887+04	1.8939+01	2.5474+02	1.41831+04	6.5065+01	1.1325+02
90.	2	6.	10.	44.193	1.7888+04	1.8123+01	2.3836+02	1.41822+04	6.5069+01	1.1254+02
99.	2	6.	7.	7.793	1.7888+04	1.8650+01	2.2280+02	1.41818+04	6.5073+01	1.1379+02
108.	2	6.	4.	5.256	1.7888+04	2.0363+01	2.0986+02	1.41821+04	6.5078+01	1.1682+02

LUNAR ORBIT INSERTION BURN INITIATION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	** SECS	G.E.T. HRS	MINS	** SECS	** DELTA T FROM TLI ** HRS	MINS	SECS	LOI TARGET PARAMETERS MASS	DRTX	DRTY	** DRTZ
72.	1	19	JULY 17	26	18.585	75.	54.	33.308	73.	4.	54.526	9.51994+04	-2.8890+03	-4.2665+02	1.2961+01	
81.	1	19	JULY 18	24	37.664	75.	50.	2.454	73.	3.	42.336	9.51994+04	-2.8942+03	-4.8201+02	-2.5369+01	
90.	1	19	JULY 19	29	16.487	75.	44.	30.491	73.	1.	52.160	9.51994+04	-2.8960+03	-4.9600+02	-4.9409+01	
99.	1	19	JULY 20	32	13.450	75.	38.	18.845	72.	59.	14.856	9.51994+04	-2.8934+03	-4.6557+02	1.3514-01	
108.	1	19	JULY 21	26	7.510	75.	31.	55.429	72.	55.	50.356	9.51994+04	-2.8889+03	-3.9554+02	2.3586+01	
72.	2	19	JULY 18	50	54.385	77.	19.	9.108	73.	1.	25.230	9.51994+04	-2.8892+03	-3.9374+02	-1.3218+01	
81.	2	19	JULY 19	49	26.706	77.	14.	51.496	73.	0.	25.100	9.51994+04	-2.8922+03	-4.5359+02	-3.0654+01	
90.	2	19	JULY 20	54	11.979	77.	9.	25.981	72.	58.	41.791	9.51994+04	-2.8938+03	-4.6946+02	-2.8686+01	
99.	2	19	JULY 21	56	53.720	77.	2.	59.115	72.	55.	51.324	9.51994+04	-2.8920+03	-4.3702+02	-2.2103+01	
108.	2	19	JULY 22	50	7.629	76.	55.	55.547	72.	51.	50.291	9.51994+04	-2.8892+03	-3.6213+02	5.0384+00	

LUNAR ORBIT INSERTION BURN INITIATION - CONCLUDED

LAZ	OPP	SELENOGRAPHIC POLAR COORDINATES ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	8.0273+01	-1.3297+00	-1.7108+02	8.28866+03	-9.1582+00	-8.4482+01
81.	1	8.1265+01	-1.4877+00	-1.7081+02	8.28509+03	-9.3427+00	-8.3926+01
90.	1	8.1444+01	-1.5279+00	-1.7075+02	8.28483+03	-9.4001+00	-8.3786+01
99.	1	8.1046+01	-1.4398+00	-1.7095+02	8.28680+03	-9.2890+00	-8.4090+01
108.	1	7.9934+01	-1.2416+00	-1.7128+02	8.29200+03	-9.0788+00	-8.4794+01
72.	2	8.0224+01	-1.2405+00	-1.7110+02	8.29007+03	-9.1556+00	-8.4812+01
81.	2	8.1024+01	-1.4087+00	-1.7084+02	8.28674+03	-9.3385+00	-8.4212+01
90.	2	8.1143+01	-1.4526+00	-1.7084+02	8.28656+03	-9.3604+00	-8.4053+01
99.	2	8.0677+01	-1.3603+00	-1.7103+02	8.28893+03	-9.2511+00	-8.4377+01
108.	2	7.9675+01	-1.1508+00	-1.7134+02	8.29434+03	-9.0458+00	-8.5128+01

LUNAR ORBIT INSERTION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	19	JULY 17	32	24.270	76.	0.	38.995		3.6569+02	7.13659+04	2.3833+04	2.9204+03	-4.4394+00
81.	1	19	JULY 18	30	44.835	75.	56.	9.627		3.6717+02	7.12691+04	2.3930+04	2.9341+03	-5.0175+00
90.	1	19	JULY 19	35	24.136	75.	50.	38.139		3.6765+02	7.12380+04	2.3961+04	2.9385+03	-5.1630+00
99.	1	19	JULY 20	38	20.245	75.	44.	25.640		3.6680+02	7.12936+04	2.3906+04	2.9306+03	-4.8461+00
108.	1	19	JULY 21	32	12.713	75.	38.	.631		3.6520+02	7.13973+04	2.3802+04	2.9159+03	-4.1153+00
72.	2	19	JULY 18	56	59.592	77.	25.	14.314		3.6521+02	7.13971+04	2.3802+04	2.9159+03	-4.0969+00
81.	2	19	JULY 19	55	33.187	77.	20.	57.976		3.6648+02	7.13141+04	2.3885+04	2.9277+03	-4.7200+00
90.	2	19	JULY 21	0	18.893	77.	15.	32.897		3.6692+02	7.12859+04	2.3914+04	2.9317+03	-4.8856+00
99.	2	19	JULY 22	2	59.898	77.	9.	5.293		3.6618+02	7.13338+04	2.3866+04	2.9249+03	-4.5489+00
108.	2	19	JULY 22	56	12.390	77.	2.	.307		3.6476+02	7.14262+04	2.3773+04	2.9118+03	-3.7688+00

LUNAR ORBIT INSERTION BURN TERMINATION - CONCLUDED

LAZ	OPP	** ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR	** RPS	APOS
72.	1	5.8515+01	3.2835-01	1.6500+02	5.50161+03	2.8664-01	-8.8795+01	9.9676+02	1.1085+03
81.	1	5.9088+01	3.2435-01	1.6521+02	5.49855+03	4.4973-01	-8.8793+01	9.9696+02	1.1082+03
90.	1	5.9504+01	3.2374-01	1.6524+02	5.49641+03	6.3194-01	-8.8793+01	9.9677+02	1.1084+03
99.	1	5.8590+01	3.2692-01	1.6509+02	5.50113+03	2.5732-01	-8.8794+01	9.9688+02	1.1083+03
108.	1	5.8564+01	3.3190-01	1.6482+02	5.50129+03	2.8981-01	-8.8796+01	9.9680+02	1.1084+03
72.	2	5.9202+01	3.2783-01	1.6501+02	5.49697+03	5.4380-01	-8.8795+01	9.9678+02	1.1075+03
81.	2	5.8986+01	3.2427-01	1.6521+02	5.49909+03	4.8977-01	-8.8793+01	9.9675+02	1.1084+03
90.	2	5.8900+01	3.2487-01	1.6519+02	5.49955+03	4.5377-01	-8.8793+01	9.9677+02	1.1084+03
99.	2	5.9164+01	3.2781-01	1.6503+02	5.49816+03	5.2924-01	-8.8794+01	9.9680+02	1.1084+03
108.	2	5.9108+01	3.3258-01	1.6478+02	5.49743+03	5.1988-01	-8.8796+01	9.9677+02	1.1075+03

CIRCULARIZATION BURN INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS **	DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** CIRCULARIZATION TARGET PARAMETERS ** DRTX	DRTY	DRTZ
72.	1	19	JULY 21	47	48.604	80.	16.	3.329		4.	15.	24.335	7.13165+04	-1.3850+02	0.0000	0.0000
81.	1	19	JULY 22	45	4.128	80.	10.	28.919		4.	14.	19.292	7.12197+04	-1.3850+02	0.0000	0.0000
90.	1	19	JULY 23	48	32.659	80.	3.	46.662		4.	13.	8.523	7.11886+04	-1.3850+02	0.0000	0.0000
99.	1	20	JULY 0	53	54.769	80.	0.	.165		4.	15.	34.525	7.12442+04	-1.3850+02	0.0000	0.0000
108.	1	20	JULY 1	47	35.031	79.	53.	22.951		4.	15.	22.319	7.13479+04	-1.3850+02	0.0000	0.0000
72.	2	19	JULY 23	10	30.447	81.	38.	45.171		4.	13.	30.856	7.13477+04	-1.3727+02	0.0000	6.6335-01
81.	2	20	JULY 0	9	37.699	81.	35.	2.488		4.	14.	4.512	7.12647+04	-1.3850+02	0.0000	0.0000
90.	2	20	JULY 1	14	37.502	81.	29.	51.506		4.	14.	18.609	7.12365+04	-1.3850+02	0.0000	0.0000
99.	2	20	JULY 2	16	48.652	81.	22.	54.046		4.	13.	48.754	7.12844+04	-1.3850+02	0.0000	0.0000
108.	2	20	JULY 3	9	41.425	81.	15.	29.344		4.	13.	29.037	7.13768+04	-1.3700+02	0.0000	0.0000

CIRCULARIZATION BURN INITIATION - CONCLUDED

LAZ	OPP	SELENOGRAPHIC POLAR COORDINATES ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	5.8261+01	2.0594-01	1.6852+02	5.50296+03	-1.5563-02	-8.8770+01
81.	1	5.8465+01	1.2970-01	1.7206+02	5.50183+03	-1.5494-02	-8.8759+01
90.	1	5.8274+01	4.8830-02	1.7579+02	5.50285+03	-1.5551-02	-8.8753+01
99.	1	5.8383+01	2.1682-01	1.6803+02	5.50222+03	-1.5515-02	-8.8771+01
108.	1	5.8303+01	2.0806-01	1.6841+02	5.50266+03	-1.5542-02	-8.8770+01
72.	2	5.8286+01	8.9149-02	1.7391+02	5.50178+03	-1.9006-02	-8.8756+01
81.	2	5.8250+01	1.1271-01	1.7285+02	5.50296+03	-1.5558-02	-8.8757+01
90.	2	5.8268+01	1.2914-01	1.7209+02	5.50287+03	-1.5554-02	-8.8759+01
99.	2	5.8302+01	9.8697-02	1.7349+02	5.50269+03	-1.5542-02	-8.8756+01
108.	2	5.8277+01	9.2293-02	1.7376+02	5.50180+03	-4.7430-02	-8.8756+01

CIRCULARIZATION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	19	JULY	21	48	3.456	80.	16.	18.178	1.4849+01	7.03485+04	9.6799+02	1.3850+02	1.0511-06
81.	1	19	JULY	22	45	18.960	80.	10.	43.751	1.4832+01	7.02530+04	9.6668+02	1.3850+02	7.9863-07
90.	1	19	JULY	23	48	47.485	80.	4.	1.486	1.4825+01	7.02223+04	9.6625+02	1.3850+02	1.0672-07
99.	1	20	JULY	0	54	9.606	80.	0.	15.003	1.4838+01	7.02772+04	9.6701+02	1.3850+02	1.2560-06
108.	1	20	JULY	1	47	49.889	79.	53.	37.806	1.4856+01	7.03795+04	9.6842+02	1.3850+02	1.5594-06
72.	2	19	JULY	23	10	45.175	81.	38.	59.899	1.4729+01	7.03878+04	9.5991+02	1.3728+02	6.0841-07
81.	2	20	JULY	0	9	52.540	81.	35.	17.330	1.4842+01	7.02974+04	9.6729+02	1.3850+02	8.2321-07
90.	2	20	JULY	1	14	52.337	81.	30.	6.341	1.4835+01	7.02696+04	9.6690+02	1.3850+02	9.7521-07
99.	2	20	JULY	2	17	3.497	81.	23.	8.892	1.4845+01	7.03168+04	9.6755+02	1.3850+02	6.4033-07
108.	2	20	JULY	3	9	56.129	81.	15.	44.048	1.4705+01	7.04184+04	9.5836+02	1.3700+02	4.9485-07

CIRCULARIZATION BURN TERMINATION - CONCLUDED

LAZ	OPP	** ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR **
72.	1	5.8260+01	2.2231-01	1.6775+02	5.36445+03	3.9824-03	-8.8773+01
81.	1	5.8464+01	1.4619-01	1.7130+02	5.36332+03	3.8525-03	-8.8761+01
90.	1	5.8274+01	6.5411-02	1.7503+02	5.36435+03	3.9307-03	-8.8754+01
99.	1	5.8383+01	2.3315-01	1.6726+02	5.36372+03	3.8944-03	-8.8774+01
108.	1	5.8303+01	2.2443-01	1.6764+02	5.36416+03	3.9615-03	-8.8773+01
72.	2	5.8284+01	1.0558-01	1.7315+02	5.36451+03	-6.9492-03	-8.8757+01
81.	2	5.8249+01	1.2925-01	1.7209+02	5.36446+03	3.9608-03	-8.8759+01
90.	2	5.8267+01	1.4565-01	1.7133+02	5.36437+03	3.9454-03	-8.8761+01
99.	2	5.8302+01	1.1525-01	1.7272+02	5.36419+03	3.8861-03	-8.8758+01
108.	2	5.8270+01	1.0869-01	1.7300+02	5.36484+03	-2.9062-02	-8.8758+01

CSM LUNAR LANDING SITE PASS

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	** DELTA T FROM LOI ** HRS	MINS	SECS	LATS	LONS	AZR	SEA
72.	1	20	JULY	18	18	12.964	100.	46.	27.688	24.	45.	48.693	7.3456-01	2.3647+01	-9.1002+01	9.8518+00
81.	1	20	JULY	19	16	36.579	100.	42.	1.369	24.	45.	51.742	7.3474-01	2.3647+01	-9.1002+01	1.0348+01
90.	1	20	JULY	20	21	18.329	100.	36.	32.332	24.	45.	54.193	7.3464-01	2.3647+01	-9.1002+01	1.0897+01
99.	1	20	JULY	21	24	6.458	100.	30.	11.855	24.	45.	46.215	7.3459-01	2.3648+01	-9.1002+01	1.1430+01
108.	1	20	JULY	22	17	54.675	100.	23.	42.592	24.	45.	41.961	7.3455-01	2.3648+01	-9.1001+01	1.1887+01
72.	2	20	JULY	19	42	47.192	102.	11.	1.916	24.	45.	47.602	7.3478-01	2.3648+01	-9.1002+01	1.0570+01
81.	2	20	JULY	20	41	24.738	102.	6.	49.529	24.	45.	51.553	7.3464-01	2.3647+01	-9.1002+01	1.1067+01
90.	2	20	JULY	21	46	10.045	102.	1.	24.049	24.	45.	51.152	7.3458-01	2.3647+01	-9.1002+01	1.1617+01
99.	2	20	JULY	22	48	48.422	101.	54.	53.818	24.	45.	48.525	7.3457-01	2.3647+01	-9.1002+01	1.2149+01
108.	2	20	JULY	23	42	3.852	101.	47.	51.771	24.	45.	51.464	7.3465-01	2.3648+01	-9.1001+01	1.2601+01

LUNAR ORBIT PLANE CHANGE BURN INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	** DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** LOPC TARGET PARAMETERS ** DRTX	DRTY	DRTZ
72.	1	20	JULY	22	41	17.051	105.	9.	31.777	29.	8.	52.782	3.64418+04	0.0000	1.6475+01	0.0000
81.	1	20	JULY	23	39	39.571	105.	5.	4.362	29.	8.	54.735	3.63463+04	0.0000	1.6475+01	0.0000
90.	1	21	JULY	0	44	21.846	104.	59.	35.851	29.	8.	57.712	3.63156+04	0.0000	1.6475+01	0.0000
99.	1	21	JULY	1	47	9.438	104.	53.	14.835	29.	8.	49.194	3.63705+04	0.0000	1.6475+01	0.0000
108.	1	21	JULY	2	40	58.006	104.	46.	45.925	29.	8.	45.294	3.64728+04	0.0000	1.6475+01	0.0000
72.	2	21	JULY	0	5	52.796	106.	34.	7.519	29.	8.	53.204	3.64811+04	0.0000	1.6475+01	0.0000
81.	2	21	JULY	1	4	28.201	106.	29.	52.989	29.	8.	55.014	3.63907+04	0.0000	1.6475+01	0.0000
90.	2	21	JULY	2	9	13.546	106.	24.	27.550	29.	8.	54.653	3.63629+04	0.0000	1.6475+01	0.0000
99.	2	21	JULY	3	11	51.737	106.	17.	57.134	29.	8.	51.841	3.64101+04	0.0000	1.6477+01	0.0000
108.	2	21	JULY	4	5	11.886	106.	10.	59.805	29.	8.	59.497	3.65117+04	0.0000	1.6477+01	0.0000

LUNAR ORBIT PLANE CHANGE BURN INITIATION - CONCLUDED

LAZ	OPP	** ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR **
72.	1	5.8601+01	-8.3528-01	-5.6981+01	5.36221+03	-1.0841-02	-9.0918+01
81.	1	5.8386+01	-8.3579-01	-5.6981+01	5.36331+03	-4.1099-03	-9.0919+01
90.	1	5.8535+01	-8.3593-01	-5.6982+01	5.36251+03	-1.0431-02	-9.0919+01
99.	1	5.8441+01	-8.3572-01	-5.6981+01	5.36299+03	-6.4575-03	-9.0918+01
108.	1	5.8520+01	-8.3482-01	-5.6980+01	5.36258+03	-8.9268-03	-9.0918+01
72.	2	5.8790+01	-8.3505-01	-5.6980+01	5.36137+03	-3.7595-03	-9.0919+01
81.	2	5.8554+01	-8.3573-01	-5.6981+01	5.36240+03	-1.0866-02	-9.0918+01
90.	2	5.8546+01	-8.3579-01	-5.6981+01	5.36244+03	-1.0314-02	-9.0918+01
99.	2	5.8510+01	-8.3544-01	-5.6981+01	5.36263+03	-9.1659-03	-9.0918+01
108.	2	5.9104+01	-8.3463-01	-5.6980+01	5.35946+03	1.0835-02	-9.0918+01

LUNAR ORBIT PLANE CHANGE BURN TERMINATION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	22	JULY	22	41	17.959	105.	9.	32.683	9.0637-01	3.63827+04	5.9192+01	1.6475+01	1.7657-01
81.	1	22	JULY	23	39	40.477	105.	5.	5.265	9.0294-01	3.62873+04	5.9037+01	1.6475+01	1.7653-01
90.	1	21	JULY	0	44	22.751	104.	59.	36.754	9.0294-01	3.62566+04	5.8987+01	1.6475+01	1.7656-01
99.	1	21	JULY	1	47	10.344	104.	53.	15.741	9.0637-01	3.63115+04	5.9076+01	1.6475+01	1.7654-01
108.	1	21	JULY	2	49	58.915	104.	46.	46.832	9.0637-01	3.64136+04	5.9243+01	1.6475+01	1.7656-01
72.	2	21	JULY	0	5	53.705	106.	34.	8.428	9.0981-01	3.64219+04	5.9257+01	1.6475+01	1.7660-01
81.	2	21	JULY	1	4	29.107	106.	29.	53.899	9.0981-01	3.63316+04	5.9109+01	1.6475+01	1.7656-01
90.	2	21	JULY	2	9	14.453	106.	24.	28.457	9.0637-01	3.63038+04	5.9064+01	1.6475+01	1.7655-01
99.	2	21	JULY	3	11	52.645	106.	17.	59.040	9.0637-01	3.63510+04	5.9148+01	1.6477+01	1.7657-01
108.	2	21	JULY	4	5	12.796	106.	11.	.714	9.0981-01	3.64524+04	5.9313+01	1.6477+01	1.7669-01

CSM LUNAR ASCENT PASS

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS **	DELTA T FROM LOI ** HRS	MINS	SECS	LATS	LONS	AZR
72.	1	21	JULY	15	59	19.563	122.	27.	34.287	46.	26.	55.292	7.3397-01	2.3647+01	-9.0835+01
81.	1	21	JULY	16	57	40.937	122.	23.	5.726	46.	26.	56.099	7.3424-01	2.3648+01	-9.0835+01
90.	1	21	JULY	18	2	22.589	122.	17.	36.593	46.	26.	58.454	7.3409-01	2.3647+01	-9.0834+01
99.	1	21	JULY	19	5	9.693	122.	11.	15.789	46.	26.	49.449	7.3398-01	2.3647+01	-9.0835+01
108.	1	21	JULY	19	58	58.534	122.	4.	46.451	46.	26.	45.820	7.3371-01	2.3647+01	-9.0834+01
72.	2	21	JULY	17	34	1.074	123.	52.	15.797	46.	27.	1.482	7.3408-01	2.3647+01	-9.0835+01
81.	2	21	JULY	18	22	28.440	123.	47.	53.230	46.	26.	55.255	7.3404-01	2.3647+01	-9.0835+01
90.	2	21	JULY	19	27	14.127	123.	42.	28.131	46.	26.	55.234	7.3395-01	2.3647+01	-9.0835+01
99.	2	21	JULY	20	29	52.198	123.	35.	57.595	46.	26.	52.302	7.3382-01	2.3647+01	-9.0835+01
108.	2	21	JULY	21	23	28.783	123.	29.	16.700	46.	27.	16.393	7.3365-01	2.3647+01	-9.0834+01

TRANSEARTH INJECTION BURN INITIATION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS **	DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** TEI TARGET PARAMETERS DRTX	DRTY	DRTZ **
72.	1	22	JULY	1	1	35.453	131.	29.	50.174	55.	29.	11.180	3.64514+04	3.0752+03	7.0845+02	3.5401+01
81.	1	22	JULY	2	0	23.450	131.	25.	48.241	55.	29.	38.618	3.63560+04	3.1067+03	7.0926+02	4.2420+01
90.	1	22	JULY	3	5	36.599	131.	20.	50.601	55.	30.	12.463	3.63253+04	3.1430+03	7.1082+02	5.1100+01
99.	1	22	JULY	4	8	52.883	131.	14.	58.277	55.	30.	32.636	3.63802+04	3.1812+03	7.1257+02	6.1494+01
108.	1	22	JULY	5	3	7.595	131.	8.	55.515	55.	30.	54.884	3.64823+04	3.2155+03	7.1451+02	7.1710+01
72.	2	22	JULY	2	27	.810	132.	55.	15.530	55.	30.	1.215	3.64906+04	3.1210+03	7.1017+02	4.6435+01
81.	2	22	JULY	3	25	51.524	132.	51.	16.316	55.	30.	18.340	3.64003+04	3.1548+03	7.1149+02	5.4979+01
90.	2	22	JULY	4	31	8.847	132.	46.	22.851	55.	30.	49.953	3.63725+04	3.1949+03	7.1316+02	6.3885+01
99.	2	22	JULY	5	34	16.386	132.	40.	21.778	55.	31.	16.485	3.64197+04	3.2362+03	7.1564+02	7.5400+01
108.	2	22	JULY	6	28	29.819	132.	34.	17.732	55.	32.	17.425	3.65211+04	3.2738+03	7.1776+02	8.3566+01

TRANSEARTH INJECTION BURN INITIATION - CONCLUDED

LAZ	OPP	** SELENOGRAPHIC POLAR COORDINATES ALTS	LATS	LONS	VRS	PTR	AZR **
72.	1	5.8269+01	-2.9708-01	1.7326+02	5.36446+03	-3.7838-03	-8.8933+01
81.	1	5.8437+01	-2.7023-01	1.7183+02	5.36353+03	3.7258-03	-8.8925+01
90.	1	5.8273+01	-2.4947-01	1.7326+02	5.36437+03	-1.3075-03	-8.8918+01
99.	1	5.8365+01	-2.1173-01	1.6874+02	5.36395+03	1.5432-03	-8.8912+01
108.	1	5.8297+01	-1.8753-01	1.6746+02	5.36422+03	-8.2132-04	-8.8903+01
72.	2	5.8383+01	-2.6917-01	1.7113+02	5.36402+03	-1.3359-02	-8.8923+01
81.	2	5.8250+01	-2.3168-01	1.6973+02	5.36448+03	-2.3962-03	-8.8916+01
90.	2	5.8266+01	-2.0125-01	1.6819+02	5.36443+03	-1.4755-03	-8.8910+01
99.	2	5.8297+01	-1.7259-01	1.6669+02	5.36422+03	-1.5636-04	-8.8906+01
108.	2	5.8305+01	-1.4818-01	1.6539+02	5.36358+03	-3.5049-02	-8.8903+01

TRANSEARTH INJECTION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	22	JULY	1	4	5.1[illegible]	131.	32.	1[illegible].828	1.4965+02	2.66977+04	9.7537+03	3.1569+03	4.[illegible]63+[illegible]
81.	1	22	JULY	2	2	53.956	131.	28.	1[illegible].747	1.5051+02	2.65467+04	9.[illegible]92+03	3.1469+03	4.7951+[illegible]
90.	1	22	JULY	2	8	8.415	131.	23.	2[illegible].419	1.5132+02	2.64307+04	9.9946+[illegible]	3.2229+03	4.7846+[illegible]
99.	1	22	JULY	4	11	26.642	131.	17.	31.838	1.5354+02	2.63728+04	1.0[illegible]+04	3.2684+03	4.7753+[illegible]
108.	1	22	JULY	5	5	43.951	131.	11.	3[illegible].468	1.5535+02	2.63574+04	1.0[illegible]+04	3.2948+03	4.7693+[illegible]
72.	2	22	JULY	2	25	42.646	132.	57.	47.158	1.5164+02	2.66[illegible]+04	9.[illegible]+03	3.2311+03	4.7924+[illegible]
81.	2	22	JULY	3	28	24.126	132.	53.	48.916	1.5267+02	2.64545+04	9.9453+03	3.2345+03	4.7924+[illegible]
90.	2	22	JULY	4	33	42.914	132.	45.	56.213	1.5409+02	2.63312+04	1.0041+04	3.2741+03	4.7713+[illegible]
99.	2	22	JULY	5	36	52.792	132.	42.	57.698	1.5591+02	2.62585+04	1.0161+04	3.3153+03	4.7635+[illegible]
108.	2	22	JULY	6	31	7.643	132.	36.	55.558	1.5783+02	2.62349+04	1.0285+04	3.3524+03	4.7571+[illegible]

TRANSEARTH INJECTION BURN TERMINATION - CONCLUDED

LAZ	OPP	** SELENOGRAPHIC POLAR COORDINATES ALTS	LATS	LONS	VRS	PTR	AZR **
72.	1	6.0514+01	3.5939-01	1.6362+02	8.45931+03	2.9937+00	-8.4123+01
81.	1	6.0672+01	3.9235-01	1.6212+02	8.48974+03	3.1[illegible]+00	-8.4131+01
90.	1	6.0473+01	4.2973-01	1.6043+02	8.52699+03	2.9994+00	-8.4140+01
99.	1	6.0598+01	4.6794-01	1.5873+02	8.56472+03	3.0011+00	-8.4150+01
108.	1	6.0435+01	5.0196-01	1.5735+02	8.59958+03	3.0017+00	-8.4157+01
72.	2	6.0583+01	4.3902-01	1.6143+02	8.56468+03	3.0[illegible]+00	-8.4134+01
81.	2	6.0438+01	4.4265-01	1.5991+02	8.53898+03	3.0032+00	-8.4143+01
90.	2	6.0435+01	4.8145-01	1.5819+02	8.57898+03	3.0072+00	-8.4154+01
99.	2	6.0417+01	5.2033-01	1.5653+02	8.62036+03	3.0101+00	-8.4163+01
108.	2	6.0541+01	5.5499-01	1.5509+02	8.65767+03	3.0100+00	-8.4172+01

ENTRY

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	** DELTA T FROM TEI ** HRS	MINS	SECS	PROP RESERVE	DV RESERVE
72.	1	24	JULY 16	36	14.311	195.	4.	29.035	63.	32.	9.216		4.05557+03	1.69587+03
81.	1	24	JULY 16	37	26.303	194.	2.	50.739	62.	34.	32.242		3.91463+03	1.63772+03
90.	1	24	JULY 16	38	43.659	192.	53.	57.657	61.	35.	35.230		3.73859+03	1.59280+03
99.	1	24	JULY 16	39	57.369	191.	45.	2.663	60.	24.	33.825		3.73932+03	1.57004+03
108.	1	24	JULY 16	40	58.87[illegible]	191.	46.	46.787	59.	35.	15.9[illegible]		3.72490+03	1.56416+03
72.	2	24	JULY 16	37	57.917	195.	6.	12.636	62.	8.	25.467		3.97565+03	1.66127+03
81.	2	24	JULY 16	39	7.373	194.	4.	32.159	61.	13.	43.243		3.82238+03	1.60232+03
90.	2	24	JULY 16	40	22.333	192.	55.	36.833	6[illegible].	6.	39.9[illegible]		3.69909+03	1.55411+03
99.	2	24	JULY 16	41	33.414	191.	47.	38.837	59.	4.	41.12		3.62642+03	1.52577+03
108.	2	24	JULY 16	42	32.494	190.	48.	20.411	58.	11.	24.353		3.60281+03	1.51654+03

ENTRY - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INC	INMP
72.	1	6.5785+01	-3.5156+00	1.7055+02	3.61608+04	-6.5000+00	5.0126+01	4.0001+01	1.2191+01
81.	1	6.5873+01	-3.4347+00	1.7054+02	3.61679+04	-6.5000+00	5.0121+01	4.0000+01	1.2228+01
90.	1	6.5903+01	-3.3519+00	1.7054+02	3.61766+04	-6.5000+00	5.0116+01	4.0000+01	1.2271+01
99.	1	6.5854+01	-3.2790+00	1.7054+02	3.61862+04	-6.5000+00	5.0111+01	4.0000+01	1.2314+01
108.	1	6.5832+01	-3.2226+00	1.7053+02	3.61948+04	-6.5000+00	5.0107+01	4.0000+01	1.2353+01
72.	2	6.5868+01	-3.4001+00	1.7054+02	3.61715+04	-6.5000+00	5.0118+01	4.0000+01	1.2246+01
81.	2	6.5893+01	-3.3278+00	1.7054+02	3.61796+04	-6.5000+00	5.0114+01	4.0000+01	1.2285+01
90.	2	6.5802+01	-3.2551+00	1.7054+02	3.61899+04	-6.5000+00	5.0109+01	4.0000+01	1.2330+01
99.	2	6.5879+01	-3.1926+00	1.7053+02	3.61996+04	-6.5000+00	5.0105+01	4.0000+01	1.2375+01
108.	2	6.5786+01	-3.1457+00	1.7053+02	3.62094+04	-6.5000+00	5.0101+01	4.0000+01	1.2415+01

TOUCHDOWN

LAZ	OPP	** G.E.T. HRS	MINS	SECS	** ENTDT HRS	MINS	SECS **	ENTRG	LAT	LON	AZ	SEATD	DTSUN
72.	1	195.	18.	29.029	0.	14.	.000	1.2850+03	1.0662+01	1.8667+02	4.9505+01	-7.8024+00	-5.6544-01
81.	1	194.	16.	50.783	0.	14.	.000	1.2850+03	1.0741+01	1.8667+02	4.9523+01	-7.5016+00	-5.4369-01
90.	1	193.	7.	57.651	0.	14.	.000	1.2850+03	1.0822+01	1.8667+02	4.9541+01	-7.1768+00	-5.2019-01
99.	1	192.	0.	2.657	0.	14.	.000	1.2850+03	1.0893+01	1.8667+02	4.9557+01	-6.8710+00	-4.9805-01
108.	1	191.	0.	46.781	0.	14.	.000	1.2850+03	1.0948+01	1.8667+02	4.9569+01	-6.6167+00	-4.7963-01
72.	2	195.	20.	12.630	0.	14.	.000	1.2850+03	1.0775+01	1.8667+02	4.9530+01	-7.3678+00	-5.3401-01
81.	2	194.	18.	32.153	0.	14.	.000	1.2850+03	1.0846+01	1.8667+02	4.9546+01	-7.0779+00	-5.1303-01
90.	2	193.	9.	36.817	0.	14.	.000	1.2850+03	1.0917+01	1.8667+02	4.9562+01	-6.7657+00	-4.9042-01
99.	2	192.	1.	38.801	0.	14.	.000	1.2850+03	1.0977+01	1.8667+02	4.9576+01	-6.4742+00	-4.6931-01
108.	2	191.	2.	20.405	0.	14.	.000	1.2850+03	1.1023+01	1.8667+02	4.9585+01	-6.2320+00	-4.5175-01

CIRCUMLUNAR PERICYNTHION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS	** DELTA T FROM TLI ** HRS	MINS	SECS
72.	1	19	JULY 17	29		38.440	75.	57.	53.163	73.	8.	14.381
81.	1	19	JULY 18	28		1.698	75.	53.	26.487	73.	7.	6.369
90.	1	19	JULY 19	32		41.763	75.	47.	55.768	73.	5.	17.436
99.	1	19	JULY 20	35		36.235	75.	41.	41.632	73.	2.	37.644
108.	1	19	JULY 21	29		25.473	75.	35.	13.392	72.	59.	8.320
72.	2	19	JULY 18	54		14.104	77.	22.	28.829	73.	4.	44.951
81.	2	19	JULY 19	52		50.540	77.	18.	15.330	73.	3.	48.934
90.	2	19	JULY 20	57		36.295	77.	12.	50.300	73.	2.	6.109
99.	2	19	JULY 22	0		15.554	77.	6.	20.951	72.	59.	13.160
108.	2	19	JULY 22	53		24.748	76.	59.	12.666	72.	55.	7.410

CIRCUMLUNAR PERICYNTHION - CONCLUDED

LAZ	OPP	** ALTS	LATS	SELENOGRAPHIC POLAR COORDINATES LONS	VRS	PTR	AZR	** LIN
72.	1	5.8285+01	1.9883-01	1.7341+02	8.36281+03	3.6041-08	-8.4328+01	1.7431+02
81.	1	5.8367+01	2.2944-01	1.7338+02	8.36224+03	-1.1788-07	-8.3751+01	1.7373+02
90.	1	5.8263+01	2.3957-01	1.7335+02	8.36293+03	-2.4854-07	-8.3606+01	1.7359+02
99.	1	5.8416+01	2.2075-01	1.7334+02	8.36305+03	-3.2532-09	-8.3922+01	1.7391+02
108.	1	5.8337+01	1.8714-01	1.7334+02	8.36482+03	-1.0834-07	-8.4652+01	1.7464+02
72.	2	5.8254+01	1.9578-01	1.7339+02	8.36415+03	1.5641-07	-8.4670+01	1.7466+02
81.	2	5.8153+01	2.2646-01	1.7336+02	8.36382+03	-1.3966-07	-8.4048+01	1.7403+02
90.	2	5.8164+01	2.3155-01	1.7333+02	8.36400+03	-1.9046-07	-8.3883+01	1.7387+02
99.	2	5.8241+01	2.1300-01	1.7332+02	8.36455+03	2.8177-07	-8.4219+01	1.7420+02
108.	2	5.8244+01	1.8096-01	1.7334+02	8.36660+03	3.4000-07	-8.4998+01	1.7498+02

CIRCUMLUNAR ENTRY

LAZ	** OPP	DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS	** DELTA T FROM PERICYNTHION** HRS	MINS	SECS
72.	1	22	JULY 14	36	34.590	145.	4.	49.311		69.	6.	56.148
81.	1	22	JULY 15	31	34.919	144.	56.	59.707		69.	3.	33.224
90.	1	22	JULY 16	32	38.872	144.	47.	52.877		68.	59.	57.109
99.	1	22	JULY 17	32	43.815	144.	38.	49.211		68.	57.	7.583
108.	1	22	JULY 18	24	41.344	144.	30.	29.258		68.	55.	15.866
72.	2	22	JULY 15	57	10.499	146.	25.	25.218		69.	2.	56.392
81.	2	22	JULY 16	52	15.721	146.	17.	40.510		68.	59.	25.180
90.	2	22	JULY 17	53	29.934	146.	8.	43.938		68.	55.	53.638
99.	2	22	JULY 18	53	26.209	145.	59.	31.600		68.	53.	10.649
108.	2	22	JULY 19	44	58.021	145.	50.	45.939		68.	51.	33.276

CIRCUMLUNAR ENTRY - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INC	INMP
72.	1	6.5833+01	-1.4720+01	1.7533+02	3.61470+04	-6.4203+00	5.8946+01	3.4012+01	5.5149+00
81.	1	6.5834+01	-1.3997+01	1.6124+02	3.61468+04	-6.6187+00	6.1096+01	3.1814+01	3.3020+00
90.	1	6.5833+01	-1.3501+01	1.4665+02	3.61467+04	-6.4699+00	6.1252+01	3.1480+01	2.9635+00
99.	1	6.5832+01	-1.3975+01	1.3203+02	3.61467+04	-6.6669+00	5.9666+01	3.3084+01	4.5691+00
108.	1	6.5832+01	-1.4645+01	1.2041+02	3.61467+04	-6.4964+00	5.6198+01	3.6457+01	7.9467+00
72.	2	6.5832+01	-1.5086+01	1.5602+02	3.61470+04	-6.5089+00	5.6979+01	3.5910+01	7.4125+00
81.	2	6.5832+01	-1.4063+01	1.4227+02	3.61468+04	-6.4671+00	5.9250+01	3.3491+01	4.9805+00
90.	2	6.5833+01	-1.3483+01	1.2768+02	3.61466+04	-6.2804+00	5.9513+01	3.3040+01	4.5243+00
99.	2	6.5832+01	-1.3830+01	1.1337+02	3.61465+04	-6.3418+00	5.7780+01	3.4736+01	6.2199+00
108.	2	6.5832+01	-1.4860+01	1.0142+02	3.61467+04	-6.4659+00	5.4183+01	3.8361+01	9.8476+00

CIRCUMLUNAR TOUCHDOWN

LAZ	** OPP	G.E.T. HRS	MINS	SECS	** HRS	ENTDT MINS	SECS **	ENTRG	LAT	LON	AZ	SEATD	DTSUN
72.	1	145.	18.	49.305	0.	14.	.000	1.2850+03	-2.6769+00	1.9329+02	5.4935+01	-3.4231+01	-2.4364+00
81.	1	145.	10.	59.702	0.	14.	.000	1.2850+03	-2.6667+00	1.7964+02	5.7210+01	-3.4135+01	-2.4294+00
90.	1	145.	1.	52.871	0.	14.	.000	1.2850+03	-2.2462+00	1.6508+02	5.7513+01	-3.3325+01	-2.3722+00
99.	1	144.	52.	49.205	0.	14.	.000	1.2850+03	-2.1928+00	1.5014+02	5.5848+01	-3.3233+01	-2.3656+00
108.	1	144.	44.	29.252	0.	14.	.000	1.2850+03	-1.7669+00	1.3776+02	5.2329+01	-3.2510+01	-2.3148+00
72.	2	146.	39.	25.212	0.	14.	.000	1.2850+03	-2.4219+00	1.7355+02	5.2947+01	-3.3759+01	-2.4030+00
81.	2	146.	31.	40.504	0.	14.	.000	1.2850+03	-2.1462+00	1.6029+02	5.5423+01	-3.3183+01	-2.3623+00
90.	2	146.	22.	43.932	0.	14.	.000	1.2850+03	-1.6777+00	1.4575+02	5.5850+01	-3.2297+01	-2.2998+00
99.	2	146.	13.	31.594	0.	14.	.000	1.2850+03	-1.4701+00	1.3106+02	5.4084+01	-3.1942+01	-2.2748+00
108.	2	146.	4.	45.933	0.	14.	.000	1.2850+03	-1.3762+00	1.1829+02	5.0338+01	-3.1807+01	-2.2653+00

SUMMARY OF MISSIONS FOR JULY 18 LAUNCH WINDOW

TABLE III.- SUMMARY OF MISSIONS FOR JULY 18 LAUNCH WINDOW

(a) Mission summaries for specific launch azimuths (72°, 81°, 90°, 99°, 108°)

```
*****************************************************************************************************************

ID     0718072.1
LAUNCH TIME      18   JULY 1969    13 HRS,    37 MINS,  54.348 SECS    G.M.T.
LAUNCH AZIMUTH    72.                              INJECTION OPPORTUNITY     1
*****************************************************************************************************************

ID     0718072.1
EARTH PARKING ORBIT INSERTION
 18    JULY 1969 13 HRS, 49 MINS, 18.390 SECS   G.M.T. ***  0. HRS, 11. MINS, 24.042 SECS   G.E.T. ***   T    1.90011727-01 HRS
X       3.4618822+01  Y       2.9831083+03  Z       1.9129378+03  DX     -2.5555111+04  DY     -2.0190441+02  DZ      7.7733345+02
ALT     1.0337523+02  LAT     3.2838504+01  LON     3.0580793+02  V       2.5567727+04  PTH     2.3578062-08  AZ      8.7930260+01
R       3.5439334+03  DEC     3.2668535+01  RA      8.9335114+01  RAS     1.1773874+02  DES     2.0996844+01  RAN     3.1655284+00
INC     3.2726784+01  MASS    2.9588213+05
*****************************************************************************************************************

ID     0718072.1
3.5 MINS PRIOR TO TLI INITIATION
 18    JULY 1969 16 HRS, 23 MINS, 55.772 SECS   G.M.T. ***  2. HRS, 46. MINS,  1.424 SECS   G.E.T. ***   T    2.76706222+00 HRS
X       3.5438786+03  Y       1.1024773+02  Z      -2.2329496+01  DX     -5.6985500+02  DY      2.1509509+04  DZ      1.3848564+04
ALT     9.8731719+01  LAT    -3.6359419-01  LON     1.7949460+02  V       2.5588404+04  PTH     2.8034922-02  AZ      5.7233369+01
*****************************************************************************************************************

ID     0718072.1
TRANSLUNAR INJECTION INITIATION
 18    JULY 1969 16 HRS, 27 MINS, 25.772 SECS   G.M.T. ***  2. HRS, 49. MINS, 31.424 SECS   G.E.T. ***   T    2.82539552+00 HRS
X       3.4116128+03  Y       8.4253325+02  Z       4.5292114+02  DX     -6.8710854+03  DY      2.0645976+04  DZ      1.3457930+04
ALT     9.9316956+01  LAT     7.3771991+00  LON     1.9070605+02  V       2.5584839+04  PTH     2.3201606-02  AZ      5.7974703+01
R       3.5430618+03  DEC     7.3297281+00  RA      1.3872213+01  RAS     1.1784904+02  DES     2.0977398+01  RAN     2.3437890+00
INC     3.2766197+01  MASS    2.9260380+05
*****************************************************************************************************************

ID     0718072.1
TRANSLUNAR INJECTION TERMINATION
 18    JULY 1969 16 HRS, 32 MINS, 46.494 SECS   G.M.T. ***  2. HRS, 54. MINS, 52.146 SECS   G.E.T. ***   T    2.91448495+00 HRS
X       2.6982917+03  Y       2.0536559+03  Z       1.2492783+03  DX     -2.0231523+04  DY      2.4773204+04  DZ      1.5626896+04
ALT     1.6804612+02  LAT     2.3209451+01  LON     2.1276851+02  V       3.5598118+04  PTH     7.0013463+00  AZ      6.4784980+01
R       3.6106117+03  DEC     2.3093816+01  RA      3.7274675+01  RAS     1.1785277+02  DES     2.0976741+01  DEM     8.3589865+00
SEM     4.5199210+01  RBVS    1.0545516+02  RAN     1.1640108+00  INC     3.1824978+01  ECC     9.7536688-01  SMA     1.4437023+05
RP      3.5562899+03  APF     2.6468071+01  INMP    3.5558583+00  C3TLI  -4.7493451-01  DAZTLI  1.1327489+00  MASS    1.3709505+05
PROP    1.5553876+05
*****************************************************************************************************************

ID     0718072.1
TRANSLUNAR INJECTION + 2 HOURS
 18    JULY 1969 18 HRS, 32 MINS, 46.494 SECS   G.M.T. ***  4. HRS, 54. MINS, 52.146 SECS   G.E.T. ***   T    4.91448492+00 HRS
X      -2.3164969+04  Y       5.8089387+03  Z       3.8422218+03  DX     -1.4092038+04  DY     -1.3158379+03  DZ     -6.4994825+02
ALT     1.7890273+04  LAT     1.0386560+01  LON     3.0934155+02  V       1.4168253+04  PTH     6.5336450+01  AZ      1.2025174+02
R       2.1333932+04  DEC     1.0375581+01  RA      1.6392985+02  RAS     1.1793647+02  DES     2.0961932+01
*****************************************************************************************************************

ID     0718072.1
LUNAR ORBIT INSERTION BURN INITIATION
 21    JULY 1969 15 HRS, 24 MINS, 44.317 SECS   G.M.T. *** 73. HRS, 46. MINS, 49.966 SECS   G.E.T. ***   T    7.37805462+01 HRS
XL     -8.4281047+02  YL     -5.2358885+02  ZL     -2.3621896+02  DXL    -3.5182793+03  DYL     6.7949671+03  DZL     3.2125660+03
XS     -1.0377275+03  YS     -1.5526024+02  ZS     -2.5565542+01  DXS     5.0666534+01  DYS     8.3035206+03  DZS     4.3537940+02
ALTS    9.1444762+01  LATS   -1.4363135+00  LONS   -1.7124133+02  VRS     8.3150812+03  PTR    -9.1689563+00  AZR    -8.7190948+01
LIN     1.7694029+02  LAN     1.6174489+02  LAP    -1.1696289+00  LTS     1.2793907+00  LNS     9.3054670+01  DEM    -9.1638794+00
THETA   1.6390190+01  BETA   -1.7234122+02  MASS    9.5199404+04  DRTX   -2.9188215+03  DRTY   -3.7629173+02  DRTZ   -2.2550282+01
*****************************************************************************************************************

ID     0718072.1
LUNAR ORBIT INSERTION BURN TERMINATION
 21    JULY 1969 15 HRS, 30 MINS, 52.452 SECS   G.M.T. *** 73. HRS, 52. MINS, 58.104 SECS   G.E.T. ***   T    7.38828068+01 HRS
XL     -9.8393898+02  YL     -1.5963367+02  ZL     -7.6502200+01  DXL    -1.0445009+03  DYL     5.0066909+03  DZL     1.9426820+03
XS     -9.5387151+02  YS      2.6502461+02  ZS     -1.3601276+01  DXS     1.3783603+03  DYS     5.3107796+03  DZS    -6.9417778+01
ALTS    6.1242114+01  LATS   -7.7952587-01  LONS    1.6462596+02  VRS     5.4871737+03  PTR     8.3422571-01  AZR    -9.0713623+01
LIN     1.7894172+02  LAN     3.2064587+01  LAP     1.4206309+02  SMAS    1.0525130+03  ECCS    5.2221876-02  PERS    2.1451561+00
RPS     9.9754876+02  APOS    1.1074771+03  RANS    1.7790332+02  INCS    1.5863131+02  LTS     1.2793082+00  LNS     9.3002580+01
LTE     2.8234971+00  LNE    -7.4294117+00  THETA  -7.4015370+00  BETA   -1.6863953+02  PROP    2.3993158+04  BARC    2.4080826+01
DELV    2.9430501+03  MASS    7.1206246+04  PLCHNG-3.9201993+00
*****************************************************************************************************************

ID     0718072.1
CIRCULARIZATION BURN INITIATION
 21    JULY 1969 19 HRS, 42 MINS, 32.973 SECS   G.M.T. *** 78. HRS,  4. MINS, 38.624 SECS   G.E.T. ***   T    7.80773954+01 HRS
XL     -8.8496223+02  YL     -4.2429466+02  ZL     -1.7861023+02  DXL    -2.5277687+03  DYL     4.5430804+03  DZL     1.7403258+03
XS     -9.9747521+02  YS      6.5189187+00  ZS     -9.2922140+00  DXS     3.8214724+01  DYS     5.4978115+03  DZS    -8.7545713+01
ALTS    5.9046280+01  LATS   -5.3372543-01  LONS    1.7962555+02  VRS     5.4986412+03  PTR    -1.5302518-02  AZR    -9.0912389+01
LIN     1.7894059+02  LAN     2.9874354+01  LAP    -1.1503993+00  LTS     1.2759262+00  LNS     9.0866126+01  DEM    -1.0223987+01
THETA   3.8718720-01  BETA   -1.8000000+02  MASS    7.1156847+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0718072.1
CIRCULARIZATION BURN TERMINATION
 21    JULY 1969 19 HRS, 42 MINS, 47.792 SECS   G.M.T. *** 78. HRS,  4. MINS, 53.441 SECS   G.E.T. ***   T    7.80815115+01 HRS
XL     -9.9997462+02  YL     -4.1331890+02  ZL     -1.7440438+02  DXL    -2.4025143+03  DYL     4.4572638+03  DZL     1.7085637+03
XS     -9.9729857+02  YS      1.9757933+01  ZS     -9.5022514+00  DXS     1.0663702+02  DYS     5.3584122+03  DZS    -8.4683973+01
ALTS    5.9046011+01  LATS   -5.4579004-01  LONS    1.7886503+02  VRS     5.3601421+03  PTR     3.5028576-03  AZR    -9.0905174+01
LIN     1.7894061+02  LAN     2.9872177+01  LAP    -1.6654028+02  SMAS    9.9729548+02  ECCS    2.5230860-04  PERS    1.9785795+00
RPS     9.9704385+02  APOS    9.9754710+02  RANS    1.7789998+02  INCS    1.5862894+02  LTS     1.2759231+00  LNS     9.0864027+01
LTE     3.0612605+00  LNE    -7.4590325+00  THETA  -3.7113967-01  BETA    1.7999300+02  PROP    9.6582617+02  BARC    7.5845630-01
DELV    1.3850225+02  MASS    7.0191021+04  PLCHNG 4.1484416-06
*****************************************************************************************************************
```

```
*****************************************************************************************************

ID    0718072.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 22   JULY 1969 16 HRS, 24 MINS, 43.981 SECS  G.M.T. *** 98. HRS, 46. MINS, 49.630 SECS  G.E.T. ***  T   9.87804527+01 HRS
XL     7.8642490+02  YL     5.6568915+02  ZL     2.3275498+02  DXL    3.2834204+03  DYL   -3.9501059+03  DZL   -1.4981852+03
XS     9.9601907+02  YS    -2.3386644+01  ZS     6.5056408+00  DXS   -1.2763626+02  DYS   -5.3643675+03  DZS    9.3130844+01
ALTS   5.7821267+01  LATS   3.7412716-01  LONS  -1.3449495+00  VRS    5.3666938+03  PTR   -1.1556252-02  AZR   -8.9005603+01
LIN    1.7893476+02  LAN    1.9213497+01  SEASV  8.3367372+00
*****************************************************************************************************

ID    0718072.1
CSM PLANE CHANGE BURN INITIATION
 22   JULY 1969 20 HRS, 47 MINS, 45.480 SECS  G.M.T. ***103. HRS,  9. MINS, 51.130 SECS  G.E.T. ***  T   1.03164203+02 HRS
XL     7.5873516+02  YL    -6.0535616+02  ZL    -2.2590562+02  DXL   -3.4647537+03  DYL   -3.7770149+03  DZL   -1.5285138+03
XS     1.3802323+02  YS    -9.8680405+02  ZS     1.8323797+01  DXS   -5.3124545+03  DYS   -7.4628298+02  DZS   -1.5516050+01
ALTS   5.8084839+01  LATS   1.0535402+00  LONS  -8.2037753+01  VRS    5.3646390+03  PTR    3.1171844-02  AZR   -9.0166248+01
LIN    1.7893334+02  LAN    1.6959568+01  LAP   -5.1595145+01  LTS    1.2553416+00  LNS    7.8092955+01  DEM   -1.6184504+01
THETA  7.8547175-05  BETA  -8.9999907+01  MASS   3.6284321+04  DRTX   0.0000000     DRTY  -1.8596429+01  DRTZ   0.0000000
*****************************************************************************************************

ID    0718072.1
CSM PLANE CHANGE BURN TERMINATION
 22   JULY 1969 20 HRS, 47 MINS, 46.591 SECS  G.M.T. ***103. HRS,  9. MINS, 52.149 SECS  G.E.T. ***  T   1.03164486+02 HRS
XL     7.5815289+02  YL    -6.0599978+02  ZL    -2.2616373+02  DXL   -3.4691704+03  DYL   -3.7673085+03  DZL   -1.5447366+03
XS     1.3713078+02  YS    -9.8692903+02  ZS     1.8319627+01  DXS   -5.3130228+03  DYS   -7.4181198+02  DZS   -3.4198092+01
ALTS   5.8085314+01  LATS   1.0533000+00  LONS  -8.2089572+01  VRS    5.3646683+03  PTR    3.1189684-02  AZR   -9.0365842+01
LIN    1.7888464+02  LAN    2.7119961+01  LAP   -5.0589470+01  SMAS   9.9706842+02  ECCS   7.3427726-04  PERS   1.9779038+00
RPS    9.9633627+02  APOS   9.9780051+02  RANS   1.7753842+02  INCS   1.5845630+02  LTS    1.2553411+00  LNS    7.8092807+01
LTE    4.3880011+00  LNE   -7.3790129+00  THETA -4.2603305-04  BETA  -8.9800324+01  PROP   6.6519531+01  BARC   5.2339162-02
DELV   1.8596457+01  MASS   3.6217802+04  PLCHNG-1.9921489-01
*****************************************************************************************************

ID    0718072.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 23   JULY 1969 14 HRS,  5 MINS, 45.142 SECS  G.M.T. ***120. HRS, 27. MINS, 50.790 SECS  G.E.T. ***  T   1.20464108+02 HRS
XL     6.4338481+02  YL     7.0388366+02  ZL     2.8876981+02  DXL    4.0832429+03  DYL   -3.2390216+03  DZL   -1.2086809+03
XS     9.9608976+02  YS    -2.3386129+01  ZS     6.5156993+00  DXS   -1.2841451+02  DYS   -5.3639047+03  DZS    9.8667070+01
ALTS   5.7892048+01  LATS   3.7467899-01  LONS  -1.3449394+00  VRS    5.3663487+03  PTR   -1.9593788-02  AZR   -8.8946355+01
LIN    1.7887871+02  LAN    1.8173530+01
*****************************************************************************************************

ID    0718072.1
TRANSEARTH INJECTION BURN INITIATION
 23   JULY 1969 22 HRS, 56 MINS, 16.140 SECS  G.M.T. ***129. HRS, 18. MINS, 21.791 SECS  G.E.T. ***  T   1.29306053+02 HRS
XL    -5.0209074+02  YL    -7.9862808+02  ZL    -3.2387456+02  DXL   -4.6185697+03  DYL    4.5281132+03  DZL    9.1899474+02
XS    -9.9520174+02  YS    -6.6022466+01  ZS    -3.3379516+00  DXS   -3.5673882+02  DYS    5.3480646+03  DZS   -1.0340833+02
ALTS   5.8901395+01  LATS  -1.9175042-01  LONS  -1.7620451+02  VRS    5.3609468+03  PTR    2.4429843-02  AZR   -9.1105183+01
LIN    1.7887502+02  LAN    1.3608046+01  LAP    7.7818474+01  LTS    1.2332145+00  LNS    6.4790910+01  DEM   -2.1670632+01
THETA -4.1591437+00  BETA   1.6630301+01  MASS   3.6286502+04  DRTX   2.9261120+03  DRTY   8.7149217+02  DRTZ   4.9097501+00
*****************************************************************************************************

ID    0718072.1
TRANSEARTH INJECTION BURN TERMINATION
 23   JULY 1969 22 HRS, 58 MINS, 40.958 SECS  G.M.T. ***129. HRS, 20. MINS, 46.605 SECS  G.E.T. ***  T   1.29346279+02 HRS
XL    -6.3517151+02  YL    -7.1802957+02  ZL    -2.8374048+02  DXL   -6.6554510+03  DYL    4.2876750+03  DZL    2.5134799+03
XS    -9.9523911+02  YS     9.4895365+01  ZS     3.4516543+00  DXS    3.5479348+02  DYS    8.2843003+03  DZS    7.1327842+02
ALTS   6.1265413+01  LATS   1.9781331-01  LONS   1.7455335+02  VRS    8.3225161+03  PTR    3.0002587+00  AZR   -8.5087062+01
LIN    1.7507355+02  LAN    1.7684892+02  LAP    1.7328988+02  SMAS  -2.3760471+03  ECCS   1.4197795+00  PERS   7.2761275+00
RPS    9.9741577+02  APOS  -5.7495098+03  RANS  -1.7042019+02  INCS   1.5477549+02  INMPS  1.7404731+02  SEM    1.0334621+02
RBVS   7.0225861+01  LTS    1.2331802+00  LNS    6.4770450+01  LTE    5.5268266+00  LNE   -6.7819798+00  THETA  4.8294628+00
BETA   1.0611094+01  PROP   9.4384727+03  BARC   9.2282629+00  DELV   3.0531422+03  MASS   2.6848029+04  PLCHNG 6.0125098+00
*****************************************************************************************************

ID    0718072.1
ENTRY AND TOUCHDOWN
 26   JULY 1969 18 HRS, 18 MINS, 31.569 SECS  G.M.T. ***196. HRS, 40. MINS, 37.221 SECS  G.E.T. ***  T   1.96677006+02 HRS
X      3.1034515+03  Y      1.5551799+03  Z      5.1623436+02  DX    -1.9048799+04  DY     2.1534840+04  DZ     2.1850272+04
R      3.5094862+03  DEC    8.4587219+00  RA     2.6616044+01  V      3.6111500+04  PTH   -6.5000244+00  AZ     5.0755274+01
ALT    6.5803594+01  LAT    8.5138285+00  LON    1.6771482+02  VE     3.4941816+04  PTE   -6.6825534+00  AZE    4.9143613+01
SMA    1.4291884+05  ECC    9.7576279-01  INC    4.0011597+01  RAN    1.6408107+01  APF    2.6390687+01  RP     3.4639546+03
INMP   1.5155594+01  SEM    1.4619328+02  RBVS   8.4171358+01  RAM   -8.9882442+01  DEM   -2.8515017+01  RAS    1.2588282+02
DES    1.9358148+01  SPSPR  4.2159294+03  DVRES  1.7534532+03  PERNAD 9.3880583+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  2.1957499+01  LONTD  1.8500022+02  AZTD   5.3732001+01  SEATD  1.7360808+01  DTSUN  1.0661928+01
*****************************************************************************************************

ID    0718072.1
CIRCUMLUNAR PERICYNTHION
 21   JULY 1969 15 HRS, 28 MINS,  2.999 SECS  G.M.T. *** 73. HRS, 50. MINS,  8.651 SECS  G.E.T. ***  T   7.38357363+01 HRS
XL    -9.4480342+02  YL    -2.9476300+02  ZL    -1.2820374+02  DXL   -2.6955544+03  DYL    7.1702266+03  DZL    3.3796527+03
XS    -9.9101938+02  YS     1.1718873+02  ZS    -1.1021906+01  DXS    9.7873727+02  DYS    8.3191328+03  DZS    4.5214273+02
ALTS   5.9491495+01  LATS  -6.3279664-01  LONS   1.7325605+02  VRS    8.3887024+03  PTR   -1.5357173-04  AZR   -8.6910127+01
LIN    1.7684024+02  LAN    1.6171486+02  LAP   -1.1931198+00  LTS    1.2793463+00  LNS    9.3026559+01  DEM   -9.1775436+00
SEM    7.9480953+01  RBVS   9.9752422+01  SMAS  -2.1928123+03  ECCS   1.4551165+00  INCS   1.5493766+02  RANS  -1.7875398+02
APFS  -1.7652882+01  RPS    9.9798505+02  RM     2.0812931+05  DEMP   2.2476690+00  RAMP  -1.7954797+02
*****************************************************************************************************

ID    0718072.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24   JULY 1969 10 HRS, 24 MINS,  4.310 SECS  G.M.T. ***140. HRS, 46. MINS,  9.955 SECS  G.E.T. ***  T   1.40769432+02 HRS
X      3.4715768+03  Y      3.3989615+01  Z     -5.1353128+02  DX    -2.6478562+02  DY     2.2855382+04  DZ     2.7795481+04
R      3.5095178+03  DEC   -8.4140325+00  RA     5.6995525-01  V      3.6141189+04  PTH   -6.5729522+00  AZ     3.9540052+01
ALT    6.5832589+01  LAT   -8.4688561+00  LON    2.6256927+02  VE     3.5188528+04  PTE   -6.7951569+00  AZE    3.7598620+01
SMA    1.6485551+05  ECC    9.7899348-01  INC    5.0967192+01  RAN    7.4485250+00  APF    2.4297420+00  RP     3.4630413+03
INMP   2.3093453+01  RAM   -1.2751487+02  DEM   -2.3710349+01  RAS    1.2358249+02  DES    1.9862425+01  SEM    1.1455668+02
RBVS   5.6167679+01  PERNAD 1.0018659+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  8.6233397+00  LONTD  2.7556806+02
AZTD   3.7619452+01  SEATD -1.2339647+01  DTSUN -8.9043961-01
*****************************************************************************************************
```

```
*****************************************************************************************************************

ID    0718081.1
LAUNCH TIME      18   JULY 1969    14 HRS,    31 MINS,     .784 SECS    G.M.T.
LAUNCH AZIMUTH    81.                                INJECTION OPPORTUNITY     1
*****************************************************************************************************************

ID    0718081.1
EARTH PARKING ORBIT INSERTION
 18   JULY 1969 14 HRS, 42 MINS, 22.111 SECS   G.M.T. ***  0. HRS, 11. MINS, 21.326 SECS   G.E.T. ***   T    1.89257342-01 HRS
X     -6.6343309+02  Y      3.0238886+03  Z      1.7249402+03  DX    -2.5114790+04  DY    -4.2666577+03  DZ    -2.1798348+03
ALT    1.0274514+02  LAT    2.9285035+01  LON    3.0554547+02  V      2.5567727+04  PTH   -2.3578062-08  AZ     9.5600888+01
R      3.5439334+03  DEC    2.9125906+01  RA     1.0237448+02  RAS    1.1777576+02  DES    2.0990327+01  RAN    9.8302051-01
INC    2.9613120+01  MASS   2.9716536+05
*****************************************************************************************************************

ID    0718081.1
3.5 MINS PRIOR TO TLI INITIATION
 18   JULY 1969 17 HRS, 14 MINS, 12.117 SECS   G.M.T. ***  2. HRS, 43. MINS, 11.333 SECS   G.E.T. ***   T    2.71981466+00 HRS
X      3.5404199+03  Y      8.3769696+01  Z      4.1699139+01  DX    -6.5806432+02  DY     2.2234421+04  DZ     1.2658173+04
ALT    9.7724282+01  LAT    6.7903010-01  LON    1.6646614+02  V      2.5593590+04  PTH    3.8293565-02  AZ     6.0355948+01
*****************************************************************************************************************

ID    0718081.1
TRANSLUNAR INJECTION INITIATION
 18   JULY 1969 17 HRS, 17 MINS, 42.117 SECS   G.M.T. ***  2. HRS, 46. MINS, 41.333 SECS   G.E.T. ***   T    2.77814797+00 HRS
X      3.4080635+03  Y      8.4166294+02  Z      4.7333963+02  DX    -6.9605974+03  DY     2.1395061+04  DZ     1.2189586+04
ALT    9.8496525+01  LAT    7.7289753+00  LON    1.7810363+02  V      2.5588758+04  PTH    3.4820947-02  AZ     6.1275800+01
R      3.5422230+03  DEC    7.6792825+00  RA     1.3872314+01  RAS    1.1788411+02  DES    2.0971200+01  RAN    1.6917684-01
INC    2.9648270+01  MASS   2.9391414+05
*****************************************************************************************************************

ID    0718081.1
TRANSLUNAR INJECTION TERMINATION
 18   JULY 1969 17 HRS, 23 MINS,  4.070 SECS   G.M.T. ***  2. HRS, 52. MINS,  3.286 SECS   G.E.T. ***   T    2.86757931+00 HRS
X      2.6839688+03  Y      2.1013903+03  Z      1.1845623+03  DX    -2.0433474+04  DY     2.5603506+04  DZ     1.3957457+04
ALT    1.6601591+02  LAT    1.9276795+01  LON    2.0094504+02  V      3.5607260+04  PTH    6.9253927+00  AZ     6.7925124+01
R      3.6087003+03  DEC    1.9162701+01  RA     3.8058860+01  RAS    1.1788785+02  DES    2.0970537+01  DEM    8.1620901+00
SEM    4.5591639+01  RBVS   1.0585421+02  RAN   -9.2801075-01  INC    2.8914085+01  ECC    9.7532769-01  SMA    1.4411178+05
RP     3.5555712+03  APF    2.8731730+01  INMP   4.6277697-01  C3TLI -4.7578422-01  DAZTLI 9.0936135-01  MASS   1.3780859+05
PROP   1.5610556+05
*****************************************************************************************************************

ID    0718081.1
TRANSLUNAR INJECTION + 2 HOURS
 19   JULY 1969 19 HRS, 23 MINS,  4.070 SECS   G.M.T. ***  4. HRS, 52. MINS,  3.285 SECS   G.E.T. ***   T    4.86757928+00 HRS
X     -2.0217334+04  Y      6.0304184+03  Z      3.1343629+03  DX    -1.4079544+04  DY    -1.3232217+03  DZ    -8.6598015+02
ALT    1.7885422+04  LAT    8.4593642+00  LON    2.9619527+02  V      1.4168137+04  PTH    6.5032912+01  AZ     1.1775169+02
R      2.1329106+04  DEC    8.4503534+00  RA     1.6339123+02  RAS    1.1797154+02  DES    2.0955714+01
*****************************************************************************************************************

ID    0718081.1
LUNAR ORBIT INSERTION BURN INITIATION
 21   JULY 1969 16 HRS, 18 MINS, 39.192 SECS   G.M.T. *** 73. HRS, 47. MINS, 38.406 SECS   G.E.T. ***   T    7.37940016+01 HRS
XL    -8.3700749+02  YL    -5.3150156+02  ZL    -2.4250304+02  DXL   -3.5784097+03  DYL    6.7245980+03  DZL    3.2801861+03
XS    -1.0080498+03  YS    -1.5783103+02  ZS    -2.8427619+01  DXS    5.0200941+01  DYS    8.2932156+03  DZS    5.2420329+02
ALTS   8.2233247+01  LATS  -1.5959151+00  LONS  -1.7110141+02  VRS    8.3099177+03  PTR   -9.3252236+00  AZR   -8.6595987+01
LIN    1.7623464+02  LAN    1.6385289+02  LAP    9.999919+01  LTS    1.2786677+00  LNS    9.2596974+01  DEM   -9.3862110+00
THETA  1.6148531+01  BETA  -1.7116677+02  MASS   9.5199404+04  DRTX  -2.9205107+03  DRTY  -4.3554276+02  DRTZ  -1.1281563+01
*****************************************************************************************************************

ID    0718081.1
LUNAR ORBIT INSERTION BURN TERMINATION
 21   JULY 1969 16 HRS, 24 MINS, 48.380 SECS   G.M.T. *** 73. HRS, 53. MINS, 47.594 SECS   G.E.T. ***   T    7.38965540+01 HRS
XL    -9.8122392+02  YL    -1.6873915+02  ZL    -8.0129716+01  DXL   -1.0684465+03  DYL    5.0064146+03  DZL    1.9429448+03
XS    -9.6341766+02  YS     2.6331818+02  ZS    -1.3562698+01  DXS    1.4023041+03  DYS    5.3091135+03  DZS   -6.9151482+01
ALTS   6.6835814+01  LATS  -7.7800684-01  LONS   1.6471345+02  VRS    5.4916230+03  PTR    5.0054244-01  AZR   -9.0714787+01
LIN    1.7834207+02  LAN    3.2051028+01  LAP    1.7146996+01  SMAS   1.0524390+03  ECCS   5.1668656-02  PERS   2.1449300+00
RPS    9.9836087+02  APOS   1.1068170+03  RANS   1.7789237+02  INCS   1.5862323+02  LTS    1.2785851+00  LNS    9.2544739+01
LTE    2.8746948+00  LNE   -7.4367278+00  THETA -7.6022370+00  BETA  -1.6686270+02  PROP   2.4061766+04  BARC   2.4137245+01
DELV   2.9529299+03  MASS   7.1137639+04  PLCHNG-4.5387866+00
*****************************************************************************************************************

ID    0718081.1
CIRCULARIZATION BURN INITIATION
 21   JULY 1969 20 HRS, 38 MINS, 25.047 SECS   G.M.T. *** 78. HRS,  7. MINS, 24.260 SECS   G.E.T. ***   T    7.81234055+01 HRS
XL    -9.2558183+02  YL    -3.4301957+02  ZL    -1.4753920+02  DXL   -2.0440944+03  DYL    4.7445692+03  DZL    1.8266504+03
XS    -9.9178249+02  YS     1.1126733+02  ZS    -1.0907668+01  DXS    6.1852115+02  DYS    5.4602020+03  DZS   -8.1619525+01
ALTS   5.9577564+01  LATS  -6.2618802-01  LONS   1.7359879+02  VRS    5.4957289+03  PTR   -5.2291655-02  AZR   -9.0851562+01
LIN    1.7894098+02  LAN    2.9843292+01  LAP    3.0327955+00  LTS    1.2751731+00  LNS    9.0391892+01  DEM   -1.0452628+01
THETA  3.8455843-01  BETA   1.8000000+02  MASS   7.1088239+04  DRTX  -1.3783806+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID    0718081.1
CIRCULARIZATION BURN TERMINATION
 21   JULY 1969 20 HRS, 38 MINS, 39.781 SECS   G.M.T. *** 78. HRS,  7. MINS, 38.995 SECS   G.E.T. ***   T    7.81274986+01 HRS
XL    -9.3039915+02  YL    -3.3163039+02  ZL    -1.4315310+02  DXL   -1.9288900+03  DYL    4.6483991+03  DZL    1.7906893+03
XS    -9.9021827+02  YS     1.2433258+02  ZS    -1.1102204+01  DXS    6.7153961+02  DYS    5.3151011+03  DZS   -7.8809562+01
ALTS   5.9561635+01  LATS  -6.3736212-01  LONS   1.7284335+02  VRS    5.3579358+03  PTR   -3.4882114-02  AZR   -9.0843221+01
LIN    1.7894096+02  LAN    2.9841168+01  LAP    1.2835998+02  SMAS   9.9749967+02  ECCS   8.2644135-04  PERS   1.9791873+00
RPS    9.9667531+02  APOS   9.9832404+02  RANS   1.7788912+02  INCS   1.5862084+02  LTS    1.2751701+00  LNS    9.0389809+01
LTE    3.1134900+00  LNE   -7.4640154+00  THETA -3.6860055-01  BETA   1.7999300+02  PROP   9.6031445+02  BARC   7.5337573-01
DELV   1.3784025+02  MASS   7.0127925+04  PLCHNG 4.1408846-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718081.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 22    JULY 1969 17 HRS, 18 MINS, 57.853 SECS  G.M.T. *** 98. HRS, 47. MINS, 57.069 SECS  G.E.T. ***   T    9.87991858+01 HRS
XL      7.9088775+02  YL      5.7182877+02  ZL      2.3523016+02  DXL     3.3231054+03  DYL    -3.9235468+03  DZL    -1.4875833+03
XS      9.9575006+02  YS     -2.3379425+01  ZS      6.4962431+00  DXS    -1.2515002+02  DYS    -5.3664221+03  DZS     9.3167860+01
ALTS    5.7552152+01  LATS    3.7368764-01  LONS   -1.3450125+03  VRS     5.3686896+03  PTR     1.5546485-02  AZR    -8.9005751+01
LIN     1.7893506+02  LAN     1.9194206+01  SEASV   8.7966579+00
*****************************************************************************************************************

ID     0718081.1
CSM PLANE CHANGE BURN INITIATION
 22    JULY 1969 21 HRS, 42 MINS,  4.060 SECS  G.M.T. ***103. HRS, 11. MINS,  3.276 SECS  G.E.T. ***   T    1.03184243+02 HRS
XL      7.6474640+02  YL     -5.9956539+02  ZL     -2.2358800+02  DXL    -3.4253600+03  DYL    -3.8047602+03  DZL    -1.5396774+03
XS      1.3810170+02  YS     -9.8736982+02  ZS      1.8330362+01  DXS    -5.3095601+03  DYS    -7.4892496+02  DZS    -1.5413843+01
ALTS    5.8656041+01  LATS    1.0533140+00  LONS   -8.2037799+01  VRS     5.3621407+03  PTR     6.3481429-02  AZR    -9.0165955+01
LIN     1.7893366+02  LAN     1.6939038+01  LAP    -8.9890791+01  LTS     1.2545875+00  LNS     7.7632227+01  DEM    -1.6389501+01
THETA   7.6839627-06  BETA   -8.9999966+01  MASS    3.6221226+04  DRTX    0.0000000     DRTY   -1.8600000+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0718081.1
CSM PLANE CHANGE BURN TERMINATION
 22    JULY 1969 21 HRS, 42 MINS,  5.079 SECS  G.M.T. ***103. HRS, 11. MINS,  4.292 SECS  G.E.T. ***   T    1.03184525+02 HRS
XL      7.6417164+02  YL     -6.0020267+02  ZL     -2.2384758+02  DXL    -3.4287924+03  DYL    -3.7950876+03  DZL    -1.5559172+03
XS      1.3721111+02  YS     -9.8749506+02  ZS      1.8326218+01  DXS    -5.3101268+03  DYS    -7.4446687+02  DZS    -3.4099111+01
ALTS    5.8657042+01  LATS    1.0530748+00  LONS   -8.2089477+01  VRS     5.3621674+03  PTR     6.3480730-02  AZR    -9.0365574+01
LIN     1.7888494+02  LAN     2.7109612+01  LAP    -8.8294705+01  SMAS    9.9727573+02  ECCS    1.1183632-03  PERS    1.9785208+00
RPS     9.9616042+02  APOS    9.9839104+02  RANS    1.7753153+02  INCS    1.5844703+02  LTS     1.2545870+00  LNS     7.7632079+01
LTE     4.4321764+00  LNE    -7.3674164+00  THETA  -5.5495287-05  BETA   -8.9800080+01  PROP    6.6416016+01  BARC    5.2339162-02
DELV    1.8600082+01  MASS    3.6154810+04  PLCHNG-1.9934579-01
*****************************************************************************************************************

ID     0719081.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 23    JULY 1969 15 HRS,  0 MINS, 23.590 SECS  G.M.T. ***120. HRS, 29. MINS, 22.804 SECS  G.E.T. ***   T    1.20489668+02 HRS
XL      6.3649075+02  YL      7.0880280+02  ZL      2.9075913+02  DXL     4.1163761+03  DYL    -3.2059986+03  DZL    -1.1954369+03
XS      9.9572778+02  YS     -2.3377884+01  ZS      6.5068083+00  DXS    -1.2658043+02  DYS    -5.3664420+03  DZS     9.8710650+01
ALTS    5.7529918+01  LATS    3.7430375-01  LONS   -1.3449540+03  VRS     5.3688421+03  PTR     6.2893039-04  AZR    -8.8946518+01
LIN     1.7887901+02  LAN     1.8158170+01
*****************************************************************************************************************

ID     0718081.1
TRANSEARTH INJECTION BURN INITIATION
 23    JULY 1969 23 HRS, 51 MINS, 31.815 SECS  G.M.T. ***129. HRS, 20. MINS, 31.025 SECS  G.E.T. ***   T    1.29341951+02 HRS
XL     -5.1462728+02  YL     -7.9249040+02  ZL     -3.2184032+02  DXL    -4.5760743+03  DYL     2.5874350+03  DZL     9.4337498+02
XS     -9.9728680+02  YS     -4.3223053+01  ZS     -3.7744997+00  DXS    -2.3236843+02  DYS     5.3510120+03  DZS    -1.0287537+02
ALTS    5.9736631+01  LATS   -2.1664686-01  LONS   -1.7751832+02  VRS     5.3570428+03  PTR     8.9914503-03  AZR    -9.1100303+01
LIN     1.7887529+02  LAN     1.3586071+01  LAP    -1.7524193+02  LTS     1.2324212+00  LNS     6.4322412+01  DEM    -2.1844186+01
THETA  -4.2026316+00  BETA    1.6564737+01  MASS    3.6223510+04  DRTX    2.9472368+03  DRTY    8.7407198+02  DRTZ    6.4273215+00
*****************************************************************************************************************

ID     0718081.1
TRANSEARTH INJECTION BURN TERMINATION
 23    JULY 1969 23 HRS, 53 MINS, 57.232 SECS  G.M.T. ***129. HRS, 22. MINS, 56.443 SECS  G.E.T. ***   T    1.29332345+02 HRS
XL     -6.4703613+02  YL     -7.0969592+02  ZL     -2.8074750+02  DXL    -6.5962708+03  DYL     4.3863552+03  DZL     2.5567229+03
XS     -9.9353039+02  YS      1.1845257+02  ZS      3.0849348+00  DXS     5.5059982+02  DYS     8.2909165+03  DZS     7.1563194+02
ALTS    6.2077902+01  LATS    1.7665308-01  LONS    1.7320107+02  VRS     8.3400250+03  PTR     3.0035813+00  AZR    -8.5073158+01
LIN     1.7596044+02  LAN     1.7524549+02  LAP    -5.6262025+00  SMAS   -2.3110561+03  ECCS    1.4319365+00  PERS    6.9796473+00
RPS     9.9822939+02  APOS   -5.6203416+03  RANS   -1.7055875+02  INCS    1.5470072+02  INMPS   1.7413494+02  SEM     1.0894352+02
RBVS    7.1108786+01  LTS     1.2323866+00  LNS     6.4301867+01  LTE     5.5609754+00  LNE    -6.7509316+00  THETA   4.8261613+00
BETA    1.0539296+01  PROP    9.4775317+03  BARC    9.2667822+00  DELV    3.0741295+03  MASS    2.6745978+04  PLCHNG  6.0176787+00
*****************************************************************************************************************

ID     0718081.1
ENTRY AND TOUCHDOWN
 26    JULY 1969 18 HRS, 20 MINS,  1.734 SECS  G.M.T. ***195. HRS, 49. MINS,   .944 SECS  G.E.T. ***   T    1.95816929+02 HRS
X       3.0934305+03  Y      1.5728210+03  Z      5.2257224+02  DX     -1.9228046+04  DY      2.1460404+04  DZ      2.1774635+04
R       3.5094386+03  DEC    8.5634630+00  RA     2.6950562+01  V       3.6116498+04  PTH    -6.5000360+00  AZ      5.0890927+01
ALT     6.5762282+01  LAT    8.6192322+00  LON    1.6767263+02  VE      3.4944782+04  PTE    -6.6825968+00  AZE     4.9284452+01
SMA     1.4520904+05  ECC    9.7627600-01  INC    3.9888315+01  RAN     1.6570868+01  APF     2.6585042+01  RP      3.4639192+03
INMP    1.5120831+01  SEM    1.4620782+02  RBVS   8.4516598+01  RAM    -8.9864655+01  DEM    -2.8514813+01  RAS     1.2588385+02
DES     1.9357917+01  SPSPR  4.1138782+03  DVRES  1.7144026+03  PERNAD 9.5851827+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   2.2316200+01  LONTD  1.8500323+02  AZTD   5.3908936+01  SEATD  1.7715623+01  DTSUN   1.0635152+01
*****************************************************************************************************************

ID     0718081.1
CIRCUMLUNAR PERICYNTHION
 21    JULY 1969 16 HRS, 22 MINS,  1.507 SECS  G.M.T. *** 73. HRS, 51. MINS,   .722 SECS  G.E.T. ***   T    7.38502007+01 HRS
XL     -9.4270937+02  YL     -3.0060752+02  ZL     -1.3013208+02  DXL    -2.7448921+03  DYL     7.1128360+03  DZL     3.4540113+03
XS     -9.9978634+02  YS      1.1928799+02  ZS     -1.0627978+01  DXS     9.9460626+02  DYS     8.3092413+03  DZS     5.4239717+02
ALTS    5.9504556+01  LATS   -6.1017131-01  LONS    1.7313479+02  VRS     8.3861150+03  PTR    -9.6967195-05  AZR    -8.6291427+01
LIN     1.7623459+02  LAN     1.6382227+02  LAP    -7.8802897-01  LTS     1.2786224+00  LNS     9.2568351+01  DEM    -9.4001058+00
SEM     7.9932481+01  RBVS    9.9416162+01  SMAS   -2.1999918+03  ECCS    1.4536372+00  INCS    1.5435616+02  RANS   -1.7821362+02
APFS   -1.7535236+01  RPS     9.9799809+02  RM      2.0802350+05  DEMP    2.3090909+00  RAMP   -1.7966809+02
*****************************************************************************************************************

ID     0718081.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24    JULY 1969 11 HRS, 10 MINS, 52.065 SECS  G.M.T. ***140. HRS, 39. MINS, 51.277 SECS  G.E.T. ***   T    1.40664244+02 HRS
X       3.4815869+03  Y      2.5349278+01  Z     -4.4168593+02  DX     -8.2200851+02  DY      2.4161678+04  DZ      2.6865027+04
R       3.5095835+03  DEC   -7.2299244+00  RA     4.1716062-01  V       3.6141279+04  PTH    -6.3893204+00  AZ      4.2288289+01
ALT     6.5833667+01  LAT   -7.2772128+00  LON    2.5069447+02  VE      3.5128466+04  PTE    -6.6103394+00  AZE     4.0417828+01
SMA     1.6522305+05  ECC    9.7902438-01  INC    4.8124707+01  RAN     6.9473247+00  APF     3.1853408+00  RP      3.4656559+03
INMP    2.0231135+01  RAM   -1.2703259+02  DEM   -2.3838989+01  RAS     1.2361467+02  DES     1.9855592+01  SEM     1.1498414+02
RBVS    5.6381669+01  PERNAD 1.0070055+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03  LATTD   9.1282020+00  LONTD   2.6454275+02
AZTD    4.0647017+01  SEATD -1.1533525+01  DTSUN -8.3334520-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0718090.1
LAUNCH TIME     18   JULY 1969    15 HRS,   37 MINS,  31.508 SECS   G.M.T.
LAUNCH AZIMUTH   90.                          INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID    0718090.1
EARTH PARKING ORBIT INSERTION
 18   JULY 1969 15 HRS, 48 MINS, 51.836 SECS  G.M.T. ***  0. HRS, 11. MINS, 20.328 SECS  G.E.T. ***  T   1.88980063-01 HRS
X     -1.5171480+03  Y      2.8115242+03  Z      1.5339682+03  DX    -2.3106379+04  DY    -9.6207227+03  DZ    -5.2197331+03
ALT    1.0217145+02  LAT    2.5794248+01  LON    3.0485371+02  V      2.5567727+04  PTH   -2.8293674-07  AZ     1.0308917+02
R      3.5439334+03  DEC    2.5648144+01  RA     1.1835208+02  RAS    1.1782214+02  DES    2.0982148+01  RAN    1.0897533-01
INC    2.8592229+01  MASS   2.9764633+05
*****************************************************************************************************************

ID    0718090.1
3.5 MINS PRIOR TO TLI INITIATION
 18   JULY 1969 18 HRS, 17 MINS, 11.901 SECS  G.M.T. ***  2. HRS, 39. MINS, 40.394 SECS  G.E.T. ***  T   2.66122046+00 HRS
X      3.5383407+03  Y      9.5951926+01  Z      7.5077517+01  DX    -8.4916050+02  DY     2.2462142+04  DZ     1.2252114+04
ALT    9.6509160+01  LAT    1.2230500+00  LON    1.5086985+02  V      2.5600453+04  PTH    4.4582140-02  AZ     6.1400709+01
*****************************************************************************************************************

ID    0718090.1
TRANSLUNAR INJECTION INITIATION
 18   JULY 1969 18 HRS, 20 MINS, 41.901 SECS  G.M.T. ***  2. HRS, 43. MINS, 10.394 SECS  G.E.T. ***  T   2.71955377+00 HRS
X      3.3994040+03  Y      8.6124582+02  Z      4.9178440+02  DX    -7.1481614+03  DY     2.1593163+04  DZ     1.1735871+04
ALT    9.7411957+01  LAT    8.0345569+00  LON    1.6265596+02  V      2.5594756+04  PTH    4.3651703-02  AZ     6.2425180+01
R      3.5411218+03  DEC    7.9829339+00  RA     1.4216858+01  RAS    1.1792804+02  DES    2.0963424+01  RAN   -6.7535877-01
INC    2.8619814+01  MASS   2.9442913+05
*****************************************************************************************************************

ID    0718090.1
TRANSLUNAR INJECTION TERMINATION
 18   JULY 1969 18 HRS, 26 MINS,  4.381 SECS  G.M.T. ***  2. HRS, 48. MINS, 32.873 SECS  G.E.T. ***  T   2.80913132+00 HRS
X      2.6618901+03  Y      2.1325280+03  Z      1.1744364+03  DX    -2.0696737+04  DY     2.5738742+04  DZ     1.3323779+04
ALT    1.6459843+02  LAT    1.9113544+01  LON    1.8579113+02  V      3.5614054+04  PTH    6.9045007+00  AZ     6.9992068+01
R      3.6073031+03  DEC    1.9000225+01  RA     3.8699368+01  RAS    1.1793179+02  DES    2.0962759+01  DEM    7.9147656+00
SEM    4.6083622+01  RBVS   1.0634327+02  RAN   -1.7394086+00  INC    2.7961875+01  ECC    9.7531447-01  SMA    1.4399172+05
RP     3.5545122+03  APF    2.9991194+01  INMP   5.7176849-01  C3TLI -4.7618224-01  DAZTLI 8.2895082-01  MASS   1.3806832+05
PROP   1.5636081+05
*****************************************************************************************************************

ID    0718090.1
TRANSLUNAR INJECTION + 2 HOURS
 18   JULY 1969 20 HRS, 26 MINS,  4.381 SECS  G.M.T. ***  4. HRS, 48. MINS, 32.873 SECS  G.E.T. ***  T   4.80913132+00 HRS
X     -2.0278583+04  Y      5.9726176+03  Z      2.8275216+03  DX    -1.4062559+04  DY    -1.4132867+03  DZ    -9.8645020+02
ALT    1.7884371+04  LAT    7.6264234+00  LON    2.8059843+02  V      1.4167781+04  PTH    6.5034927+01  AZ     1.1698302+02
R      2.1328102+04  DEC    7.6182773+00  RA     1.6358880+02  RAS    1.1801547+02  DES    2.0947914+01
*****************************************************************************************************************

ID    0718090.1
LUNAR ORBIT INSERTION BURN INITIATION
 21   JULY 1969 17 HRS, 19 MINS, 50.737 SECS  G.M.T. *** 73. HRS, 42. MINS, 19.198 SECS  G.E.T. ***  T   7.37053328+01 HRS
XL    -8.3097532+02  YL    -5.3942635+02  ZL    -2.4644716+02  DXL   -3.6512339+03  DYL    6.6818779+03  DZL    3.2860765+03
XS    -1.0080907+03  YS    -1.5856353+02  ZS    -2.9113810+01  DXS    4.9150410+01  DYS    8.2913961+03  DZS    5.4540407+02
ALTS   9.2406537+01  LATS  -1.6341704+00  LONS  -1.7106113+02  VRS    8.3094603+03  PTR   -9.3632029+00  AZR   -8.6454239+01
LIN    1.7608973+02  LAN    1.6426944+02  LAP    1.0540570+02  LTS    1.2778465+00  LNS    9.2077598+01  DEM   -9.6381614+00
THETA  1.5584197+01  BETA  -1.7091200+02  MASS   9.5199404+04  DRTX  -2.9211512+03  DRTY  -4.4968016+02  DRTZ   1.7744772+01
*****************************************************************************************************************

ID    0718090.1
LUNAR ORBIT INSERTION BURN TERMINATION
 21   JULY 1969 17 HRS, 26 MINS,   .195 SECS  G.M.T. *** 73. HRS, 48. MINS, 28.685 SECS  G.E.T. ***  T   7.38079681+01 HRS
XL    -9.7833797+02  YL    -1.7770376+02  ZL    -8.3721286+01  DXL   -1.0907036+03  DYL    5.0070880+03  DZL    1.9436965+03
XS    -9.6254301+02  YS     2.6279375+02  ZS    -1.3543173+01  DXS    1.4344661+03  DYS    5.3059611+03  DZS   -6.8785988+01
ALTS   5.9370704+01  LATS  -7.7765135-01  LONS   1.6472926+02  VRS    5.4968761+03  PTR    1.5218974-01  AZR   -9.0714994+01
LIN    1.7894221+02  LAN    3.2045687+01  LAP    7.1776449+01  SMAS   1.0524998+03  ECCS   5.1978444-02  PERS   2.1451161+00
RPS    9.9779255+02  APOS   1.1072071+03  RANS   1.7787930+02  INCS   1.5861399+02  LTS    1.2777633+00  LNS    9.2025234+01
LTE    2.9325974+00  LNE   -7.4443897+00  THETA -8.1668340+00  BETA  -1.6642256+02  PROP   2.4081301+04  BARC   2.4162799+01
DELV   2.9556133+03  MASS   7.1118104+04  PLCHNG-4.6862913+00
*****************************************************************************************************************

ID    0718090.1
CIRCULARIZATION BURN INITIATION
 21   JULY 1969 21 HRS, 42 MINS, 12.735 SECS  G.M.T. *** 78. HRS,  4. MINS, 41.226 SECS  G.E.T. ***  T   7.80781183+01 HRS
XL    -9.6574644+02  YL    -2.2849548+02  ZL    -1.0344947+02  DXL   -1.3744395+03  DYL    4.9477912+03  DZL    1.9165848+03
XS    -9.6634439+02  YS     2.4817581+02  ZS    -1.2860698+01  DXS    1.3696350+03  DYS    5.3234368+03  DZS   -7.2569443+01
ALTS   5.9293097+01  LATS  -7.3851878-01  LONS   1.6559662+02  VRS    5.4972852+03  PTR   -1.5225416-02  AZR   -9.0756648+01
LIN    1.7894110+02  LAN    2.9814905+01  LAP   -4.7677432+00  LTS    1.2743124+00  LNS    8.9850385+01  DEM   -1.0713191+01
THETA  3.8651784-01  BETA  -1.8000000+02  MASS   7.1068704+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID    0718090.1
CIRCULARIZATION BURN TERMINATION
 21   JULY 1969 21 HRS, 42 MINS, 27.536 SECS  G.M.T. *** 78. HRS,  4. MINS, 56.027 SECS  G.E.T. ***  T   7.80822296+01 HRS
XL    -9.6897090+02  YL    -2.1657651+02  ZL    -9.8831261+01  DXL   -1.2729570+03  DYL    4.8381143+03  DZL    1.8751315+03
XS    -9.6296853+02  YS     2.6095844+02  ZS    -1.3034165+01  DXS    1.4020986+03  DYS    5.1716330+03  DZS   -6.9841767+01
ALTS   5.9292828+01  LATS  -7.4848077-01  LONS   1.6483737+02  VRS    5.3587821+03  PTR    3.3732039-03  AZR   -9.0746821+01
LIN    1.7894107+02  LAN    2.9812825+01  LAP   -1.7907073+02  SMAS   9.9727989+02  ECCS   5.1126192-04  PERS   1.9785332+00
RPS    9.9677001+02  APOS   9.9778976+02  RANS   1.7787615+02  INCS   1.5861156+02  LTS    1.2743090+00  LNS    8.9848295+01
LTE    3.1728993+00  LNE   -7.4689906+00  THETA -3.7049422-01  BETA   1.8000000+02  PROP   9.6463086+02  BARC   7.5710051-01
DELV   1.3850232+02  MASS   7.0104073+04  PLCHNG 4.8555444-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************
ID     0718090.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 22    JULY 1969 18 HRS, 19 MINS, 47.765 SECS  G.M.T. *** 98. HRS, 42. MINS, 16.256 SECS  G.E.T. ***  T   9.87045155+01 HRS
XL     7.7493130+02  YL     5.7890019+02  ZL     2.3809046+02  DXL    3.3599399+03  DYL   -3.8947927+03  DZL   -1.4761877+03
XS     9.9586250+02  YS    -2.3381089+01  ZS     6.4951109+00  DXS   -1.2902199+02  DYS   -5.3651726+03  DZS    9.3117936+01
ALTS   5.7664591+01  LATS   3.7358034-01  LONS  -1.3449564+00  VRS    5.3675314+03  PTR   -2.6143829-02  AZR   -8.9005775+01
LIN    1.7893511+02  LAN    1.9189722+01  SEASV  9.3126839+00
*****************************************************************************************************************

ID     0718090.1
CSM PLANE CHANGE BURN INITIATION
 22    JULY 1969 22 HRS, 42 MINS, 48.455 SECS  G.M.T. ***103. HRS,  5. MINS, 16.945 SECS  G.E.T. ***  T   1.03088040+02 HRS
XL     7.7025450+02  YL    -5.9214272+02  ZL    -2.2063784+02  DXL   -3.3898658+03  DYL   -3.8367693+03  DZL   -1.5527120+03
XS     1.3798206+02  YS    -9.8652500+02  ZS     1.8313623+01  DXS   -5.3138759+03  DYS   -7.4701134+02  DZS   -1.5463397+01
ALTS   5.7802625+01  LATS   1.0532535+00  LONS  -8.2037875+01  VRS    5.3661477+03  PTR    3.6894440-02  AZR   -9.0165806+01
LIN    1.7893373+02  LAN    1.6935007+01  LAP   -2.5565208+01  LTS    1.2537424+00  LNS    7.7116964+01  DEM   -1.6617717+01
THETA  2.6466983-05  BETA  -8.9999937+01  MASS   3.6197374+04  DRTX   0.0000000     DRTY  -1.8600000+01  DRTZ   0.0000000
*****************************************************************************************************************

ID     0718090.1
CSM PLANE CHANGE BURN TERMINATION
 22    JULY 1969 22 HRS, 42 MINS, 49.473 SECS  G.M.T. ***103. HRS,  5. MINS, 17.965 SECS  G.E.T. ***  T   1.03088324+02 HRS
XL     7.6968607+02  YL    -5.9278495+02  ZL    -2.2089944+02  DXL   -3.3933302+03  DYL   -3.8271243+03  DZL   -1.5689630+03
XS     1.3709134+02  YS    -9.8664982+02  ZS     1.8379466+01  DXS   -5.3144432+03  DYS   -7.4254825+02  DZS   -3.4148806+01
ALTS   5.7803190+01  LATS   1.0530138+00  LONS  -8.2089608+01  VRS    5.3661765+03  PTR    3.6927102-02  AZR   -9.0365440+01
LIN    1.7888509+02  LAN    2.7099228+01  LAP   -1.9838291+01  SMAS   9.9706806+02  ECCS   1.0081324-03  PERS   1.9779028+00
RPS    9.9606288+02  APOS   9.9807323+02  RANS   1.7752352+02  INCS   1.5843668+02  LTS    1.2537424+00  LNS    7.7116817+01
LTE    4.4812224+00  LNE   -7.3536971+00  THETA -3.4919342-04  BETA  -8.9799863+01  PROP   6.6373047+01  BARC   5.1396036-02
DELV   1.8600082+01  MASS   3.6131001+04  PLCHNG-1.9919648-01
*****************************************************************************************************************

ID     0718090.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 23    JULY 1969 16 HRS,  0 MINS, 48.954 SECS  G.M.T. ***120. HRS, 23. MINS, 17.444 SECS  G.E.T. ***  T   1.20388179+02 HRS
XL     6.2923698+02  YL     7.1465218+02  ZL     2.9313177+02  DXL    4.1454918+03  DYL   -3.1720003+03  DZL   -1.1812150+03
XS     9.9599397+02  YS    -2.3383840+01  ZS     6.5050795+00  DXS   -1.2994753+02  DYS   -5.3643807+03  DZS    9.8647650+01
ALTS   5.7796146+01  LATS   3.7410431-01  LONS  -1.3449371+00  VRS    5.3668610+03  PTR   -3.5848308-02  AZR   -8.8946541+01
LIN    1.7887912+02  LAN    1.8149323+01
*****************************************************************************************************************

ID     0718090.1
TRANSEARTH INJECTION BURN INITIATION
 24    JULY 1969  0 HRS, 52 MINS, 12.033 SECS  G.M.T. ***129. HRS, 14. MINS, 40.520 SECS  G.E.T. ***  T   1.29244589+02 HRS
XL    -5.2667273+02  YL    -7.8466807+02  ZL    -3.1915271+02  DXL   -4.5398521+03  DYL    2.6485398+03  DZL    9.6839825+02
XS    -9.9728089+02  YS    -1.8959278+01  ZS    -4.2332496+00  DXS   -1.0517117+02  DYS    5.3585371+03  DZS   -1.0243037+02
ALTS   5.8976564+01  LATS  -2.4316325-01  LONS  -1.7891088+02  VRS    5.3605478+03  PTR    3.9913335-02  AZR   -9.1094728+01
LIN    1.7887535+02  LAN    1.3574350+01  LAP   -1.0335243+02  LTS    1.2315498+00  LNS    6.3808070+01  DEM   -2.2032889+01
THETA -4.4185122+00  BETA   1.6347972+01  MASS   3.6199701+04  DRTX   2.9712150+03  DRTY   8.6875772+02  DRTZ   1.5631076+01
*****************************************************************************************************************

ID     0718090.1
TRANSEARTH INJECTION BURN TERMINATION
 24    JULY 1969  0 HRS, 54 MINS, 38.225 SECS  G.M.T. ***129. HRS, 17. MINS,  6.714 SECS  G.E.T. ***  T   1.29285198+02 HRS
XL    -6.5963046+02  YL    -6.9935658+02  ZL    -2.7706026+02  DXL   -6.5365169+03  DYL    4.5907169+03  DZL    2.5977824+03
XS    -9.8943415+02  YS     1.4376818+02  ZS     2.6133809+00  DXS    7.6557007+02  DYS    8.3010094+03  DZS    7.1209903+02
ALTS   6.1334500+01  LATS   1.4976162-01  LONS   1.7173259+02  VRS    8.3665964+03  PTR    3.0000161+00  AZR   -8.5118671+01
LIN    1.7510694+02  LAN    1.7348224+02  LAP   -5.3356674+00  SMAS  -2.2382804+03  ECCS   1.4456557+00  PERS   6.6525704+00
RPS    9.9750243+02  APOS  -5.4740633+03  RANS  -1.7081000+02  INCS   1.5466464+02  INMPS  1.7424649+02  SEM    1.0939024+02
RBVS   7.2061900+01  LTS    1.2315143+00  LNS    6.3787416+01  LTE    5.5979468+00  LNE   -6.7160502+00  THETA  4.7109016+00
BETA   1.0372099+01  PROP   9.5280337+03  BARC   9.3424923+00  DELV   3.0956632+03  MASS   2.6671667+04  PLCHNG 5.9618956+00
*****************************************************************************************************************

ID     0718090.1
ENTRY AND TOUCHDOWN
 26    JULY 1969 18 HRS, 21 MINS, 39.714 SECS  G.M.T. ***194. HRS, 44. MINS,  8.199 SECS  G.E.T. ***  T   1.94735611+02 HRS
X      3.0813590+03  Y      1.5958338+03  Z      5.2440625+02  DX    -1.9388322+04  DY     2.1271403+04  DZ     2.1826782+04
R      3.5094815+03  DEC    8.5936385+00  RA     2.7379607+01  V      3.6121849+04  PTH   -6.5000012+00  AZ     5.0780926+01
ALT    6.5896878+01  LAT    8.6495975+00  LON    1.6769230+02  VE     3.4952124+04  PTE   -6.6819351+00  AZE    4.9171108+01
SMA    1.4981137+05  ECC    9.7687775-01  INC    4.0000742+01  RAN    1.7004275+01  APF    2.6596562+01  RP     3.4639760+03
INMP   1.5371462+01  SEM    1.4622362+02  RBVS   8.4923413+01  RAM   -8.9845316+01  DEM   -2.8514587+01  RAS    1.2588495+02
DES    1.9357663+01  SPSPR  4.0395676+03  DVRES  1.6858721+03  PERNAD 9.8067497+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  2.2078521+01  LONTD  1.8500025+02  AZTD   5.3803240+01  SEATD  1.8095133+01  DTSUN  1.0606510+01
*****************************************************************************************************************

ID     0718090.1
CIRCUMLUNAR PERICYNTHION
 21    JULY 1969 17 HRS, 23 MINS, 13.859 SECS  G.M.T. *** 73. HRS, 45. MINS, 42.349 SECS  G.E.T. ***  T   7.37617636+01 HRS
XL    -9.3957476+02  YL    -3.0885328+02  ZL    -1.3334462+02  DXL   -2.8186565+03  DYL    7.0792653+03  DZL    3.4639541+03
XS    -9.9072945+02  YS     1.1965035+02  ZS    -1.0523840+01  DXS    9.9733877+02  DYS    8.3076416+03  DZS    5.6393979+02
ALTS   5.9490366+01  LATS  -6.0420093-01  LONS   1.7311374+02  VRS    8.3862756+03  PTR   -1.0590153-04  AZR   -8.6143991+01
LIN    1.7608968+02  LAN    1.6423868+02  LAP   -6.6967764-01  LTS    1.2778309+03  LNS    9.2048770+01  DEM   -9.6520883+00
SEM    8.0445092+01  RBVS   9.8917957+01  SMAS  -2.1996645+03  ECCS   1.4536982+00  INCS   1.5422237+02  RANS  -1.7801431+02
APFS  -1.7893024+01  RPS    9.9798386+02  RM     2.0790312+05  DEMP   2.3710876+00  RAMP  -1.7968688+02
*****************************************************************************************************************

ID     0718090.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24    JULY 1969 12 HRS,  7 MINS, 41.724 SECS  G.M.T. ***140. HRS, 30. MINS, 10.210 SECS  G.E.T. ***  T   1.40502836+02 HRS
X      3.4817152+03  Y      2.3675966+01  Z     -4.4076501+02  DX    -1.0145501+03  DY     2.4422692+04  DZ     2.6621297+04
R      3.5095833+03  DEC   -7.2147703+00  RA     3.8961028-01  V      3.6141259+04  PTH   -6.6496426+00  AZ     4.2883483+01
ALT    6.5832641+01  LAT   -7.2619616+00  LON    2.3642111+02  VE     3.5116905+04  PTE   -6.8801268+00  AZE    4.1029316+01
SMA    1.6520511+05  ECC    9.7904411-01  INC    4.7536399+01  RAN    7.0423610+00  APF    3.6403615+00  RP     3.4620202+03
INMP   1.9669857+01  RAM   -1.2644500+02  DEM   -2.3993345+01  RAS    1.2365376+02  DES    1.9847288+01  SEM    1.1550383+02
RBVS   5.6323489+01  PERNAD 1.0077561+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  8.9964101+00  LONTD  2.5044045+02
AZTD   4.1246891+01  SEATD -1.1490640+01  DTSUN -8.2974008-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718099.1
LAUNCH TIME      18   JULY 1969    16 HRS,   51 MINS,  12.411 SECS   G.M.T.
LAUNCH AZIMUTH    99.                          INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID     0718099.1
EARTH PARKING ORBIT INSERTION
 18    JULY 1969 17 HRS,   2 MINS, 33.465 SECS   G.M.T. ***  0. HRS, 11. MINS, 21.055 SECS   G.E.T. ***   T    1.89181888-01 HRS
X      -2.3492163+03  Y       2.2889285+03  Z       1.3421824+03  DX     -1.9141341+04  DY     -1.4795495+04  DZ     -8.2710979+03
ALT     1.0166273+02  LAT     2.2386137+01  LON     3.0377244+02  V       2.5567727+04  PTH    -5.6587348-07  AZ      1.1045888+02
R       3.5439334+03  DEC     2.2254835+01  RA      1.3574471+02  RAS     1.1787355+02  DES     2.0973069+01  RAN     1.1760555+00
INC     2.9873117+01  MASS    2.9729818+05
*****************************************************************************************************************

ID     0718099.1
3.5 MINS PRIOR TO TLI INITIATION
 18    JULY 1969 19 HRS, 27 MINS,  4.448 SECS   G.M.T. ***  2. HRS, 35. MINS, 52.037 SECS   G.E.T. ***   T    2.59778818+00 HRS
X       3.5355132+03  Y       1.4624119+02  Z       6.8779734+01  DX     -1.1454095+03  DY      2.2176132+04  DZ      1.2753713+04
ALT     9.5275661+01  LAT     1.1208357+00  LON     1.3416833+02  V       2.5607615+04  PTH     4.4664518-02  AZ      6.0124114+01
*****************************************************************************************************************

ID     0718099.1
TRANSLUNAR INJECTION INITIATION
 18    JULY 1969 19 HRS, 30 MINS, 34.448 SECS   G.M.T. ***  2. HRS, 39. MINS, 22.037 SECS   G.E.T. ***   T    2.65612152+00 HRS
X       3.3864186+03  Y       9.0017850+02  Z       5.0283155+02  DX     -7.4365932+03  DY      2.1225196+04  DZ      1.2232607+04
ALT     9.6214540+01  LAT     8.2190661+00  LON     1.4580846+02  V       2.5601729+04  PTH     4.6776163-02  AZ      6.1145858+01
R       3.5399140+03  DEC     8.1662717+00  RA      1.4886129+01  RAS     1.1797677+02  DES     2.0954785+01  RAN     4.2983839-01
INC     2.9891582+01  MASS    2.9411809+05
*****************************************************************************************************************

ID     0718099.1
TRANSLUNAR INJECTION TERMINATION
 18    JULY 1969 19 HRS, 35 MINS, 56.708 SECS   G.M.T. ***  2. HRS, 44. MINS, 44.298 SECS   G.E.T. ***   T    2.74563828+00 HRS
X       2.6329662+03  Y       2.1449072+03  Z       1.2144284+03  DX     -2.1019801+04  DY      2.5171206+04  DZ      1.3898536+04
ALT     1.6403783+02  LAT     1.9793805+01  LON     1.6874338+02  V       3.5617284+04  PTH     6.9411361+00  AZ      6.8040967+01
R       3.6166570+03  DEC     1.9677078+01  RA      3.9167475+01  RAS     1.1798052+02  DES     2.0954120+01  DEM     7.6396427+00
SEM     4.5629702+01  RBVS    1.0691650+02  RAN     -6.9867486-01 INC     2.9156378+01  ECC     9.7532273-01  SMA     1.4399150+05
RP      3.5533180+03  APE     2.9661410+01  INMP    7.2823288-01  C3TLI -4.7618224-01  DAZTLI 9.2181209-01  MASS    1.3786337+05
PROP    1.5625472+05
*****************************************************************************************************************

ID     0718099.1
TRANSLUNAR INJECTION + 2 HOURS
 18    JULY 1969 21 HRS, 35 MINS, 56.708 SECS   G.M.T. ***  4. HRS, 44. MINS, 44.298 SECS   G.E.T. ***   T    4.74563825+00 HRS
X      -2.0351625+04  Y       5.6436165+03  Z       2.9943389+03  DX     -1.4044597+04  DY     -1.5771551+03  DZ     -9.8569806+02
ALT     1.7887142+04  LAT     8.0782187+00  LON     2.6399478+02  V       1.4167205+04  PTH     6.5041810+01  AZ      1.1811001+02
R       2.1330848+04  DEC     8.0696036+00  RA      1.6450102+02  RAS     1.1806418+02  DES     2.0939250+01
*****************************************************************************************************************

ID     0718099.1
LUNAR ORBIT INSERTION BURN INITIATION
 21    JULY 1969 18 HRS, 22 MINS, 40.365 SECS   G.M.T. *** 73. HRS, 31. MINS, 27.952 SECS   G.E.T. ***   T    7.35244312+01 HRS
XL     -8.2516218+02  YL     -5.4713140+02  ZL     -2.4768928+02  DXL    -3.7314126+03  DYL     6.6717753+03  DZL     3.2242419+03
XS     -1.0079309+03  YS     -1.5786420+02  ZS     -2.7375857+01  DXS     4.6135342+01  DYS     8.2980724+03  DZS     4.9158133+02
ALTS    8.2092249+01  LATS   -1.5370676+00  LONS   -1.7139853+02  VRS     8.3127483+03  PTR    -9.2924794+00  AZR    -8.6815399+01
LIN     1.7645842+02  LAN     1.6320782+02  LAP     5.3502116+01  LTS     1.2770015+00  LNS     9.1544168+01  DEM    -9.8963915+00
THETA   1.7101292+01  BETA   -1.7156708+02  MASS    9.5199404+04  DRTX   -2.9220626+03  DRTY   -4.1374679+02  DRTZ   -5.9307310+01
*****************************************************************************************************************

ID     0718099.1
LUNAR ORBIT INSERTION BURN TERMINATION
 21    JULY 1969 18 HRS, 28 MINS, 49.442 SECS   G.M.T. *** 73. HRS, 37. MINS, 37.031 SECS   G.E.T. ***   T    7.36269531+01 HRS
XL     -9.7882497+02  YL     -1.8726227+02  ZL     -8.7604993+01  DXL    -1.2262823+03  DYL     4.9676426+03  DZL     1.9271049+03
XS     -9.6509459+02  YS      2.6348066+02  ZS     -1.3582436+01  DXS     1.3473293+03  DYS     5.3152550+03  DZS    -6.9789434+01
ALTS    6.1926602+01  LATS   -7.7791337-01  LONS    1.6472844+02  VRS     5.4838036+03  PTR     1.0573464+00  AZR    -9.0714960+01
LIN     1.7894197+02  LAN     3.2053107+01  LAP    -4.7304711+01  SMAS    1.0525918+03  ECCS    5.2899722-02  PERS    2.1453973+00
RPS     9.9691001+02  APOS    1.1082736+03  RANS    1.7786500+02  INCS    1.5860443+02  LTS     1.2769189+00  LNS     9.1491958+01
LTE     2.9918182+00  LNE    -7.4515426+00  THETA  -6.6732783+00  BETA   -1.6754868+02  PROP    2.4054553+04  BARC    2.4123533+01
DELV    2.9518023+03  MASS    7.1144852+04  PLCHNG-4.3113062+00
*****************************************************************************************************************

ID     0718099.1
CIRCULARIZATION BURN INITIATION
 21    JULY 1969 22 HRS, 39 MINS,  4.962 SECS   G.M.T. *** 77. HRS, 47. MINS, 52.551 SECS   G.E.T. ***   T    7.77979307+01 HRS
XL     -8.2927200+02  YL     -5.1095761+02  ZL     -2.1220536+02  DXL    -3.0425744+03  DYL     4.2656892+03  DZL     1.6258799+03
XS     -9.9413727+02  YS     -7.3677058+01  ZS     -7.9737684+00  DXS    -4.0438876+02  DYS     5.4865372+03  DZS    -9.1411853+01
ALTS    5.8402065+01  LATS   -4.5829088-01  LONS   -1.7576147+02  VRS     5.5021792+03  PTR    -1.5512827-02  AZR    -9.0952065+01
LIN     1.7894080+02  LAN     2.9874028+01  LAP    -1.7898084+02  LTS     1.2735435+00  LNS     8.9367663+01  DEM    -1.0944989+01
THETA   3.8736393-01  BETA    1.7999300+02  MASS    7.1095452+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0718099.1
CIRCULARIZATION BURN TERMINATION
 21    JULY 1969 22 HRS, 39 MINS, 19.768 SECS   G.M.T. *** 77. HRS, 48. MINS,  7.355 SECS   G.E.T. ***   T    7.78020430+01 HRS
XL     -8.3652248+02  YL     -5.0065131+02  ZL     -2.0827561+02  DXL    -2.9081104+03  DYL     4.1930043+03  DZL     1.5993841+03
XS     -9.9502590+02  YS     -6.0469851+01  ZS     -8.1930351+00  DXS    -3.2494574+02  DYS     5.3530975+03  DZS    -8.8544264+01
ALTS    5.8401796+01  LATS   -4.7089360-01  LONS   -1.7652229+02  VRS     5.3636818+03  PTR     3.7918421-03  AZR    -9.0945879+01
LIN     1.7894084+02  LAN     2.9871826+01  LAP    -1.8803510+02  SMAS    9.9733163+02  ECCS    4.4247132-04  PERS    1.9786871+00
RPS     9.9689034+02  APOS    9.9777291+02  RANS    1.7786179+02  INCS    1.5860208+02  LTS     1.2735407+00  LNS     8.9365574+01
LTE     3.2254448+00  LNE    -7.4727798+00  THETA  -3.7140946-01  BETA    1.8000000+02  PROP    9.6499023+02  BARC    7.5871428-01
DELV    1.3852210+02  MASS    7.0130462+04  PLCHNG 3.4893265-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718099.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 22   JULY 1969 19 HRS, 22 MINS, 53.739 SECS  G.M.T. *** 98. HRS, 31. MINS, 38.297 SECS  G.E.T. ***  T   9.85273046+01 HRS
XL     7.6924954+02  YL     5.8669509+02  ZL     2.4121496+02  DXL    3.4094706+03  DYL   -3.8586978+03  DZL   -1.4618403+03
XS     9.9671714+02  YS    -2.3401153+01  ZS     6.5030781+00  DXS   -1.2680833+02  DYS   -5.3607504+03  DZS    9.3074606+01
ALTS   5.8519508+01  LATS   3.7371786-01  LONS  -1.3449563+00  VRS    5.3639577+03  PTR   -3.6327212-03  AZR   -8.9005603+01
LIN    1.7893485+02  LAN    1.9192430+01  SEASV  9.8474460+00
*****************************************************************************************************************

ID     0718099.1
CSM PLANE CHANGE BURN INITIATION
 22   JULY 1969 23 HRS, 45 MINS, 54.797 SECS  G.M.T. ***102. HRS, 54. MINS, 42.385 SECS  G.E.T. ***  T   1.02911774+02 HRS
XL     7.7704379+02  YL    -5.8525324+02  ZL    -2.1787120+02  DXL   -3.3490527+03  DYL   -3.8637430+03  DZL   -1.5637538+03
XS     1.3836558+02  YS    -9.8711101+02  ZS     1.8329039+01  DXS   -5.3113714+03  DYS   -7.4278033+02  DZS   -1.5531814+01
ALTS   5.8394740+01  LATS   1.0535139+00  LONS  -8.2037786+01  VRS    5.3633803+03  PTR   -4.2394788-03  AZR   -9.0165806+01
LIN    1.7893350+02  LAN    1.6936621+01  LAP    2.3258363+01  LTS    1.2528640+00  LNS    7.6581649+01  DEM   -1.6853616+01
THETA -4.0127361-05  BETA  -8.9999929+01  MASS   3.6223763+04  DRTX   0.0000000     DRTY  -1.8630000+01  DRTZ   0.0000000
*****************************************************************************************************************

ID     0718099.1
CSM PLANE CHANGE BURN TERMINATION
 22   JULY 1969 23 HRS, 45 MINS, 55.816 SECS  G.M.T. ***102. HRS, 54. MINS, 43.405 SECS  G.E.T. ***  T   1.02912057+02 HRS
XL     7.7549178+02  YL    -5.8597047+02  ZL    -2.1813484+02  DXL   -3.3525443+03  DYL   -3.8541313+03  DZL   -1.5800180+03
XS     1.3717463+02  YS    -9.8723524+02  ZS     1.8324868+01  DXS   -5.3119385+03  DYS   -7.3831945+02  DZS   -3.4217245+01
ALTS   5.8394688+01  LATS   1.0532743+00  LONS  -8.2039498+01  VRS    5.3631125+03  PTR   -4.2358305-03  AZR   -9.0365440+01
LIN    1.7888477+02  LAN    2.7103901+01  LAP    2.2121681+01  SMAS   9.9710511+02  ECCS   2.2980673-04  PERS   1.9780133+00
RPS    3.9887596+02  APOS   9.9733425+02  RANS   1.7751408+02  INCS   1.5842575+02  LTS    1.2528640+00  LNS    7.6581501+01
LTE    4.5317711+00  LNE   -7.3386034+00  THETA  5.1226418-06  BETA  -8.9799587+01  PROP   6.6421875+01  BARC   5.2804408-02
DELV   1.3602233+01  MASS   3.6157341+04  PLCHNG-1.9931136-01
*****************************************************************************************************************

ID     0718099.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 23   JULY 1969 17 HRS,  3 MINS, 55.956 SECS  G.M.T. ***120. HRS, 12. MINS, 43.443 SECS  G.E.T. ***  T   1.20212068+02 HRS
XL     6.2188551+02  YL     7.2112966+02  ZL     2.9572759+02  DXL    4.1782220+03  DYL   -3.1267644+03  DZL   -1.1638706+03
XS     3.9673970+02  YS    -2.3401684+01  ZS     6.5127965+00  DXS   -1.2680477+02  DYS   -5.3605637+03  DZS    9.3623399+01
ALTS   5.8542127+01  LATS   3.7426788-01  LONS  -1.3449564+00  VRS    5.3629702+03  PTR   -3.2447747-03  AZR   -8.8946262+01
LIN    1.7887875+02  LAN    1.8152110+01
*****************************************************************************************************************

ID     0718099.1
TRANSEARTH INJECTION BURN INITIATION
 24   JULY 1969  1 HRS, 55 MINS, 52.533 SECS  G.M.T. ***129. HRS,  4. MINS, 40.383 SECS  G.E.T. ***  T   1.29077801+02 HRS
XL    -5.3942616+02  YL    -7.7636892+02  ZL    -3.1630144+02  DXL   -4.4964047+03  DYL    2.7177794+03  DZL    9.9677771+02
XS    -9.9684972+02  YS     6.6445994+00  ZS    -4.7202600+00  DXS    3.6030835+01  DYS    5.3626976+03  DZS   -1.0189464+02
ALTS   5.8389531+01  LATS  -2.7129761-01  LONS   1.7961803+02  VRS    5.3637865+03  PTR    2.1068552-03  AZR   -9.1088498+01
LIN    1.7887502+02  LAN    1.3571092+01  LAP   -4.9534187+00  LTS    1.2306330+00  LNS    6.3268275+01  DEM   -2.2228825+01
THETA -4.5169756+00  BETA   1.6205283+01  MASS   3.6226041+04  DRTX   2.9969112+03  DRTY   8.6806824+02  DRTZ   1.9284960+01
*****************************************************************************************************************

ID     0718099.1
TRANSEARTH INJECTION BURN TERMINATION
 24   JULY 1969  1 HRS, 58 MINS, 19.787 SECS  G.M.T. ***129. HRS,  7. MINS,  7.375 SECS  G.E.T. ***  T   1.29118715+02 HRS
XL    -6.7103325+02  YL    -6.8815479+02  ZL    -2.7297880+02  DXL   -5.4697887+03  DYL    4.6210820+03  DZL    2.6463313+03
XS    -9.8449197+02  YS     1.7067747+02  ZS     2.1830584+00  DXS    9.9558141+02  DYS    8.3058307+03  DZS    7.1223543+02
ALTS   5.8688154+01  LATS   1.2518282-01  LONS   1.7016462+02  VRS    8.3955557+03  PTR    3.0000157+00  AZR   -8.5133012+01
LIN    1.7512203+02  LAN    1.7163161+02  LAP   -1.8483846+02  SMAS  -2.1622469+03  ECCS   1.4610323+00  PERS   6.3164880+00
RPS    9.9686563+02  APOS  -5.3213594+03  RANS  -1.7192134+02  INCS   1.5460404+02  INMPS  1.7435498+02  SEM    1.0996438+02
RBVS   7.3189946+01  LTS    1.2305975+00  LNS    6.3247460+01  LTE    5.6361634+00  LNE   -6.6785459+00  THETA  4.6917047+00
BETA   1.0252340+01  PROP   5.5994072+03  BARC   9.4393213+00  DELV   3.1201620+03  MASS   2.6626634+04  PLCHNG 5.9365044+00
*****************************************************************************************************************

ID     0718099.1
ENTRY AND TOUCHDOWN
 26   JULY 1969 18 HRS, 23 MINS, 21.299 SECS  G.M.T. ***193. HRS, 32. MINS,  8.883 SECS  G.E.T. ***  T   1.93535801+02 HRS
X      3.0692765+03  Y      1.6177650+03  Z      5.2827379+02  DX    -1.9567547+04  DY     2.1127932+04  DZ     2.1316267+04
R      3.5095149+03  DEC    8.6574192+00  RA     2.7792972+01  V      3.6127949+04  PTH   -6.5000322+00  AZ     5.0793235+01
ALT    6.5844135+01  LAT    8.7137802+00  LON    1.6768124+02  VE     3.4958191+04  PTE   -6.5816828+00  AZE    4.9184339+01
SMA    1.5433504+05  ECC    9.7755516-01  INC    4.0000303+01  RAN    1.7338416+01  APF    2.6693007+01  RP     3.4640258+03
INMP   1.5494158+02  SEM    1.4623999+02  RBVS   8.5327507+01  RAM   -8.9825273+01  DEM   -2.8514350+01  RAS    1.2588612+02
DES    1.9357402+01  SPSPR  3.9945339+03  DVRES  1.6695430+03  PERNAD 1.0048935+01  ENTDT  2.3333330-01  ENTRG  1.2853000+03
LATTD  2.2135459+01  LONTD  1.8499995+02  AZTD   5.3837192+01  SEATD  1.8489216+01  DTSUN  1.2576832+01
*****************************************************************************************************************

ID     0718099.1
CIRCUMLUNAR PERICYNTHION
 21   JULY 1969 18 HRS, 26 MINS,  1.823 SECS  G.M.T. *** 73. HRS, 34. MINS, 49.411 SECS  G.E.T. ***  T   7.35803919+01 HRS
XL    -9.3570043+02  YL    -3.1874359+02  ZL    -1.3757072+02  DXL   -2.9101498+03  DYL    7.0741520+03  DZL    3.4332416+03
XS    -9.9093919+02  YS     1.1824479+02  ZS    -1.0744611+01  DXS    9.8662058+02  DYS    8.3145558+03  DZS    5.0926999+02
ALTS   5.9533422+01  LATS  -6.1684983-01  LONS   1.7319530+02  VRS    8.3883616+03  PTR   -1.6647265-07  AZR   -8.6519145+01
LIN    1.7645838+02  LAN    1.6317735+02  LAP   -8.6633351-01  LTS    1.2769569+00  LNS    9.1515668+01  DEM   -9.9101765+00
SEM    8.0971713+01  RBVS   9.8303220+01  SMAS  -2.1933553+03  ECCS   1.4550229+00  INCS   1.5458153+02  RANS  -1.7821747+02
APES  -1.8732015+01  RPS    9.9802695+02  RM     2.0777917+05  DEMP   2.4263823+00  RAMP  -1.7960213+02
*****************************************************************************************************************

ID     0718099.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24   JULY 1969 13 HRS, 10 MINS,  5.733 SECS  G.M.T. ***140. HRS, 18. MINS, 53.315 SECS  G.E.T. ***  T   1.40314810+02 HRS
X      3.4800352+03  Y      9.3304385+01  Z     -4.4474411+02  DX    -1.2995724+03  DY     2.3555665+04  DZ     2.7378967+04
R      3.5095794+03  DEC   -7.2802625+00  RA     1.5358084+00  V      3.6140919+04  PTH   -6.5648881+00  AZ     4.1056959+01
ALT    6.5832128+01  LAT   -7.3278730+00  LON    2.2192457+02  VE     3.5153886+04  PTE   -6.7869812+00  AZE    3.9151229+01
SMA    1.5489898+05  ECC    9.7899796-01  INC    4.9344156+01  RAN    7.8346133+00  APF    3.6554684+00  RP     3.4632149+03
INMP   2.1561702+01  RAM   -1.2579738+02  DEM   -2.4160453+01  RAS    1.2369666+02  DES    1.9838160+01  SEM    1.1607523+02
RBVS   5.7336255+01  PERNAD 1.0052817+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  9.3769931+00  LONTD  2.3541274+02
AZTD   3.9398103+01  SEATD -1.0825931+01  DTSUN -7.8246110-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0718108.1
LAUNCH TIME      18   JULY 1969    18 HRS,    1 MINS,  47.366 SECS   G.M.T.
LAUNCH AZIMUTH  108.                            INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID    0718108.1
EARTH PARKING ORBIT INSERTION
 18   JULY 1969 18 HRS, 13 MINS, 10.879 SECS  G.M.T. ***  0. HRS, 11. MINS, 23.513 SECS  G.E.T. ***  T   1.89864811-01 HRS
X     -2.9597337+03  Y      1.5725291+03  Z      1.1517784+03  DX    -1.4033626+04  DY    -1.8160764+04  DZ    -1.1267329+04
ALT    1.0122467+02  LAT    1.9080753+01  LON    3.0234145+02  V      2.5567727+04  PTH   -1.8862449-07  AZ     1.1777379+02
R      3.5439335+03  DEC    1.8965575+01  RA     1.5201795+02  RAS    1.1792280+02  DES    2.0964353+01  RAN    3.6967500+00
INC    3.3209205+01  MASS   2.9613124+05
*****************************************************************************************************************

ID    0718108.1
3.5 MINS PRIOR TO TLI INITIATION
 18   JULY 1969 20 HRS, 34 MINS, 10.010 SECS  G.M.T. ***  2. HRS, 32. MINS, 22.644 SECS  G.E.T. ***  T   2.53962344+00 HRS
X      3.5307616+03  Y      2.2854407+02  Z      2.8741875+01  DX    -1.4804331+03  DY     2.1378381+04  DZ     1.4028269+04
ALT    9.4334483+01  LAT    4.6847930-01  LON    1.1868418+02  V      2.5612872+04  PTH    3.9226489-02  AZ     5.6789503+01
*****************************************************************************************************************

ID    0718108.1
TRANSLUNAR INJECTION INITIATION
 18   JULY 1969 20 HRS, 37 MINS, 40.010 SECS  G.M.T. ***  2. HRS, 35. MINS, 52.644 SECS  G.E.T. ***  T   2.59795675+00 HRS
X      3.3702674+03  Y      9.5262566+02  Z      5.0762925+02  DX    -7.7578164+03  DY     2.0304098+04  DZ     1.3538889+04
ALT    9.5215161+01  LAT    8.3004012+00  LON    1.2988649+02  V      2.5607452+04  PTH    4.3641014-02  AZ     5.7715519+01
R      3.5389101+03  DEC    8.2470839+00  RA     1.5783252+01  RAS    1.1802355+02  DES    2.0946477+01  RAN    2.9917029+00
INC    3.3210500+01  MASS   2.9298548+05
*****************************************************************************************************************

ID    0718108.1
TRANSLUNAR INJECTION TERMINATION
 18   JULY 1969 20 HRS, 43 MINS,  1.305 SECS  G.M.T. ***  2. HRS, 41. MINS, 13.940 SECS  G.E.T. ***  T   2.68720543+00 HRS
X      2.6024977+03  Y      2.1343459+03  Z      1.2968056+03  DX    -2.1322456+04  DY     2.3936934+04  DZ     1.5520303+04
ALT    1.6452084+02  LAT    2.1194763+01  LON    1.5211651+02  V      3.5616060+04  PTH    7.0309420+00  AZ     6.4975095+01
R      3.6069559+03  DEC    2.1071279+01  RA     3.9355671+01  RAS    1.1802729+02  DES    2.0945813+01  DEM    7.3747118+00
SEM    4.7154409+01  RBVS   1.0743785+02  RAN    1.7544209+00  INC    3.2270695+01  ECC    9.7535984-01  SMA    1.4416426+05
RP     3.5522302+03  APF    2.8087756+01  INMP   4.0824786+00  C3TLI -4.7561264-01  DAZTLI 1.1536504+00  MASS   1.3719875+05
PROP   1.5578673+05
*****************************************************************************************************************

ID    0718108.1
TRANSLUNAR INJECTION + 2 HOURS
 18   JULY 1969 22 HRS, 43 MINS,  1.305 SECS  G.M.T. ***  4. HRS, 41. MINS, 13.940 SECS  G.E.T. ***  T   4.68720543+00 HRS
X     -2.0413366+04  Y      5.0743629+03  Z      3.5805132+03  DX    -1.4025411+04  DY    -1.7946473+03  DZ    -8.7292451+02
ALT    1.7893559+04  LAT    9.6705537+00  LON    2.4871904+02  V      1.4166683+04  PTH    6.5052855+01  AZ     1.2093802+02
R      2.1337168+04  DEC    9.6603024+00  RA     1.6604033+02  RAS    1.1811095+02  DES    2.0930922+01
*****************************************************************************************************************

ID    0718108.1
LUNAR ORBIT INSERTION BURN INITIATION
 21   JULY 1969 19 HRS, 17 MINS, 32.428 SECS  G.M.T. *** 73. HRS, 15. MINS, 45.061 SECS  G.E.T. ***  T   7.32625170+01 HRS
XL    -9.2001988+02  YL    -5.5389164+02  ZL    -2.4626766+02  DXL   -3.8102309+03  DYL    6.6936694+03  DZL    3.1048683+03
XS    -1.0073892+03  YS    -1.5649320+02  ZS    -2.3521076+01  DXS    3.7880090+01  DYS    8.3122507+03  DZS    3.7244338+02
ALTS   8.1249725+01  LATS  -1.3216836+00  LONS  -1.7116994+02  VRS    8.3206768+03  PTR   -9.1394415+00  AZR   -8.7613680+01
LIN    1.7726811+02  LAN    1.5991464+02  LAP    2.7674226+01  LTS    1.2762638+00  LNS    9.1078415+01  DEM   -1.0121507+01
THETA  1.4855095+01  BETA  -1.7324092+02  MASS   9.5199404+04  DRTX  -2.9195645+03  DRTY  -3.3436774+02  DRTZ   5.7424966+01
*****************************************************************************************************************

ID    0718108.1
LUNAR ORBIT INSERTION BURN TERMINATION
 21   JULY 1969 19 HRS, 23 MINS, 40.148 SECS  G.M.T. *** 73. HRS, 21. MINS, 52.780 SECS  G.E.T. ***  T   7.33646612+01 HRS
XL    -9.7430235+02  YL    -1.9398488+02  ZL    -9.0303685+01  DXL   -1.1786059+03  DYL    4.9913925+03  DZL    1.9377782+03
XS    -9.6201998+02  YS     2.6340733+02  ZS    -1.3565750+01  DXS    1.4479983+03  DYS    5.3041309+03  DZS   -6.8673589+01
ALTS   5.9028358+01  LATS  -7.7921516-01  LONS   1.6468734+02  VRS    5.4986562+03  PTR    5.3015934-02  AZR   -9.0714893+01
LIN    1.7894105+02  LAN    3.2063610+01  LAP   -4.0536518+01  SMAS   1.0524988+03  ECCS   5.2242876-02  PERS   2.1451129+00
RPS    9.9751325+02  APOS   1.1074844+03  RANS   1.7785095+02  INCS   1.5859629+02  LTS    1.2761807+00  LNS    9.1026391+01
LTE    3.2433356+00  LNE   -7.4571929+00  THETA -9.0049427+00  BETA  -1.6985878+02  PROP   2.3966098+04  BARC   2.4088545+01
DELV   2.9392096+03  MASS   7.1233307+04  PLCHNG-3.4827401+00
*****************************************************************************************************************

ID    0718108.1
CIRCULARIZATION BURN INITIATION
 21   JULY 1969 23 HRS, 40 MINS, 31.954 SECS  G.M.T. *** 77. HRS, 38. MINS, 44.587 SECS  G.E.T. ***  T   7.76457186+01 HRS
XL    -9.6969397+02  YL    -2.1258971+02  ZL    -9.7555579+01  DXL   -1.2819879+03  DYL    4.9697397+03  DZL    1.9279889+03
XS    -9.5641284+02  YS     2.8304450+02  ZS    -1.3345195+01  DXS    1.5625984+03  DYS    5.2715704+03  DZS   -7.0331260+01
ALTS   5.9312282+01  LATS  -7.6655811-01  LONS   1.6351420+02  VRS    5.4987336+03  PTR   -1.5309231-02  AZR   -9.0729992+01
LIN    1.7893999+02  LAN    2.9826281+01  LAP   -1.7875440+02  LTS    1.2727127+00  LNS    8.8846092+01  DEM   -1.1194911+01
THETA  3.8735283-01  BETA   1.8000000+02  MASS   7.1183907+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID    0718108.1
CIRCULARIZATION BURN TERMINATION
 21   JULY 1969 23 HRS, 40 MINS, 46.778 SECS  G.M.T. *** 77. HRS, 38. MINS, 59.412 SECS  G.E.T. ***  T   7.76498365+01 HRS
XL    -9.7270041+02  YL    -2.0059986+02  ZL    -9.2902895+01  DXL   -1.1824207+03  DYL    4.8584764+03  DZL    1.8858685+03
XS    -9.5256727+02  YS     2.9571997+02  ZS    -1.3512784+01  DXS    1.5896679+03  DYS    5.1186415+03  DZS   -6.7332710+01
ALTS   5.9612025+01  LATS  -7.7618534-01  LONS   1.6275329+02  VRS    5.3602302+03  PTR    3.5233639-03  AZR   -9.0719732+01
LIN    1.7893999+02  LAN    2.9824184+01  LAP   -3.4506582+02  SMAS   9.9726056+02  ECCS   2.5330441-04  PERS   1.9784756+00
RPS    9.9700795+02  APOS   9.9751315+02  RANS   1.7784792+02  INCS   1.5859384+02  LTS    1.2727092+00  LNS    8.8843995+01
LTE    3.2824037+00  LNE   -7.4761836+00  THETA -3.7130872-01  BETA   1.8000000+02  PROP   9.6618945+02  BARC   7.5877875-01
DELV   1.3850187+02  MASS   7.0217718+04  PLCHNG 4.9863140-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718108.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 22    JULY 1969 20 HRS, 17 MINS, 24.047 SECS  G.M.T. *** 98. HRS, 15. MINS, 36.681 SECS  G.E.T. ***  T   9.82601891+01 HRS
XL      7.6322150+02  YL      5.9242410+02  ZL      2.4357788+02  DXL     3.4371004+03  DYL    -3.8342807+03  DZL    -1.4520043+03
XS      9.9609950+02  YS     -2.3386614+01  ZS      6.5079437+00  DXS    -1.2847792+02  DYS    -5.3638745+03  DZS     9.3194016+01
ALTS    5.7901734+01  LATS    3.7422937-01  LONS   -1.3449542+00  VRS     5.3662222+03  PTR    -2.0653779-02  AZR    -8.9004743+01
LIN     1.7893394+02  LAN     1.9203080+01  SEASV   1.0310169+01
*****************************************************************************************************************

ID     0718108.1
CSM PLANE CHANGE BURN INITIATION
 23    JULY 1969  0 HRS, 40 MINS, 25.111 SECS  G.M.T. ***102. HRS, 38. MINS, 37.744 SECS  G.E.T. ***  T   1.02643818+02 HRS
XL      7.8208607+02  YL     -5.7868943+02  ZL     -2.1523937+02  DXL    -3.3120218+03  DYL    -3.8938175+03  DZL    -1.5759501+03
XS      1.3800113+02  YS     -9.8665469+02  ZS      1.8336052+01  DXS    -5.3133073+03  DYS    -7.4571014+02  DZS    -1.5522219+01
ALTS    5.7934116+01  LATS    1.0544044+00  LONS   -8.2037822+01  VRS     5.3654039+03  PTR     2.3913624-02  AZR    -9.0166395+01
LIN     1.7893254+02  LAN     1.6947386+01  LAP    -3.1887157+01  LTS     1.2521047+00  LNS     7.6119292+01  DEM    -1.7056356+01
THETA   4.8665097-05  BETA   -8.9999909+01  MASS    3.6311019+04  DRTX    0.0000000     DRTY   -1.8600000+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0718108.1
CSM PLANE CHANGE BURN TERMINATION
 23    JULY 1969  0 HRS, 40 MINS, 26.132 SECS  G.M.T. ***102. HRS, 38. MINS, 38.764 SECS  G.E.T. ***  T   1.02644101+02 HRS
XL      7.9152893+02  YL     -5.7934328+02  ZL     -2.1550570+02  DXL    -3.3155503+03  DYL    -3.8842244+03  DZL    -1.5922222+03
XS      1.3710785+02  YS     -9.8677968+02  ZS      1.8331876+01  DXS    -5.3138762+03  DYS    -7.4123437+02  DZS    -3.4208051+01
ALTS    5.7934489+01  LATS    1.0541639+00  LONS   -8.2089696+01  VRS     5.3654337+03  PTR     2.3939000-02  AZR    -9.0365708+01
LIN     1.7888384+02  LAN     2.7101390+01  LAP    -3.1573372+01  SMAS    9.9705293+02  ECCS    7.5394383-04  PERS    1.9778577+00
RPS     9.9630119+02  APOS    9.9780463+02  RANS    1.7750456+02  INCS    1.5841659+02  LTS     1.2521041+00  LNS     7.6119152+01
LTE     4.5750909+00  LNE    -7.3248773+00  THETA  -4.2774059-04  BETA   -8.9800243+01  PROP    6.6582031+01  BARC    5.2339162-02
DELV    1.8600233+01  MASS    3.6244437+04  PLCHNG-1.9922494-01
*****************************************************************************************************************

ID     0718108.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 23    JULY 1969 17 HRS, 58 MINS, 23.350 SECS  G.M.T. ***119. HRS, 56. MINS, 35.984 SECS  G.E.T. ***  T   1.19943329+02 HRS
XL      6.1475362+02  YL      7.2562020+02  ZL      2.9759599+02  DXL     4.2078381+03  DYL    -3.0961576+03  DZL    -1.1515223+03
XS      9.9620306+02  YS     -2.3388846+01  ZS      6.5137042+00  DXS    -1.2911255+02  DYS    -5.3632388+03  DZS     9.8744868+01
ALTS    5.8[illegible]5360+01  LATS    3.7452167-01  LONS   -1.3449427+00  VRS     5.3657014+03  PTR    -2.7208711-02  AZR    -8.8945357+01
LIN     1.7887783+02  LAN     1.8148706+01
*****************************************************************************************************************

ID     0718108.1
TRANSEARTH INJECTION BURN INITIATION
 24    JULY 1969  2 HRS, 50 MINS, 40.892 SECS  G.M.T. ***128. HRS, 48. MINS, 53.521 SECS  G.E.T. ***  T   1.28814867+02 HRS
XL     -5.5110181+02  YL     -7.6958038+02  ZL     -3.1399965+02  DXL    -4.4557292+03  DYL     2.7715791+03  DZL     1.3189409+03
XS     -9.9684089+02  YS      2.9062318+01  ZS     -5.1501912+00  DXS     1.5407465+02  DYS     5.3583632+03  DZS    -1.0135973+02
ALTS    5.8784222+01  LATS   -2.9589103-01  LONS    1.7833305+02  VRS     5.3615369+03  PTR     2.8509572-02  AZR    -9.1083068+01
LIN     1.7887409+02  LAN     1.3563921+01  LAP    -9.5013410+01  LTS     1.2298433+00  LNS     6.2803660+01  DEM    -2.2395715+01
THETA  -4.7231876+00  BETA    1.6062268+01  MASS    3.6313137+04  DRTX    3.0227171+03  DRTY    8.6714567+02  DRTZ    2.8419444+01
*****************************************************************************************************************

ID     0718108.1
TRANSEARTH INJECTION BURN TERMINATION
 24    JULY 1969  2 HRS, 53 MINS,  9.526 SECS  G.M.T. ***128. HRS, 51. MINS, 22.159 SECS  G.E.T. ***  T   1.28856155+02 HRS
XL     -6.8262960+02  YL     -6.7864559+02  ZL     -2.6951028+02  DXL    -6.4057977+03  DYL     4.7266583+03  DZL     2.6886180+03
XS     -9.9048630+02  YS      1.9447894+02  ZS      1.8183787+00  DXS     1.1988853+03  DYS     8.3024247+03  DZS     7.1218761+02
ALTS    5.1095779+01  LATS    1.0422829-01  LONS    1.6978103+02  VRS     8.4187167+03  PTR     3.0002084+00  AZR    -8.5146022+01
LIN     1.7513557+02  LAN     1.7000583+02  LAP     1.7327841+02  SMAS   -2.0967057+03  ECCS    1.4756430+00  PERS    6.0314809+00
RPS     9.9728336+02  APOS   -5.1906948+03  RANS   -1.7121027+02  INCS    1.5455205+02  INMPS   1.7445108+02  SEM     1.1046021+02
RBVS    7.4007997+01  LTS     1.2298074+00  LNS     6.2782659+01  LTE     5.6685643+00  LNE    -6.6455296+00  THETA   4.5835239+00
BETA    1.0125991+01  PROP    9.6872246+03  BARC    9.5347244+00  DELV    3.1447735+03  MASS    2.6625912+04  PLCHNG  5.9138061+00
*****************************************************************************************************************

ID     0718108.1
ENTRY AND TOUCHDOWN
 26    JULY 1969 18 HRS, 24 MINS, 47.572 SECS  G.M.T. ***192. HRS, 23. MINS,   .206 SECS  G.E.T. ***  T   1.92383390+02 HRS
X       3.3589401+03  Y       1.6364079+03  Z       5.3119897+02  DX     -1.9717167+04  DY      2.1005110+04  DZ      2.1809223+04
R       3.5095751+03  DEC     8.7055784+00  RA      2.8144960+01  V       3.6133412+04  PTH    -6.5000160+00  AZ      5.3801708+01
ALT     6.5907258+01  LAT     8.7622420+00  LON     1.6767277+02  VE      3.4963633+04  PTE    -6.6814446+00  AZE     4.9193503+01
SMA     1.5874963+05  ECC     9.7817885-01  INC     4.0000830+01  RAN     1.7630872+01  APF     2.6764756+01  RP      3.4641004+03
INMP    1.5603243+01  SEM     1.4625391+02  RBVS    8.5669488+01  RAM    -8.9808242+01  DEM    -2.8514147+01  RAS     1.2588710+02
DES     1.9357179+01  SPSPR   3.9938123+03  DVRES   1.6682650+03  PERNAD 1.0265352+01  ENTDT  2.3333330-01  ENTRG   1.2850000+03
LATTD   2.2179040+01  LONTD   1.8499942+02  AZTD    5.3862000+01  SEATD  1.8822397+01  DTSUN  1.0551784+01
*****************************************************************************************************************

ID     0718108.1
CIRCUMLUNAR PERICYNTHION
 21    JULY 1969 19 HRS, 20 MINS, 50.170 SECS  G.M.T. *** 73. HRS, 19. MINS,  2.801 SECS  G.E.T. ***  T   7.33174448+01 HRS
XL     -9.3137843+02  YL     -3.2900753+02  ZL     -1.4211096+02  DXL    -3.0077446+03  DYL     7.0968255+03  DZL     3.2821968+03
XS     -9.9124438+02  YS      1.1497060+02  ZS     -1.1115268+01  DXS     9.6173841+02  DYS     8.3294039+03  DZS     3.8824842+02
ALTS    5.9457997+01  LATS   -6.3817840-01  LONS    1.7338404+02  VRS     8.3937266+03  PTR     2.2453669-05  AZR    -8.7348689+01
LIN     1.7726808+02  LAN     1.5988480+02  LAP    -2.6529468+00  LTS     1.2762191+00  LNS     9.1050437+01  DEM    -1.0135018+01
SEM     8.1431853+01  RBVS    9.7648965+01  SMAS   -2.1790383+03  ECCS    1.4579780+00  INCS    1.5536353+02  RANS   -1.7882723+02
APFS   -1.9974927+01  RPS     9.9795150+02  RM      2.0767066+05  DEMP    2.4761177+00  RAMP   -1.7941055+02
*****************************************************************************************************************

ID     0718108.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24    JULY 1969 14 HRS,  8 MINS, 45.120 SECS  G.M.T. ***140. HRS,  6. MINS, 57.748 SECS  G.E.T. ***  T   1.40116041+02 HRS
X       3.4720357+03  Y       2.1057858+02  Z      -4.6652897+02  DX     -1.4509569+03  DY      2.1565941+04  DZ      2.8964243+04
R       3.5095618+03  DEC    -7.6389866+00  RA      3.4707311+00  V       3.6140315+04  PTH    -6.3412551+00  AZ      3.6995029+01
ALT     6.5833307+01  LAT    -7.6888880+00  LON     2.0915522+02  VE      3.5240229+04  PTE    -6.5447959+00  AZE     3.4983576+01
SMA     1.6431146+05  ECC     9.7890417-01  INC     5.3387111+01  RAN     9.1899745+00  APF     3.2871864+00  RP      3.4662887+03
INMP    2.5735996+01  RAM    -1.2518632+02  DEM    -2.4315226+01  RAS     1.2373699+02  DES     1.9829568+01  SEM     1.1661305+02
RBVS    5.8999158+01  PERNAD 9.9871126+00  ENTDT  2.3333330-01  ENTRG   1.2850000+03  LATTD   9.9498572+00  LONTD   2.2140454+02
AZTD    3.5230918+01  SEATD -1.0012724+01  DTSUN -7.2486027-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718072.2
LAUNCH TIME     18   JULY 1969    13 HRS,   37 MINS,  54.348 SECS   G.M.T.
LAUNCH AZIMUTH    72.                          INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID     0718072.2
EARTH PARKING ORBIT INSERTION
 18   JULY 1969 13 HRS, 49 MINS, 18.390 SECS  G.M.T. ***  0. HRS, 11. MINS, 24.042 SECS  G.E.T. ***  T   1.90011727-01 HRS
X      3.4618822+01  Y      2.9831083+03  Z      1.9129378+03  DX    -2.5555111+04  DY    -2.0190441+02  DZ     7.7733345+02
ALT    1.0337523+02  LAT    3.2838504+01  LON    3.0580793+02  V      2.5567727+04  PTH    2.3578062-08  AZ     8.7930260+01
R      3.5439334+03  DEC    3.2668535+01  RA     8.9335114+01  RAS    1.1773874+02  DES    2.0996844+01  RAN    3.1655284+00
INC    3.2726784+01  MASS   2.9588213+05
*****************************************************************************************************************

ID     0718072.2
3.5 MINS PRIOR TO TLI INITIATION
 18   JULY 1969 17 HRS, 52 MINS,  3.103 SECS  G.M.T. ***  4. HRS, 14. MINS,  8.755 SECS  G.E.T. ***  T   4.23576522+00 HRS
X      3.5410383+03  Y      1.0608019+02  Z     -6.5921304+00  DX    -6.0602390+02  DY     2.1508073+04  DZ     1.3849742+04
ALT    9.8699490+01  LAT   -1.0731432-01  LON    1.5733628+02  V      2.5588666+04  PTH    2.8016894-02  AZ     5.7231425+01
*****************************************************************************************************************

ID     0718072.2
TRANSLUNAR INJECTION INITIATION
 18   JULY 1969 17 HRS, 55 MINS, 33.103 SECS  G.M.T. ***  4. HRS, 17. MINS, 38.755 SECS  G.E.T. ***  T   4.29409856+00 HRS
X      3.4105271+03  Y      8.3844626+02  Z      4.6730926+02  DX    -6.9066019+03  DY     2.0652041+04  DZ     1.3430889+04
ALT    9.9298738+01  LAT    7.6281801+00  LON    1.6855470+02  V      2.5585088+04  PTH    2.3293124-02  AZ     5.8026809+01
R      3.5430305+03  DEC    7.5791312+00  RA     1.3811730+01  RAS    1.1791051+02  DES    2.0966530+01  RAN    1.8808172+00
INC    3.2766313+01  MASS   2.9174726+05
*****************************************************************************************************************

ID     0718072.2
TRANSLUNAR INJECTION TERMINATION
 18   JULY 1969 18 HRS,  0 MINS, 52.243 SECS  G.M.T. ***  4. HRS, 22. MINS, 57.895 SECS  G.E.T. ***  T   4.38274872+00 HRS
X      2.6949077+03  Y      2.0379011+03  Z      1.2540084+03  DX    -2.0419369+04  DY     2.4360082+04  DZ     1.6101632+04
ALT    1.6137152+02  LAT    2.0482684+01  LON    1.9050631+02  V      3.5631823+04  PTH    6.6212071+00  AZ     6.3757997+01
R      3.6039014+03  DEC    2.0362502+01  RA     3.7796731+01  RAS    1.1791422+02  DES    2.0965873+01  DEM    8.0137817+00
SEM    4.5886781+01  RBVS   1.0531738+02  RAN    1.8808159+00  INC    3.2766309+01  ECC    9.7539062-01  SMA    1.4447267+05
RP     3.5553838+03  APF    2.6599839+01  INMP   4.5708953+00  C3TLI -4.7459560-01  DAZTLI 0.0000000     MASS   1.3700519+05
PROP   1.5474207+05
*****************************************************************************************************************

ID     0718072.2
TRANSLUNAR INJECTION + 2 HOURS
 18   JULY 1969 20 HRS,  0 MINS, 52.243 SECS  G.M.T. ***  6. HRS, 22. MINS, 57.895 SECS  G.E.T. ***  T   6.38274872+00 HRS
X     -2.0231565+04  Y      5.4538326+03  Z      3.9186598+03  DX    -1.4077771+04  DY    -1.5066899+03  DZ    -6.8334084+02
ALT    1.7873501+04  LAT    1.0603989+01  LON    2.8824081+02  V      1.4174650+04  PTH    6.5033918+01  AZ     1.2118500+02
R      2.1317045+04  DEC    1.0592781+01  RA     1.6491336+02  RAS    1.1799790+02  DES    2.0951036+01
*****************************************************************************************************************

ID     0718072.2
LUNAR ORBIT INSERTION BURN INITIATION
 21   JULY 1969 16 HRS, 44 MINS, 52.060 SECS  G.M.T. *** 75. HRS,  6. MINS, 57.710 SECS  G.E.T. ***  T   7.51160337+01 HRS
XL    -8.3436018+02  YL    -5.3539172+02  ZL    -2.3924884+02  DXL   -3.6265478+03  DYL    6.7711231+03  DZL    3.1502571+03
XS    -1.0073941+03  YS    -1.5692255+02  ZS    -2.3950225+01  DXS    3.9600930+01  DYS    8.3392515+03  DZS    3.8616978+02
ALTS   9.1330565+01  LATS  -1.3456958+00  LONS  -1.7114614+02  VRS    8.3183143+03  PTR   -9.1777273+00  AZR   -8.7521542+01
LIN    1.7717561+02  LAN    1.6041914+02  LAP    5.5369033+01  LTS    1.2783157+00  LNS    9.2374436+01  DEM   -9.4941978+00
THETA  1.6487744+01  BETA  -1.7299947+02  MASS   9.5199404+04  DRTX  -2.9192947+03  DRTY  -3.4353765+02  DRTZ  -2.6965202+01
*****************************************************************************************************************

ID     0718072.2
LUNAR ORBIT INSERTION BURN TERMINATION
 21   JULY 1969 16 HRS, 50 MINS, 59.818 SECS  G.M.T. *** 75. HRS, 13. MINS,  5.468 SECS  G.E.T. ***  T   7.52181854+01 HRS
XL    -9.3118407+02  YL    -1.7299121+02  ZL    -9.1859547+01  DXL   -1.1260007+03  DYL    4.9917061+03  DZL    1.9366872+03
XS    -9.6430496+02  YS     2.6321197+02  ZS    -1.3580752+01  DXS    1.3657513+03  DYS    5.3143926+03  DZS   -6.9608555+01
ALTS   6.1180955+01  LATS  -7.7839714-01  LONS   1.6473273+02  VRS    5.4875213+03  PTR    8.6438216-01  AZR   -9.0715165+01
LIN    1.7894147+02  LAN    3.2067715+01  LAP    1.3175483+01  SMAS   1.0525257+03  ECCS   5.2438191-02  PERS   2.1451952+00
RPS    9.9733318+02  APOS   1.1077182+03  RANS   1.7788477+02  INCS   1.5861929+02  LTS    1.2782338+00  LNS    9.2322404+01
LTE    2.8995007+00  LNE   -7.4400903+00  THETA -7.3384687+00  BETA  -1.6962607+02  PROP   2.3968559+04  BARC   2.4067431+01
DELV   2.9395597+03  MASS   7.1230846+04  PLCHNG-3.5780312+00
*****************************************************************************************************************

ID     0718072.2
CIRCULARIZATION BURN INITIATION
 21   JULY 1969 21 HRS,  2 MINS, 35.614 SECS  G.M.T. *** 79. HRS, 24. MINS, 41.266 SECS  G.E.T. ***  T   7.94114628+01 HRS
XL    -8.7574080+02  YL    -4.3996558+02  ZL    -1.8482870+02  DXL   -2.6228210+03  DYL    4.4974230+03  DZL    1.7218238+03
XS    -9.9728071+02  YS     5.2243948-02  ZS    -9.1896794+00  DXS    1.1403705+00  DYS    5.4990968+03  DZS   -8.7923852+01
ALTS   5.9829536+01  LATS  -5.2795060-01  LONS   1.7999700+02  VRS    5.4997997+03  PTR   -4.3854432-04  AZR   -9.0916001+01
LIN    1.7894038+02  LAN    2.9877530+01  LAP    1.5365946+00  LTS    1.2748471+00  LNS    9.0186678+01  DEM   -1.0551442+01
THETA  3.8596289-01  BETA  -1.8000000+02  MASS   7.1181446+04  DRTX  -1.3795321+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID     0718072.2
CIRCULARIZATION BURN TERMINATION
 21   JULY 1969 21 HRS,  2 MINS, 50.380 SECS  G.M.T. *** 79. HRS, 24. MINS, 56.029 SECS  G.E.T. ***  T   7.94155636+01 HRS
XL    -8.8196110+02  YL    -4.2913689+02  ZL    -1.8068161+02  DXL   -2.4962780+03  DYL    4.4142191+03  DZL    1.6910961+03
XS    -9.9719395+02  YS     1.3248208+01  ZS    -9.3998965+00  DXS    7.0250592+01  DYS    5.3606944+03  DZS   -8.5371119+01
ALTS   5.8832731+01  LATS  -5.4002627-01  LONS   1.7923884+02  VRS    5.3618296+03  PTR    1.8919662-02  AZR   -9.0908924+01
LIN    1.7894036+02  LAN    2.9875353+01  LAP   -6.7036694+01  SMAS   9.9749997+02  ECCS   3.7419935-04  PERS   1.9791881+00
RPS    9.9712670+02  APOS   9.9787322+02  RANS   1.7788151+02  INCS   1.5861692+02  LTS    1.2748441+00  LNS    9.0184586+01
LTE    3.1360345+00  LNE   -7.4659908+00  THETA -3.6997854-01  BETA   1.7999300+02  PROP   9.6236914+02  BARC   7.5616295-01
DELV   1.3795548+02  MASS   7.0219077+04  PLCHNG 3.5795548-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718072.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 22    JULY 1969 17 HRS, 45 MINS, 17.772 SECS  G.M.T. ***100. HRS,  7. MINS, 23.422 SECS  G.E.T. ***  T   1.00123173+02 HRS
XL      7.7901064+02  YL      5.7540479+02  ZL      2.3668949+02  DXL     3.3348772+03  DYL    -3.9088712+03  DZL    -1.4817918+03
XS      9.9668459+02  YS     -2.3400298+01  ZS      6.5102723+00  DXS    -1.2849175+02  DYS    -5.3613324+03  DZS     9.3100562+01
ALTS    5.8486972+01  LATS    3.7414351-01  LONS   -1.3449511+00  VRS     5.3636799+03  PTR    -2.1459712-02  AZR    -8.9005282+01
LIN     1.7893446+02  LAN     1.9209570+01  SEASV   9.0200709+00
*****************************************************************************************************************

ID     0718072.2
CSM PLANE CHANGE BURN INITIATION
 22    JULY 1969 22 HRS,  8 MINS, 24.817 SECS  G.M.T. ***104. HRS, 30. MINS, 30.466 SECS  G.E.T. ***  T   1.04508463+02 HRS
XL      7.6709355+02  YL     -5.9631090+02  ZL     -2.2228489+02  DXL    -3.4138916+03  DYL    -3.8163829+03  DZL    -1.5445415+03
XS      1.3804284+02  YS     -9.8693355+02  ZS      1.8331751+01  DXS    -5.3126634+03  DYS    -7.4368228+02  DZS    -1.5556731+01
ALTS    5.8215920+01  LATS    1.0538590+00  LONS   -8.2037667+01  VRS     5.3644848+03  PTR     3.2646800-03  AZR    -9.0166101+01
LIN     1.7893306+02  LAN     1.6953044+01  LAP    -1.9478204+01  LTS     1.2542209+00  LNS     7.7408728+01  DEM    -1.6488628+01
THETA  -2.9882077-05  BETA   -8.9999951+01  MASS    3.6312378+04  DRTX    0.0000000     DRTY   -1.8600000+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0718072.2
CSM PLANE CHANGE BURN TERMINATION
 22    JULY 1969 22 HRS,  8 MINS, 25.839 SECS  G.M.T. ***104. HRS, 30. MINS, 31.490 SECS  G.E.T. ***  T   1.04508747+02 HRS
XL      7.6651926+02  YL     -5.9695175+02  ZL     -2.2254594+02  DXL    -3.4173486+03  DYL    -3.8067136+03  DZL    -1.5607832+03
XS      1.3714963+02  YS     -9.8735820+02  ZS      1.8327565+01  DXS    -5.3132321+03  DYS    -7.3920888+02  DZS    -3.4242562+01
ALTS    5.8215971+01  LATS    1.0536183+00  LONS   -8.2089520+01  VRS     5.3645165+03  PTR     3.2872469-03  AZR    -9.0365909+01
LIN     1.7888437+02  LAN     2.7113292+01  LAP    -1.5388613+01  SMAS    9.9727251+02  ECCS    5.6744968-04  PERS    1.9785112+00
RPS     9.3670663+02  APOS    9.9793839+02  RANS    1.7752618+02  INCS    1.5844260+02  LTS     1.2542209+00  LNS     7.7408589+01
LTE     4.4534963+00  LNE    -7.3615624+00  THETA  -3.9188210-04  BETA   -8.9800256+01  PROP    6.6583984+01  BARC    5.1396036-02
DELV    1.8600082+01  MASS    3.6245794+04  PLCHNG-1.9926019-01
*****************************************************************************************************************

ID     0718072.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 23    JULY 1969 15 HRS, 26 MINS, 42.600 SECS  G.M.T. ***121. HRS, 48. MINS, 48.251 SECS  G.E.T. ***  T   1.21813403+02 HRS
XL      6.3393580+02  YL      7.1202599+02  ZL      2.9207615+02  DXL     4.1249210+03  DYL    -3.1881037+03  DZL    -1.1883564+03
XS      9.9678174+02  YS     -2.3402583+01  ZS      6.5183005+00  DXS    -1.2868043+02  DYS    -5.3607419+03  DZS     9.8643256+01
ALTS    5.8584220+01  LATS    3.7456835-01  LONS   -1.3449513+00  VRS     5.3631934+03  PTR    -2.3230053-02  AZR    -8.8945961+01
LIN     1.7887840+02  LAN     1.8161462+01
*****************************************************************************************************************

ID     0718072.2
TRANSEARTH INJECTION BURN INITIATION
 24    JULY 1969  0 HRS, 18 MINS,   .148 SECS  G.M.T. ***130. HRS, 40. MINS,  5.800 SECS  G.E.T. ***  T   1.30668278+02 HRS
XL     -5.1873459+02  YL     -7.8891498+02  ZL     -3.2058891+02  DXL    -4.5666436+03  DYL     2.6125285+03  DZL     9.5349730+02
XS     -9.9654999+02  YS     -3.3497236+01  ZS     -3.9593911+00  DXS    -1.8186073+02  DYS     5.3588917+03  DZS    -1.0284963+02
ALTS    5.8427149+01  LATS   -2.2751288-01  LONS   -1.7807483+02  VRS     5.3629628+03  PTR     2.2848305-02  AZR    -9.1098767+01
LIN     1.7887468+02  LAN     1.3587608+01  LAP    -4.6059731+01  LTS     1.2320411+00  LNS     6.4097993+01  DEM    -2.1926759+01
THETA  -4.3479063+00  BETA    1.6447911+01  MASS    3.6314494+04  DRTX    2.9569930+03  DRTY    8.6999052+02  DRTZ    1.2551366+01
*****************************************************************************************************************

ID     0718072.2
TRANSEARTH INJECTION BURN TERMINATION
 24    JULY 1969  0 HRS, 20 MINS, 26.229 SECS  G.M.T. ***130. HRS, 42. MINS, 31.877 SECS  G.E.T. ***  T   1.30708855+02 HRS
XL     -6.5136970+02  YL     -7.0484718+02  ZL     -2.7899747+02  DXL    -6.5740599+03  DYL     4.4369086+03  DZL     2.5728236+03
XS     -9.9108831+02  YS      1.2910157+02  ZS      2.8859437+00  DXS     6.4219263+02  DYS     8.2989111+03  DZS     7.1271677+02
ALTS    6.0972140+01  LATS    1.6544103-01  LONS    1.7257830+02  VRS     8.3541786+03  PTR     2.9999959+00  AZR    -8.5107944+01
LIN     1.7509568+02  LAN     1.7450675+02  LAP    -5.3287321+00  SMAS   -2.2790614+03  ECCS    1.4375203+00  PERS    6.8352085+00
RPS     9.9713557+02  APOS   -5.5552582+03  RANS   -1.7068767+02  INCS    1.5469745+02  INMPS   1.7418486+02  SEM     1.0908203+02
RBVS    7.1506645+01  LTS     1.2320064+00  LNS     6.4077347+01  LTE     5.5771781+00  LNE    -6.7358107+00  THETA   4.7487223+00
BETA    1.0454677+01  PROP    9.5207896+03  BARC    9.3328428+00  DELV    3.0814852+03  MASS    2.6793705+04  PLCHNG  5.9792645+00
*****************************************************************************************************************

ID     0718072.2
ENTRY AND TOUCHDOWN
 26    JULY 1969 18 HRS, 20 MINS, 44.761 SECS  G.M.T. ***196. HRS, 42. MINS, 50.409 SECS  G.E.T. ***  T   1.96714003+02 HRS
X       3.0879133+03  Y       1.5839639+03  Z       5.2215598+02  DX     -1.9289822+04  DY      2.1348712+04  DZ      2.1832887+04
R       3.5095294+03  DEC     8.5563676+00  RA      2.7155832+01  V       3.6118412+04  PTH    -6.5300224+00  AZ      5.0773935+01
ALT     6.5852654+01  LAT     8.6120906+00  LON     1.6759813+02  VE      3.4948681+04  PTE    -6.6821291+00  AZE     4.9163563+01
SMA     1.4761336+05  ECC     9.7653319-01  INC     4.0000844+01  RAN     1.6826715+01  APF     2.6539994+01  RP      3.4640146+03
INMP    1.5396639+01  SEM     1.4621475+02  RBVS    8.4703709+01  RAM    -8.9856167+01  DEM    -2.8514714+01  RAS     1.2588434+02
DES     1.9357806+01  SPSPR   4.1616047+03  DVRES   1.7326842+03  PERNAD 9.6802688+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   2.2045078+01  LONTD   1.8499985+02  AZTD    5.3783602+01  SEATD  1.7880794+01  DTSUN   1.0622671+01
*****************************************************************************************************************

ID     0718072.2
CIRCUMLUNAR PERICYNTHION
 21    JULY 1969 16 HRS, 48 MINS, 10.743 SECS  G.M.T. *** 75. HRS, 10. MINS, 16.395 SECS  G.E.T. ***  T   7.51712208+01 HRS
XL     -9.3999639+02  YL     -3.0716281+02  ZL     -1.3321115+02  DXL    -2.8095686+03  DYL     7.1576741+03  DZL     3.3211205+03
XS     -9.9104488+02  YS      1.1573981+02  ZS     -1.1031352+01  DXS     9.6791373+02  DYS     8.3263110+03  DZS     4.0220856+02
ALTS    5.9347829+01  LATS   -6.3343015-01  LONS    1.7333885+02  VRS     8.3920249+03  PTR     1.9068052-05  AZR    -8.7252734+01
LIN     1.7717557+02  LAN     1.6038914+02  LAP    -8.1165145-01  LTS     1.2782716+00  LNS     9.2346327+01  DEM    -9.5078328+00
SEM     8.0151447+01  RBVS    9.8989666+01  SMAS   -2.1848466+03  ECCS    1.4567100+00  INCS    1.5526768+02  RANS   -1.7890796+02
APFS   -1.8607737+01  RPS     9.9784134+02  RM      2.0797211+05  DEMP    2.3320591+00  RAMP   -1.7946130+02
*****************************************************************************************************************

ID     0718072.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24    JULY 1969 11 HRS, 42 MINS, 49.403 SECS  G.M.T. ***142. HRS,  4. MINS, 55.052 SECS  G.E.T. ***  T   1.42081959+02 HRS
X       3.4720783+03  Y       1.2380049+02  Z      -4.9617228+02  DX     -7.1396831+02  DY      2.1945498+04  DZ      2.8706072+04
R       3.5095357+03  DEC    -8.1276116+00  RA      2.0420743+00  V       3.6140741+04  PTH    -6.3394735+00  AZ      3.7682071+01
ALT     6.5834026+01  LAT    -8.1806208+00  LON     2.4430860+02  VE      3.5226732+04  PTE    -6.5477151+00  AZE     3.5690843+01
SMA     1.6455550+05  ECC     9.7893546-01  INC     5.2761116+01  RAN     8.2740201+00  APF     2.5868514+00  RP      3.4662876+03
INMP    2.4977962+01  RAM    -1.2670242+02  DEM    -2.3926041+01  RAS     1.2363665+02  DES     1.9850924+01  SEM     1.1527631+02
RBVS    5.7597488+01  PERNAD 9.9944108+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD   9.3207368+00  LONTD   2.5675304+02
AZTD    3.5819055+01  SEATD -1.1279556+01  DTSUN  -8.1543034-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718081.2
LAUNCH TIME      18   JULY 1969    14 HRS,    31 MINS,     .784 SECS    G.M.T.
LAUNCH AZIMUTH    81.                                INJECTION OPPORTUNITY     2
*****************************************************************************************************************

ID     0718081.2
EARTH PARKING ORBIT INSERTION
 18    JULY 1969 14 HRS, 42 MINS, 22.111 SECS   G.M.T. ***  0. HRS, 11. MINS, 21.326 SECS   G.E.T. ***   T    1.89257342-01 HRS
X     -6.6343309+02  Y      3.0238886+03  Z      1.7249402+03  DX    -2.5114790+04  DY    -4.2666577+03  DZ    -2.1799348+03
ALT    1.0274514+02  LAT    2.9285035+01  LON    3.0554547+02  V      2.5567727+04  PTH   -2.3578062-08  AZ     9.5600888+01
R      3.5439334+03  DEC    2.9125906+01  RA     1.0237448+02  RAS    1.1777576+02  DES    2.0990327+01  RAN    9.8302051-01
INC    2.9613120+01  MASS   2.9716536+05
*****************************************************************************************************************

ID     0718081.2
3.5 MINS PRIOR TO TLI INITIATION
 18    JULY 1969 18 HRS, 42 MINS, 20.586 SECS   G.M.T. ***  4. HRS, 11. MINS, 19.802 SECS   G.E.T. ***   T    4.18883383+00 HRS
X      3.5398690+03  Y      9.2027667+01  Z      6.3230114+01  DX    -7.8692550+02  DY     2.2233021+04  DZ     1.2653630+04
ALT    9.7699649+01  LAT    1.0296791+00  LON    1.4450231+02  V      2.5593765+04  PTH    3.8261162-02  AZ     6.0365204+01
*****************************************************************************************************************

ID     0718081.2
TRANSLUNAR INJECTION INITIATION
 18    JULY 1969 18 HRS, 45 MINS, 50.586 SECS   G.M.T. ***  4. HRS, 14. MINS, 49.802 SECS   G.E.T. ***   T    4.24716717+00 HRS
X      3.4031202+03  Y      8.4961749+02  Z      4.9404501+02  DX    -7.0845864+03  DY     2.1378993+04  DZ     1.2146605+04
ALT    9.8488775+01  LAT    8.0692452+00  LON    1.5615352+02  V      2.5588917+04  PTH    3.4915693-02  AZ     6.1361482+01
R      3.5421967+03  DEC    8.0174210+00  RA     1.4017820+01  RAS    1.1794558+02  DES    2.0960317+01  RAN   -3.0952156-01
INC    2.9647810+01  MASS   2.9305741+05
*****************************************************************************************************************

ID     0718081.2
TRANSLUNAR INJECTION TERMINATION
 18    JULY 1969 18 HRS, 51 MINS, 11.182 SECS   G.M.T. ***  4. HRS, 20. MINS, 10.398 SECS   G.E.T. ***   T    4.33622164+00 HRS
X      3.6721894+03  Y      2.0977135+03  Z      1.2021827+03  DX    -2.0685322+04  DY     2.5242773+04  DZ     1.4303953+04
ALT    1.6099874+02  LAT    1.9603439+01  LON    1.7892875+02  V      3.5632614+04  PTH    6.6513168+00  AZ     6.7204577+01
R      3.6036420+03  DEC    1.9487556+01  RA     3.8132518+01  RAS    1.1794930+02  DES    2.0959657+01  DEM    7.9159803+00
SEM    4.6279840+01  RRVS   1.0595801+02  RAN   -3.0952309-01  INC    2.9647810+01  ECC    9.7533996-01  SMA    1.4414756+05
RP     3.5546862+03  APF    2.8935753+01  INMP   1.2541771+00  C3TLI -4.7566697-01  DAZTLI 0.0000000     MASS   1.3760961+05
PROP   1.5544780+05
*****************************************************************************************************************

ID     0718081.2
TRANSLUNAR INJECTION + 2 HOURS
 18    JULY 1969 20 HRS, 51 MINS, 11.182 SECS   G.M.T. ***  6. HRS, 20. MINS, 10.398 SECS   G.E.T. ***   T    6.33622164+00 HRS
X     -2.0292255+04  Y      5.7084466+03  Z      3.1739966+03  DX    -1.4062866+04  DY    -1.5063771+03  DZ    -9.1117136+02
ALT    1.7873385+04  LAT    8.5638449+00  LON    2.7500219+02  V      1.4172636+04  PTH    6.5029674+01  AZ     1.1849209+02
R      2.1317763+04  DEC    8.5547209+00  RA     1.6428809+02  RAS    1.1803298+02  DES    2.0944802+01
*****************************************************************************************************************

ID     0718081.2
LUNAR ORBIT INSERTION BURN INITIATION
 21    JULY 1969 17 HRS, 39 MINS, 27.636 SECS   G.M.T. *** 75. HRS,  8. MINS, 26.851 SECS   G.E.T. ***   T    7.51407919+01 HRS
XL    -9.2853790+02  YL    -5.4272616+02  ZL    -2.4554347+02  DXL   -3.6844310+03  DYL    6.6981068+03  DZL    3.2245181+03
XS    -1.0276349+03  YS    -1.5893186+02  ZS    -2.7037835+01  DXS    4.1978434+01  DYS    8.2989728+03  DZS    4.8214729+02
ALTS   9.1956511+01  LATS  -1.5182862+00  LONS  -1.7103671+02  VRS    8.3130726+03  PTR   -9.3233321+00  AZR   -8.6879025+01
LIN    1.7652400+02  LAN    1.6309158+02  LAP    1.4028860+02  LTS    1.2775829+00  LNS    9.1910998+01  DEM   -9.7188323+00
THETA  1.6764131+01  BETA  -1.7170203+02  MASS   9.5199404+04  DRTX  -2.9206104+03  DRTY  -4.0754355+02  DRTZ  -4.2301921+01
*****************************************************************************************************************

ID     0718081.2
LUNAR ORBIT INSERTION BURN TERMINATION
 21    JULY 1969 17 HRS, 45 MINS, 36.434 SECS   G.M.T. *** 75. HRS, 14. MINS, 35.648 SECS   G.E.T. ***   T    7.52432356+01 HRS
XL    -9.7308988+02  YL    -1.8186394+02  ZL    -8.5404902+01  DXL   -1.1748093+03  DYL    4.9827892+03  DZL    1.9332326+03
XS    -9.6440924+02  YS     2.6213836+02  ZS    -1.3554195+01  DXS    1.3640127+03  DYS    5.3157784+03  DZS   -6.9621745+01
ALTS   6.0899069+01  LATS  -7.7701623-01  LONS   1.6479368+02  VRS    5.4884313+03  PTR    8.2460062-01  AZR   -9.0715746+01
LIN    1.7894211+02  LAN    3.2055246+01  LAP   -4.9666128+01  SMAS   1.0525107+03  ECCS   5.2395116-02  PERS   2.1451493+00
RPS    9.9736430+02  APOS   1.1076571+03  RANS   1.7737462+02  INCS   1.5861090+02  LTS    1.2775001+00  LNS    9.1959817+01
LTE    2.9511021+00  LNE   -7.4466996+00  THETA -7.0166900+00  BETA  -1.6772048+02  PROP   2.4736354+04  BARC   2.4119673+01
DELV   2.9492102+03  MASS   7.1163051+04  PLCHNG-4.2454260+00
*****************************************************************************************************************

ID     0718081.2
CIRCULARIZATION BURN INITIATION
 21    JULY 1969 21 HRS, 57 MINS, 23.355 SECS   G.M.T. *** 79. HRS, 26. MINS, 22.570 SECS   G.E.T. ***   T    7.94396029+01 HRS
XL    -9.7632798+02  YL    -4.3948746+02  ZL    -1.8478476+02  DXL   -2.6191372+03  DYL    4.4988707+03  DZL    1.7229913+03
XS    -9.9726934+02  YS     9.3199340+00  ZS    -9.3286743+00  DXS    5.3352747+01  DYS    5.4986414+03  DZS   -8.7398590+01
ALTS   5.8862308+01  LATS  -5.3591869-01  LONS   1.7946456+02  VRS    5.4995947+03  PTR   -1.1957496-02  AZR   -9.0910670+01
LIN    1.7894096+02  LAN    2.9862954+01  LAP    1.3035541+00  LTS    1.2741072+00  LNS    8.9721563+01  DEM   -1.0775095+01
THETA  6.5945305-01  BETA   1.7999303+02  MASS   7.1113651+04  DRTX  -1.3770409+02  DRTY   0.0000000     DRTZ  -6.5993380-01
*****************************************************************************************************************

ID     0718081.2
CIRCULARIZATION BURN TERMINATION
 21    JULY 1969 21 HRS, 57 MINS, 38.080 SECS   G.M.T. *** 79. HRS, 26. MINS, 37.295 SECS   G.E.T. ***   T    7.94436932+01 HRS
XL    -9.8222259+02  YL    -4.2868512+02  ZL    -1.8064629+02  DXL   -2.4935114+03  DYL    4.4154395+03  DZL    1.6921600+03
XS    -9.9705788+02  YS     2.2478268+01  ZS    -9.5370615+00  DXS    1.2032453+02  DYS    5.3598662+03  DZS   -8.4561254+01
ALTS   5.8863330+01  LATS  -5.4788986-01  LONS   1.7870851+02  VRS    5.3618834+03  PTR    1.4104649-02  AZR   -9.0903524+01
LIN    1.7894098+02  LAN    2.9860778+01  LAP   -5.1691743+01  SMAS   9.9758105+02  ECCS   3.3388619-04  PERS   1.9794295+00
RPS    9.9724799+02  APOS   9.9791411+02  RANS   1.3035140+02  INCS   1.5860854+02  LTS    1.2741042+00  LNS    8.9719481+01
LTE    3.1869943+00  LNE   -7.4700616+00  THETA -9.4458954-02  BETA  -1.8000000+02  PROP   9.5974219+02  BARC   7.5395995-01
DELV   1.3770796+02  MASS   7.0153909+04  PLCHNG 3.5516047-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718081.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 22   JULY 1969 18 HRS, 40 MINS,  3.684 SECS  G.M.T. ***190. HRS,  9. MINS,  2.900 SECS  G.E.T. ***  T   1.00150805+02 HRS
XL     7.7362971+02  YL     5.8176892+02  ZL     2.3925643+02  DXL    3.3714281+03  DYL   -3.8810316+03  DZL   -1.4707544+03
XS     9.9680067+02  YS    -2.3403096+01  ZS     6.5024334+00  DXS   -1.2799121+02  DYS   -5.3609415+03  DZS    9.3056116+01
ALTS   5.9603055+01  LATS   3.7364950-01  LONS  -1.3449553+00  VRS    5.3632764+03  PTR   -1.6221205-02  AZR   -8.9005726+01
LIN    1.7893504+02  LAN    1.9191906+01  SEASV  9.4845710+00
*****************************************************************************************************************

ID     0718081.2
CSM PLANE CHANGE BURN INITIATION
 22   JULY 1969 23 HRS,  3 MINS, 12.895 SECS  G.M.T. ***104. HRS, 32. MINS, 12.111 SECS  G.E.T. ***  T   1.04536697+02 HRS
XL     7.7276775+02  YL    -5.9015871+02  ZL    -2.1983414+02  DXL   -3.3773423+03  DYL   -3.8433439+03  DZL   -1.5554512+03
XS     1.3806462+02  YS    -9.8711024+02  ZS     1.8326068+01  DXS   -5.3119504+03  DYS   -7.4348306+02  DZS   -1.5518078+01
ALTS   5.8393790+01  LATS   1.0533442+00  LONS  -8.2037835+01  VRS    5.3637509+03  PTR    2.3888777-03  AZR   -9.0165806+01
LIN    1.7893364+02  LAN    1.6935568+01  LAP    1.5486881+00  LTS    1.2534584+00  LNS    7.6943852+01  DEM   -1.6694138+01
THETA  1.7929246-05  BETA  -8.9999907+01  MASS   3.6247210+04  DRTX   0.0000000     DRTY  -1.8600000+01  DRTZ   0.0000000
*****************************************************************************************************************

ID     0718081.2
CSM PLANE CHANGE BURN TERMINATION
 22   JULY 1969 23 HRS,  3 MINS, 13.915 SECS  G.M.T. ***104. HRS, 32. MINS, 13.130 SECS  G.E.T. ***  T   1.04536981+02 HRS
XL     7.7220064+02  YL    -5.9080294+02  ZL    -2.2009656+02  DXL   -3.3808167+03  DYL   -3.8337087+03  DZL   -1.5717060+03
XS     1.3717301+02  YS    -9.8723464+02  ZS     1.8321898+01  DXS   -5.3125178+03  DYS   -7.3901904+02  DZS   -3.4203509+01
ALTS   5.8393828+01  LATS   1.0531045+00  LONS  -8.2089585+01  VRS    5.3637827+03  PTR    2.4054660-03  AZR   -9.0365507+01
LIN    1.7888496+02  LAN    2.7103255+01  LAP    2.1461946+00  SMAS   9.9735351+02  ECCS   4.6926902-04  PERS   1.9787522+00
RPS    9.9688548+02  APOS   9.9782152+02  RANS   1.7752033+02  INCS   1.5843312+02  LTS    1.2534587+00  LNS    7.6943705+01
LTE    4.4976148+00  LNE   -7.3489105+00  THETA  2.9199059-04  BETA  -8.9800181+01  PROP   6.6463867+01  BARC   5.2339162-02
DELV   1.8600082+01  MASS   3.6187746+04  PLCHNG-1.9928593-01
*****************************************************************************************************************

ID     0718081.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 23   JULY 1969 16 HRS, 21 MINS, 37.996 SECS  G.M.T. ***121. HRS, 50. MINS, 37.212 SECS  G.E.T. ***  T   1.21843670+02 HRS
XL     6.2722130+02  YL     7.1722082+02  ZL     2.9417823+02  DXL    4.1546965+03  DYL   -3.1538249+03  DZL   -1.1747097+03
XS     9.9687654+02  YS    -2.3404886+01  ZS     6.5113917+00  DXS   -1.2815214+02  DYS   -5.3604659+03  DZS    9.8598162+01
ALTS   5.8679006+01  LATS   3.7413578-01  LONS  -1.3449558+00  VRS    5.3629039+03  PTR   -1.7664777-02  AZR   -8.8946424+01
LIN    1.7887895+02  LAN    1.8148517+01
*****************************************************************************************************************

ID     0718081.2
TRANSEARTH INJECTION BURN INITIATION
 24   JULY 1969  1 HRS, 13 MINS, 25.766 SECS  G.M.T. ***130. HRS, 42. MINS, 24.976 SECS  G.E.T. ***  T   1.30706938+02 HRS
XL    -5.3071163+02  YL    -7.8198550+02  ZL    -3.1823068+02  DXL   -4.5265697+03  DYL    2.6720125+03  DZL    9.7798263+02
XS    -9.9714302+02  YS    -1.0649194+01  ZS    -4.3900536+00  DXS   -5.8416595+01  DYS    5.3614122+03  DZS   -1.0228600+02
ALTS   5.8714033+01  LATS  -2.5223621-01  LONS  -1.7938812+02  VRS    5.3627059+03  PTR    1.7185505-02  AZR   -9.1192806+01
LIN    1.7887522+02  LAN    1.3569196+01  LAP   -3.8232019+01  LTS    1.2312441+00  LNS    6.3628098+01  DEM   -2.2099457+01
THETA -4.4416284+00  BETA   1.6307959+01  MASS   3.6249446+04  DRTX   2.9786905+03  DRTY   8.6865226+02  DRTZ   1.6442814+01
*****************************************************************************************************************

ID     0718081.2
TRANSEARTH INJECTION BURN TERMINATION
 24   JULY 1969  1 HRS, 15 MINS, 52.448 SECS  G.M.T. ***130. HRS, 44. MINS, 51.657 SECS  G.E.T. ***  T   1.30747683+02 HRS
XL    -6.6269031+02  YL    -6.9563435+02  ZL    -2.7569159+02  DXL   -6.5149231+03  DYL    4.5405341+03  DZL    2.6139449+03
XS    -9.9780241+02  YS     1.5268151+02  ZS     2.4821175+00  DXS    8.4163152+02  DYS    8.3034287+03  DZS    7.1225434+02
ALTS   6.1042074+01  LATS   1.4228108-01  LONS   1.7121350+02  VRS    8.3763104+03  PTR    3.0000251+00  AZR   -8.5122892+01
LIN    1.7511140+02  LAN    1.7287727+02  LAP   -6.0331659+00  SMAS  -2.2129494+03  ECCS   1.4506266+00  PERS   6.5399581+00
RPS    9.9721394+02  APOS  -5.4231127+03  RANS  -1.7087762+02  INCS   1.5464449+02  INMPS  1.7428155+02  SEM    1.0958176+02
RBVS   7.2400667+01  LTS    1.2312091+00  LNS    6.3607375+01  LTE    5.6107567+00  LNE   -6.7036466+00  THETA  4.7098986+00
BETA   1.0339172+01  PROP   9.5599595+03  BARC   9.3842882+00  DELV   3.1028120+03  MASS   2.6689487+04  PLCHNG 5.9542140+00
*****************************************************************************************************************

ID     0718081.2
ENTRY AND TOUCHDOWN
 26   JULY 1969 18 HRS, 22 MINS, 13.786 SECS  G.M.T. ***195. HRS, 51. MINS, 13.000 SECS  G.E.T. ***  T   1.95853611+02 HRS
X      3.7773530+03  Y      1.6331917+03  Z      5.2574494+02  DX    -1.9448528+04  DY     2.1223339+04  DZ     2.1823042+04
R      3.5095203+03  DEC    8.6156470+00  RA     2.7517913+01  V      3.6123683+04  PTH   -6.5000048+00  AZ     5.0785074+01
ALT    6.5847010+01  LAT    8.6717442+00  LON    1.6768825+02  VE     3.4953939+04  PTE   -6.6818444+00  AZE    4.9175546+01
SMA    1.5125003+05  ECC    9.7709740-01  INC    4.0000677+01  RAN    1.7115279+01  APF    2.6629896+01  RP     3.4640201+03
INMP   1.5412159+01  SEM    1.4622911+02  RBVS   8.5358845+01  RAM   -8.9838594+01  DEM   -2.8514508+01  RAS    1.2588535+02
DES    1.0357577+01  SPSPR  4.0573870+03  DVRES  1.6927209+03  PERNAD 9.8865920+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  2.2098276+01  LONTD  1.8499988+02  AZTD   5.3814823+01  SEATD  1.8227219+01  DTSUN  1.0596557+01
*****************************************************************************************************************

ID     0718081.2
CIRCUMLUNAR PERICYNTHION
 21   JULY 1969 17 HRS, 42 MINS, 49.716 SECS  G.M.T. *** 75. HRS, 11. MINS, 48.931 SECS  G.E.T. ***  T   7.51969252+01 HRS
XL    -9.3776023+02  YL    -3.1280594+02  ZL    -1.3599871+02  DXL   -2.8574939+03  DYL    7.0971603+03  DZL    3.4320329+03
XS    -9.9667551+02  YS     1.1807445+02  ZS    -1.0671618+01  DXS    9.8577657+02  DYS    8.3160868+03  DZS    4.9971160+02
ALTS   5.9250644+01  LATS  -6.1283281-01  LONS   1.7320322+02  VRS    8.3892052+03  PTR   -3.5244815-07  AZR   -8.6584907+01
LIN    1.7652395+02  LAN    1.6306101+02  LAP   -7.3288129-01  LTS    1.2775372+00  LNS    9.1882403+01  DEM   -9.7326806+00
SEM    8.0609364+01  RBVS   9.8662020+01  SMAS  -2.1936931+03  ECCS   1.4548240+00  INCS   1.5464196+02  RANS  -1.7831255+02
APFS  -1.8431028+01  RPS    9.9774417+02  RM     2.0786448+05  DEMP   2.3903465+00  RAMP  -1.7959615+02
*****************************************************************************************************************

ID     0718081.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24   JULY 1969 12 HRS, 29 MINS, 35.617 SECS  G.M.T. ***141. HRS, 58. MINS, 34.828 SECS  G.E.T. ***  T   1.41976341+02 HRS
X      3.4812520+03  Y      9.9317691+01  Z     -4.3386930+02  DX    -1.2311393+03  DY     2.3427943+04  DZ     2.7491508+04
R      3.5095899+03  DEC   -7.1012965+00  RA     1.6341653+00  V      3.6140936+04  PTH   -6.2855181+00  AZ     4.0758400+01
ALT    6.5833667+01  LAT   -7.1477612+00  LON    2.3217612+02  VE     3.5159160+04  PTE   -6.4979608+00  AZE    3.8844414+01
SMA    1.6495950+05  ECC    9.7898229-01  INC    4.9619341+01  RAN    7.7162420+00  APF    3.3668237+00  RP     3.4670718+03
INMP   2.1812277+01  RAM   -1.2621801+02  DEM   -2.4052275+01  RAS    1.2366881+02  DES    1.9844085+01  SEM    1.1570427+02
RBVS   5.7513310+01  PERNAD 1.0051691+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  9.6226221+00  LONTD  2.4558344+02
AZTD   3.9140154+01  SEATD -1.0689607+01  DTSUN -7.7332318-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718090.2
LAUNCH TIME      18   JULY 1969    15 HRS,    37 MINS,  31.508 SECS    G.M.T.
LAUNCH AZIMUTH    90.                                INJECTION OPPORTUNITY     2
*****************************************************************************************************************

ID     0718090.2
EARTH PARKING ORBIT INSERTION
 18    JULY 1969 15 HRS, 48 MINS, 51.836 SECS   G.M.T. ***  0. HRS, 11. MINS, 20.328 SECS   G.E.T. ***   T    1.88980063-01 HRS
X      -1.5171480+03  Y       2.8115242+03  Z       1.5339682+03  DX     -2.3106379+04  DY     -9.6207227+03  DZ     -5.2197331+03
ALT     1.0217145+02  LAT     2.5794248+01  LON     3.0485371+02  V       2.5567727+04  PTH    -2.8293674-07  AZ      1.0308917+02
R       3.5439334+03  DEC     2.5648144+01  RA      1.1835208+02  RAS     1.1782214+02  DES     2.0982148+01  RAN     1.0897533-01
INC     2.8592229+01  MASS    2.9764633+05
*****************************************************************************************************************

ID     0718090.2
3.5 MINS PRIOR TO TLI INITIATION
 18    JULY 1969 19 HRS, 45 MINS, 20.017 SECS   G.M.T. ***  4. HRS,  7. MINS, 48.509 SECS   G.E.T. ***   T    4.13014132+00 HRS
X       3.5373851+03  Y       1.0854918+02  Z       9.8239250+01  DX     -1.0093343+03  DY      2.2460345+04  DZ      1.2243471+04
ALT     9.6488787+01  LAT     1.6004603+00  LON     1.2898000+02  V       2.5600555+04  PTH     4.4526827-02  AZ      6.1418195+01
*****************************************************************************************************************

ID     0718090.2
TRANSLUNAR INJECTION INITIATION
 18    JULY 1969 19 HRS, 48 MINS, 50.017 SECS   G.M.T. ***  4. HRS, 11. MINS, 18.509 SECS   G.E.T. ***   T    4.18847460+00 HRS
X       3.3929987+03  Y       8.7339104+02  Z       5.1392895+02  DX     -7.3017027+03  DY      2.1568941+04  DZ      1.1685964+04
ALT     9.7408775+01  LAT     8.3988591+00  LON     1.4078008+02  V       2.5594840+04  PTH     4.3750290-02  AZ      6.2525811+01
R       3.5410980+03  DEC     8.3449607+00  RA      1.4435117+01  RAS     1.1798950+02  DES     2.0952525+01  RAN    -1.1595220+00
INC     2.8618892+01  MASS    2.9357245+05
*****************************************************************************************************************

ID     0718090.2
TRANSLUNAR INJECTION TERMINATION
 18    JULY 1969 19 HRS, 54 MINS, 11.208 SECS   G.M.T. ***  4. HRS, 16. MINS, 39.700 SECS   G.E.T. ***   T    4.27769458+00 HRS
X       2.6472087+03  Y       2.1329724+03  Z       1.1928384+03  DX     -2.2968159+04  DY      2.5392375+04  DZ      1.3620875+04
ALT     1.6013459+02  LAT     1.9449894+01  LON     1.6386292+02  V       3.5636562+04  PTH     6.6650160+00  AZ      6.8480583+01
R       3.6027973+03  DEC     1.9334748+01  RA      3.8859920+01  RAS     1.1799324+02  DES     2.0951863+01  DEM     7.5676714+00
SEM     4.6772355+01  RRVS    1.0652780+02  RAN    -1.1595223+00  INC     2.8618891+01  ECC     9.7531640-01  SMA     1.4396806+05
RP      3.5536514+03  APF     3.0228120+01  INMP    1.5686166-01  C3TLI  -4.7625999-01  DAZTLI 0.0000000      MASS    1.3783588+05
PROP    1.5573658+05
*****************************************************************************************************************

ID     0718090.2
TRANSLUNAR INJECTION + 2 HOURS
 18    JULY 1969 21 HRS, 54 MINS, 11.208 SECS   G.M.T. ***  6. HRS, 16. MINS, 39.700 SECS   G.E.T. ***   T    6.27769458+00 HRS
X      -2.0354066+04  Y       5.6602612+03  Z       2.8478160+03  DX     -1.4043520+04  DY     -1.5944208+03  DZ     -1.0351036+03
ALT     1.7873791+04  LAT     7.6853293+00  LON     2.5938015+02  V       1.4171594+04  PTH     6.5032156+01  AZ      1.1765219+02
R       2.1317519+04  DEC     7.6771177+00  RA      1.6445928+02  RAS     1.1807690+02  DES     2.0936986+01
*****************************************************************************************************************

ID     0718090.2
LUNAR ORBIT INSERTION BURN INITIATION
 21    JULY 1969 19 HRS, 41 MINS, 16.769 SECS   G.M.T. *** 75. HRS,  3. MINS, 45.261 SECS   G.E.T. ***   T    7.50625725+01 HRS
XL     -9.2254091+02  YL     -5.5073348+02  ZL     -2.4961642+02  DXL    -3.7561175+03  DYL     6.6525325+03  DZL     3.2319487+03
XS     -1.0079275+03  YS     -1.5968007+02  ZS     -2.7812701+01  DXS     4.1870454+01  DYS     8.2959259+03  DZS     5.0584447+02
ALTS    9.2383162+01  LATS   -1.5611558+00  LONS   -1.7099778+02  VRS     8.3114390+03  PTR    -9.3668190+00  AZR    -8.6720265+01
LIN     1.7636207+02  LAN     1.6361953+02  LAP     1.7191280+02  LTS     1.2767511+00  LNS     9.1386225+01  DEM    -9.9727731+00
THETA   1.6981308+01  BETA   -1.7138110+02  MASS    9.5199404+04  DRTX   -2.9221952+03  DRTY   -4.2327194+02  DRTZ   -5.3691526+01
*****************************************************************************************************************

ID     0718090.2
LUNAR ORBIT INSERTION BURN TERMINATION
 21    JULY 1969 18 HRS, 47 MINS, 25.995 SECS   G.M.T. *** 75. HRS,  9. MINS, 54.484 SECS   G.E.T. ***   T    7.51651344+01 HRS
XL     -9.7734354+02  YL     -1.9131654+02  ZL     -8.9209160+01  DXL    -1.2351947+03  DYL     4.9681789+03  DZL     1.9274502+03
XS     -9.6490437+02  YS      2.6179491+02  ZS     -1.3552298+01  DXS     1.3554181+03  DYS     5.3158896+03  DZS    -6.9698642+01
ALTS    6.1386820+01  LATS   -7.7660622-01  LONS    1.6482012+02  VRS     5.4864103+03  PTR     8.8539808-01  AZR    -9.0716053+01
LIN     1.7894223+02  LAN     3.2056010+01  LAP    -2.5855577+01  SMAS    1.0525080+03  ECCS    5.2343163-02  PERS    2.1451411+00
RPS     9.9741641+02  APOS    1.1075996+03  RANS    1.7786160+02  INCS    1.5860141+02  LTS     1.2766686+00  LNS     9.1333982+01
LTE     3.0093186+00  LNE    -7.4535221+00  THETA  -6.7868353+00  BETA   -1.6726126+02  PROP    2.4064215+04  BARC    2.4133261+01
DELV    2.9531789+03  MASS    7.1135189+04  PLCHNG-4.4105145+00
*****************************************************************************************************************

ID     0718090.2
CIRCULARIZATION BURN INITIATION
 21    JULY 1969 22 HRS, 58 MINS, 47.697 SECS   G.M.T. *** 79. HRS, 21. MINS, 16.189 SECS   G.E.T. ***   T    7.93544970+01 HRS
XL     -8.5988454+02  YL     -4.6618308+02  ZL     -1.9516979+02  DXL    -2.7763829+03  DYL     4.4163891+03  DZL     1.6889779+03
XS     -9.9727086+02  YS     -1.3778530+01  ZS     -8.9585949+00  DXS    -7.4050097+01  DYS     5.4981127+03  DZS    -8.8546844+01
ALTS    5.8912750+01  LATS   -5.1463141-01  LONS   -1.7920844+02  VRS     5.4993242+03  PTR    -1.1643411-02  AZR    -9.0922680+01
LIN     1.7894110+02  LAN     2.9866904+01  LAP     1.0072147+00  LTS     1.2732769+00  LNS     8.9200349+01  DEM    -1.1025222+01
THETA   6.5106387-01  BETA    1.7999300+02  MASS    7.1985790+04  DRTX   -1.3771341+02  DRTY    0.0000000     DRTZ   -6.4020043-01
*****************************************************************************************************************

ID     0718090.2
CIRCULARIZATION BURN TERMINATION
 21    JULY 1969 22 HRS, 59 MINS,  2.418 SECS   G.M.T. *** 79. HRS, 21. MINS, 30.907 SECS   G.E.T. ***   T    7.93585854+01 HRS
XL     -8.6645551+02  YL     -4.5557942+02  ZL     -1.9111320+02  DXL    -2.6478984+03  DYL     4.3368344+03  DZL     1.6597031+03
XS     -9.9736527+02  YS     -6.2390599-01  ZS     -9.1696941+00  DXS    -3.8915672+00  DYS     5.3609175+03  DZS    -8.5705630+01
ALTS    5.8914110+01  LATS   -5.2675773-01  LONS   -1.7996416+02  VRS     5.3616039+03  PTR     1.4169380-02  AZR    -9.0915789+01
LIN     1.7894112+02  LAN     2.9864742+01  LAP    -5.4630552+01  SMAS    9.9757800+02  ECCS    3.0115769-04  PERS    1.9794204+00
RPS     9.9727757+02  APOS    9.9787842+02  RANS    1.7785843+02  INCS    1.5859905+02  LTS     1.2732738+00  LNS     8.9198266+01
LTE     3.2438779+00  LNE    -7.4739495+00  THETA  -1.0258176-01  BETA    1.7999300+02  PROP    9.5942578+02  BARC    7.5366791-01
DELV    1.3771634+02  MASS    7.0126364+04  PLCHNG 3.8054931-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718090.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 22   JULY 1969 19 HRS, 41 MINS, 53.883 SECS  G.M.T. ***100. HRS,  4. MINS, 22.374 SECS  G.E.T. ***  T   1.00072882+02 HRS
XL     7.6733274+02  YL      5.8878543+02  ZL      2.4209517+02  DXL     3.4124128+03  DYL    -3.8501731+03  DZL    -1.4584688+03
XS     9.9673863+02  YS     -2.3401676+01  ZS      6.5099163+00  DXS    -1.2804311+02  DYS    -5.3612642+03  DZS     9.3056246+01
ALTS   5.8540985+01  LATS   3.7358557-01  LONS   -1.3449574+00  VRS     5.3636002+03  PTR    -1.6692504-02  AZR    -8.9305799+01
LIN    1.7893508+02  LAN    1.9189745+01  SEASV  1.0009041+01
*****************************************************************************************************************

ID     0718090.2
CSM PLANE CHANGE BURN INITIATION
 23   JULY 1969  0 HRS,  5 MINS,  2.880 SECS  G.M.T. ***104. HRS, 27. MINS, 31.369 SECS  G.E.T. ***  T   1.04458714+02 HRS
XL     7.7892723+02  YL     -5.8303198+02  ZL     -2.1698841+02  DXL    -3.3360832+03  DYL    -3.8743108+03  DZL    -1.5680168+03
XS     1.3805953+02  YS     -9.8708745+02  ZS      1.8324628+01  DXS    -5.3120255+03  DYS    -7.4378657+02  DZS    -1.5507619+01
ALTS   5.8370504+01  LATS   1.0532860+00  LONS   -8.2037944+01  VRS     5.3638674+03  PTR     5.5985677-03  AZR    -9.0165806+01
LIN    1.7893368+02  LAN    1.6932940+01  LAP    -8.7861567+00  LTS     1.2525976+00  LNS     7.6419328+01  DEM    -1.6924900+01
THETA  2.8174530-05  BETA  -8.9999903+01  MASS    3.6219665+04  DRTX    0.0000000     DRTY   -1.8600000+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0718090.2
CSM PLANE CHANGE BURN TERMINATION
 23   JULY 1969  0 HRS,  5 MINS,  3.899 SECS  G.M.T. ***104. HRS, 27. MINS, 32.388 SECS  G.E.T. ***  T   1.04458997+02 HRS
XL     7.7836747+02  YL     -5.8368091+02  ZL     -2.1725273+02  DXL    -3.3395832+03  DYL    -3.8647091+03  DZL    -1.5842849+03
XS     1.3716872+02  YS     -9.8721179+02  ZS      1.8320458+01  DXS    -5.3125925+03  DYS    -7.3932681+02  DZS    -3.4192909+01
ALTS   5.8370581+01  LATS   1.0530463+00  LONS   -8.2089649+01  VRS     5.3638989+03  PTR     5.6173502-03  AZR    -9.0365309+01
LIN    1.7888505+02  LAN    2.7101142+01  LAP    -8.6715648+00  SMAS    9.9735049+02  ECCS    4.9748802-04  PERS    1.9787433+00
RPS    9.9685433+02  APOS   9.9784664+02  RANS    1.7751226+02  INCS    1.5842240+02  LTS     1.2525972+00  LNS     7.6419188+01
LTE    4.5470151+00  LNE   -7.3338569+00  THETA  -1.0330661-04  BETA   -8.9800106+01  PROP    6.6413086+01  BARC    5.2339162-02
DELV   1.8599931+01  MASS    3.6153252+04  PLCHNG-1.9928078-01
*****************************************************************************************************************

ID     0718090.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 23   JULY 1969 17 HRS, 23 MINS, 27.876 SECS  G.M.T. ***121. HRS, 45. MINS, 56.367 SECS  G.E.T. ***  T   1.21755657+02 HRS
XL     6.1952015+02  YL      7.2288145+02  ZL      2.9647602+02  DXL     4.1878822+03  DYL    -3.1158412+03  DZL    -1.1595317+03
XS     3.9681788+02  YS     -2.3403553+01  ZS      6.5094961+00  DXS    -1.2827456+02  DYS    -5.3607687+03  DZS     9.8601423+01
ALTS   5.8620323+01  LATS   3.7404888-01  LONS   -1.3449583+00  VRS     5.3632096+03  PTR    -1.8894135-02  AZR    -8.8946448+01
LIN    1.7887899+02  LAN    1.8144632+01
*****************************************************************************************************************

ID     0718090.2
TRANSEARTH INJECTION BURN INITIATION
 24   JULY 1969  2 HRS, 15 MINS, 44.527 SECS  G.M.T. ***130. HRS, 38. MINS, 13.018 SECS  G.E.T. ***  T   1.30636950+02 HRS
XL    -5.4403980+02  YL     -7.7396889+02  ZL     -3.1549209+02  DXL    -4.4807817+03  DYL     2.7377033+03  DZL     1.0350424+03
XS    -9.9714182+02  YS      1.5058464+01  ZS     -4.8775547+00  DXS     7.9705945+01  DYS     5.3608331+03  DZS    -1.0164219+02
ALTS   5.8773920+01  LATS  -2.8023017-01  LONS    1.7913481+02  VRS     5.3623889+03  PTR     1.8680370-02  AZR    -9.1086001+01
LIN    1.7887526+02  LAN    1.3560071+01  LAP    -4.5734202+01  LTS     1.2303466+00  LNS     6.3099848+01  DEM    -2.2289513+01
THETA -4.5858393+00  BETA   1.6149629+01  MASS    3.6221952+04  DRTX    3.0059040+03  DRTY    8.6743655+02  DRTZ    2.2589126+01
*****************************************************************************************************************

ID     0718090.2
TRANSEARTH INJECTION BURN TERMINATION
 24   JULY 1969  2 HRS, 18 MINS, 12.139 SECS  G.M.T. ***130. HRS, 40. MINS, 40.627 SECS  G.E.T. ***  T   1.30677952+02 HRS
XL    -6.7545538+02  YL     -6.8486836+02  ZL     -2.7179717+02  DXL    -6.4458168+03  DYL     4.6591771+03  DZL     2.6613613+03
XS    -9.8334586+02  YS      1.7940197+02  ZS      2.0401328+00  DXS     1.0694535+03  DYS     8.3041356+03  DZS     7.1204047+02
ALTS   5.1085554+01  LATS   1.1694030-01  LONS    1.6966065+02  VRS     8.4029399+03  PTR     2.9999826+00  AZR    -8.5138544+01
LIN    1.7512779+02  LAN    1.7103265+02  LAP    -1.8479935+02  SMAS   -2.1384766+03  ECCS    1.4663449+00  PERS    6.2126156+00
RPS    9.9726755+02  APOS  -5.2742206+03  RANS   -1.7139243+02  INCS    1.5458512+02  INMPS   1.7439081+02  SEM     1.1014434+02
RBVS   7.3424263+01  LTS    1.2303112+00  LNS     6.3078994+01  LTE     5.6479577+00  LNE    -6.6666576+00  THETA   4.6448974+00
BETA   1.0204115+01  PROP   9.6206074+03  BARC    9.4599682+00  DELV    3.1286483+03  MASS    2.6601345+04  PLCHNG  5.9269518+00
*****************************************************************************************************************

ID     0718090.2
ENTRY AND TOUCHDOWN
 26   JULY 1969 18 HRS, 23 MINS, 52.628 SECS  G.M.T. ***194. HRS, 46. MINS, 21.120 SECS  G.E.T. ***  T   1.94772533+02 HRS
X      3.0655113+03  Y      1.6245364+03  Z      5.2936582+02  DX    -1.9622227+04  DY     2.1083360+04  DZ     2.1313676+04
R      3.5095165+03  DEC    8.6754493+00  RA     2.7920896+01  V      3.6129991+04  PTH   -6.5000119+00  AZ     5.0796316+01
ALT    6.5846907+01  LAT    8.7319238+00  LON    1.6767826+02  VE     3.4960233+04  PTE   -6.6815766+00  AZE    4.9187686+01
SMA    1.5587389+05  ECC    9.7777671-01  INC    4.0000583+01  RAN    1.7444084+01  APF    2.6719894+01  RP     3.4640312+03
INMP   1.5533545+01  SEM    1.4624504+02  RBVS   8.5451972+01  RAM   -8.9819094+01  DEM   -2.8514277+01  RAS    1.2588648+02
DES    1.9357321+01  SPSPR  3.9692449+03  DVRES  1.6587987+03  PERNAD 1.0126703+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  2.2151926+01  LONTD  1.8499993+02  AZTD   5.3846394+01  SEATD  1.8610488+01  DTSUN  1.0567710+01
*****************************************************************************************************************

ID     0718090.2
CIRCUMLUNAR PERICYNTHION
 21   JULY 1969 18 HRS, 44 MINS, 39.886 SECS  G.M.T. *** 75. HRS,  7. MINS,  8.378 SECS  G.E.T. ***  T   7.51189938+01 HRS
XL    -9.3474066+02  YL     -3.2100206+02  ZL     -1.3828473+02  DXL    -2.9298183+03  DYL     7.0609120+03  DZL     3.4136306+03
XS    -9.9081519+02  YS      1.1865380+02  ZS     -1.0561596+01  DXS     9.8994966+02  DYS     8.3131697+03  DZS     5.2379164+02
ALTS   5.9456893+01  LATS  -6.0638901-01  LONS    1.7317113+02  VRS     8.3882744+03  PTR    -2.6119540-07  AZR    -8.6419730+01
LIN    1.7636202+02  LAN    1.6358879+02  LAP    -9.4148602-01  LTS     1.2767058+00  LNS     9.1357483+01  DEM    -9.9866674+00
SEM    8.1128109+01  RBVS   9.8169498+01  SMAS   -2.1943334+03  ECCS    1.4547852+00  INCS    1.5449190+02  RANS   -1.7809882+02
APFS  -1.8770302+01  RPS    9.9795042+02  RM     2.0774231+05  DEMP    2.4518770+00  RAMP   -1.7962671+02
*****************************************************************************************************************

ID     0718090.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24   JULY 1969 13 HRS, 27 MINS,  6.969 SECS  G.M.T. ***141. HRS, 49. MINS, 35.455 SECS  G.E.T. ***  T   1.41826515+02 HRS
X      3.4855042+03  Y      1.3581080+02  Z     -3.8767239+02  DX    -1.7405246+03  DY     2.3717132+04  DZ     2.7214514+04
R      3.5096258+03  DEC   -6.3418189+00  RA     2.2313705+00  V      3.6140856+04  PTH   -6.0624091+00  AZ     4.1400427+01
ALT    6.5833820+01  LAT   -6.3834016+00  LON    2.1835332+02  VE     3.5143786+04  PTE   -6.2671656+00  AZE    3.9501688+01
SMA    1.6505077+05  ECC    9.7897580-01  INC    4.8907952+01  RAN    7.7935714+00  APF    3.8275737+00  RP     3.4700600+03
INMP   2.1128782+01  RAM   -1.2562029+02  DEM   -2.4205596+01  RAS    1.2370837+02  DES    1.9835667+01  SEM    1.1623122+02
RBVS   5.8285740+01  PERNAD 1.0069216+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  1.0210352+01  LONTD  2.3197910+02
AZTD   3.9964575+01  SEATD -9.7614640+00  DTSUN -7.0732637-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718099.2
LAUNCH TIME      18   JULY 1969    16 HRS,    51 MINS,  12.411 SECS    G.M.T.
LAUNCH AZIMUTH    99.                              INJECTION OPPORTUNITY     2
*****************************************************************************************************************

ID     0718099.2
EARTH PARKING ORBIT INSERTION
 18    JULY 1969 17 HRS,  2 MINS, 33.465 SECS   G.M.T. ***  0. HRS, 11. MINS, 21.055 SECS   G.E.T. ***   T    1.89181888-01 HRS
X      -2.3492163+03  Y       2.2889285+03  Z       1.3421824+03  DX     -1.9141341+04  DY     -1.4795495+04  DZ     -8.2710979+03
ALT     1.0166273+02  LAT     2.2386137+01  LON     3.0377244+02  V       2.5567727+04  PTH    -5.6587348-07  AZ      1.1045888+02
R       3.5439334+03  DEC     2.2254835+01  RA      1.3574471+02  RAS     1.1787355+02  DES     2.0973069+01  RAN     1.1760555+00
INC     2.9873117+01  MASS    2.9729818+05
*****************************************************************************************************************

ID     0718099.2
3.5 MINS PRIOR TO TLI INITIATION
 18    JULY 1969 20 HRS, 55 MINS, 10.560 SECS   G.M.T. ***  4. HRS,  3. MINS, 58.150 SECS   G.E.T. ***   T    4.06615269+00 HRS
X       3.5346862+03  Y       1.5379687+02  Z       9.0112792+01  DX     -1.2698272+03  DY      2.2173572+04  DZ      1.2746568+04
ALT     9.5251752+01  LAT     1.4685554+00  LON     1.1220537+02  V       2.5607708+04  PTH     4.4515315-02  AZ      6.0138527+01
*****************************************************************************************************************

ID     0718099.2
TRANSLUNAR INJECTION INITIATION
 18    JULY 1969 20 HRS, 58 MINS, 40.560 SECS   G.M.T. ***  4. HRS,  7. MINS, 28.150 SECS   G.E.T. ***   T    4.12448603+00 HRS
X       3.3813611+03  Y       9.0741201+02  Z       5.2325494+02  DX     -7.5557015+03  DY      2.1209215+04  DZ      1.2187393+04
ALT     9.6206175+01  LAT     8.5553243+00  LON     1.2385836+02  V       2.5601796+04  PTH     4.6818650-02  AZ      6.1236053+01
R       3.5398863+03  DEC     8.5004325+00  RA      1.5021799+01  RAS     1.1803820+02  DES     2.0943874+01  RAN    -4.9272969-02
INC     2.9890443+01  MASS    2.9326174+05
*****************************************************************************************************************

ID     0718099.2
TRANSLUNAR INJECTION TERMINATION
 18    JULY 1969 21 HRS,  4 MINS,  1.451 SECS   G.M.T. ***  4. HRS, 12. MINS, 49.040 SECS   G.E.T. ***   T    4.21362227+00 HRS
X       2.6215155+03  Y       2.1404532+03  Z       1.2316356+03  DX     -2.1265486+04  DY      2.4803946+04  DZ      1.4246879+04
ALT     1.5892326+02  LAT     2.0115933+01  LON     1.4672731+02  V       3.5643094+04  PTH     6.6613459+00  AZ      6.7310056+01
R       3.6015010+03  DEC     1.9997455+01  RA      3.9231450+01  RAS     1.1804193+02  DES     2.0943209+01  DEM     7.2915990+00
SEM     4.7318793+01  RRVS    1.0700800+02  RAN    -4.9274531-02  INC     2.9890442+01  ECC     9.7532899-01  SMA     1.4399193+05
RP      3.5524274+03  APF     2.9840497+01  INMP    1.5278069+00  C3TLI  -4.7618224-01  DAZTLI  0.0000000     MASS    1.3767123+05
PROP    1.5559051+05
*****************************************************************************************************************

ID     0718099.2
TRANSLUNAR INJECTION + 2 HOURS
 18    JULY 1969 23 HRS,  4 MINS,  1.451 SECS   G.M.T. ***  6. HRS, 12. MINS, 49.040 SECS   G.E.T. ***   T    6.21362227+00 HRS
X      -2.0420702+04  Y       5.3186785+03  Z       3.0311484+03  DX     -1.4024295+04  DY     -1.7604946+03  DZ     -1.0295438+03
ALT     1.7874865+04  LAT     8.1829448+00  LON     2.4281508+02  V       1.4171808+04  PTH     6.5038459+01  AZ      1.1884859+02
R       2.1318566+04  DEC     8.1742159+00  RA      1.6540136+02  RAS     1.1812558+02  DES     2.0928309+01
*****************************************************************************************************************

ID     0718099.2
LUNAR ORBIT INSERTION BURN INITIATION
 21    JULY 1969 19 HRS, 43 MINS, 21.619 SECS   G.M.T. *** 74. HRS, 52. MINS,  9.205 SECS   G.E.T. ***   T    7.48692236+01 HRS
XL     -8.1682560+02  YL      -5.5807991+02  ZL      -2.5061698+02  DXL    -3.8356165+03  DYL     6.6430008+03  DZL     3.1673576+03
XS     -1.3077717+03  YS      -1.5870420+02  ZS      -2.5984690+01  DXS     3.8390020+01  DYS     8.3030385+03  DZS     4.4925339+02
ALTS    8.2028922+01  LATS    -1.4590311+00  LONS    -1.7105054+02  VRS     8.3152721+03  PTR    -9.2776402+00  AZR    -8.7099575+01
LIN     1.7674833+02  LAN     1.6231370+02  LAP     1.2544703+02  LTS     1.2759157+00  LNS     9.0859241+01  DEM    -1.0227310+01
THETA   1.6746263+01  BETA   -1.7215039+02  MASS    9.5199404+04  DRTX   -2.9220401+03  DRTY   -3.8551066+02  DRTZ   -4.0671867+01
*****************************************************************************************************************

ID     0718099.2
LUNAR ORBIT INSERTION BURN TERMINATION
 21    JULY 1969 19 HRS, 49 MINS, 30.248 SECS   G.M.T. *** 74. HRS, 58. MINS, 17.834 SECS   G.E.T. ***   T    7.49716206+01 HRS
XL     -9.7535816+02  YL      -1.9987635+02  ZL      -9.2668309+01  DXL    -1.2844821+03  DYL     4.9570267+03  DZL     1.9231434+03
XS     -9.6482776+02  YS       2.6226495+02  ZS      -1.3565225+01  DXS     1.3587591+03  DYS     5.3147492+03  DZS    -6.9672833+01
ALTS    6.1436008+01  LATS    -7.7730877-01  LONS     1.6479332+02  VRS     5.4861293+03  PTR     8.7583554-01  AZR    -9.0715917+01
LIN     1.7894181+02  LAN     3.2059322+01  LAP     -2.4547575+01  SMAS    1.0524972+03  ECCS    5.2239940-02  PERS    2.1451079+00
RPS     9.9751478+02  APOS    1.1074796+03  RANS    1.7784738+02  INCS    1.5859205+02  LTS     1.2758329+00  LNS     9.0907088+01
LTE     3.3675418+00  LNE    -7.4596616+00  THETA  -7.0556818+00  BETA   -1.6838111+02  PROP    2.4325324+04  BARC    2.4105059+01
DELV    2.9476395+03  MASS    7.1174080+04  PLCHNG-4.0167130+00
*****************************************************************************************************************

ID     0718099.2
CIRCULARIZATION BURN INITIATION
 22    JULY 1969  0 HRS,  0 MINS, 53.449 SECS   G.M.T. *** 79. HRS,  9. MINS, 41.036 SECS   G.E.T. ***   T    7.91613989+01 HRS
XL     -8.5599013+02  YL      -4.7243727+02  ZL      -1.9773830+02  DXL    -2.8126955+03  DYL     4.3957759+03  DZL     1.6808925+03
XS     -9.9739603+02  YS      -1.1690879+01  ZS      -8.9977189+00  DXS    -6.2173533+01  DYS     5.4977209+03  DZS    -8.8466406+01
ALTS    5.9011628+01  LATS    -5.1682772-01  LONS    -1.7932844+02  VRS     5.4987841+03  PTR    -1.5308932-02  AZR    -9.0921965+01
LIN     1.7894068+02  LAN     2.9869515+01  LAP     2.0749565+00  LTS     1.2724369+00  LNS     8.8673294+01  DEM    -1.1277585+01
THETA   3.8703693-01  BETA    1.7999011+02  MASS    7.1124681+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0718099.2
CIRCULARIZATION BURN TERMINATION
 22    JULY 1969  0 HRS,  1 MINS,  8.261 SECS   G.M.T. *** 79. HRS,  9. MINS, 55.847 SECS   G.E.T. ***   T    7.91655130+01 HRS
XL     -8.6268806+02  YL      -4.6181702+02  ZL      -1.9367581+02  DXL    -2.6822453+03  DYL     4.3170135+03  DZL     1.6519558+03
XS     -9.9746115+02  YS       1.5434384+00  ZS      -9.2099022+00  DXS     8.7560408+00  DYS     5.3595949+03  DZS    -8.5602044+01
ALTS    5.9011345+01  LATS    -5.2901600-01  LONS    1.7991134+02  VRS     5.3602855+03  PTR     3.5016771-03  AZR    -9.0915013+01
LIN     1.7894066+02  LAN     2.9867321+01  LAP     -1.6388663+02  SMAS    9.9727984+02  ECCS    2.3382240-04  PERS    1.9785330+00
RPS     9.9704666+02  APOS    9.9751301+02  RANS    1.7784426+02  INCS    1.5858969+02  LTS     1.2724338+00  LNS     8.8671197+01
LTE     3.3011537+00  LNE    -7.4771524+00  THETA  -3.7100648-01  BETA   -1.8000000+02  PROP    9.6538477+02  BARC    7.5803692-01
DELV    1.3850172+02  MASS    7.0159296+04  PLCHNG 3.5516047-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0718099.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 22    JULY 1969 20 HRS, 43 MINS, 23.286 SECS   G.M.T. *** 99. HRS, 52. MINS, 10.873 SECS   G.E.T. ***   T    9.98696871+01 HRS
XL      7.6049483+02  YL      5.9530867+02  ZL      2.4473861+02  DXL     3.4550775+03  DYL    -3.8207285+03  DZL    -1.4466549+03
XS      9.9601838+02  YS     -2.3384767+01  ZS      6.5010927+03  DXS    -1.2755359+02  DYS    -5.3643311+03  DZS     9.3150681+01
ALTS    5.7820549+01  LATS    3.7386587-01  LONS   -1.3449574+00  VRS     5.3666558+03  PTR    -1.0678375-02  AZR    -8.9005405+01
LIN     1.7893462+02  LAN     1.9196306+01  SEASV   1.0530565+01
*****************************************************************************************************************

ID     0718099.2
CSM PLANE CHANGE BURN INITIATION
 23    JULY 1969  1 HRS,  6 MINS, 24.479 SECS   G.M.T. ***104. HRS, 15. MINS, 12.068 SECS   G.E.T. ***   T    1.04253352+02 HRS
XL      7.8476000+02  YL \   -5.7575690+02  ZL     -2.1407763+02  DXL    -3.2935782+03  DYL    -3.9062737+03  DZL    -1.5809757+03
XS      1.3801958+02  YS     -9.8680704+02  ZS      1.8327277+01  DXS    -5.3124109+03  DYS    -7.4619218+02  DZS    -1.5486603+01
ALTS    5.8087354+01  LATS    1.0537377+00  LONS   -8.2037985+01  VRS     5.3645831+03  PTR     3.0513242-02  AZR    -9.0166101+01
LIN     1.7893323+02  LAN     1.6940369+01  LAP    -4.7002457+01  LTS     1.2517416+00  LNS     7.5898839+01  DEM    -1.7152687+01
THETA -5.3787739-05   BETA   -8.9999952+01  MASS    3.6252597+04  DRTX    0.0000000     DRTY   -1.8600000+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0718099.2
CSM PLANE CHANGE BURN TERMINATION
 23    JULY 1969  1 HRS,  6 MINS, 25.499 SECS   G.M.T. ***104. HRS, 15. MINS, 13.087 SECS   G.E.T. ***   T    1.04253635+02 HRS
XL      7.9420686+02  YL     -5.7641179+02  ZL     -2.1434437+02  DXL    -3.2971113+03  DYL    -3.8966995+03  DZL    -1.5972550+03
XS      1.3712775+02  YS     -9.8693195+02  ZS      1.8323107+01  DXS    -5.3129788+03  DYS    -7.4172474+02  DZS    -3.4172066+01
ALTS    5.8087854+01  LATS    1.0534974+00  LONS   -8.2089767+01  VRS     5.3646124+03  PTR     3.0531014-02  AZR    -9.0365507+01
LIN     1.7888455+02  LAN     2.7102483+01  LAP    -4.6487992+01  SMAS    9.9705256+02  ECCS    7.1342860-04  PERS    1.9778567+00
RPS     9.9634123+02  APOS    9.9776388+02  RANS    1.7750303+02  INCS    1.5841184+02  LTS     1.2517415+00  LNS     7.5898691+01
LTE     4.5956348+00  LNE    -7.3181002+00  THETA   1.1099057-04  BETA   -8.9800140+01  PROP    6.6473633+01  BARC    5.2339162-02
DELV    1.8599931+01  MASS    3.6186123+04  PLCHNG-1.9925425-01
*****************************************************************************************************************

ID     0718099.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 23    JULY 1969 18 HRS, 24 MINS, 22.602 SECS   G.M.T. ***121. HRS, 33. MINS, 10.191 SECS   G.E.T. ***   T    1.21552831+02 HRS
XL      6.1142147+02  YL      7.2789266+02  ZL      2.9851489+02  DXL     4.2225040+03  DYL    -3.0796651+03  DZL    -1.1449805+03
XS      9.9608523+02  YS     -2.3386364+01  ZS      6.5090471+00  DXS    -1.2831636+02  DYS    -5.3638890+03  DZS     9.8701524+01
ALTS    5.7887442+01  LATS    3.7429818-01  LONS   -1.3449591+00  VRS     5.3663312+03  PTR    -1.8535079-02  AZR    -8.8945984+01
LIN     1.7887849+02  LAN     1.8148949+01
*****************************************************************************************************************

ID     0718099.2
TRANSEARTH INJECTION BURN INITIATION
 24    JULY 1969  3 HRS, 16 MINS, 53.487 SECS   G.M.T. ***130. HRS, 25. MINS, 41.073 SECS   G.E.T. ***   T    1.30428076+02 HRS
XL     -5.5701943+02  YL     -7.6598897+02  ZL     -3.1276250+02  DXL    -4.4337805+03  DYL     2.8307519+03  DZL     1.0310686+03
XS     -9.9658433+02  YS      4.0261893+01  ZS     -5.3590484+00  DXS     2.1502293+02  DYS     5.3555532+03  DZS    -1.0196643+02
ALTS    5.8918164+01  LATS   -3.0784915-01  LONS    1.7768651+02  VRS     5.3608188+03  PTR     2.0116546-02  AZR    -9.1079040+01
LIN     1.7887474+02  LAN     1.3561736+01  LAP    -1.0479549+02  LTS     1.2294650+00  LNS     6.2581476+01  DEM    -2.2474941+01
THETA -4.7556754+00   BETA    1.5988478+01  MASS    3.6254823+04  DRTX    3.0353458+03  DRTY    8.6651379+02  DRTZ    2.9785001+01
*****************************************************************************************************************

ID     0718099.2
TRANSEARTH INJECTION BURN TERMINATION
 24    JULY 1969  3 HRS, 19 MINS, 22.364 SECS   G.M.T. ***130. HRS, 28. MINS,  9.951 SECS   G.E.T. ***   T    1.30469431+02 HRS
XL     -6.8810986+02  YL     -6.7393915+02  ZL     -2.6780961+02  DXL    -6.3747516+03  DYL     4.7777611+03  DZL     2.7090865+03
XS     -9.7827712+02  YS      2.0586966+02  ZS      1.6236246+00  DXS     1.2969013+03  DYS     8.2997296+03  DZS     7.1214082+02
ALTS    5.1211977+01  LATS    9.3054283-02  LONS    1.6811602+02  VRS     8.4305757+03  PTR     2.9999835+00  AZR    -8.5152609+01
LIN     1.7514241+02  LAN     1.6921104+02  LAP     1.7418873+02  SMAS   -2.0653948+03  ECCS    1.4829121+00  PERS    5.8968810+00
RPS     9.9740420+02  APOS   -5.1281938+03  RANS   -1.7130419+02  INCS    1.5452706+02  INMPS   1.7449848+02  SEM     1.1369723+02
RBVS    7.4449516+01  LTS     1.2294290+00  LNS     6.2560443+01  LTE     5.6838944+00  LNE    -6.6295058+00  THETA   4.5744193+00
BETA    1.3064102+01  PROP    9.7030674+03  BARC    9.5561739+00  DELV    3.1567509+03  MASS    2.6551756+04  PLCHNG 5.9011538+00
*****************************************************************************************************************

ID     0718099.2
ENTRY AND TOUCHDOWN
 26    JULY 1969 18 HRS, 25 MINS, 28.382 SECS   G.M.T. ***193. HRS, 34. MINS, 15.968 SECS   G.E.T. ***   T    1.93571102+02 HRS
X       3.0539681+03  Y       1.6452087+03  Z       5.3249059+02  DX     -1.9787654+04  DY      2.0947212+04  DZ      2.1806039+04
R       3.5095553+03  DEC     8.7269607+00  RA      2.8311870+01  V       3.6136412+04  PTH    -6.5000355+00  AZ      5.0806292+01
ALT     6.5888834+01  LAT     8.7837594+00  LON     1.6766917+02  VE      3.4966625+04  PTE    -6.6813626+00  AZE     4.9198468+01
SMA     1.6106053+05  ECC     9.7849202-01  INC     4.0000282+01  RAN     1.7771049+01  APF     2.6796651+01  RP      3.4640864+03
INMP    1.5655188+01  SEM     1.4626048+02  RBVS    8.5831163+01  RAM    -8.9800199+01  DEM    -2.8514052+01  RAS     1.2588757+02
DES     1.9357075+01  SPSPR   3.9196560+03  DVRES   1.6396639+03  PERNAD 1.3371081+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   2.2198035+01  LONTD   1.8499957+02  AZTD    5.3873933+01  SEATD  1.8979986+01  DTSUN   1.0539952+01
*****************************************************************************************************************

ID     0718099.2
CIRCUMLUNAR PERICYNTHION
 21    JULY 1969 19 HRS, 46 MINS, 42.620 SECS   G.M.T. *** 74. HRS, 55. MINS, 30.207 SECS   G.E.T. ***   T    7.49250574+01 HRS
XL     -9.3069875+02  YL     -3.3100421+02  ZL     -1.4258213+02  DXL    -3.0223855+03  DYL     7.0552742+03  DZL     3.3496578+03
XS     -9.9110963+02  YS      1.1695519+02  ZS     -1.0805871+01  DXS     9.7676624+02  DYS     8.3204919+03  DZS     4.6629109+02
ALTS    5.9551358+01  LATS   -6.2035577-01  LONS    1.7326997+02  VRS     8.3905950+03  PTR     2.5102324-05  AZR    -8.6814061+01
LIN     1.7674828+02  LAN     1.6228332+02  LAP    -3.7632746+00  LTS     1.2758703+00  LNS     9.0830805+01  DEM    -1.0241030+01
SEM     8.1649262+01  RBVS    9.7543874+01  SMAS   -2.1869012+03  ECCS    1.4563740+00  INCS    1.5486635+02  RANS   -1.7834067+02
APFS   -1.9655135+01  RPS     9.9804488+02  RM      2.0761932+05  DEMP    2.5064301+00  RAMP   -1.7952541+02
*****************************************************************************************************************

ID     0718099.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24    JULY 1969 14 HRS, 29 MINS,  1.136 SECS   G.M.T. ***141. HRS, 37. MINS, 48.725 SECS   G.E.T. ***   T    1.41630201+02 HRS
X       3.4777691+03  Y       1.6357058+02  Z      -4.4219386+02  DX     -1.6549410+03  DY      2.2803144+04  DZ      2.7989630+04
R       3.5095824+03  DEC    -7.2382855+00  RA      2.6928189+00  V       3.6140580+04  PTH    -6.5199655+00  AZ      3.9533422+01
ALT     6.5832949+01  LAT    -7.2856274+00  LON     2.0329670+02  VE      3.5185305+04  PTE    -6.7352976+00  AZE     3.7585735+01
SMA     1.6462488+05  ECC     9.7895916-01  INC     5.0842405+01  RAN     8.6294816+00  APF     3.8292806+00  RP      3.4638460+03
INMP    2.3154915+01  RAM    -1.2497468+02  DEM    -2.4368173+01  RAS     1.2375093+02  DES     1.9826598+01  SEM     1.1679902+02
RBVS    5.8383984+01  PERNAD 1.0031158+01  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD   9.7754109+00  LONTD   2.1633449+02
AZTD    3.7875128+01  SEATD -1.0082665+01  DTSUN  -7.2942543-01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0718108.2
LAUNCH TIME      18   JULY 1969    18 HRS,     1 MINS,  47.366 SECS   G.M.T.
LAUNCH AZIMUTH  108.                            INJECTION OPPORTUNITY     2
*****************************************************************************************************************

ID    0718108.2
EARTH PARKING ORBIT INSERTION
 18   JULY 1969 18 HRS, 13 MINS, 10.879 SECS  G.M.T. ***  0. HRS, 11. MINS, 23.513 SECS  G.E.T. ***  T   1.89864811-01 HRS
X     -2.9597337+03  Y      1.5725291+03  Z      1.1517784+03  DX    -1.4033626+04  DY    -1.8160764+04  DZ    -1.1267329+04
ALT    1.0122467+02  LAT    1.9080753+01  LON    3.0234145+02  V      2.5567727+04  PTH   -1.8862449-07  AZ     1.1777379+02
R      3.5439335+03  DEC    1.8965575+01  RA     1.5201795+02  RAS    1.1792280+02  DES    2.0964353+01  RAN    3.6967500+00
INC    3.3200205+01  MASS   2.9613124+05
*****************************************************************************************************************

ID    0718108.2
3.5 MINS PRIOR TO TLI INITIATION
 18   JULY 1969 22 HRS,  2 MINS, 12.619 SECS  G.M.T. ***  4. HRS,  0. MINS, 25.253 SECS  G.E.T. ***  T   4.00701481+00 HRS
X      3.5309302+03  Y      2.2297345+02  Z      4.3812877+01  DX    -1.5066209+03  DY     2.1378195+04  DZ     1.4026019+04
ALT    9.4302921+01  LAT    7.1414642-01  LON    9.6522849+01  V      2.5613011+04  PTH    3.8892821-02  AZ     5.6794280+01
*****************************************************************************************************************

ID    0718108.2
TRANSLUNAR INJECTION INITIATION
 18   JULY 1969 22 HRS,  5 MINS, 42.619 SECS  G.M.T. ***  4. HRS,  3. MINS, 55.253 SECS  G.E.T. ***  T   4.06534809+00 HRS
X      3.3695337+03  Y      9.4722174+02  Z      5.2215289+02  DX    -7.7835680+03  DY     2.0313881+04  DZ     1.3509634+04
ALT    9.5193094+01  LAT    8.5396509+00  LON    1.0773349+02  V      2.5607575+04  PTH    4.3529881-02  AZ     5.7772058+01
R      3.5388741+03  DEC    8.4848411+00  RA     1.5701395+01  RAS    1.1808494+02  DES    2.0935555+01  RAN    2.5285120+00
INC    3.3209405+01  MASS   2.9212969+05
*****************************************************************************************************************

ID    0718108.2
TRANSLUNAR INJECTION TERMINATION
 18   JULY 1969 22 HRS, 11 MINS,  2.307 SECS  G.M.T. ***  4. HRS,  9. MINS, 14.941 SECS  G.E.T. ***  T   4.15415019+00 HRS
X      3.6003927+03  Y      2.1173712+03  Z      1.3096183+03  DX    -2.1496805+04  DY     2.3514030+04  DZ     1.5998492+04
ALT    1.5765646+02  LAT    2.1457308+01  LON    1.2985064+02  V      3.5650721+04  PTH    6.6396168+00  AZ     6.3924379+01
R      3.6000559+03  DEC    2.1332348+01  RA     3.9154222+01  RAS    1.1808865+02  DES    2.0934894+01  DEM    7.0258974+00
SEM    4.7843624+01  RRVS   1.0727273+02  RAN    2.5285095+00  INC    3.3209404+01  ECC    9.7537860-01  SMA    1.4423715+05
RP     3.5513203+03  APF    2.8172586+01  INMP   5.1098370+00  C3TLI -4.7537164-01  DAZTLI 0.0000000     MASS   1.3712252+05
PROP   1.5500717+05
*****************************************************************************************************************

ID    0718108.2
TRANSLUNAR INJECTION + 2 HOURS
 19   JULY 1969  2 HRS, 11 MINS,  2.307 SECS  G.M.T. ***  6. HRS,  9. MINS, 14.941 SECS  G.E.T. ***  T   6.15415019+00 HRS
X     -2.0467993+04  Y      4.7148721+03  Z      3.6570414+03  DX    -1.4004394+04  DY    -1.9852048+03  DZ    -9.0559869+02
ALT    1.7876412+04  LAT    9.8873249+00  LON    2.2764229+02  V      1.4173363+04  PTH    6.5047334+01  AZ     1.2186530+02
R      2.1320007+04  DEC    9.8768445+00  RA     1.6702800+02  RAS    1.1817230+02  DES    2.0919971+01
*****************************************************************************************************************

ID    0718108.2
LUNAR ORBIT INSERTION BURN INITIATION
 21   JULY 1969 20 HRS, 36 MINS, 56.939 SECS  G.M.T. *** 74. HRS, 35. MINS,  9.571 SECS  G.E.T. ***  T   7.45859919+01 HRS
XL    -8.1107594+02  YL    -5.6539285+02  ZL    -2.4916562+02  DXL   -3.9175715+03  DYL    6.6657407+03  DZL    3.0403858+03
XS    -1.0070057+03  YS    -1.5829358+02  ZS    -2.1894485+01  DXS    2.4946397+01  DYS    8.3180022+03  DZS    3.2274461+02
ALTS   8.1112640+01  LATS  -1.2304339+00  LONS  -1.7136664+02  VRS    8.3242985+03  PTR   -9.1444836+00  AZR   -8.7947100+01
LIN    1.7760321+02  LAN    1.5805974+02  LAP    9.6734282+01  LTS    1.2751931+00  LNS    9.0404357+01  DEM   -1.0446624+01
THETA  1.5051542+01  BETA  -1.7390053+02  MASS   9.5199404+04  DRTX  -2.9206478+03  DRTY  -3.0131688+02  DRTZ   4.8035651+01
*****************************************************************************************************************

ID    0718108.2
LUNAR ORBIT INSERTION BURN TERMINATION
 21   JULY 1969 20 HRS, 43 MINS,  4.372 SECS  G.M.T. *** 74. HRS, 41. MINS, 17.005 SECS  G.E.T. ***  T   7.46880569+01 HRS
XL    -9.7118748+02  YL    -2.0719032+02  ZL    -9.5601086+01  DXL   -1.2652203+03  DYL    4.9724631+03  DZL    1.9301339+03
XS    -9.5263219+02  YS     2.6158796+02  ZS    -1.3545188+01  DXS    1.4290175+03  DYS    5.3086600+03  DZS   -6.8933660+01
ALTS   5.9139924+01  LATS  -7.7794700-01  LONS   1.6479742+02  VRS    5.4980645+03  PTR    1.4621006-01  AZR   -9.0716463+01
LIN    1.7894094+02  LAN    3.2066311+01  LAP   -9.0185690+00  SMAS   1.0524942+03  ECCS   5.2187147-02  PERS   2.1459989+00
RPS    9.9756754+02  APOS   1.1074209+03  RANS   1.7783414+02  INCS   1.5858408+02  LTS    1.2751105+00  LNS    9.0352374+01
LTE    3.1176049+00  LNE   -7.4643840+00  THETA -8.8430637+00  BETA  -1.7086335+02  PROP   2.3947342+04  BARC   2.4080341+01
DELV   2.9365414+03  MASS   7.1252062+04  PLCHNG-3.1376681+00
*****************************************************************************************************************

ID    0718108.2
CIRCULARIZATION BURN INITIATION
 22   JULY 1969  0 HRS, 59 MINS, 19.394 SECS  G.M.T. *** 78. HRS, 57. MINS, 32.024 SECS  G.E.T. ***  T   7.89588957+01 HRS
XL    -9.5748848+02  YL    -2.5547515+02  ZL    -1.1435618+02  DXL   -1.5349834+03  DYL    4.9077380+03  DZL    1.9009696+03
XS    -9.6583883+02  YS     2.4923523+02  ZS    -1.2892363+01  DXS    1.3760797+03  DYS    5.3229706+03  DZS   -7.2564672+01
ALTS   5.9068039+01  LATS  -7.4050422-01  LONS   1.6553046+02  VRS    5.4984431+03  PTR   -1.5291479-02  AZR   -9.0756421+01
LIN    1.7893987+02  LAN    2.9833515+01  LAP    1.3032888+00  LTS    1.2716453+00  LNS    8.8177344+01  DEM   -1.1514515+01
THETA  3.8741345-01  BETA   1.8000000+02  MASS   7.1232663+04  DRTX  -1.3850000+02  DRTY   0.0000000     DRTZ   0.0000000
*****************************************************************************************************************

ID    0718108.2
CIRCULARIZATION BURN TERMINATION
 22   JULY 1969  0 HRS, 59 MINS, 34.222 SECS  G.M.T. *** 78. HRS, 57. MINS, 46.856 SECS  G.E.T. ***  T   7.89630156+01 HRS
XL    -9.6110635+02  YL    -2.4362789+02  ZL    -1.0976595+02  DXL   -1.4298389+03  DYL    4.8010081+03  DZL    1.8606945+03
XS    -9.6244086+02  YS     2.6204078+02  ZS    -1.3066137+01  DXS    1.4085242+03  DYS    5.1710871+03  DZS   -6.9833033+01
ALTS   5.9067758+01  LATS  -7.5048617-01  LONS   1.6476943+02  VRS    5.3599401+03  PTR    3.5032242-03  AZR   -9.0746493+01
LIN    1.7893987+02  LAN    2.9831415+01  LAP   -1.5743044+02  SMAS   9.9726342+02  ECCS   3.0492940-04  PERS   1.9784841+00
RPS    9.9695933+02  APOS   9.9756749+02  RANS   1.7783117+02  INCS   1.5858164+02  LTS    1.2716420+00  LNS    8.8175246+01
LTE    3.3548152+00  LNE   -7.4794919+00  THETA -3.7139580-01  BETA  -1.8000000+02  PROP   9.6644727+02  BARC   7.5887546-01
DELV   1.3850202+02  MASS   7.0236216+04  PLCHNG 4.9788849-06
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0718108.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 22   JULY 1969 21 HRS, 36 MINS, 51.072 SECS  G.M.T. *** 99. HRS, 35. MINS,  3.703 SECS  G.E.T. ***  T   9.95843620+01 HRS
XL     7.5498405+02  YL     6.0131212+02  ZL     2.4717688+02  DXL    3.4890316+03  DYL   -3.7937351+03  DZL   -1.4358341+03
XS     9.9603430+02  YS    -2.3385113+01  ZS     6.5081041+00  DXS   -1.2851982+02  DYS   -5.3642183+03  DZS    9.3214710+01
ALTS   5.7836521+01  LATS   3.7426309-01  LONS  -1.3449559+00  VRS    5.3665672+03  PTR   -2.1009822-02  AZR   -8.9304620+01
LIN    1.7893375+02  LAN    1.9201770+01  SEASV  1.0984007+01
*****************************************************************************************************************

ID    0718108.2
CSM PLANE CHANGE BURN INITIATION
 23   JULY 1969  1 HRS, 59 MINS, 51.949 SECS  G.M.T. ***103. HRS, 58. MINS,  4.582 SECS  G.E.T. ***  T   1.03967939+02 HRS
XL     7.8983620+02  YL    -5.6942013+02  ZL    -2.1153241+02  DXL   -3.2582742+03  DYL   -3.9326951+03  DZL   -1.5917392+03
XS     1.3799701+02  YS    -9.8663416+02  ZS     1.8338710+01  DXS   -5.3133691+03  DYS   -7.4604232+02  DZS   -1.5515888+01
ALTS   5.7913243+01  LATS   1.0545793+00  LONS  -8.2037893+01  VRS    5.3655113+03  PTR    2.7405954-02  AZR   -9.0165955+01
LIN    1.7893235+02  LAN    1.6945491+01  LAP   -3.4775165+01  LTS    1.2509954+00  LNS    7.5445390+01  DEM   -1.7350138+01
THETA -5.3787739-05  BETA  -8.9999868+01  MASS   3.6329517+04  DRTX   0.0000000     DRTY  -1.8600000+01  DRTZ   0.0000000
*****************************************************************************************************************

ID    0718108.2
CSM PLANE CHANGE BURN TERMINATION
 23   JULY 1969  1 HRS, 59 MINS, 52.971 SECS  G.M.T. ***103. HRS, 58. MINS,  5.605 SECS  G.E.T. ***  T   1.03968224+02 HRS
XL     7.8928782+02  YL    -5.7008086+02  ZL    -2.1190153+02  DXL   -3.2618403+03  DYL   -3.9231417+03  DZL   -1.6380271+03
XS     1.3710312+02  YS    -9.8675927+02  ZS     1.8334532+01  DXS   -5.3139386+03  DYS   -7.4156319+02  DZS   -3.4201763+01
ALTS   5.7913666+01  LATS   1.0543386+00  LONS  -8.2089804+01  VRS    5.3655408+03  PTR    2.7432668-02  AZR   -9.0365775+01
LIN    1.7888369+02  LAN    2.7097834+01  LAP   -3.4538417+01  SMAS   9.9705135+02  ECCS   8.0499237-04  PERS   1.9778531+00
RPS    9.9624873+02  APOS   9.9785397+02  RANS   1.7749416+02  INCS   1.5840284+02  LTS    1.2509956+00  LNS    7.5445242+01
LTE    4.6376601+00  LNE   -7.3037068+00  THETA -7.2570759-05  BETA  -8.9799930+01  PROP   6.6615234+01  BARC   5.2339162-02
DELV   1.8600082+01  MASS   3.6262901+04  PLCHNG-1.9922055-01
*****************************************************************************************************************

ID    0718108.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 23   JULY 1969 19 HRS, 17 MINS, 50.229 SECS  G.M.T. ***121. HRS, 16. MINS,  2.862 SECS  G.E.T. ***  T   1.21267462+02 HRS
XL     6.0471664+02  YL     7.3274158+02  ZL     3.0048914+02  DXL    4.2495890+03  DYL   -3.0466174+03  DZL   -1.1316978+03
XS     9.9614090+02  YS    -2.3387422+01  ZS     6.5125945+00  DXS   -1.2923086+02  DYS   -5.3635643+03  DZS    9.8771303+01
ALTS   5.7943174+01  LATS   3.7448123-01  LONS  -1.3449447+00  VRS    5.3660300+03  PTR   -2.8385215-02  AZR   -8.8945102+01
LIN    1.7887764+02  LAN    1.8142917+01
*****************************************************************************************************************

ID    0718108.2
TRANSEARTH INJECTION BURN INITIATION
 24   JULY 1969  4 HRS, 10 MINS, 45.327 SECS  G.M.T. ***130. HRS,  8. MINS, 57.959 SECS  G.E.T. ***  T   1.30149433+02 HRS
XL    -5.6813922+02  YL    -7.5872848+02  ZL    -3.1025774+02  DXL   -4.3936967+03  DYL    2.8555736+03  DZL    1.0536755+03
XS    -9.9538647+02  YS     6.2315865+01  ZS    -5.7758613+00  DXS    3.3278056+02  DYS    5.3498537+03  DZS   -1.0040277+02
ALTS   5.8858416+01  LATS  -3.3181300-01  LONS   1.7641769+02  VRS    5.3611340+03  PTR    2.9097258-02  AZR   -9.1072902+01
LIN    1.7887383+02  LAN    1.3551380+01  LAP    8.2779148+01  LTS    1.2286875+00  LNS    6.2124870+01  DEM   -2.2636558+01
THETA -4.9475815+00  BETA   1.5954468+01  MASS   3.6331602+04  DRTX   3.0617774+03  DRTY   8.6610777+02  DRTZ   3.8111055+01
*****************************************************************************************************************

ID    0718108.2
TRANSEARTH INJECTION BURN TERMINATION
 24   JULY 1969  4 HRS, 13 MINS, 15.542 SECS  G.M.T. ***130. HRS, 11. MINS, 28.170 SECS  G.E.T. ***  T   1.30191158+02 HRS
XL    -6.9911494+02  YL    -6.6389795+02  ZL    -2.6410671+02  DXL   -6.3105181+03  DYL    4.8839509+03  DZL    2.7522539+03
XS    -9.7299880+02  YS     2.2922956+02  ZS     1.2788437+00  DXS    1.4998434+03  DYS    8.2924653+03  DZS    7.1263192+02
ALTS   6.1143672+01  LATS   7.3298961-02  LONS   1.6674337+02  VRS    8.4570890+03  PTR    2.9999623+00  AZR   -8.5163470+01
LIN    1.7515366+02  LAN    1.6760791+02  LAP   -4.9275519+00  SMAS  -2.0011375+03  ECCS   1.4983894+00  PERS   5.6238421+00
RPS    9.9734566+02  APOS  -4.3996205+03  RANS  -1.7148932+02  INCS   1.5447631+02  INMPS  1.7459276+02  SEM    1.1118491+02
RBVS   7.5364679+01  LTS    1.2286507+00  LNS    6.2133652+01  LTE    5.7150756+00  LNE   -6.5960803+00  THETA  4.4884109+00
BETA   9.9460206+00  PROP   9.7902256+03  BARC   9.6598701+00  DELV   3.1821549+03  MASS   2.6541376+04  PLCHNG 5.8798283+00
*****************************************************************************************************************

ID    0718108.2
ENTRY AND TOUCHDOWN
 26   JULY 1969 18 HRS, 26 MINS, 51.389 SECS  G.M.T. ***192. HRS, 25. MINS,  4.021 SECS  G.E.T. ***  T   1.92417784+02 HRS
X      3.0437550+03  Y      1.6631350+03  Z      5.3483183+02  DX    -1.9929303+04  DY     2.0828442+04  DZ     2.1801703+04
R      3.5094882+03  DEC    8.7658015+00  RA     2.8652587+01  V      3.6142985+04  PTH   -6.5000365+00  AZ     5.0813001+01
ALT    6.5823968+01  LAT    8.8228462+00  LON    1.6766308+02  VE     3.4973221+04  PTE   -6.6811642+00  AZE    4.9205886+01
SMA    1.6625939+05  ECC    9.7916487-01  INC    4.0000885+01  RAN    1.8063794+01  APF    2.6853359+01  RP     3.4640362+03
INMP   1.5765714+01  SEM    1.4627387+02  RBVS   8.6159559+01  RAM   -8.9783808+01  DEM   -2.8513851+01  RAS    1.2588851+02
DES    1.9356861+01  SPSPP  3.9092761+03  DVRES  1.6356541+03  PERNAD 1.0593981+01  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  2.2233012+01  LONTD  1.8499991+02  AZTD   5.3893984+01  SEATD  1.9299693+01  DTSUN  1.0515981+01
*****************************************************************************************************************

ID    0718108.2
CIRCUMLUNAR PERICYNTHION
 21   JULY 1969 20 HRS, 40 MINS, 14.578 SECS  G.M.T. *** 74. HRS, 38. MINS, 27.211 SECS  G.E.T. ***  T   7.46408920+01 HRS
XL    -9.2598332+02  YL    -3.4136134+02  ZL    -1.4710777+02  DXL   -3.1217070+03  DYL    7.0797853+03  DZL    3.2213222+03
XS    -9.9129498+02  YS     1.1324218+02  ZS    -1.1127541+01  DXS    9.4857166+02  DYS    8.3367828+03  DZS    3.3781665+02
ALTS   5.9310738+01  LATS  -6.3897736-01  LONS   1.7348298+02  VRS    8.3973717+03  PTR    1.4118974-05  AZR   -8.7694298+01
LIN    1.7760317+02  LAN    1.5802996+02  LAP    2.0952497+00  LTS    1.2751488+00  LNS    9.0376398+01  DEM   -1.0460092+01
SEM    8.2099444+01  RBVS   9.6876261+01  SMAS  -2.1703039+03  ECCS   1.4597532+00  INCS   1.5569114+02  RANS  -1.7903227+02
APFS  -2.0986228+01  RPS    9.9780424+02  RM     2.0751287+05  DEMP   2.5596020+00  RAMP  -1.7931065+02
*****************************************************************************************************************

ID    0718108.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 24   JULY 1969 15 HRS, 27 MINS, 15.812 SECS  G.M.T. ***141. HRS, 25. MINS, 28.445 SECS  G.E.T. ***  T   1.41424568+02 HRS
X      3.4675611+03  Y      2.9578858+02  Z     -4.5347562+02  DX    -1.8132271+03  DY     2.0594313+04  DZ     2.9642520+04
R      3.5095741+03  DEC   -7.4240020+00  RA     4.8756201+00  V      3.6139901+04  PTH   -6.1726932+00  AZ     3.5126805+01
ALT    6.5834231+01  LAT   -7.4725314+00  LON    1.9087849+02  VE     3.5280487+04  PTE   -6.3643320+00  AZE    3.3068643+01
SMA    1.6401703+05  ECC    9.7885244-01  INC    5.5210395+01  RAN    1.0069608+01  APF    3.4270913+00  RP     3.4685606+03
INMP   2.7666754+01  RAM   -1.2436495+02  DEM   -2.4518823+01  RAS    1.2379097+02  DES    1.9818057+01  SEM    1.1733397+02
RBVS   6.0336433+01  PERNAD 9.9564403+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  1.0555528+01  LONTD  2.0254999+02
AZTD   3.3389053+01  SEATD -9.0825152+00  DTSUN -6.5864637-01
*****************************************************************************************************************
```

TABLE III.- SUMMARY OF MISSIONS FOR JULY 18 LAUNCH WINDOW - Concluded

(b) Mission parameters across launch azimuth range (72° - 108°)

LAUNCH TIME

LAZ	DAY	MONTH	YEAR	HRS	MINS	SECS
72.	18	JULY	1969	13	37	54.348
81.	18	JULY	1969	14	31	.784
90.	18	JULY	1969	15	37	31.508
99.	18	JULY	1969	16	51	12.411
108.	18	JULY	1969	18	1	47.366

EARTH PARKING ORBIT INSERTION

LAZ	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	** G.E.T. HRS	MINS	SECS **	MASS	LAT	LON
72.	18	JULY	13	49	18.390	0.	11.	24.042	2.95882+05	3.2839+01	3.0581+02
81.	18	JULY	14	42	22.111	0.	11.	21.326	2.97165+05	2.9285+01	3.0555+02
90.	18	JULY	15	48	51.836	0.	11.	20.328	2.97646+05	2.5794+01	3.0485+02
99.	18	JULY	17	2	33.465	0.	11.	21.055	2.97298+05	2.2386+01	3.0377+02
108.	18	JULY	18	13	10.879	0.	11.	23.513	2.96131+05	1.9081+01	3.0234+02

3.5 MINS PRIOR TO TLI INITIATION

LAZ	OPP	** G.E.T. HRS	MINS	SECS **	ALT	LAT	LON	V	PTH	AZ
72.	1	2.	46.	1.424	9.8732+01	-3.6350-01	1.7949+02	2.55884+04	2.8035-02	5.7233+01
81.	1	2.	43.	11.333	9.7724+01	6.7903-01	1.6646+02	2.55936+04	3.8294-02	6.0356+01
90.	1	2.	39.	40.394	9.6509+01	1.2230+00	1.5087+02	2.56005+04	4.4582-02	6.1401+01
99.	1	2.	35.	52.037	9.5275+01	1.1208+00	1.3417+02	2.56076+04	4.4665-02	6.0124+01
108.	1	2.	32.	22.644	9.4334+01	4.6848-01	1.1868+02	2.56129+04	3.9226-02	5.6790+01
72.	2	4.	14.	8.755	9.8699+01	-1.0731-01	1.5734+02	2.55887+04	2.8017-02	5.7231+01
81.	2	4.	11.	19.802	9.7700+01	1.0297+00	1.4450+02	2.55938+04	3.8261-02	6.0365+01
90.	2	4.	7.	48.509	9.6489+01	1.6005+00	1.2898+02	2.56006+04	4.4527-02	6.1418+01
99.	2	4.	3.	58.150	9.5252+01	1.4686+00	1.1221+02	2.56077+04	4.4515-02	6.0139+01
108.	2	4.	0.	25.253	9.4303+01	7.1415-01	9.6523+01	2.56130+04	3.8893-02	5.6794+01

TRANSLUNAR INJECTION INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	** G.E.T. HRS	MINS	SECS **	** DELTA T FROM EPOI ** HRS	MINS	SECS	MASS	LAT	LON	AZ
72.	1	18	JULY 16	27	25.772	2.	49.	31.424	2.	38.	7.382	2.92604+05	7.3772+00	1.9071+02	5.7975+01
81.	1	18	JULY 17	17	42.117	2.	46.	41.333	2.	35.	20.006	2.93914+05	7.7290+00	1.7810+02	6.1276+01
90.	1	18	JULY 18	20	41.901	2.	43.	10.394	2.	31.	50.065	2.94429+05	8.0346+00	1.6266+02	6.2425+01
99.	1	18	JULY 19	30	34.448	2.	39.	22.037	2.	28.	.983	2.94118+05	8.2191+00	1.4581+02	6.1146+01
108.	1	18	JULY 20	37	40.010	2.	35.	52.644	2.	24.	29.131	2.92985+05	8.3004+00	1.2989+02	5.7716+01
72.	2	18	JULY 17	55	33.103	4.	17.	38.755	4.	6.	14.713	2.91747+05	7.6282+00	1.6855+02	5.8027+01
81.	2	18	JULY 18	45	50.586	4.	14.	49.802	4.	3.	28.475	2.93057+05	8.0692+00	1.5615+02	6.1361+01
90.	2	18	JULY 19	48	50.017	4.	11.	18.509	3.	59.	58.180	2.93572+05	8.3989+00	1.4078+02	6.2526+01
99.	2	18	JULY 20	58	40.560	4.	7.	28.150	3.	56.	7.095	2.93262+05	8.5553+00	1.2386+02	6.1236+01
108.	2	18	JULY 22	5	42.619	4.	3.	55.253	3.	52.	31.740	2.92130+05	8.5397+00	1.0773+02	5.7772+01

TRANSLUNAR INJECTION CUTOFF

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	** G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	ENERGY	PLCHNG
72.	1	18	JULY 16	32	46.494	2.	54.	52.146		3.2072+02	1.37095+05	1.55509+05	-4.7493-01	1.1327+00
81.	1	18	JULY 17	23	4.070	2.	52.	3.286		3.2195+02	1.37809+05	1.56106+05	-4.7578-01	9.0936-01
90.	1	18	JULY 18	26	4.381	2.	48.	32.873		3.2248+02	1.38068+05	1.56361+05	-4.7618-01	8.2895-01
99.	1	18	JULY 19	35	56.708	2.	44.	44.298		3.2226+02	1.37863+05	1.56255+05	-4.7618-01	9.2181-01
108.	1	18	JULY 20	43	1.305	2.	41.	13.940		3.2130+02	1.37199+05	1.55787+05	-4.7561-01	1.1537+00
72.	2	18	JULY 18	0	52.243	4.	22.	57.895		3.1914+02	1.37005+05	1.54742+05	-4.7460-01	0.0000
81.	2	18	JULY 18	51	11.182	4.	20.	10.398		3.2060+02	1.37610+05	1.55448+05	-4.7567-01	0.0000
90.	2	18	JULY 19	54	11.208	4.	16.	39.700		3.2119+02	1.37836+05	1.55737+05	-4.7626-01	0.0000
99.	2	18	JULY 21	4	1.451	4.	12.	49.040		3.2089+02	1.37671+05	1.55591+05	-4.7618-01	0.0000
108.	2	18	JULY 22	11	2.307	4.	9.	14.941		3.1969+02	1.37123+05	1.55007+05	-4.7537-01	0.0000

TRANSLUNAR INJECTION CUTOFF - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INMP
72.	1	1.6805+02	2.0209+01	2.1277+02	3.55981+04	7.0013+00	6.4785+01	3.5559+00
81.	1	1.6602+02	1.9277+01	2.0095+02	3.56073+04	6.9254+00	6.7925+01	4.6278-01
90.	1	1.6460+02	1.9114+01	1.8579+02	3.56141+04	6.9045+00	6.9092+01	5.7177-01
99.	1	1.6404+02	1.9794+01	1.6874+02	3.56173+04	6.9411+00	6.8041+01	7.2823-01
108.	1	1.6452+02	2.1195+01	1.5212+02	3.56161+04	7.0309+00	6.4975+01	4.0825+00
72.	2	1.6137+02	2.0483+01	1.9051+02	3.56318+04	6.6212+00	6.3758+01	4.5709+00
81.	2	1.6100+02	1.9603+01	1.7893+02	3.56326+04	6.6513+00	6.7205+01	1.2542+00
90.	2	1.6013+02	1.9450+01	1.6386+02	3.56366+04	6.6650+00	6.8481+01	1.5686-01
99.	2	1.5892+02	2.0116+01	1.4673+02	3.56431+04	6.6613+00	6.7310+01	1.5278+00
108.	2	1.5766+02	2.1457+01	1.2985+02	3.56507+04	6.6396+00	6.3924+01	5.1088+00

TRANSLUNAR INJECTION CUTOFF + 2 HOURS

LAZ	OPP	** HRS	G.E.T. MINS	** SECS	ALT	LAT	LON	V	PTH	AZ
72.	1	4.	54.	52.146	1.7890+04	1.0387+01	3.0934+02	1.41683+04	6.5036+01	1.2025+02
81.	1	4.	52.	3.285	1.7885+04	8.4594+00	2.9620+02	1.41681+04	6.5033+01	1.1775+02
90.	1	4.	48.	32.873	1.7884+04	7.6264+00	2.8060+02	1.41678+04	6.5035+01	1.1698+02
99.	1	4.	44.	44.298	1.7887+04	8.0782+00	2.6399+02	1.41672+04	6.5042+01	1.1811+02
108.	1	4.	41.	13.940	1.7894+04	9.6706+00	2.4872+02	1.41667+04	6.5053+01	1.2094+02
72.	2	6.	22.	57.895	1.7874+04	1.0604+01	2.8824+02	1.41746+04	6.5031+01	1.2119+02
81.	2	6.	20.	10.398	1.7873+04	8.5638+00	2.7500+02	1.41726+04	6.5030+01	1.1849+02
90.	2	6.	16.	39.700	1.7874+04	7.6853+00	2.5938+02	1.41716+04	6.5032+01	1.1765+02
99.	2	6.	12.	49.040	1.7875+04	8.1829+00	2.4282+02	1.41719+04	6.5038+01	1.1885+02
108.	2	6.	9.	14.941	1.7876+04	9.8873+00	2.2764+02	1.41734+04	6.5047+01	1.2187+02

LUNAR ORBIT INSERTION BURN INITIATION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS	** DELTA T FROM TLI ** HRS	MINS	SECS	MASS	LOI TARGET PARAMETERS DRTX	DRTY	** DRTZ
72.	1	21	JULY 15	24	44.317	73.	46.	49.966	70.	51.	57.824	9.51994+04	-2.9188+03	-3.7629+02	-2.2550+01
81.	1	21	JULY 16	18	39.192	73.	47.	38.406	70.	55.	35.123	9.51994+04	-2.9205+03	-4.3554+02	-1.1282+01
90.	1	21	JULY 17	19	50.707	73.	42.	19.198	70.	53.	46.328	9.51994+04	-2.9212+03	-4.4968+02	1.7745+01
99.	1	21	JULY 18	22	40.365	73.	31.	27.952	70.	46.	43.656	9.51994+04	-2.9221+03	-4.1375+02	-5.9307+01
108.	1	21	JULY 19	17	32.428	73.	15.	45.061	70.	34.	31.122	9.51994+04	-2.9196+03	-3.3437+02	5.7425+01
72.	2	21	JULY 16	44	52.060	75.	6.	57.710	70.	43.	59.816	9.51994+04	-2.9193+03	-3.4354+02	-2.6965+01
81.	2	21	JULY 17	39	27.636	75.	8.	26.851	70.	48.	16.456	9.51994+04	-2.9206+03	-4.0754+02	-4.2302+01
90.	2	21	JULY 18	41	16.769	75.	3.	45.261	70.	47.	5.563	9.51994+04	-2.9222+03	-4.2327+02	-5.3692+01
99.	2	21	JULY 19	43	21.619	74.	52.	9.205	70.	39.	20.165	9.51994+04	-2.9220+03	-3.8551+02	-4.0672+01
108.	2	21	JULY 20	36	56.939	74.	35.	9.571	70.	25.	54.631	9.51994+04	-2.9206+03	-3.0132+02	4.8036+01

LUNAR ORBIT INSERTION BURN INITIATION - CONCLUDED

SELENOGRAPHIC POLAR COORDINATES

LAZ	OPP	ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	8.1445+01	-1.4363+00	-1.7124+02	8.31508+03	-9.1690+00	-8.7191+01
81.	1	8.2233+01	-1.5959+00	-1.7110+02	8.30992+03	-9.3252+00	-8.6596+01
90.	1	8.2407+01	-1.6342+00	-1.7106+02	8.30946+03	-9.3632+00	-8.6454+01
99.	1	8.2092+01	-1.5371+00	-1.7110+02	8.31275+03	-9.2925+00	-8.6815+01
108.	1	8.1250+01	-1.3217+00	-1.7117+02	8.32068+03	-9.1394+00	-8.7614+01
72.	2	8.1331+01	-1.3457+00	-1.7115+02	8.31831+03	-9.1777+00	-8.7522+01
81.	2	8.1957+01	-1.5183+00	-1.7104+02	8.31307+03	-9.3233+00	-8.6879+01
90.	2	8.2383+01	-1.5612+00	-1.7100+02	8.31144+03	-9.3668+00	-8.6720+01
99.	2	8.2029+01	-1.4590+00	-1.7105+02	8.31527+03	-9.2776+00	-8.7109+01
108.	2	8.1113+01	-1.2304+00	-1.7107+02	8.32430+03	-9.1445+00	-8.7947+01

LUNAR ORBIT INSERTION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	21	JULY 15	30	52.452	73.	52.	58.104	3.6814+02	7.12062+04	2.3993+04	2.9431+03	-3.9202+00
81.	1	21	JULY 16	24	48.380	73.	53.	47.594	3.6919+02	7.11376+04	2.4062+04	2.9528+03	-4.5388+00
90.	1	21	JULY 17	26	.195	73.	48.	28.685	3.6949+02	7.11181+04	2.4081+04	2.9556+03	-4.6863+00
99.	1	21	JULY 18	28	49.442	73.	37.	37.031	3.6908+02	7.11449+04	2.4055+04	2.9518+03	-4.3113+00
108.	1	21	JULY 19	23	40.148	73.	21.	52.780	3.6772+02	7.12333+04	2.3966+04	2.9392+03	-3.4827+00
72.	2	21	JULY 16	50	59.818	75.	13.	5.468	3.6776+02	7.12308+04	2.3969+04	2.9396+03	-3.5780+00
81.	2	21	JULY 17	45	36.434	75.	14.	35.648	3.6880+02	7.11631+04	2.4036+04	2.9492+03	-4.2454+00
90.	2	21	JULY 18	47	25.995	75.	9.	54.484	3.6922+02	7.11352+04	2.4064+04	2.9532+03	-4.4105+00
99.	2	21	JULY 19	49	30.248	74.	58.	17.834	3.6863+02	7.11741+04	2.4025+04	2.9476+03	-4.0167+00
108.	2	21	JULY 20	43	4.372	74.	41.	17.005	3.6743+02	7.12521+04	2.3947+04	2.9365+03	-3.1377+00

LUNAR ORBIT INSEPTION BURN TERMINATION - CONCLUDED

LAZ	OPP	** ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR **	RPS	APOS
72.	1	6.1242+01	-7.7953-01	1.6463+02	5.48717+03	8.3423-01	-9.0714+01	9.9755+02	1.1075+03
81.	1	6.0353+01	-7.7901-01	1.6471+02	5.49162+03	5.0054-01	-9.0715+01	9.9806+02	1.1068+03
90.	1	5.9371+01	-7.7765-01	1.6473+02	5.49688+03	1.5219-01	-9.0715+01	9.9779+02	1.1072+03
99.	1	6.1927+01	-7.7791-01	1.6473+02	5.48380+03	1.0573+00	-9.0715+01	9.9691+02	1.1083+03
108.	1	5.9028+01	-7.7922-01	1.6469+02	5.49866+03	5.3016-02	-9.0715+01	9.9751+02	1.1075+03
72.	2	6.1181+01	-7.7840-01	1.6473+02	5.48752+03	8.6438-01	-9.0715+01	9.9733+02	1.1077+03
81.	2	6.0999+01	-7.7702-01	1.6479+02	5.48843+03	8.2460-01	-9.0716+01	9.9736+02	1.1077+03
90.	2	6.1387+01	-7.7661-01	1.6482+02	5.48641+03	8.8540-01	-9.0716+01	9.9742+02	1.1076+03
99.	2	6.1436+01	-7.7731-01	1.6479+02	5.48613+03	8.7584-01	-9.0716+01	9.9751+02	1.1075+03
108.	2	5.9140+01	-7.7795-01	1.6480+02	5.49806+03	1.4621-01	-9.0716+01	9.9757+02	1.1074+03

CIRCULARIZATION BURN INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS **	DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** CIRCULARIZATION TARGET PARAMETERS ** DRTX	DRTY	DRTZ
72.	1	21	JULY 19	42	32.973	78.	4.	38.624	4.	11.	40.519	7.11568+04	-1.3850+02	0.0000	0.0000
81.	1	21	JULY 20	38	25.047	78.	7.	24.260	4.	13.	36.665	7.10882+04	-1.3784+02	0.0000	0.0000
90.	1	21	JULY 21	42	12.735	78.	4.	41.226	4.	16.	12.541	7.10687+04	-1.3850+02	0.0000	0.0000
99.	1	21	JULY 22	39	4.962	77.	47.	52.551	4.	10.	15.519	7.10955+04	-1.3850+02	0.0000	0.0000
108.	1	21	JULY 23	40	31.954	77.	38.	44.587	4.	16.	51.806	7.11839+04	-1.3850+02	0.0000	0.0000
72.	2	21	JULY 21	2	35.614	79.	24.	41.266	4.	11.	35.798	7.11814+04	-1.3795+02	0.0000	0.0000
81.	2	21	JULY 21	57	23.355	79.	26.	22.570	4.	11.	46.922	7.11137+04	-1.3770+02	0.0000	-6.5993-01
90.	2	21	JULY 22	58	47.697	79.	21.	16.189	4.	11.	21.705	7.10858+04	-1.3771+02	0.0000	-6.4020-01
99.	2	22	JULY 0	0	53.449	79.	9.	41.036	4.	11.	23.202	7.11247+04	-1.3850+02	0.0000	0.0000
108.	2	22	JULY 2	59	19.394	78.	57.	32.024	4.	16.	15.019	7.12027+04	-1.3850+02	0.0000	0.0000

CIRCULARIZATION BURN INITIATION - CONCLUDED

LAZ	OPP	ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR
72.	1	5.9046+01	-5.3373-01	1.7963+02	5.49864+03	-1.5303-02	-9.0912+01
81.	1	5.9571+01	-6.2619-01	1.7360+02	5.49573+03	-5.2292-02	-9.0852+01
90.	1	5.9293+01	-7.3852-01	1.6560+02	5.49729+03	-1.5225-02	-9.0757+01
99.	1	5.8402+01	-4.5829-01	-1.7576+02	5.50218+03	-1.5513-02	-9.0952+01
108.	1	5.9012+01	-7.6656-01	1.6351+02	5.49873+03	-1.5309-02	-9.0730+01
72.	2	5.8830+01	-5.2795-01	1.8000+02	5.49980+03	-4.3854-04	-9.0916+01
81.	2	5.8862+01	-5.3592-01	1.7946+02	5.49959+03	-1.1957-02	-9.0911+01
90.	2	5.8913+01	-5.1463-01	-1.7921+02	5.49932+03	-1.1643-02	-9.0923+01
99.	2	5.9012+01	-5.1683-01	-1.7933+02	5.49878+03	-1.5309-02	-9.0922+01
108.	2	5.9068+01	-7.4050-01	1.6553+02	5.49844+03	-1.5291-02	-9.0756+01

CIRCULARIZATION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	21	JULY	19	42	47.792	78.	4.	53.441	1.4818+01	7.01910+04	9.6583+02	1.3850+02	4.1484-06
81.	1	21	JULY	20	38	39.781	78.	7.	38.995	1.4735+01	7.01279+04	9.6031+02	1.3784+02	4.1409-06
90.	1	21	JULY	21	42	27.536	78.	4.	56.027	1.4801+01	7.01041+04	9.6463+02	1.3850+02	4.8555-06
99.	1	21	JULY	22	39	19.768	77.	48.	7.355	1.4804+01	7.01305+04	9.6499+02	1.3850+02	3.4893-06
108.	1	21	JULY	23	40	46.778	77.	38.	59.412	1.4825+01	7.02177+04	9.6619+02	1.3850+02	4.9863-06
72.	2	21	JULY	21	2	50.380	79.	24.	56.029	1.4763+01	7.02191+04	9.6237+02	1.3796+02	3.5796-06
81.	2	21	JULY	21	57	38.080	79.	26.	37.295	1.4725+01	7.01539+04	9.5974+02	1.3771+02	3.5516-06
90.	2	21	JULY	22	59	2.418	79.	21.	30.907	1.4718+01	7.01264+04	9.5943+02	1.3772+02	3.8055-06
99.	2	22	JULY	0	1	8.261	79.	9.	55.847	1.4811+01	7.01593+04	9.6538+02	1.3850+02	3.5516-06
108.	2	22	JULY	0	59	34.222	78.	57.	46.856	1.4832+01	7.02362+04	9.6645+02	1.3850+02	4.9789-06

CIRCULARIZATION BURN TERMINATION - CONCLUDED

LAZ	OPP	** ALTS	LATS	SELENOGRAPHIC POLAR COORDINATES LONS	VRS	PTR	AZR **
72.	1	5.9046+01	-5.4579-01	1.7887+02	5.36014+03	3.5029-03	-9.0905+01
81.	1	5.9562+01	-6.3736-01	1.7284+02	5.35794+03	-3.4882-02	-9.0843+01
90.	1	5.9293+01	-7.4848-01	1.6484+02	5.35878+03	3.3732-03	-9.0747+01
99.	1	5.8402+01	-4.7089-01	-1.7652+02	5.36368+03	3.7918-03	-9.0946+01
108.	1	5.9012+01	-7.7619-01	1.6275+02	5.36023+03	3.5234-03	-9.0720+01
72.	2	5.8833+01	-5.4003-01	1.7924+02	5.36183+03	1.8920-02	-9.0909+01
81.	2	5.8863+01	-5.4789-01	1.7971+02	5.36188+03	1.4105-02	-9.0904+01
90.	2	5.8914+01	-5.2676-01	-1.7996+02	5.36160+03	1.4169-02	-9.0916+01
99.	2	5.9011+01	-5.2902-01	1.7991+02	5.36029+03	3.5017-03	-9.0915+01
108.	2	5.9068+01	-7.5049-01	1.6477+02	5.35994+03	3.5032-03	-9.0746+01

CSM LUNAR LANDING SITE PASS

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	** DELTA T FROM LOI ** HRS	MINS	SECS	LATS	LONS	AZR	SEA
72.	1	22	JULY	16	24	43.981	98.	46.	49.630	24.	53.	51.525	3.7413-01	-1.3449+00	-8.9006+01	8.3367+00
81.	1	22	JULY	17	18	57.853	98.	47.	57.069	24.	54.	9.474	3.7369-01	-1.3450+00	-8.9006+01	8.7967+00
90.	1	22	JULY	18	19	47.765	98.	42.	16.256	24.	53.	47.570	3.7358-01	-1.3450+00	-8.9006+01	9.3127+00
99.	1	22	JULY	19	22	50.709	98.	31.	38.297	24.	54.	1.265	3.7372-01	-1.3450+00	-8.9006+01	9.8474+00
108.	1	22	JULY	20	17	24.047	98.	15.	36.681	24.	53.	43.900	3.7423-01	-1.3450+00	-8.9005+01	1.0310+01
72.	2	22	JULY	17	45	17.772	100.	7.	23.422	24.	54.	17.954	3.7414-01	-1.3450+00	-8.9005+01	9.0201+00
81.	2	22	JULY	18	40	3.684	100.	9.	2.900	24.	54.	27.252	3.7365-01	-1.3450+00	-8.9006+01	9.4946+00
90.	2	22	JULY	19	41	53.883	100.	4.	22.374	24.	54.	27.890	3.7359-01	-1.3450+00	-8.9006+01	1.0009+01
99.	2	22	JULY	20	43	23.286	99.	52.	10.873	24.	53.	53.039	3.7387-01	-1.3450+00	-8.9005+01	1.0531+01
108.	2	22	JULY	21	36	51.072	99.	35.	3.703	24.	53.	46.698	3.7426-01	-1.3450+00	-8.9005+01	1.0984+01

LUNAR ORBIT PLANE CHANGE BURN INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	** DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** LOPC TARGET PARAMETERS ** DRTX	DRTY	DRTZ
72.	1	22	JULY	20	47	45.480	103.	9.	51.130	29.	16.	53.025	3.62843+04	0.0000	-1.8596+01	0.0000
81.	1	22	JULY	21	42	4.060	103.	11.	3.276	29.	17.	15.681	3.62212+04	0.0000	-1.8600+01	0.0000
90.	1	22	JULY	22	42	48.455	103.	5.	16.945	29.	16.	48.260	3.61974+04	0.0000	-1.8600+01	0.0000
99.	1	22	JULY	23	45	54.797	102.	54.	42.385	29.	17.	5.354	3.62238+04	0.0000	-1.8600+01	0.0000
108.	1	23	JULY	0	40	25.111	102.	38.	37.744	29.	16.	44.964	3.63110+04	0.0000	-1.8600+01	0.0000
72.	2	22	JULY	22	8	24.817	104.	30.	30.466	29.	17.	24.999	3.63124+04	0.0000	-1.8600+01	0.0000
81.	2	22	JULY	23	3	12.895	104.	32.	12.111	29.	17.	36.462	3.62472+04	0.0000	-1.8600+01	0.0000
90.	2	23	JULY	0	5	2.880	104.	27.	31.369	29.	17.	36.885	3.62197+04	0.0000	-1.8600+01	0.0000
99.	2	23	JULY	1	6	24.479	104.	15.	12.068	29.	16.	54.234	3.62526+04	0.0000	-1.8600+01	0.0000
108.	2	23	JULY	1	59	51.949	103.	58.	4.582	29.	16.	47.577	3.63295+04	0.0000	-1.8600+01	0.0000

LUNAR ORBIT PLANE CHANGE BURN INITIATION - CONCLUDED

		** SELENOGRAPHIC POLAR COORDINATES **					
LAZ	OPP	ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	5.8085+01	1.0535+00	-8.2038+01	5.36464+03	3.1172-02	-9.0166+01
81.	1	5.8656+01	1.0533+00	-8.2038+01	5.36214+03	6.3481-02	-9.0166+01
90.	1	5.7803+01	1.0533+00	-8.2038+01	5.36615+03	3.6894-02	-9.0166+01
99.	1	5.8395+01	1.0535+00	-8.2038+01	5.36308+03	-4.2395-03	-9.0166+01
108.	1	5.7934+01	1.0544+00	-8.2038+01	5.36540+03	2.3914-02	-9.0166+01
72.	2	5.8216+01	1.0539+00	-8.2038+01	5.36448+03	3.2647-03	-9.0166+01
81.	2	5.8394+01	1.0533+00	-8.2038+01	5.36375+03	2.3889-03	-9.0166+01
90.	2	5.8371+01	1.0533+00	-8.2038+01	5.36387+03	5.5986-03	-9.0166+01
99.	2	5.8087+01	1.0537+00	-8.2038+01	5.36458+03	3.0513-02	-9.0166+01
108.	2	5.7913+01	1.0544+00	-8.2038+01	5.36551+03	2.7406-02	-9.0166+01

LUNAR ORBIT PLANE CHANGE BURN TERMINATION

		** G.M.T.				** G.E.T. **							
LAZ	OPP	DAY	MONTH	HRS	MINS	SECS	HRS	MINS	SECS	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	22	JULY 21	47	46.501	103.	9.	52.149	1.0197+00	3.62178+04	6.6520+01	1.8596+01	-1.9921-01
81.	1	22	JULY 21	42	5.079	103.	11.	4.292	1.0162+00	3.61548+04	6.6416+01	1.8600+01	-1.9935-01
90.	1	22	JULY 22	42	49.473	103.	5.	17.965	1.0197+00	3.61311+04	6.6373+01	1.8600+01	-1.9920-01
99.	1	22	JULY 23	45	55.816	102.	54.	43.405	1.0197+00	3.61573+04	6.6422+01	1.8600+01	-1.9931-01
108.	1	23	JULY 0	40	26.132	102.	38.	38.764	1.0197+00	3.62444+04	6.6582+01	1.8600+01	-1.9922-01
72.	2	22	JULY 22	8	25.839	104.	30.	31.490	1.0231+00	3.62458+04	6.6584+01	1.8600+01	-1.9926-01
81.	2	22	JULY 23	3	13.915	104.	32.	13.130	1.0197+00	3.61807+04	6.6464+01	1.8600+01	-1.9929-01
90.	2	23	JULY 0	5	3.899	104.	27.	32.388	1.0197+00	3.61533+04	6.6413+01	1.8600+01	-1.9928-01
99.	2	23	JULY 1	6	25.499	104.	15.	13.087	1.0197+00	3.61861+04	6.6474+01	1.8600+01	-1.9925-01
108.	2	23	JULY 1	59	52.971	103.	58.	5.605	1.0231+00	3.62629+04	6.6615+01	1.8600+01	-1.9922-01

CSM LUNAR ASCENT PASS

		** G.M.T.					** G.E.T.			** DELTA T FROM LOI **					
LAZ	OPP	DAY	MONTH	HRS	MINS	SECS	HRS	MINS	SECS	HRS	MINS	SECS	LATS	LONS	AZR
72.	1	23	JULY 14	5	45.142	120.	27.	50.790		46.	34.	52.686	3.7468-01	-1.3449+00	-8.8946+01
81.	1	23	JULY 15	0	23.590	120.	29.	22.804		46.	35.	35.210	3.7430-01	-1.3450+00	-8.8947+01
90.	1	23	JULY 15	0	48.954	120.	23.	17.444		46.	34.	48.758	3.7410-01	-1.3449+00	-8.8947+01
99.	1	23	JULY 17	3	55.856	120.	12.	43.443		46.	35.	6.412	3.7427-01	-1.3450+00	-8.8946+01
108.	1	23	JULY 17	58	23.350	119.	56.	35.984		46.	34.	43.204	3.7452-01	-1.3449+00	-8.8945+01
72.	2	23	JULY 15	26	42.600	121.	48.	48.251		46.	35.	42.784	3.7457-01	-1.3450+00	-8.8946+01
81.	2	23	JULY 16	21	37.996	121.	50.	37.212		46.	36.	1.563	3.7414-01	-1.3450+00	-8.8946+01
90.	2	23	JULY 17	23	27.876	121.	45.	56.367		46.	36.	1.883	3.7405-01	-1.3450+00	-8.8946+01
99.	2	23	JULY 18	24	22.602	121.	33.	10.191		46.	34.	52.356	3.7430-01	-1.3450+00	-8.8946+01
108.	2	23	JULY 19	17	50.229	121.	15.	2.862		46.	34.	45.857	3.7448-01	-1.3449+00	-8.8945+01

TRANSEARTH INJECTION BURN INITIATION

		** G.M.T.					** G.E.T.			** DELTA T FROM LOI **				** TEI TARGET PARAMETERS **		
LAZ	OPP	DAY	MONTH	HRS	MINS	SECS	HRS	MINS	SECS	HRS	MINS	SECS	MASS	DRTX	DRTY	DRTZ
72.	1	23	JULY 22	56	16.140	129.	18.	21.791		55.	25.	23.687	3.62865+04	2.9261+03	8.7149+02	4.9094+00
81.	1	23	JULY 23	51	31.815	129.	20.	31.025		55.	26.	43.434	3.62235+04	2.9472+03	8.7407+02	6.4273+00
90.	1	24	JULY 0	52	12.033	129.	14.	40.520		55.	26.	11.835	3.61997+04	2.9712+03	8.6876+02	1.5631+01
99.	1	24	JULY 1	55	52.500	129.	4.	40.083		55.	27.	3.051	3.62260+04	2.9969+03	8.6807+02	1.9285+01
108.	1	24	JULY 2	50	40.892	128.	48.	53.521		55.	27.	.744	3.63131+04	3.0227+03	8.6715+02	2.8419+01
72.	2	24	JULY 0	18	.148	130.	40.	5.800		55.	27.	.332	3.63145+04	2.9561+03	8.6999+02	1.2551+01
81.	2	24	JULY 1	13	25.766	130.	42.	24.976		55.	27.	49.331	3.62494+04	2.9787+03	8.6865+02	1.6443+01
90.	2	24	JULY 2	15	44.527	130.	38.	13.018		55.	28.	18.534	3.62220+04	3.0059+03	8.6744+02	2.2589+01
99.	2	24	JULY 3	16	53.487	130.	25.	41.073		55.	27.	23.239	3.62548+04	3.0353+03	8.6651+02	2.9785+01
108.	2	24	JULY 4	10	45.327	130.	8.	57.959		55.	27.	40.954	3.63316+04	3.0618+03	8.6611+02	3.8111+01

TRANSEARTH INJECTION BURN INITIATION - CONCLUDED

LAZ	OPP	** SELENOGRAPHIC POLAR COORDINATES ** ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	5.8901+01	-1.9175-01	-1.7620+02	5.36095+03	2.4430-02	-9.1105+01
81.	1	5.9737+01	-2.1665-01	-1.7752+02	5.35704+03	8.9915-03	-9.1100+01
90.	1	5.8977+01	-2.4316-01	-1.7891+02	5.36055+03	3.9913-02	-9.1095+01
99.	1	5.8390+01	-2.7130-01	1.7962+02	5.36379+03	2.1069-03	-9.1088+01
108.	1	5.8784+01	-2.9589-01	1.7833+02	5.36154+03	2.8510-02	-9.1083+01
72.	2	5.8627+01	-2.2751-01	-1.7807+02	5.36296+03	2.2848-02	-9.1099+01
81.	2	5.8716+01	-2.5224-01	-1.7939+02	5.36271+03	1.7186-02	-9.1093+01
90.	2	5.8774+01	-2.8023-01	1.7913+02	5.36239+03	1.8680-02	-9.1086+01
99.	2	5.8918+01	-3.0785-01	1.7769+02	5.36082+03	2.0117-02	-9.1079+01
108.	2	5.8858+01	-3.3181-01	1.7642+02	5.36113+03	2.9097-02	-9.1073+01

TRANSEARTH INJECTION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	23	JULY	22	58	40.958	129.	20.	46.605	1.4481+02	2.68480+04	9.4385+03	3.0531+03	6.0125+00
81.	1	23	JULY	23	53	57.232	129.	22.	56.443	1.4542+02	2.67460+04	9.4775+03	3.0741+03	6.0177+00
90.	1	24	JULY	0	54	38.225	129.	17.	6.714	1.4619+02	2.66717+04	9.5280+03	3.0957+03	5.9619+00
99.	1	24	JULY	1	58	19.787	129.	7.	7.375	1.4729+02	2.66266+04	9.5994+03	3.1202+03	5.9365+00
108.	1	24	JULY	2	53	9.526	128.	51.	22.159	1.4864+02	2.66259+04	9.6872+03	3.1448+03	5.9139+00
72.	2	24	JULY	0	20	26.229	130.	42.	31.877	1.4608+02	2.67937+04	9.5209+03	3.0815+03	5.9793+00
81.	2	24	JULY	1	15	52.448	130.	44.	51.657	1.4668+02	2.66895+04	9.5600+03	3.1028+03	5.9542+00
90.	2	24	JULY	2	18	12.139	130.	40.	40.627	1.4761+02	2.66013+04	9.6206+03	3.1286+03	5.9270+00
99.	2	24	JULY	3	19	22.364	130.	28.	9.951	1.4888+02	2.65518+04	9.7031+03	3.1568+03	5.9012+00
108.	2	24	JULY	4	13	15.542	130.	11.	28.170	1.5021+02	2.65414+04	9.7902+03	3.1822+03	5.8793+00

TRANSEARTH INJECTION BURN TERMINATION - CONCLUDED

LAZ	OPP	** SELENOGRAPHIC POLAR COORDINATES ** ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	6.1265+01	1.9781-01	1.7455+02	8.32252+03	3.0003+00	-8.5087+01
81.	1	6.2078+01	1.7665-01	1.7320+02	8.34003+03	3.0036+00	-8.5073+01
90.	1	6.1335+01	1.4976-01	1.7173+02	8.36660+03	3.0000+00	-8.5119+01
99.	1	6.0686+01	1.2518-01	1.7016+02	8.39556+03	3.0000+00	-8.5133+01
108.	1	6.1096+01	1.0423-01	1.6878+02	8.41872+03	3.0002+00	-8.5146+01
72.	2	6.0972+01	1.6544-01	1.7258+02	8.35418+03	3.0000+00	-8.5108+01
81.	2	6.1042+01	1.4228-01	1.7121+02	8.37631+03	3.0000+00	-8.5123+01
90.	2	6.1086+01	1.1694-01	1.6966+02	8.40294+03	3.0000+00	-8.5139+01
99.	2	6.1212+01	9.3054-02	1.6812+02	8.43058+03	3.0000+00	-8.5153+01
108.	2	6.1144+01	7.3299-02	1.6674+02	8.45709+03	3.0000+00	-8.5163+01

ENTRY

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	** DELTA T FROM TEI ** HRS	MINS	SECS	PROP RESERVE	DV RESERVE
72.	1	26	JULY	18	18	31.569	196.	40.	37.221	67.	19.	50.616	4.21593+03	1.75345+03
81.	1	26	JULY	18	20	1.734	195.	49.	.944	66.	26.	4.501	4.11388+03	1.71440+03
90.	1	26	JULY	18	21	39.714	194.	44.	8.199	65.	27.	1.486	4.03957+03	1.68587+03
99.	1	26	JULY	18	23	21.298	193.	32.	8.883	64.	25.	1.508	3.99453+03	1.66854+03
108.	1	26	JULY	18	24	47.572	192.	23.	.206	63.	31.	38.046	3.99381+03	1.66827+03
72.	2	26	JULY	18	20	44.761	196.	42.	50.409	66.	0.	18.533	4.16160+03	1.73268+03
81.	2	26	JULY	18	22	13.786	195.	51.	13.000	65.	6.	21.342	4.05739+03	1.69272+03
90.	2	26	JULY	18	23	52.628	194.	46.	21.120	64.	5.	40.494	3.96924+03	1.65880+03
99.	2	26	JULY	18	25	28.382	193.	34.	15.968	63.	6.	6.016	3.91966+03	1.63966+03
108.	2	26	JULY	18	26	51.389	192.	25.	4.021	62.	13.	35.852	3.90928+03	1.63565+03

ENTRY - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INC	INMP
72.	1	6.5804+01	8.5138+00	1.6771+02	3.61115+04	-6.5000+00	5.0755+01	4.0002+01	1.5156+01
81.	1	6.5762+01	8.6192+00	1.6767+02	3.61165+04	-6.5000+00	5.0891+01	3.9888+01	1.5121+01
90.	1	6.5807+01	8.6496+00	1.6769+02	3.61218+04	-6.5000+00	5.0781+01	4.0001+01	1.5371+01
99.	1	6.5844+01	8.7138+00	1.6768+02	3.61279+04	-6.5000+00	5.0793+01	4.0000+01	1.5494+01
108.	1	6.5907+01	8.7622+00	1.6767+02	3.61334+04	-6.5000+00	5.0802+01	4.0001+01	1.5603+01
72.	2	6.5853+01	8.6121+00	1.6770+02	3.61184+04	-6.5000+00	5.0774+01	4.0001+01	1.5307+01
81.	2	6.5847+01	8.6717+00	1.6769+02	3.61237+04	-6.5000+00	5.0785+01	4.0001+01	1.5412+01
90.	2	6.5847+01	8.7319+00	1.6768+02	3.61300+04	-6.5000+00	5.0796+01	4.0001+01	1.5534+01
99.	2	6.5889+01	8.7838+00	1.6767+02	3.61364+04	-6.5000+00	5.0806+01	4.0000+01	1.5655+01
108.	2	6.5824+01	8.8228+00	1.6766+02	3.61430+04	-6.5000+00	5.0813+01	4.0001+01	1.5766+01

TOUCHDOWN

LAZ	OPP	** HRS	G.E.T. MINS	SECS	** HRS	ENTDT MINS	SECS **	ENTRG	LAT	LON	AZ	SEATD	DTSUN
72.	1	196.	54.	37.215	0.	14.	.000	1.2850+03	2.1957+01	1.8500+02	5.3732+01	1.7361+01	1.0662+01
81.	1	196.	3.	.938	0.	14.	.000	1.2850+03	2.2016+01	1.8500+02	5.3909+01	1.7716+01	1.0635+01
90.	1	194.	58.	8.194	0.	14.	.000	1.2850+03	2.2079+01	1.8500+02	5.3803+01	1.8095+01	1.0607+01
99.	1	193.	46.	8.877	0.	14.	.000	1.2850+03	2.2136+01	1.8500+02	5.3837+01	1.8489+01	1.0577+01
108.	1	192.	37.	.200	0.	14.	.000	1.2850+03	2.2179+01	1.8500+02	5.3862+01	1.8822+01	1.0552+01
72.	2	196.	56.	50.403	0.	14.	.000	1.2850+03	2.2045+01	1.8500+02	5.3784+01	1.7881+01	1.0623+01
81.	2	196.	5.	12.994	0.	14.	.000	1.2850+03	2.2098+01	1.8500+02	5.3815+01	1.8227+01	1.0597+01
90.	2	195.	0.	21.114	0.	14.	.000	1.2850+03	2.2152+01	1.8500+02	5.3846+01	1.8610+01	1.0568+01
99.	2	193.	49.	15.962	0.	14.	.000	1.2850+03	2.2198+01	1.8500+02	5.3874+01	1.8980+01	1.0540+01
108.	2	192.	39.	4.016	0.	14.	.000	1.2850+03	2.2233+01	1.8500+02	5.3894+01	1.9300+01	1.0516+01

CIRCUMLUNAR PERICYNTHION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS	** DELTA T FROM TLI ** HRS	MINS	SECS
72.	1	21	JULY 15	28		2.999	73.	50.	8.651	70.	55.	16.508
81.	1	21	JULY 16	22		1.507	73.	51.	.722	70.	58.	57.440
90.	1	21	JULY 17	23		13.859	73.	45.	42.349	70.	57.	9.478
99.	1	21	JULY 18	26		1.823	73.	34.	49.411	70.	50.	5.114
108.	1	21	JULY 19	29		50.170	73.	19.	2.801	70.	37.	48.862
72.	2	21	JULY 16	48		10.743	75.	10.	16.395	70.	47.	18.500
81.	2	21	JULY 17	42		49.716	75.	11.	48.931	70.	51.	38.536
90.	2	21	JULY 18	44		39.886	75.	7.	8.378	70.	50.	28.680
99.	2	21	JULY 19	46		42.620	74.	55.	30.207	70.	42.	41.167
108.	2	21	JULY 20	49		14.578	74.	39.	27.211	70.	29.	12.271

CIRCUMLUNAR PERICYNTHION - CONCLUDED

LAZ	OPP	** ALTS	LATS	SELENOGRAPHIC POLAR COORDINATES LONS	VRS	PTR	AZR	** LIN
72.	1	5.9491+01	-6.3280-01	1.7326+02	8.38870+03	-1.5357-04	-8.6910+01	1.7684+02
81.	1	5.9505+01	-6.1017-01	1.7313+02	8.38611+03	-9.6967-05	-8.6291+01	1.7623+02
90.	1	5.9490+01	-6.0420-01	1.7311+02	8.38628+03	-1.0590-04	-8.6144+01	1.7609+02
99.	1	5.9533+01	-6.1685-01	1.7320+02	8.38836+03	-1.6647-07	-8.6519+01	1.7646+02
108.	1	5.9458+01	-6.3818-01	1.7338+02	8.39373+03	2.2454-05	-8.7349+01	1.7727+02
72.	2	5.9348+01	-6.3343-01	1.7334+02	8.39202+03	1.9068-05	-8.7253+01	1.7718+02
81.	2	5.9251+01	-6.1283-01	1.7320+02	8.38921+03	-3.5245-07	-8.6585+01	1.7652+02
90.	2	5.9457+01	-6.0639-01	1.7317+02	8.38827+03	-2.6120-07	-8.6420+01	1.7636+02
99.	2	5.9551+01	-6.2036-01	1.7327+02	8.39059+03	2.5102-05	-8.6814+01	1.7675+02
108.	2	5.9311+01	-6.3899-01	1.7348+02	8.39737+03	1.4119-05	-8.7694+01	1.7760+02

CIRCUMLUNAR ENTRY

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS	** DELTA T FROM PERICYNTHION** HRS	MINS	SECS
72.	1	24	JULY 10	24	4.310	140.	46.	9.955	66.	56.	1.308
81.	1	24	JULY 11	10	52.065	140.	39.	51.277	66.	48.	50.555
90.	1	24	JULY 12	7	41.724	140.	30.	10.210	66.	44.	27.865
99.	1	24	JULY 13	10	5.730	140.	18.	53.315	66.	44.	3.908
108.	1	24	JULY 14	8	45.120	140.	6.	57.748	66.	47.	54.950
72.	2	24	JULY 11	42	49.403	142.	4.	55.052	66.	54.	38.657
81.	2	24	JULY 12	29	35.617	141.	58.	34.828	66.	46.	45.901
90.	2	24	JULY 13	27	6.969	141.	49.	35.455	66.	42.	27.077
99.	2	24	JULY 14	29	1.136	141.	37.	48.725	66.	42.	18.522
108.	2	24	JULY 15	27	15.812	141.	25.	28.445	66.	47.	1.234

CIRCUMLUNAR ENTRY - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INC	INMP
72.	1	6.5833+01	-8.4689+00	2.6257+02	3.61412+04	-6.5730+00	3.9540+01	5.0967+01	2.3093+01
81.	1	6.5834+01	-7.2772+00	2.5069+02	3.61413+04	-6.3893+00	4.2288+01	4.8125+01	2.0231+01
90.	1	6.5833+01	-7.2620+00	2.3642+02	3.61413+04	-6.6496+00	4.2883+01	4.7536+01	1.9670+01
99.	1	6.5832+01	-7.3279+00	2.2192+02	3.61409+04	-6.5649+00	4.1057+01	4.9344+01	2.1562+01
108.	1	6.5833+01	-7.6889+00	2.0916+02	3.61403+04	-6.3413+00	3.6995+01	5.3387+01	2.5736+01
72.	2	6.5834+01	-8.1806+00	2.4431+02	3.61407+04	-6.3395+00	3.7682+01	5.2761+01	2.4978+01
81.	2	6.5834+01	-7.1478+00	2.3218+02	3.61409+04	-6.2855+00	4.0758+01	4.9619+01	2.1812+01
90.	2	6.5834+01	-6.3834+00	2.1835+02	3.61409+04	-6.0624+00	4.1400+01	4.8908+01	2.1129+01
99.	2	6.5833+01	-7.2856+00	2.0330+02	3.61406+04	-6.5200+00	3.9533+01	5.0842+01	2.3155+01
108.	2	6.5834+01	-7.4725+00	1.9089+02	3.61399+04	-6.1727+00	3.5127+01	5.5210+01	2.7667+01

CIRCUMLUNAR TOUCHDOWN

LAZ	OPP	** HRS	G.E.T. MINS	SECS	** HRS	ENTOT MINS	** SECS	ENTRG	LAT	LON	AZ	SEATD	DTSUN
72.	1	141.	0.	9.949	0.	14.	.000	1.2850+03	8.6233+00	2.7557+02	3.7619+01	-1.2340+01	-8.9044-01
81.	1	140.	53.	51.271	0.	14.	.000	1.2850+03	9.1282+00	2.6454+02	4.0647+01	-1.1534+01	-8.3335-01
90.	1	140.	44.	10.204	0.	14.	.000	1.2850+03	8.9964+00	2.5044+02	4.1247+01	-1.1491+01	-8.2974-01
99.	1	140.	32.	53.309	0.	14.	.000	1.2850+03	9.3770+00	2.3541+02	3.9398+01	-1.0826+01	-7.8246-01
108.	1	140.	20.	57.742	0.	14.	.000	1.2850+03	9.9499+00	2.2140+02	3.5231+01	-1.0013+01	-7.2486-01
72.	2	142.	18.	55.046	0.	14.	.000	1.2850+03	9.3207+00	2.5675+02	3.5819+01	-1.1280+01	-8.1543-01
81.	2	142.	12.	34.823	0.	14.	.000	1.2850+03	9.6226+00	2.4558+02	3.9140+01	-1.0690+01	-7.7332-01
90.	2	142.	3.	35.449	0.	14.	.000	1.2850+03	1.0210+01	2.3198+02	3.9965+01	-9.7615+00	-7.0733-01
99.	2	141.	51.	48.719	0.	14.	.000	1.2850+03	9.7754+00	2.1633+02	3.7875+01	-1.0083+01	-7.2943-01
108.	2	141.	39.	28.439	0.	14.	.000	1.2850+03	1.0556+01	2.0255+02	3.3389+01	-9.0825+00	-6.5865-01

SUMMARY OF MISSIONS FOR JULY 21 LAUNCH WINDOW

TABLE IV.- SUMMARY OF MISSIONS FOR JULY 21 LAUNCH WINDOW

(a) Mission summaries for specific launch azimuths (72°, 81°, 90°, 99°, 108°)

```
*****************************************************************************************************************

ID     0721072.1
LAUNCH TIME      21   JULY 1969   14 HRS,    9 MINS,   7.419 SECS   G.M.T.
LAUNCH AZIMUTH   72.                          INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID     0721072.1
EARTH PARKING ORBIT INSERTION
 21   JULY 1969 14 HRS, 20 MINS, 31.461 SECS  G.M.T. ***  0. HRS, 11. MINS, 24.042 SECS  G.E.T. ***  T   1.90011725-01 HRS
X     -5.2408382+02  Y      2.9369151+03  Z      1.9129378+03  DX    -2.5066135+04  DY    -4.9792881+03  DZ     7.7733313+02
ALT    1.3337523+02  LAT   3.2838504+01  LON    3.0589793+02  V      2.5567727+04  PTH   -1.1789031-08  AZ     8.7930247+01
R      3.5439334+03  DEC   3.2668535+01  RA     1.0011777+02  RAS    1.2076378+02  DES    2.0436044+01  RAN    1.3948176+01
INC    3.2726784+01  MASS  2.9588213+05
*****************************************************************************************************************

ID     0721072.1
3.5 MINS PRIOR TO TLI INITIATION
 21   JULY 1969 17 HRS,  3 MINS,  5.153 SECS  G.M.T. ***  2. HRS, 53. MINS, 57.734 SECS  G.E.T. ***  T   2.89937061+00 HRS
X      2.5777182+03  Y      2.2118457+03  Z      1.0195198+03  DX    -1.7262603+04  DY     1.4758282+04  DZ     1.1768697+04
ALT    1.0045551+02  LAT   1.6655102+01  LON    2.0557020+02  V      2.5579417+04  PTH    1.6214630-02  AZ     6.1321668+01
*****************************************************************************************************************

ID     0721072.1
TRANSLUNAR INJECTION INITIATION
 21   JULY 1969 17 HRS,  6 MINS, 35.153 SECS  G.M.T. ***  2. HRS, 57. MINS, 27.734 SECS  G.E.T. ***  T   2.95770395+01 HRS
X      1.9074626+03  Y      2.6481642+03  Z      1.3836967+03  DX    -2.1321741+04  DY     1.0359955+04  DZ     9.5983948+03
ALT    1.0148409+02  LAT   2.3365567+01  LON    2.1829606+02  V      2.5575068+04  PTH    1.1126830-02  AZ     6.5355525+01
R      3.5436578+03  DEC   2.2931149+01  RA     5.4234937+01  RAS    1.2087879+02  DES    2.0413598+01  RAN    1.3104663+01
INC    3.2747738+01  MASS  2.9252664+05
*****************************************************************************************************************

ID     0721072.1
TRANSLUNAR INJECTION TERMINATION
 21   JULY 1969 17 HRS, 11 MINS, 54.935 SECS  G.M.T. ***  3. HRS,  2. MINS, 47.517 SECS  G.E.T. ***  T   3.04653242+00 HRS
X      4.3118224+02  Y      3.0696022+03  Z      1.8525479+03  DX    -3.4321271+04  DY     5.3506371+03  DZ     7.5544719+03
ALT    1.7625231+02  LAT   3.1726196+01  LON    2.4472911+02  V      3.5549967+04  PTH    4.9973372+00  AZ     7.9840077+01
R      3.6111369+03  DEC   3.0864504+01  RA     8.2004066+01  RAS    1.2088248+02  DES    2.0412877+01  DEM   -9.6055375+00
SEM    8.0350279+01  RAVS  1.4362836+02  RAN    1.1259577+01  INC    3.2336335+01  ECC    9.7039075-01  SMA    1.2012215+05
RP     3.5567266+03  APF   5.9346661+01  INMP   7.4381025+00  C3TLI -5.7080465-01  DAZTLI 1.0743332+00  MASS   1.3747337+05
PROP   1.5505327+05
*****************************************************************************************************************

ID     0721072.1
TRANSLUNAR INJECTION + 2 HOURS
 21   JULY 1969 19 HRS, 11 MINS, 54.935 SECS  G.M.T. ***  5. HRS,  2. MINS, 47.517 SECS  G.E.T. ***  T   5.04653239+00 HRS
X     -1.9510789+04  Y     -8.0125936+03  Z     -2.5793018+03  DX    -9.4186115+03  DY    -9.3859641+03  DZ    -4.6731664+03
ALT    1.7805325+04  LAT   -6.9786718+00  LON    3.3496964+02  V      1.4094149+04  PTH    6.4817016+01  AZ     1.2166698+02
R      2.1249089+04  DEC   -6.9711754+00  RA    -1.5767327+02  RAS    1.2096558+02  DES    2.0396607+01
*****************************************************************************************************************

ID     0721072.1
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 21   JULY 1969 23 HRS,  9 MINS,  7.418 SECS  G.M.T. ***  8. HRS, 59. MINS, 61.000 SECS  G.E.T. ***  T   8.99999388+00 HRS
X     -3.4764221+04  Y     -2.6412016+04  Z     -1.2134600+04  DX    -4.8614237+03  DY    -6.7900914+03  DZ    -3.6208190+03
ALT    4.1871285+04  LAT   -1.5540140+01  LON    2.9049419+02  V      9.1021487+03  PTH    7.2004317+01  AZ     1.1873671+02
R      4.5314392+04  DEC   -1.5532615+01  RA    -1.4277435+02  RAS    1.2112978+02  DES    2.0364334+01  DEM   -1.1067237+01
SEM    8.3354063+01  RAVS   7.9068316+01  RAN    1.1195706+01  INC    3.2347925+01  ECC    9.7020831-01  SMA    1.1941155+05
RP     3.5574728+03  APF    5.9423744+01  INMP   7.4169418+00  THETA -2.9903900+01  BETA  -1.5128089+02  MASS   9.6792101+04
DRTX  -1.5146335+01  DRTY  -8.2990210+00  DRTZ   9.9330770+00
*****************************************************************************************************************

ID     0721072.1
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 21   JULY 1969 23 HRS,  9 MINS, 10.335 SECS  G.M.T. ***  9. HRS,  0. MINS,  2.916 SECS  G.E.T. ***  T   9.00081003+00 HRS
X     -3.4765555+04  Y     -2.6415272+04  Z     -1.2136334+04  DX    -4.8521132+03  DY    -6.7789468+03  DZ    -3.6033867+03
ALT    4.1875438+04  LAT   -1.5540956+01  LON    2.9039355+02  V      9.0875179+03  PTH    7.2076367+01  AZ     1.1856628+02
R      4.5318545+04  DEC   -1.5533431+01  RA    -1.4277280+02  RAS    1.2112981+02  DES    2.0364327+01  DEM   -1.1067434+01
SEM    8.3354472+01  RAVS   7.9066671+01  RAN    1.1036026+01  INC    3.2200836+01  ECC    9.7013791-01  SMA    1.1785186+05
RP     3.5134082+03  APF    5.9357795+01  INMP   7.2616557+00  THETA -2.9905483+01  BETA  -1.5111040+02  MASS   9.6602007+04
PROP   1.9009375+02  DELV   1.9923551+01  MASS   9.6602007+04  PLCHNG-1.7001542-01
*****************************************************************************************************************

ID     0721072.1
LUNAR ORBIT INSERTION BURN INITIATION
 24   JULY 1969 18 HRS, 59 MINS, 24.278 SECS  G.M.T. *** 76. HRS, 50. MINS, 16.859 SECS  G.E.T. ***  T   7.68380165+01 HRS
XL    -4.8110572+02  YL    -8.2021506+02  ZL    -3.3411330+02  DXL   -6.7642357+03  DYL    4.5056510+03  DZL    1.3226000+03
XS    -1.0032429+03  YS     9.6593530+01  ZS    -4.7117539+00  DXS    1.6592840+03  DYS    8.0680771+03  DZS   -4.7400200+02
ALTS   6.9398784+01  LATS  -2.6785064-01  LONS   1.7450101+02  VRS    8.2505616+03  PTR   -6.0967459+00  AZR   -9.3343958+01
LIN    1.7664170+02  LAN   -9.2956109-01  LAP    1.8915050+02  LTS    1.2157135+00  LNS    5.4593182+01  DEM   -2.5047977+01
THETA  9.5305207+00  BETA  -1.7792564+02  MASS   9.4997318+04  DRTX  -2.7915178+03  DRTY  -1.0026720+02  DRTZ   2.9276261+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721072.1
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 19 HRS,  5 MINS, 17.073 SECS   G.M.T. *** 76. HRS, 56. MINS,  9.651 SECS   G.E.T. ***  T    7.69360142+01 HRS
XL     -7.8389758+02  YL     -5.6839525+02  ZL     -2.5903748+02  DXL    -3.4791000+03  DYL     4.0255186+03  DZL     1.2158013+03
XS     -8.8032695+02  YS      4.7832743+02  ZS     -2.9937840+01  DXS     2.5075251+03  DYS     4.8505347+03  DZS    -3.8521423+02
ALTS    6.3838233+01  LATS   -1.7115761+00  LONS    1.5148246+02  VRS     5.4739161+03  PTR     1.2974538+00  AZR    -9.3999366+01
LIN     1.7563941+02  LAN    -5.4467396+00  LAP    -1.9659400+02  SMAS    1.0526222+03  ECCS    5.2887999-02  PERS    2.1454901+00
RPS     9.9695110+02  APOS    1.1082933+03  RANS    1.6926019+02  INCS    1.5981250+02  LTS     1.2156266+00  LNS     5.4543360+01
LTE     6.1625919+00  LNE    -5.9487271+00  THETA  -1.3484288+01  BETA   -1.7682460+02  PROP    2.2993340+04  BARC    2.3006008+01
DELV    2.8086151+03  MASS    7.2003979+04  PLCHNG-1.0455776+00
*****************************************************************************************************************

ID     0721072.1
CIRCULARIZATION BURN INITIATION
 24    JULY 1969 23 HRS, 13 MINS, 53.144 SECS   G.M.T. *** 81. HRS,  4. MINS, 45.723 SECS   G.E.T. ***  T    8.10793676+01 HRS
XL     -4.1412415+02  YL     -8.4338640+02  ZL     -3.3323902+02  DXL    -4.9772205+03  DYL     2.2582363+03  DZL     4.7445777+02
XS     -9.9464310+02  YS      6.7144818+01  ZS      4.9302654+00  DXS     3.6895830+02  DYS     5.4739792+03  DZS    -4.1657524+02
ALTS    5.8425556+01  LATS    2.8335755-01  LONS    1.7613803+02  VRS     5.5021917+03  PTR    -1.5525180-02  AZR    -9.4342033+01
LIN     1.7563602+02  LAN    -7.5776785+00  LAP    -1.7629378+02  LTS     1.2119462+03  LNS     5.2436818+01  DEM    -2.5643603+01
THETA   3.9203493-01  BETA    1.8000000+02  MASS    7.1954579+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721072.1
CIRCULARIZATION BURN TERMINATION
 24    JULY 1969 23 HRS, 14 MINS,  8.129 SECS   G.M.T. *** 81. HRS,  5. MINS,   .710 SECS   G.E.T. ***  T    8.10835304+01 HRS
XL     -4.2620827+02  YL     -8.3781458+02  ZL     -3.3205490+02  DXL    -4.8221300+03  DYL     2.2601040+03  DZL     4.8577939+02
XS     -9.9365818+02  YS      8.0469030+01  ZS      3.9154399+00  DXS     4.2973500+02  DYS     5.3309830+03  DZS    -4.0636842+02
ALTS    5.8425325+01  LATS    2.2503212-01  LONS    1.7537014+02  VRS     5.3636915+03  PTR     4.0526745-03  AZR    -9.4345098+01
LIN     1.7563602+02  LAN    -7.5799546+00  LAP     1.7122320+02  SMAS    9.9739859+02  ECCS    4.8618050-04  PERS    1.9789864+00
RPS     9.9691367+02  APOS    9.9788350+02  RANS    1.6924457+02  INCS    1.5980279+02  LTS     1.2119426+00  LNS     5.2434700+01
LTE     6.2628379+00  LNE    -5.7370623+00  THETA  -3.7569028-01  BETA   -1.7999011+02  PROP    9.7665433+02  BARC    7.6784798-01
DELV    1.3850255+02  MASS    7.0977925+04  PLCHNG 5.7406953-06
*****************************************************************************************************************

ID     0721072.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 25    JULY 1969 20 HRS,  8 MINS, 28.582 SECS   G.M.T. ***101. HRS, 59. MINS, 21.160 SECS   G.E.T. ***  T    1.01989211+02 HRS
XL      7.7614896+02  YL      5.6921516+02  ZL      2.6122962+02  DXL     3.3375001+03  DYL    -3.9959068+03  DZL    -1.2163553+03
XS      7.4131885+02  YS     -6.6605667+02  ZS      3.0779680+01  DXS    -3.5844078+03  DYS    -3.9711547+03  DZS     3.7394136+02
ALTS    5.8568423+01  LATS    1.7690235+00  LONS   -4.1938909+01  VRS     5.3626375+03  PTR    -7.1281565-03  AZR    -8.5399345+01
LIN     1.7561522+02  LAN    -1.8186418+01  SEASV  6.2849504+00
*****************************************************************************************************************

ID     0721072.1
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  1 HRS, 30 MINS, 49.071 SECS   G.M.T. ***107. HRS, 21. MINS, 41.650 SECS   G.E.T. ***  T    1.07361569+02 HRS
XL     -7.6954078+02  YL      6.1135068+02  ZL      1.6810975+02  DXL     3.3811654+03  DYL     3.8118715+03  DZL     1.6183248+03
XS      5.4229553+02  YS      8.3339696+02  ZS     -7.4622845+01  DXS     4.4977125+03  DYS    -2.9183892+03  DZS     8.5912572+01
ALTS    5.8604030+01  LATS   -4.2920329+00  LONS    5.6947747+01  VRS     5.3622563+03  PTR     5.3763418-03  AZR    -8.9379018+01
LIN     1.7560996+02  LAN    -2.0893937+01  LAP    -8.4374539+00  LTS     1.1880603+00  LNS     3.9078919+01  DEM    -2.8137174+01
THETA  -1.6221699-05  BETA    8.9999980+01  MASS    3.7071226+04  DRTX    0.0000000     DRTY    7.3702687+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721072.1
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  1 HRS, 30 MINS, 53.192 SECS   G.M.T. ***107. HRS, 21. MINS, 45.773 SECS   G.E.T. ***  T    1.07362715+02 HRS
XL     -7.6724386+02  YL      6.1392375+02  ZL      1.6922977+02  DXL     3.3913327+03  DYL     3.7748475+03  DZL     1.6841751+03
XS      5.4534342+02  YS      8.3141365+02  ZS     -7.4539188+01  DXS     4.4890571+03  DYS    -2.9294513+03  DZS     1.6085516+02
ALTS    5.8604376+01  LATS   -4.2872108+00  LONS    5.6738205+01  VRS     5.3627597+03  PTR     5.3780398-03  AZR    -8.8275934+01
LIN     1.7537778+02  LAN    -1.1270655+01  LAP    -8.7623928+01  SMAS    9.9741019+02  ECCS    3.2694491-04  PERS    1.9789209+00
RPS     9.9708410+02  APOS    9.9773627+02  RANS    1.6804438+02  INCS    1.5903518+02  LTS     1.1880592+00  LNS     3.9378338+01
LTE     6.6180358+00  LNE    -4.1061140+00  THETA   1.7177926-03  BETA    8.9209575+01  PROP    2.6862012+02  BARC    2.0853768-01
DELV    7.3702684+01  MASS    3.6802605+04  PLCHNG 7.8984868-01
*****************************************************************************************************************

ID     0721072.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 17 HRS, 49 MINS, 57.383 SECS   G.M.T. ***123. HRS, 40. MINS, 49.961 SECS   G.E.T. ***  T    1.23680545+02 HRS
XL      6.3058090+02  YL      7.0526748+02  ZL      3.1546932+02  DXL     4.1226194+03  DYL    -3.2812474+03  DZL    -9.0353841+02
XS      7.4147553+02  YS     -6.6619725+02  ZS      3.0831271+01  DXS    -3.5825098+03  DYS    -3.9694953+03  DZS     3.9978213+02
ALTS    5.8780425+01  LATS    1.7716127+00  LONS   -4.1938900+01  VRS     5.3620047+03  PTR     4.8142829-03  AZR    -8.5722256+01
LIN     1.7535862+02  LAN    -1.9544130+01
*****************************************************************************************************************

ID     0721072.1
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  2 HRS, 25 MINS, 20.492 SECS   G.M.T. ***132. HRS, 16. MINS, 13.073 SECS   G.E.T. ***  T    1.32270298+02 HRS
XL      3.9642920+02  YL     -8.9874421+02  ZL     -3.1447421+02  DXL    -5.0891583+03  DYL    -1.3562287+03  DZL    -9.1900381+02
XS     -9.8144364+02  YS     -1.7101477+02  ZS      4.5036419+01  DXS    -9.3386709+02  DYS     5.2681835+03  DZS    -3.6018871+02
ALTS    5.8752725+01  LATS    2.5884025+00  LONS   -1.7011552+02  VRS     5.3624249+03  PTR    -6.6824539-03  AZR    -9.3355039+01
LIN     1.7534806+02  LAN    -2.3865390+01  LAP    -1.5419757+02  LTS     1.1645534+00  LNS     2.6425049+01  DEM    -2.8326716+01
THETA  -4.5080503+00  BETA    7.0369562+00  MASS    3.6871306+04  DRTX    3.0112473+03  DRTY    3.7053717+02  DRTZ    1.3402704+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721072.1
TRANSEARTH INJECTION BURN TERMINATION
 27   JULY 1969  2 HRS, 27 MINS, 46.852 SECS  G.M.T. ***132. HRS, 18. MINS, 39.431 SECS  G.E.T. ***  T   1.32310953+02 HRS
XL      1.3792314+02  YL     -9.3157615+02  ZL     -3.3501805+02  DXL    -8.1997118+03  DYL    -1.4002927+03  DZL    -7.8930794+02
XS     -9.9879542+02  YS     -8.5523077+00  ZS      3.7795780+01  DXS    -5.1882272+02  DYS     8.3525839+03  DZS    -2.3235827+02
ALTS    6.1053364+01  LATS    2.1670370+00  LONS   -1.7950941+02  VRS     8.3719066+03  PTR     3.0001956+00  AZR    -9.1707404+01
LIN     1.7723935+02  LAN    -5.1205821+01  LAP     1.7107648+01  SMAS   -2.2256772+03  ECCS    1.4480539+00  PERS    6.5964611+00
RPS     9.9722324+02  APOS   -5.4485775+03  RANS    1.7467530+02  INCS    1.5988539+02  INMPS   1.7144485+02  SEM     1.5393557+02
RRVS    2.6122150+01  LTS     1.1645145+00  LNS     2.6404404+01  LTE     6.4662948+00  LNE    -2.1805892+00  THETA   4.8211863+00
BETA    4.4937578+00  PROP    9.5389907+03  BARC    9.3729453+00  DELV    3.0339918+03  MASS    2.7332315+04  PLCHNG  2.5373331+00
*****************************************************************************************************************

ID     0721072.1
ENTRY AND TOUCHDOWN
 29   JULY 1969 21 HRS, 30 MINS, 13.495 SECS  G.M.T. ***199. HRS, 21. MINS,  6.071 SECS  G.E.T. ***  T   1.99351686+02 HRS
X       8.3914574+02  Y       3.2369170+03  Z       1.0627258+03  DX     -3.0680021+04  DY     -2.6449831+03  DZ      1.8814712+04
R       3.5087295+03  DEC     1.7630697+01  RA      7.5466455+01  V       3.6086743+04  PTH    -6.4900188+00  AZ      5.4073038+01
ALT     6.5859788+01  LAT     1.7739972+01  LON     1.6555251+02  VE      3.4905761+04  PTE    -6.6442669+00  AZE     5.2625901+01
SMA     1.2671999+05  ECC     9.7266988-01  INC     3.9490523+01  RAN     5.2781588+01  APF     4.1604904+01  RP      3.4632738+03
INMP    3.1208766+01  SEM     1.6858716+02  RBVS    1.2935054+02  RAM    -3.9014172+01  DEM    -1.8318965+01  RAS     1.2895506+02
DES     1.8634575+01  SPSPR   4.7002151+03  DVRES   1.9367443+03  PERNAD  8.4738694+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   2.9615169+01  LONTD   1.8499976+02  AZTD    6.0511531+01  SEATD   6.0177800+01  DTSUN   7.2820274+00
*****************************************************************************************************************

ID     0721072.1
CIRCUMLUNAR PERICYNTHION
 24   JULY 1969 19 HRS,  3 MINS, 28.659 SECS  G.M.T. *** 76. HRS, 54. MINS, 21.240 SECS  G.E.T. ***  T   7.69059000+01 HRS
XL     -8.3073727+02  YL     -1.3443085+03  ZL     -7.2474377+02  DXL    -5.8326924+03  DYL     2.9305624+03  DZL     1.2498976+03
XS     -1.7214299+03  YS      1.7201342+02  ZS     -1.7214495+02  DXS     6.5868846+02  DYS     6.6413177+03  DZS     4.9438011+01
ALTS    8.0005278+02  LATS   -5.6825448+00  LONS    1.7429368+02  VRS     5.6740853+03  PTR    -3.4389984-06  AZR    -8.9573525+01
LIN     1.7430140+02  LAN     8.8611088+01  LAP     1.0420896+02  LTS     1.2156530+00  LNS     5.4558666+01  DEM    -2.5057831+01
SEM     1.1932561+02  RBVS    6.0293477+01  SMAS   -2.5017090+03  ECCS    1.6949435+00  INCS    1.5278531+02  RANS    1.7518381+02
APES   -6.5718078+01  RPS     1.7385463+03  RM      1.9888487+05  DEMP    4.8919139-01  RAMP   -1.7977808+02
*****************************************************************************************************************

ID     0721072.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27   JULY 1969 16 HRS, 14 MINS, 16.102 SECS  G.M.T. ***146. HRS,  5. MINS,  8.681 SECS  G.E.T. ***  T   1.46085745+02 HRS
X       2.7048131+03  Y       2.0468386+03  Z       8.9864204+02  DX     -2.5374034+04  DY      1.8940561+04  DZ      1.7334187+04
R       3.5090054+03  DEC     1.4838532+01  RA      3.7116226+01  V       3.6097929+04  PTH    -6.4760147+00  AZ      5.7992635+01
ALT     6.5832538+01  LAT     1.4932266+01  LON     2.0837889+02  VE      3.4841025+04  PTE    -6.6591913+00  AZE     5.6664326+01
SMA     1.3336786+05  ECC     9.7402843-01  INC     3.4945123+01  RAN     1.4836237+01  APF     3.9683338+01  RP      3.4637734+03
INMP    1.0663398+01  RAM    -7.4314574+01  DEM    -2.7445433+01  RAS     1.2678133+02  DES     1.9152428+01  SEM     1.5896446+02
RBVS    9.5124227+01  PERNAD  8.8996482+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD   2.5676943+01  LONTD   2.2811582+02
AZTD    6.3576363+01  SEATD   2.8844412+01  DTSUN   9.7632631+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721081.1
LAUNCH TIME      21   JULY 1969   14 HRS,   33 MINS,  42.338 SECS   G.M.T.
LAUNCH AZIMUTH   81.                          INJECTION OPPORTUNITY    1
*****************************************************************************************************************

ID     0721081.1
EARTH PARKING ORBIT INSERTION
 21   JULY 1969 14 HRS, 45 MINS,  3.665 SECS  G.M.T. ***  0. HRS, 11. MINS, 21.326 SECS  G.E.T. ***  T   1.89257342-01 HRS
X     -8.5364765+02  Y      2.9757909+03  Z      1.7249402+03  DX    -2.4794082+04  DY    -5.8489747+03  DZ    -2.1798348+03
ALT    1.0274514+02  LAT    2.9285035+01  LON    3.0554547+02  V      2.5567727+04  PTH   -4.0082705-07  AZ     9.5600888+01
R      3.5439334+03  DEC    2.9125906+01  RA     1.0600628+02  RAS    1.2078078+02  DES    2.0432731+01  RAN    4.6148285+00
INC    2.9613119+01  MASS   2.9716536+05
*****************************************************************************************************************

ID     0721081.1
3.5 MINS PRIOR TO TLI INITIATION
 21   JULY 1969 17 HRS, 26 MINS, 13.119 SECS  G.M.T. ***  2. HRS, 52. MINS, 30.781 SECS  G.E.T. ***  T   2.87521690+00 HRS
X      2.5993072+03  Y      2.1343960+03  Z      1.1139519+03  DX    -1.7353667+04  DY     1.6055929+04  DZ     9.7663834+03
ALT    1.0022452+02  LAT    1.8436971+01  LON    1.9853029+02  V      2.5579774+04  PTH    2.6224496-02  AZ     6.6293869+01
*****************************************************************************************************************

ID     0721081.1
TRANSLUNAR INJECTION INITIATION
 21   JULY 1969 17 HRS, 29 MINS, 43.119 SECS  G.M.T. ***  2. HRS, 56. MINS,   .781 SECS  G.E.T. ***  T   2.93355021+00 HRS
X      1.9252526+03  Y      2.6174820+03  Z      1.4133923+03  DX    -2.1449295+04  DY     1.1754580+04  DZ     7.4716108+03
ALT    1.0128312+02  LAT    2.3645412+01  LON    2.1192627+02  V      2.5574740+04  PTH    2.0488754-02  AZ     7.1431692+01
R      3.5433723+03  DEC    2.3508392+01  RA     5.3664174+01  RAS    1.2089481+02  DES    2.0410465+01  RAN    3.7667379+00
INC    2.9626442+01  MASS   2.9382352+05
*****************************************************************************************************************

ID     0721081.1
TRANSLUNAR INJECTION TERMINATION
 21   JULY 1969 17 HRS, 35 MINS,  3.872 SECS  G.M.T. ***  3. HRS,  1. MINS, 21.533 SECS  G.E.T. ***  T   3.02264819+00 HRS
X      4.3435311+02  Y      3.1235235+03  Z      1.7527196+03  DX    -3.4544094+04  DY     5.9639575+03  DZ     4.8167463+03
ALT    1.6668495+02  LAT    2.9221168+01  LON    2.3901066+02  V      3.5566728+04  PTH    6.8030789+00  AZ     8.4951686+01
R      3.6378840+03  DEC    2.9065073+01  RA     8.2088689+01  RAS    1.2089852+02  DES    2.0409740+01  DEM   -9.7707593+00
SEM    8.0544278+01  RBVS   1.4387595+02  RAN    2.5954653+00  INC    2.9478278+01  ECC    9.7044672-01  SMA    1.2034154+05
RP     3.5564872+03  APF    6.7014269+01  INMP   2.1555967+00  C3TLI -5.6976429-01  DAZTLI 5.9637628-01  MASS   1.3829987+05
PROP   1.5552364+05
*****************************************************************************************************************

ID     0721081.1
TRANSLUNAR INJECTION + 2 HOURS
 21   JULY 1969 19 HRS, 35 MINS,  3.872 SECS  G.M.T. ***  5. HRS,  1. MINS, 21.533 SECS  G.E.T. ***  T   5.02264816+00 HRS
X     -1.9549278+04  Y     -7.4291469+03  Z     -3.7085337+03  DX    -9.3994132+03  DY    -9.2459712+03  DZ    -4.9888596+03
ALT    1.7795997+04  LAT   -1.0066365+01  LON    3.2764770+02  V      1.4097009+04  PTH    6.4810965+01  AZ     1.1786890+02
R      2.1239579+04  DEC   -1.0055662+01  RA    -1.5919213+02  RAS    1.2098160+02  DES    2.0393465+01
*****************************************************************************************************************

ID     0721081.1
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 21   JULY 1969 23 HRS, 33 MINS, 42.338 SECS  G.M.T. ***  8. HRS, 59. MINS, 59.999 SECS  G.E.T. ***  T   8.99999976+00 HRS
X     -3.4811523+04  Y     -2.5776539+04  Z     -1.3692966+04  DX    -4.8221796+03  DY    -6.7567962+03  DZ    -3.6969322+03
ALT    4.1985843+04  LAT   -1.7551059+01  LON    2.8353468+02  V      9.0870796+03  PTH    7.2020804+01  AZ     1.1409100+02
R      4.5428729+04  DEC   -1.7542698+01  RA    -1.4348153+02  RAS    1.2114679+02  DES    2.0360982+01  DEM   -1.1167172+01
SEM    8.3561587+01  RBVS   7.9100208+01  RAN    2.5342029+00  INC    2.9489981+01  ECC    9.7018360-01  SMA    1.1930856+05
RP     3.5573522+03  APF    6.7097390+01  INMP   2.1341190+00  THETA -3.0981084+01  BETA  -1.4913647+02  MASS   9.6792101+04
DRTX  -1.4417540+01  DRTY  -8.6162858+00  DRTZ   1.0084786+01
*****************************************************************************************************************

ID     0721081.1
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 21   JULY 1969 23 HRS, 33 MINS, 45.206 SECS  G.M.T. ***  9. HRS,  0. MINS,  2.867 SECS  G.E.T. ***  T   9.00079644+00 HRS
X     -3.4913799+04  Y     -2.5779725+04  Z     -1.3694707+04  DX    -4.8231165+03  DY    -6.7454888+03  DZ    -3.6806214+03
ALT    4.1988919+04  LAT   -1.7551737+01  LON    2.8352430+02  V      9.0725433+03  PTH    7.2088307+01  AZ     1.1391360+02
R      4.5432805+04  DEC   -1.7543376+01  RA    -1.4347994+02  RAS    1.2114682+02  DES    2.0360975+01  DEM   -1.1167370+01
SEM    8.3561997+01  RBVS   7.9098581+01  RAN    2.3131861+00  INC    2.9350296+01  ECC    9.7010054-01  SMA    1.1776315+05
RP     3.5210548+03  APF    6.7090056+01  INMP   1.9736277+00  THETA -3.0982520+01  BETA  -1.4895916+02  MASS   9.6605177+04
PROP   1.8692383+02  DELV   1.9591004+01  MASS   9.6605177+04  PLCHNG-1.7692144-01
*****************************************************************************************************************

ID     0721081.1
LUNAR ORBIT INSERTION BURN INITIATION
 24   JULY 1969 19 HRS, 22 MINS, 42.503 SECS  G.M.T. *** 76. HRS, 49. MINS,   .165 SECS  G.E.T. ***  T   7.68167124+01 HRS
XL    -4.4493977+02  YL    -8.4104881+02  ZL    -3.4564701+02  DXL   -6.8531949+03  DYL    4.2973404+03  DZL    1.4424612+03
XS    -1.0106470+03  YS     5.7810854+01  ZS    -7.5333088+00  DXS    1.5171035+03  DYS    8.0869072+03  DZS   -2.8524028+02
ALTS   7.3833648+01  LATS  -4.2637480-01  LONS   1.7672614+02  VRS    8.2329236+03  PTR   -7.3317962+00  AZR   -9.2056808+01
LIN    1.7789543+02  LAN    8.4097649+00  LAP   -1.6673595+02  LTS    1.2153687+00  LNS    5.4395706+01  DEM   -2.5104193+01
THETA  1.0267259+01  BETA  -1.7529439+02  MASS   9.5000451+04  DRTX  -2.7970312+03  DRTY  -2.2742286+02  DRTZ   2.4965223+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721081.1
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 19 HRS, 28 MINS, 36.260 SECS   G.M.T. *** 76. HRS, 54. MINS, 53.921 SECS   G.E.T. ***   T    7.69149780+01 HRS
XL     -7.5385976+02  YL      -5.9596712+02  ZL      -2.6720996+02  DXL     -3.5627615+03  DYL      3.9917022+03  DZL     1.1985288+03
XS     -8.9333092+02  YS       4.4283831+02  ZS      -2.7140485+01  DXS      2.4577216+03  DYS      4.9039257+03  DZS    -3.8882845+02
ALTS    5.8944452+01  LATS    -1.5592220+00  LONS     1.5363165+02  VRS      5.4990972+03  PTR     -1.3955230-01  AZR    -9.4059953+01
LIN     1.7564024+02  LAN     -5.4499890+00  LAP     -2.5119413+00  SMAS     1.0525192+03  ECCS     5.2389617-02  PERS    2.1451754+00
RPS     9.9737817+02  APOS     1.1076603+03  RANS     1.6924834+02  INCS     1.5979703+02  LTS      1.2152821+00  LNS     5.4345744+01
LTE     6.1724623+00  LNE     -5.9294565+00  THETA   -1.2688231+01  BETA    -1.7283015+02  PROP     2.3056062+04  BARC    2.3064500+01
DELV    2.8173418+03  MASS     7.1944389+04  PLCHNG-2.3696814+00
*****************************************************************************************************************

ID     0721081.1
CIRCULARIZATION BURN INITIATION
 24    JULY 1969 23 HRS, 46 MINS, 45.841 SECS   G.M.T. *** 81. HRS, 13. MINS,  3.500 SECS   G.E.T. ***   T    8.12176390+01 HRS
XL     -7.8454813+02  YL      -5.5984715+02  ZL      -2.5645919+02  DXL     -3.3661267+03  DYL      4.1394305+03  DZL     1.2656960+03
XS     -8.4983500+02  YS       5.2110526+02  ZS      -3.0752250+01  DXS      2.8788710+03  DYS      4.6702257+03  DZS    -3.8133206+02
ALTS    5.8860943+01  LATS    -1.7669280+00  LONS     1.4848404+02  VRS      5.4994836+03  PTR     -1.2110570-02  AZR    -9.3978327+01
LIN     1.7563682+02  LAN     -7.6681491+00  LAP     -8.1121655+01  LTS      1.2114580+00  LNS      5.2158236+01  DEM    -2.5713687+01
THETA   6.8546611-01  BETA    -1.7999300+02  MASS     7.1894989+04  DRTX    -1.3766115+02  DRTY     0.0000000     DRTZ   -7.1234993-01
*****************************************************************************************************************

ID     0721081.1
CIRCULARIZATION BURN TERMINATION
 24    JULY 1969 23 HRS, 47 MINS,    .724 SECS   G.M.T. *** 81. HRS, 13. MINS, 18.383 SECS   G.E.T. ***   T    8.12217731+01 HRS
XL     -7.9262344+02  YL      -5.4978831+02  ZL      -2.5337636+02  DXL     -3.2273930+03  DYL      4.0736452+03  DZL     1.2514447+03
XS     -8.4279984+02  YS       5.3235701+02  ZS      -3.1671972+01  DXS      2.8653500+03  DYS      4.5168720+03  DZS    -3.6961125+02
ALTS    5.8862329+01  LATS    -1.8197873+00  LONS     1.4772132+02  VRS      5.3618071+03  PTR      1.4766607-02  AZR    -9.3954287+01
LIN     1.7563683+02  LAN     -7.6703821+00  LAP     -4.7377405+01  SMAS     9.9756697+02  ECCS     3.3408847-04  PERS    1.9793875+00
RPS     9.9723369+02  APOS     9.9790023+02  RANS     1.6923291+02  INCS     1.5978726+02  LTS      1.2114541+00  LNS     5.2156133+01
LTE     6.2752335+00  LNE     -5.7081100+00  THETA   -7.6536538-02  BETA    -1.8000000+02  PROP     9.6998633+02  BARC    7.6199576-01
DELV    1.3766522+02  MASS     7.0925003+04  PLCHNG 6.5003944-06
*****************************************************************************************************************

ID     0721081.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 25    JULY 1969 20 HRS, 32 MINS, 41.990 SECS   G.M.T. ***101. HRS, 58. MINS, 59.651 SECS   G.E.T. ***   T    1.01983236+02 HRS
XL     7.7379018+02  YL       5.7204848+02  ZL       2.6135749+02  DXL      3.3529887+03  DYL     -3.9845321+03  DZL    -1.2118844+03
XS     7.4138075+02  YS      -6.6611311+02  ZS       3.0761875+01  DXS     -3.5852061+03  DYS     -3.9706925+03  DZS     3.7389040+02
ALTS   5.8651615+01  LATS     1.7678523+00  LONS    -4.1938944+01  VRS      5.3628253+03  PTR     -1.6831388-02  AZR    -8.5999724+01
LIN    1.7561605+02  LAN     -1.8198377+01  SEASV  6.4899109+00
*****************************************************************************************************************

ID     0721081.1
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  1 HRS, 55 MINS,  9.203 SECS   G.M.T. ***107. HRS, 21. MINS, 26.863 SECS   G.E.T. ***   T    1.07357462+02 HRS
XL     -7.7232059+02  YL       6.0883022+02  ZL       1.6708093+02  DXL      3.3644565+03  DYL      3.8224719+03  DZL     1.6225437+03
XS      5.4253061+02  YS       8.3376134+02  ZS      -7.4645027+01  DXS      4.4959672+03  DYS     -2.9179814+03  DZS     8.5823232+01
ALTS    5.9038095+01  LATS    -4.2914395+00  LONS     5.6947845+01  VRS      5.3605692+03  PTR     -1.1415267-03  AZR    -9.9080159+01
LIN     1.7561069+02  LAN     -2.0907022+01  LAP      1.7906573+02  LTS      1.1876844+00  LNS      3.8872832+01  DEM    -2.8158164+01
THETA  -1.9636794-05  BETA     8.9999972+01  MASS     3.7018304+04  DRTX     0.0000000     DRTY     7.3702687+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721081.1
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  1 HRS, 55 MINS, 13.319 SECS   G.M.T. ***107. HRS, 21. MINS, 30.979 SECS   G.E.T. ***   T    1.07358605+02 HRS
XL     -7.7003825+02  YL       6.1140685+02  ZL       1.6820223+02  DXL      3.3746289+03  DYL      3.7855117+03  DZL     1.6884163+03
XS      5.4557301+02  YS       8.3178113+02  ZS      -7.4561558+01  DXS      4.4873370+03  DYS     -2.9290078+03  DZS     1.6076274+02
ALTS    5.9038031+01  LATS    -4.2866319+00  LONS     5.6738757+01  VRS      5.3610749+03  PTR     -1.1807386-03  AZR    -8.8276872+01
LIN     1.7537868+02  LAN     -1.1278259+01  LAP      4.1356062+01  SMAS     9.9764624+02  ECCS     1.1678577-04  PERS    1.9796235+00
RPS     9.9752973+02  APOS     9.9776273+02  RANS     1.6834192+02  INCS     1.5901785+02  LTS      1.1376832+00  LNS     3.8872251+01
LTE     6.6194959+00  LNE     -4.0773653+00  THETA    1.5675284-03  BETA     8.9209516+01  PROP     2.6823926+02  BARC    2.0930297-01
DELV    7.3702987+01  MASS     3.6750064+04  PLCHNG 7.9010291-01
*****************************************************************************************************************

ID     0721081.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 18 HRS, 14 MINS, 38.525 SECS   G.M.T. ***123. HRS, 40. MINS, 56.186 SECS   G.E.T. ***   T    1.23682274+02 HRS
XL     6.2761214+02  YL       7.0766047+02  ZL       3.1642369+02  DXL      4.1352228+03  DYL     -3.2668521+03  DZL    -8.9787444+02
XS     7.4156829+02  YS      -6.6628159+02  ZS       3.0814855+01  DXS     -3.5832782+03  DYS     -3.9687634+03  DZS     3.9970304+02
ALTS   5.8995219+01  LATS     1.7704476+00  LONS    -4.1938944+01  VRS      5.3619705+03  PTR     -6.5855277-03  AZR    -8.5722726+01
LIN    1.7535951+02  LAN     -1.9555229+01
*****************************************************************************************************************

ID     0721081.1
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  2 HRS, 50 MINS, 22.886 SECS   G.M.T. ***132. HRS, 16. MINS, 40.546 SECS   G.E.T. ***   T    1.32277929+02 HRS
XL     2.9084572+02  YL      -9.0025426+02  ZL      -3.1577127+02  DXL     -5.0980472+03  DYL     -1.3283161+03  DZL    -9.1008597+02
XS    -9.8324362+02  YS      -1.6131510+02  ZS       4.4382767+01  DXS     -8.8255688+02  DYS      5.2768079+03  DZS    -3.6238527+02
ALTS   5.8883254+01  LATS     2.5504757+00  LONS    -1.7068282+02  VRS      5.3623624+03  PTR      4.8846640-03  AZR    -9.3879026+01
LIN    1.7534892+02  LAN     -2.3879753+01  LAP     -1.5345494+02  LTS      1.1641528+00  LNS      2.6213083+01  DEM    -2.8310408+01
THETA  -4.5609467+00  BETA     7.1349494+00  MASS     3.6818765+04  DRTX     3.0192511+03  DRTY     3.7672816+02  DRTZ    1.6004056+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************************

ID     0721081.1
TRANSEARTH INJECTION BURN TERMINATION
 27    JULY 1969  2 HRS, 52 MINS, 49.398 SECS  G.M.T. ***132. HRS, 19. MINS,  7.055 SECS  G.E.T. ***  T   1.32318626+02 HRS
XL      1.3187551+02  YL     -9.3225325+02  ZL     -3.3598324+02  DXL    -8.2174619+03  DYL    -1.3557192+03  DZL    -7.6843687+02
XS     -9.9899467+02  YS      1.5655521+00  ZS      3.7136955+01  DXS    -4.3424460+02  DYS     8.3656344+03  DZS    -2.2972698+02
ALTS    6.1192412+01  LATS    2.1289491+00  LONS    1.7991021+02  VRS     8.3809465+03  PTR     2.9995446+00  AZR    -9.1685810+01
LIN     1.7728265+02  LAN    -5.1648044+01  LAP    -1.7005080+01  SMAS   -2.2009260+03  ECCS    1.4531576+00  PERS    6.4867309+00
RPS     9.9736634+02  APOS   -5.3992183+03  RANS    1.7479222+02  INCS    1.5986606+02  INMPS   1.7147234+02  SEM     1.5117871+02
RBVS    2.6482848+01  LTS     1.1641138+00  LNS     2.6192414+01  LTE     6.4595360+00  LNE    -2.1461273+00  THETA   4.7803478+00
BETA    4.5510648+00  PROP    9.5488608+03  BARC    9.3862488+00  DELV    3.0427086+03  MASS    2.7269904+04  PLCHNG 2.5772573+00
*****************************************************************************************************************************

ID     0721081.1
ENTRY AND TOUCHDOWN
 29    JULY 1969 21 HRS, 31 MINS,  5.099 SECS  G.M.T. ***198. HRS, 57. MINS, 22.758 SECS  G.E.T. ***  T   1.98956322+02 HRS
X       8.2798452+02  Y      3.2404773+03  Z      1.0606356+03  DX    -3.0700463+04  DY    -2.7175312+03  DZ     1.8774703+04
R       3.5087318+03  DEC    1.7594873+01  RA     7.5666844+01  V      3.6088680+04  PTH   -6.4900147+00  AZ     5.4171166+01
ALT     6.5857838+01  LAT    1.7703955+01  LON    1.6553729+02  VE     3.4905937+04  PTE   -6.6448617+00  AZE    5.2727152+01
SMA     1.2770262+05  ECC    9.7289011-01  INC    3.9390417+01  RAN    5.2948580+01  APF    4.1608244+01  RP     3.4632809+03
INMP    3.1221975+01  SEM    1.6857921+02  RBVS   1.2953190+02  RAM   -3.9005429+01  DEM   -1.8315566+01  RAS    1.2895564+02
DES     1.8634433+01  SPSPR  4.6378040+03  DVRES  1.9133085+03  PERNAD 8.5638691+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD   2.9549135+01  LONTD  1.8499864+02  AZTD   6.0602374+01  SEATD  6.0374488+01  DTSUN  7.2697995+00
*****************************************************************************************************************************

ID     0721081.1
CIRCUMLUNAR PERICYNTHION
 24    JULY 1969 19 HRS, 27 MINS, 33.164 SECS  G.M.T. *** 76. HRS, 53. MINS, 50.825 SECS  G.E.T. ***  T   7.68974514+01 HRS
XL     -8.2571188+02  YL    -1.3467789+03  ZL     -7.2604285+02  DXL    -5.8441450+03  DYL     2.8490298+03  DZL    1.3615824+03
XS     -1.7213725+03  YS     1.7292083+02  ZS     -1.7241402+02  DXS     6.4829786+02  DYS     6.6365142+03  DZS    1.8345205+02
ALTS    8.0011266+02  LATS  -5.6912597+00  LONS    1.7426358+02  VRS     6.6706269+03  PTR    -1.3513677-06  AZR   -8.8416283+01
LIN     1.7409142+02  LAN    9.9904503+01  LAP     9.2583384+01  LTS     1.2152975+00  LNS     5.4354659+01  DEM   -2.5115829+01
SEM     1.1954794+02  RBVS   6.0120830+01  SMAS   -2.5115660+03  ECCS    1.6922399+00  INCS    1.5227724+02  RANS   1.7749549+02
APES   -6.3856292+01  RPS    1.7386062+03  RM      1.9883928+05  DEMP    4.8848008-01  RAMP   -1.7982761+02
*****************************************************************************************************************************

ID     0721081.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27    JULY 1969 16 HRS, 34 MINS, 59.950 SECS  G.M.T. ***146. HRS,  1. MINS, 17.612 SECS  G.E.T. ***  T   1.46021559+02 HRS
X       2.7102841+03  Y      1.9935037+03  Z      9.9609740+02  DX    -2.5814121+04  DY     2.0643634+04  DZ     1.4511027+04
R       3.5088327+03  DEC    1.6492081+01  RA     3.6335711+01  V      3.6098445+04  PTH   -6.5079044+00  AZ     6.2888449+01
ALT     4.5833718+01  LAT    1.6595136+01  LON    2.0240149+02  VE     3.4787032+04  PTE   -6.7055954+00  AZE    6.1750910+01
SMA     1.3315558+05  ECC    9.7399165-01  INC    3.1405532+01  RAN    7.3282193+00  APF    4.6200299+01  RP     3.4631574+03
INMP    5.2462800+00  RAM   -7.4071145+01  DEM   -2.7414481+01  RAS    1.2679547+02  DES    1.9149151+01  SEM    1.5916559+02
RBVS    9.4922648+01  PERNAD 8.9316826+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  2.5528505+01  LONTD  2.2323336+02
AZTD    6.9302599+01  SEATD  2.9088815+01  DTSUN  9.7476747+00
*****************************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721090.1
LAUNCH TIME      21   JULY 1969    15 HRS,    26 MINS,  44.808 SECS    G.M.T.
LAUNCH AZIMUTH    90.                              INJECTION OPPORTUNITY     1
*****************************************************************************************************************

ID     0721090.1
EARTH PARKING ORBIT INSERTION
 21   JULY 1969 15 HRS, 38 MINS,  5.136 SECS  G.M.T. ***  0. HRS, 11. MINS, 20.328 SECS  G.E.T. ***  T   1.88980065-01 HRS
X      -1.5296392+03  Y       2.8047478+03  Z       1.5339681+03  DX     -2.3063356+04  DY     -9.7234086+03  DZ     -5.2197338+03
ALT     1.0217145+02  LAT     2.5794248+01  LON     3.0485371+02  V       2.5567727+04  PTH    -3.7724900-07  AZ      1.0308917+02
R       3.5439334+03  DEC     2.5648144+01  RA      1.1860694+02  RAS     1.2081750+02  DES     2.0425568+01  RAN     3.6383411-01
INC     2.8592230+01  MASS    2.9764634+05
*****************************************************************************************************************

ID     0721090.1
3.5 MINS PRIOR TO TLI INITIATION
 21   JULY 1969 18 HRS, 16 MINS, 25.635 SECS  G.M.T. ***  2. HRS, 49. MINS, 40.827 SECS  G.E.T. ***  T   2.82800752+00 HRS
X       2.5870779+03  Y       2.1197825+03  Z       1.1667835+03  DX     -1.7462794+04  DY      1.6444299+04  DZ      8.8944375+03
ALT     9.9616553+01  LAT     1.9348144+01  LON     1.8588325+02  V       2.5582712+04  PTH     3.7056587-02  AZ      6.8407874+01
*****************************************************************************************************************

ID     0721090.1
TRANSLUNAR INJECTION INITIATION
 21   JULY 1969 18 HRS, 19 MINS, 55.635 SECS  G.M.T. ***  2. HRS, 53. MINS, 10.827 SECS  G.E.T. ***  T   2.88634083+00 HRS
X       1.9096323+03  Y       2.6165693+03  Z       1.4347399+03  DX     -2.1535299+04  DY      1.2154930+04  DZ      6.5311493+03
ALT     1.0079247+02  LAT     2.4028004+01  LON     1.9955276+02  V       2.5576619+04  PTH     3.1859407-02  AZ      7.3797308+01
R       3.5428249+03  DEC     2.3889283+01  RA      5.3877174+01  RAS     1.2092958+02  DES     2.0403661+01  RAN    -4.6232319-01
INC     2.8596397+01  MASS    2.9433187+05
*****************************************************************************************************************

ID     0721090.1
TRANSLUNAR INJECTION TERMINATION
 21   JULY 1969 18 HRS, 25 MINS, 16.833 SECS  G.M.T. ***  2. HRS, 58. MINS, 32.025 SECS  G.E.T. ***  T   2.97556251+00 HRS
X       4.1176792+02  Y       3.1458970+03  Z       1.7144836+03  DX     -3.4618502+04  DY      7.3664282+03  DZ      3.5842268+03
ALT     1.6502345+02  LAT     2.8539778+01  LON     2.2697651+02  V       3.5574592+04  PTH     6.7432497+00  AZ      8.7352192+01
R       3.6063381+03  DEC     2.8385947+01  RA      8.2542920+01  RAS     1.2093329+02  DES     2.0402936+01  DEM    -9.9970979+00
SEM     8.0965423+01  RRVS    1.4429377+02  RAN    -1.2751603+00  INC     2.8525926+01  ECC     9.7046576-01  SMA     1.2039788+05
RP      3.5558593+03  APF     7.0871041+01  INMP    5.9347026-02  C3TLI  -5.6949801-01  DAZTLI  3.9494139-01  MASS    1.3859227+05
PROP    1.5573960+05
*****************************************************************************************************************

ID     0721090.1
TRANSLUNAR INJECTION + 2 HOURS
 21   JULY 1969 20 HRS, 25 MINS, 16.833 SECS  G.M.T. ***  4. HRS, 58. MINS, 32.025 SECS  G.E.T. ***  T   4.97556251+00 HRS
X      -1.9479819+04  Y      -7.3248879+03  Z      -4.2298794+03  DX     -9.3129236+03  DY     -9.2483413+03  DZ     -5.1459292+03
ALT     1.7793301+04  LAT    -1.1498238+01  LON     3.1485894+02  V       1.4097622+04  PTH     6.4810884+01  AZ      1.1630444+02
R       2.1234777+04  DEC    -1.1486088+01  RA     -1.5939251+02  RAS     1.2101637+02  DES     2.0386643+01
*****************************************************************************************************************

ID     0721090.1
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22   JULY 1969  3 HRS, 26 MINS, 44.808 SECS  G.M.T. ***  3. HRS, 59. MINS, 59.999 SECS  G.E.T. ***  T   8.99999976+00 HRS
X      -3.4700862+04  Y      -2.5894833+04  Z      -1.4517375+04  DX     -4.7341295+03  DY     -6.7584016+03  DZ     -3.7342086+03
ALT     4.2223919+04  LAT    -1.8544611+01  LON     2.7045103+02  V       9.0571676+03  PTH     7.2058217+01  AZ      1.1209367+02
R       4.5666687+04  DEC    -1.8535887+01  RA     -1.4326859+02  RAS     1.2118349+02  DES     2.0353740+01  DEM    -1.1382493+01
SEM     8.4099738+01  RRVS    7.8635805+01  RAN    -1.3344338+00  INC     2.8537559+01  ECC     9.7017131-01  SMA     1.1923937+05
RP      3.5567552+03  APF     7.0955279+01  INMP    3.0486634-02  THETA  -3.1665812+01  BETA   -1.4807654+02  MASS    9.6792101+04
DRTX   -1.4[illegible]+01  DRTY   -8.7661648+00  DRTZ    1.0225282+01
*****************************************************************************************************************

ID     0721090.1
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22   JULY 1969  3 HRS, 26 MINS, 47.659 SECS  G.M.T. ***  9. HRS,  0. MINS,  2.851 SECS  G.E.T. ***  T   9.00079191+00 HRS
X      -3.4703084+04  Y      -2.5898002+04  Z      -1.4519124+04  DX     -4.7352069+03  DY     -6.7470521+03  DZ     -3.7180735+03
ALT     4.2227961+04  LAT    -1.8545224+01  LON     2.7044073+02  V       9.0426194+03  PTH     7.2123614+01  AZ      1.1191222+02
R       4.5670729+04  DEC    -1.8536501+01  RA     -1.4326698+02  RAS     1.2118353+02  DES     2.0353734+01  DEM    -1.1382683+01
SEM     8.4010133+01  RRVS    7.8634206+01  RAN    -1.5875624+00  INC     2.8402730+01  ECC     9.7008323-01  SMA     1.1769858+05
RP      3.5211624+03  APF     7.0981413+01  INMP    1.5732875-01  THETA  -3.1667262+01  BETA   -1.4789511+02  MASS    9.6506257+04
PROP    1.9584375+02  DELV    1.9477663+01  MASS    9.6606257+04  PLCHNG-1.8093944-01
*****************************************************************************************************************

ID     0721090.1
LUNAR ORBIT INSERTION BURN INITIATION
 24   JULY 1969 23 HRS, 10 MINS, 23.286 SECS  G.M.T. *** 76. HRS, 43. MINS, 38.478 SECS  G.E.T. ***  T   7.67273550+01 HRS
XL     -4.3240660+02  YL     -8.4672360+02  ZL     -3.4968267+02  DXL    -6.9022322+03  DYL     4.2018312+03  DZL     1.4767327+03
XS     -1.0116699+03  YS      5.1333242+01  ZS     -9.1239259+00  DXS     1.4895910+03  DYS     8.0918139+03  DZS    -2.1792984+02
ALTS    7.4518956+01  LATS   -5.1605437-01  LONS    1.7739524+02  VRS     8.2306697+03  PTR    -7.5090739+00  AZR    -9.1598481+01
LIN     1.7831724+02  LAN     1.4949140+01  LAP    -1.6503489+02  LTS     1.2146648+00  LNS     5.3991677+01  DEM    -2.5218003+01
THETA   1.2850353+01  BETA   -1.7435129+02  MASS    9.5001519+04  DRTX   -2.7999416+03  DRTY   -2.7278356+02  DRTZ    2.2053053+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721090.1
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 20 HRS, 16 MINS, 17.536 SECS  G.M.T. *** 76. HRS, 49. MINS, 32.725 SECS  G.E.T. ***  T   7.68257570+01 HRS
XL    -7.4496703+02  YL     -6.0556767+02  ZL     -2.7064204+02  DXL    -3.6220915+03  DYL     3.9438007+03  DZL     1.1783738+03
XS    -8.9598251+02  YS      4.3753487+02  ZS     -2.6715643+01  DXS     2.4242044+03  DYS     4.9203256+03  DZS    -3.8899294+02
ALTS   5.8970842+01  LATS   -1.5347683+00  LONS    1.5397237+02  VRS     5.4989377+03  PTR    -9.2101477-02  AZR    -9.4068876+01
LIN    1.7564054+02  LAN    -5.4510000+00  LAP     5.6277406+00  SMAS    1.0525099+03  ECCS    5.2324081-02  PERS    2.1451469+00
RPS    9.9743830+02  APOS    1.1075815+03  RANS    1.6922041+02  INCS    1.5976537+02  LTS     1.2145779+00  LNS     5.3941646+01
LTE    6.1923426+00  LNE    -5.8896846+00  THETA -1.2080391+01  BETA   -1.7142406+02  PROP    2.3088166+04  BARC    2.3087289+01
DELV   2.8218270+03  MASS    7.1913353+04  PLCHNG-2.8423942+00
*****************************************************************************************************************

ID     0721090.1
CIRCULARIZATION BURN INITIATION
 25    JULY 1969  0 HRS, 34 MINS, 15.986 SECS  G.M.T. *** 81. HRS,  7. MINS, 31.174 SECS  G.E.T. ***  T   8.11253262+01 HRS
XL    -7.7000533+02  YL     -5.7717729+02  ZL     -2.6228950+02  DXL    -3.4675370+03  DYL     4.0644784+03  DZL     1.2329694+03
XS    -8.5805524+02  YS      5.0764134+02  ZS     -2.9649211+01  DXS     2.8024491+03  DYS     4.7158771+03  DZS    -3.8397036+02
ALTS   5.8921948+01  LATS   -1.7034275+00  LONS    1.4939066+02  VRS     5.4991500+03  PTR     7.3379703-03  AZR    -9.4005410+01
LIN    1.7563711+02  LAN    -7.6675223+00  LAP    -1.7744703+02  LTS     1.2107515+00  LNS     5.1755750+01  DEM    -2.5817841+01
THETA  3.8923711-01  BETA    1.8000000+02  MASS    7.1863953+04  DRTX   -1.3783279+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721090.1
CIRCULARIZATION BURN TERMINATION
 25    JULY 1969  0 HRS, 34 MINS, 30.980 SECS  G.M.T. *** 81. HRS,  7. MINS, 46.071 SECS  G.E.T. ***  T   8.11294641+01 HRS
XL    -7.7833292+02  YL     -5.6729012+02  ZL     -2.5928278+02  DXL    -3.3265859+03  DYL     4.0020440+03  DZL     1.2200874+03
XS    -8.5119819+02  YS      5.1901299+02  ZS     -3.0576099+01  DXS     2.7919298+03  DYS     4.5617897+03  DZS    -3.7222493+02
ALTS   5.8927029+01  LATS   -1.7566872+00  LONS    1.4862750+02  VRS     5.3612823+03  PTR     2.7041127-02  AZR    -9.3982205+01
LIN    1.7563713+02  LAN    -7.6697562+00  LAP    -1.2751737+02  SMAS    9.9750012+02  ECCS    4.8003588-04  PERS    1.9791886+00
RPS    9.9702129+02  APOS    9.9797894+02  RANS    1.6920520+02  INCS    1.5975557+02  LTS     1.2107478+00  LNS     5.1753648+01
LTE    6.2927873+00  LNE    -5.6658742+00  THETA -3.7327240-01  BETA   -1.8000000+02  PROP    9.7375391+02  BARC    7.6241297-01
DELV   1.3783489+02  MASS    7.0893199+04  PLCHNG 6.2260934-06
*****************************************************************************************************************

ID     0721090.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 25    JULY 1969 21 HRS, 20 MINS, 23.147 SECS  G.M.T. ***101. HRS, 53. MINS, 38.338 SECS  G.E.T. ***  T   1.01893983+02 HRS
XL     7.6882736+02  YL      5.7737572+02  ZL      2.6350547+02  DXL     3.3841609+03  DYL    -3.9620382+03  DZL    -1.2029285+03
XS     7.4122958+02  YS     -6.6597772+02  ZS      3.0752417+01  DXS    -3.5866694+03  DYS    -3.9705829+03  DZS     3.7389718+02
ALTS   5.8448470+01  LATS    1.7676688+00  LONS   -4.1938963+01  VRS     5.3637230+03  PTR    -2.9224328-02  AZR    -8.5999946+01
LIN    1.7561632+02  LAN    -1.8199428+01  SEASV  6.8934851+00
*****************************************************************************************************************

ID     0721090.1
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  2 HRS, 42 MINS, 48.022 SECS  G.M.T. ***107. HRS, 16. MINS,  3.213 SECS  G.E.T. ***  T   1.07267559+02 HRS
XL    -7.7720233+02  YL      6.0345891+02  ZL      1.6492702+02  DXL     3.3324396+03  DYL     3.8450155+03  DZL     1.6317181+03
XS     5.4262283+02  YS      8.3393307+02  ZS     -7.4653296+01  DXS     4.4948051+03  DYS    -2.9177648+03  DZS     8.5329412+01
ALTS   5.9207344+01  LATS   -4.2911863+00  LONS    5.6947845+01  VRS     5.3594767+03  PTR    -5.9638066-03  AZR    -8.9080266+01
LIN    1.7561096+02  LAN    -2.0907706+01  LAP     1.6893851+02  LTS     1.1869473+00  LNS     3.8469337+01  DEM    -2.8197604+01
THETA -5.9764155-06  BETA    8.9999981+01  MASS    3.6986500+04  DRTX    0.0000000     DRTY    7.3702687+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721090.1
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  2 HRS, 42 MINS, 52.134 SECS  G.M.T. ***107. HRS, 16. MINS,  7.326 SECS  G.E.T. ***  T   1.07268732+02 HRS
XL    -7.7494361+02  YL      6.0604858+02  ZL      1.6605357+02  DXL     3.3426678+03  DYL     3.8081401+03  DZL     1.6976223+03
XS     5.4566183+02  YS      8.3192471+02  ZS     -7.4569887+01  DXS     4.4861876+03  DYS    -2.9287721+03  DZS     1.6076676+02
ALTS   5.9206959+01  LATS   -4.2863845+00  LONS    5.6739015+01  VRS     5.3599841+03  PTR    -6.0525165-03  AZR    -8.8276856+01
LIN    1.7537891+02  LAN    -1.1276539+01  LAP     1.5048762+02  SMAS    9.9757587+02  ECCS    1.6380566-04  PERS    1.9794140+00
RPS    9.9741249+02  APOS    9.9773926+02  RANS    1.6803303+02  INCS    1.5898272+02  LTS     1.1869461+00  LNS     3.8469755+01
LTE    6.6219857+00  LNE    -4.0207970+00  THETA  1.0296510-03  BETA    8.9209146+01  PROP    2.6800684+02  BARC    2.0795041-01
DELV   7.3702835+01  MASS    3.6718493+04  PLCHNG 7.9026085-01
*****************************************************************************************************************

ID     0721090.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 19 HRS,  2 MINS, 11.501 SECS  G.M.T. ***123. HRS, 35. MINS, 26.692 SECS  G.E.T. ***  T   1.23590748+02 HRS
XL     6.2161812+02  YL      7.1194458+02  ZL      3.1816305+02  DXL     4.1603444+03  DYL    -3.2389014+03  DZL    -8.8673355+02
XS     7.4145536+02  YS     -6.6618046+02  ZS      3.0812190+01  DXS    -3.5846531+03  DYS    -3.9683638+03  DZS     3.9968428+02
ALTS   5.8753623+01  LATS    1.7705636+00  LONS   -4.1938958+01  VRS     5.3625923+03  PTR    -2.0342707-02  AZR    -8.5722996+01
LIN    1.7535971+02  LAN    -1.9552621+01
*****************************************************************************************************************

ID     0721090.1
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  3 HRS, 38 MINS, 12.574 SECS  G.M.T. ***132. HRS, 11. MINS, 27.765 SECS  G.E.T. ***  T   1.32191046+02 HRS
XL     2.8038856+02  YL     -9.0252908+02  ZL     -3.1803148+02  DXL    -5.1153395+03  DYL    -1.2759959+03  DZL    -8.9363231+02
XS    -9.8590207+02  YS     -1.4303568+02  ZS      4.3108469+01  DXS    -7.8549191+02  DYS     5.2928347+03  DZS    -3.6674818+02
ALTS   5.8662661+01  LATS    2.4777496+00  LONS   -1.7174507+02  VRS     5.3633572+03  PTR     1.6540322-02  AZR    -9.3925352+01
LIN    1.7534910+02  LAN    -2.3879466+01  LAP    -1.7489261+01  LTS     1.1633873+00  LNS     2.5808212+01  DEM    -2.8277458+01
THETA -4.6763786+00  BETA    7.3161234+00  MASS    3.6787193+04  DRTX    3.0357426+03  DRTY    3.8844664+02  DRTZ    2.1122299+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721090.1
TRANSEARTH INJECTION BURN TERMINATION
 27   JULY 1969  3 HRS, 40 MINS, 39.696 SECS  G.M.T. ***132. HRS, 13. MINS, 54.885 SECS  G.E.T. ***  T   1.32231913+02 HRS
XL     1.2013953+02  YL    -9.3300119+02  ZL    -3.3765988+02  DXL   -8.2529906+03  DYL   -1.2697806+03  DZL   -7.2877380+02
XS    -9.9860614+02  YS     2.0998143+01  ZS     3.5828953+01  DXS   -2.7153487+02  DYS    8.3905562+03  DZS   -2.2519263+02
ALTS   6.0975783+01  LATS   2.0543780+00  LONS   1.7879539+02  VRS    8.3979685+03  PTR    2.9999427+00  AZR   -9.1647410+01
LIN    1.7736489+02  LAN   -5.2410467+01  LAP   -7.6128271+00  SMAS  -2.1530647+03  ECCS   1.4631333+00  PERS   6.2762952+00
RPS    9.9715604+02  APOS  -5.3032855+03  RANS   1.7500538+02  INCS   1.5982558+02  INMPS  1.7152705+02  SEM    1.5164326+02
RBVS   2.7178498+01  LTS    1.1633477+00  LNS    2.5787458+01  LTE    6.4462380+00  LNE   -2.0801388+00  THETA  4.7154183+00
BETA   4.6558832+00  PROP   9.5886489+03  BARC   9.4391999+00  DELV   3.0605701+03  MASS   2.7198544+04  PLCHNG 2.6518117+00
*****************************************************************************************************************

ID     0721090.1
ENTRY AND TOUCHDOWN
 29   JULY 1969 21 HRS, 32 MINS, 41.927 SECS  G.M.T. ***198. HRS,  5. MINS, 57.117 SECS  G.E.T. ***  T   1.98099199+02 HRS
X      8.0662076+02  Y      3.2473440+03  Z      1.0561797+03  DX    -3.0733214+04  DY    -2.8584325+03  DZ     1.8707270+04
R      3.5087598+03  DEC    1.7518411+01  RA     7.6050392+01  V      3.6092423+04  PTH   -6.4900314+00  AZ     5.4342533+01
ALT    6.5877031+01  LAT    1.7627080+01  LON    1.6551629+02  VE     3.4906514+04  PTE   -6.6459841+00  AZE    5.2903887+01
SMA    1.2970985+05  ECC    9.7329950-01  INC    3.9210176+01  RAN    5.3289433+01  APF    4.1593765+01  RP     3.4633174+03
INMP   3.1265148+01  SEM    1.6856431+02  RBVS   1.2987780+02  RAM   -3.8989014+01  DEM   -1.8309181+01  RAS    1.2895674+02
DES    1.8634164+01  SPSPR  4.5664446+03  DVRES  1.8864458+03  PERNAD 8.7391286+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  2.9420654+01  LONTD  1.8499948+02  AZTD   6.0755468+01  SEATD  6.0747554+01  DTSUN  7.2467893+00
*****************************************************************************************************************

ID     0721090.1
CIRCUMLUNAR PERICYNTHION
 24   JULY 1969 20 HRS, 15 MINS, 22.904 SECS  G.M.T. *** 76. HRS, 48. MINS, 38.092 SECS  G.E.T. ***  T   7.68105812+01 HRS
XL    -8.1343037+02  YL    -1.3524302+03  ZL    -7.2895642+02  DXL   -5.8702355+03  DYL    2.7826842+03  DZL    1.3877948+03
XS    -1.7211938+03  YS     1.7229542+02  ZS    -1.7297339+02  DXS    6.4091704+02  DYS    6.6359925+03  DZS    2.3245697+02
ALTS   7.9992928+02  LATS  -5.7103898+00  LONS   1.7428360+02  VRS    6.6709224+03  PTR   -1.0967042-06  AZR   -8.7993093+01
LIN    1.7394552+02  LAN    1.0376015+02  LAP    1.0398853+02  LTS    1.2145908+00  LNS    5.3949365+01  DEM   -2.5229827+01
SEM    1.1998997+02  RBVS   5.9698566+01  SMAS  -2.5114323+03  ECCS   1.6922037+00  INCS   1.5206429+02  RANS   1.7839470+02
APFS  -6.3516802+01  RPS    1.7384229+03  RM     1.9874901+05  DEMP   4.8832588-01  RAMP  -1.7984695+02
*****************************************************************************************************************

ID     0721090.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27   JULY 1969 17 HRS, 20 MINS,  8.887 SECS  G.M.T. ***145. HRS, 53. MINS, 24.073 SECS  G.E.T. ***  T   1.45890020+02 HRS
X      2.6861442+03  Y      1.9983551+03  Z      1.0499390+03  DX    -2.6131095+04  DY     2.1087182+04  DZ     1.3251743+04
R      3.5087270+03  DEC    1.7411747+01  RA     3.6647377+01  V      3.6098643+04  PTH   -6.4091046+00  AZ     6.5015487+01
ALT    6.5831871+01  LAT    1.7519840+01  LON    1.9139501+02  VE     3.4768428+04  PTE   -6.6079651+00  AZE    6.3964625+01
SMA    1.3296063+05  ECC    9.7394400-01  INC    3.0129985+01  RAN    3.9401097+00  APF    4.9583785+01  RP     3.4644230+03
INMP   3.0953013+00  RAM   -7.3541386+01  DEM   -2.7345600+01  RAS    1.2682627+02  DES    1.9142011+01  SEM    1.5960348+02
RBVS   9.5466632+01  PERNAD 8.9383917+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  2.5625952+01  LONTD  2.1268178+02
AZTD   7.1858162+01  SEATD  2.9757635+01  DTSUN  9.6962215+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721099.1
LAUNCH TIME      21   JULY 1969   16 HRS,   57 MINS,  32.812 SECS   G.M.T.
LAUNCH AZIMUTH   99.                          INJECTION OPPORTUNITY     1
*****************************************************************************************************************

ID     0721099.1
EARTH PARKING ORBIT INSERTION
 21   JULY 1969 17 HRS,  8 MINS, 53.967 SECS  G.M.T. ***  0. HRS, 11. MINS, 21.055 SECS  G.E.T. ***  T   1.89181899-01 HRS
X     -2.5232512+03  Y      2.0955226+03  Z      1.3421823+03  DX    -1.7908392+04  DY    -1.6266134+04  DZ    -8.2719980+03
ALT    1.0166278+02  LAT    2.2386137+01  LON    3.0377244+02  V      2.5567727+04  PTH   -1.8862449-07  AZ     1.1345887+02
R      3.5439335+03  DEC    2.2254835+01  RA     1.4029987+02  RAS    1.2088040+02  DES    2.0413284+01  RAN    5.7222236+00
INC    2.9873116+01  MASS   2.9729818+05
*****************************************************************************************************************

ID     0721099.1
3.5 MINS PRIOR TO TLI INITIATION
 21   JULY 1969 19 HRS, 42 MINS, 34.416 SECS  G.M.T. ***  2. HRS, 45. MINS,  1.603 SECS  G.E.T. ***  T   2.75044531+00 HRS
X      2.5437422+03  Y      2.1903737+03  Z      1.1273355+03  DX    -1.7753629+04  DY     1.5600884+04  DZ     9.8119312+03
ALT    9.8321528+01  LAT    1.8676917+01  LON    1.6568862+02  V      2.5590094+04  PTH    4.5807422-02  AZ     6.6158798+01
*****************************************************************************************************************

ID      721099.1
TRANSLUNAR INJECTION INITIATION
 21   JULY 1969 19 HRS, 46 MINS,  4.416 SECS  G.M.T. ***  2. HRS, 48. MINS, 31.603 SECS  G.E.T. ***  T   2.80877861+00 HRS
X      1.8576163+03  Y      2.6560503+03  Z      1.4278587+03  DX    -2.1743764+04  DY     1.1207420+04  DZ     7.4883766+03
ALT    9.9718626+01  LAT    2.3913414+01  LON    1.7911146+02  V      2.5582676+04  PTH    4.3154951-02  AZ     7.1365741+01
R      3.5417682+03  DEC    2.3775156+01  RA     5.5031425+01  RAS    1.2098923+02  DES    2.0391970+01  RAN    4.9413310+00
INC    2.9869619+01  MASS   2.9402906+05
*****************************************************************************************************************

ID     0721099.1
TRANSLUNAR INJECTION TERMINATION
 21   JULY 1969 19 HRS, 51 MINS, 25.465 SECS  G.M.T. ***  2. HRS, 53. MINS, 52.653 SECS  G.E.T. ***  T   2.89795914+00 HRS
X      3.5215248+03  Y      3.1245634+03  Z      1.7666212+03  DX    -3.4729901+04  DY     6.1019756+03  DZ     4.7582101+03
ALT    1.6549722+02  LAT    2.9486080+01  LON    2.0630830+02  V      3.5572681+04  PTH    6.8242576+00  AZ     8.4992605+01
R      3.5066408+03  DEC    2.9329049+01  RA     8.3569639+01  RAS    1.2099293+02  DES    2.0391243+01  DEM   -1.0263336+01
SEM    8.1688885+01  RBVS   1.4504870+02  RAN    3.7113164+00  INC    2.9715933+01  ECC    9.7043013-01  SMA    1.2022178+05
RP     3.5549434+03  APF    6.7311962+01  INMP   2.7538681+00  C3TLI -5.7033315-01  DAZTLI 6.3016225-01  MASS   1.3336132+05
PRQP   1.5566774+05
*****************************************************************************************************************

ID     0721099.1
TRANSLUNAR INJECTION + 2 HOURS
 21   JULY 1969 21 HRS, 51 MINS, 25.465 SECS  G.M.T. ***  4. HRS, 53. MINS, 52.653 SECS  G.E.T. ***  T   4.89795911+00 HRS
X     -1.9385997+04  Y     -7.8844257+03  Z     -3.7893975+03  DX    -9.1611674+03  DY    -9.4475676+03  DZ    -5.0508760+03
ALT    1.7797397+04  LAT   -1.0287533+01  LON    2.9481944+02  V      1.4095917+04  PTH    5.4816620+01  AZ     1.1804882+02
R      2.1240958+04  DEC   -1.0276606+01  RA    -1.5783708+02  RAS    1.2127600+02  DES    2.0374923+01
*****************************************************************************************************************

ID     0721099.1
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22   JULY 1969  1 HRS, 57 MINS, 32.812 SECS  G.M.T. ***  8. HRS, 59. MINS, 59.999 SECS  G.E.T. ***  T   8.99999976+00 HRS
X     -3.4487985+04  Y     -2.7053999+04  Z     -1.4163489+04  DX    -4.5874860+03  DY    -6.8063937+03  DZ    -3.7120043+03
ALT    4.2621724+04  LAT   -1.7915242+01  LON    2.4906976+02  V      9.0083849+03  PTH    7.2121408+01  AZ     1.1413297+02
R      4.6764567+04  DEC   -1.7906848+01  RA    -1.4188769+02  RAS    1.2124632+02  DES    2.0341326+01  DEM   -1.1750049+01
SEM    9.4778952+01  RBVS   7.7638540+01  RAN    3.6505406+00  INC    2.9727842+01  ECC    9.7017202-01  SMA    1.1920916+05
RP     3.5557987+03  APF    6.7394061+01  INMP   2.7324877+00  THETA -3.1579741+01  BETA  -1.4871535+02  MASS   9.6792101+04
DRTX  -1.4368853+01  DRTY  -8.7312151+00  DRTZ   1.0335901+01
*****************************************************************************************************************

ID     0721099.1
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22   JULY 1969  1 HRS, 57 MINS, 35.791 SECS  G.M.T. ***  9. HRS,  0. MINS,  2.889 SECS  G.E.T. ***  T   9.00080240+00 HRS
X     -3.4490167+04  Y     -2.7057232+04  Z     -1.4165250+04  DX    -4.5885984+03  DY    -6.7951370+03  DZ    -3.6954943+03
ALT    4.2625798+04  LAT   -1.7915908+01  LON    2.4905926+02  V      8.9936531+03  PTH    7.2188849+01  AZ     1.1395064+02
R      4.6068641+04  DEC   -1.7907513+01  RA    -1.4188613+02  RAS    1.2124635+02  DES    2.0341320+01  DEM   -1.1750244+01
SEM    9.4778462+01  RBVS   7.7636949+01  RAN    3.4221668+00  INC    2.9585372+01  ECC    9.7009032-01  SMA    1.1765742+05
RP     3.5193065+03  APF    6.7391814+01  INMP   2.5588066+00  THETA -3.1581155+01  BETA  -1.4853273+02  MASS   9.6503790+04
PRQP   1.4831055+02  DELV   1.9736512+01  MASS   9.6603790+04  PLCHNG-1.8184147-01
*****************************************************************************************************************

ID     0721099.1
LUNAR ORBIT INSERTION BURN INITIATION
 24   JULY 1969 21 HRS, 29 MINS, 53.552 SECS  G.M.T. *** 76. HRS, 32. MINS, 20.735 SECS  G.E.T. ***  T   7.65390930+01 HRS
XL    -4.2926405+02  YL    -8.4785429+02  ZL    -3.4703612+02  DXL   -6.9424338+03  DYL    4.1913331+03  DZL    1.3451038+03
XS    -1.0098365+03  YS     6.1236496+01  ZS    -6.2383720+00  DXS    1.5226780+03  DYS    8.0875988+03  DZS   -3.3626831+02
ALTS   7.3217183+01  LATS  -3.5328031-01  LONS   1.7652983+02  VRS    8.2365574+03  PTR   -7.1715753+00  AZR   -9.2402814+01
LIN    1.7756659+02  LAN    4.8725305+00  LAP   -1.6688835+02  LTS    1.2134887+00  LNS    5.3317986+01  DEM   -2.5404133+01
THETA  9.5726296+00  BETA  -1.7601320+02  MASS   9.4999081+04  DRTX  -2.7962460+03  DRTY  -1.9315195+02  DRTZ   2.8541954+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721099.1
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 21 HRS, 35 MINS, 47.309 SECS   G.M.T. *** 76. HRS, 38. MINS, 14.495 SECS   G.E.T. ***  T    7.66373596+01 HRS
XL     -7.4266821+02  YL     -6.0735339+02  ZL     -2.7209372+02  DXL    -3.6242542+03  DYL     3.9432606+03  DZL     1.1800653+03
XS     -8.9155457+02  YS      4.4592527+02  ZS     -2.7391596+01  DXS     2.4857460+03  DYS     4.8912355+03  DZS    -3.8807584+02
ALTS    5.8737240+01  LATS  -1.5739790+00  LONS    1.5342734+02  VRS     5.5003381+03  PTR    -2.5511292-01  AZR    -9.4054460+01
LIN     1.7564011+02  LAN   -5.4474922+00  LAP     7.7189149+00  SMAS    1.0525883+03  ECCS    5.2780556-02  PERS    2.1453865+00
RPS     9.9703211+02  APOS   1.1081445+03  RANS    1.6917262+02  INCS    1.5971233+02  LTS     1.2134010+00  LNS     5.3268026+01
LTE     6.2245683+00  LNE   -5.8222976+00  THETA -1.3425714+01  BETA   -1.7389579+02  PROP    2.3056152+04  BARC    2.3077115+01
DELV    2.8174007+03  MASS   7.1942929+04  PLCHNG-2.0125987+00
*****************************************************************************************************************

ID     0721099.1
CIRCULARIZATION BURN INITIATION
 25    JULY 1969  1 HRS, 54 MINS, 41.636 SECS   G.M.T. *** 80. HRS, 57. MINS,  8.823 SECS   G.E.T. ***  T    8.09524508+01 HRS
XL     -7.9774443+02  YL     -5.4212654+02  ZL     -2.5243425+02  DXL    -3.2694726+03  DYL     4.2079493+03  DZL     1.3011152+03
XS     -8.2641113+02  YS      5.5671423+02  ZS     -3.3679319+01  DXS     3.0782807+03  DYS     4.5442521+03  DZS    -3.7388559+02
ALTS    5.8512195+01  LATS  -1.9358465+00  LONS    1.4603371+02  VRS     5.5014388+03  PTR    -1.5495611-02  AZR    -9.3899660+01
LIN     1.7563668+02  LAN   -7.6724857+00  LAP     4.2106563+00  LTS     1.2095537+00  LNS     5.1074306+01  DEM    -2.5990263+01
THETA   3.9161829-01  BETA  -1.8000000+02  MASS    7.1893529+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721099.1
CIRCULARIZATION BURN TERMINATION
 25    JULY 1969  1 HRS, 54 MINS, 56.608 SECS   G.M.T. *** 80. HRS, 57. MINS, 23.795 SECS   G.E.T. ***  T    8.09566097+01 HRS
XL     -8.0563028+02  YL     -5.3184189+02  ZL     -2.4924688+02  DXL    -3.1308258+03  DYL     4.1392596+03  DZL     1.2358397+03
XS     -8.1884970+02  YS      5.6772256+02  ZS     -3.4584090+01  DXS     3.0586825+03  DYS     4.3902632+03  DZS    -3.6205573+02
ALTS    5.8511977+01  LATS  -1.9879877+00  LONS    1.4526577+02  VRS     5.3629315+03  PTR     3.9894591-03  AZR    -9.3873218+01
LIN     1.7563669+02  LAN   -7.6747282+00  LAP     1.5557454+02  SMAS    9.9728774+02  ECCS    2.9150923-04  PERS    1.9785565+00
RPS     9.9699703+02  APOS   9.9757844+02  RANS    1.6915786+02  INCS    1.5970244+02  LTS     1.2095498+00  LNS     5.1072189+01
LTE     6.3215473+00  LNE   -5.5932789+00  THETA -3.7531121-01  BETA    1.7999300+02  PROP    9.7582422+02  BARC    7.6701923-01
DELV    1.3850210+02  MASS   7.0917705+04  PLCHNG 7.6935913-06
*****************************************************************************************************************

ID     0721099.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 25    JULY 1969 22 HRS, 39 MINS, 18.310 SECS   G.M.T. ***101. HRS, 41. MINS, 45.497 SECS   G.E.T. ***  T    1.01695971+02 HRS
XL      7.6078276+02  YL      5.8639824+02  ZL      2.6713902+02  DXL     3.4371597+03  DYL    -3.9204229+03  DZL    -1.1863085+03
XS      7.4123621+02  YS     -6.6598293+02  ZS      3.0766760+01  DXS    -3.5846615+03  DYS    -3.9716067+03  DZS     3.7394091+02
ALTS    5.8457323+01  LATS   1.7684778+00  LONS   -4.1938931+01  VRS     5.3631417+03  PTR    -5.9327423-03  AZR    -8.5399768+01
LIN     1.7561584+02  LAN   -1.8190714+01  SEASV  7.5614612+00
*****************************************************************************************************************

ID     0721099.1
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  4 HRS,  1 MINS, 38.060 SECS   G.M.T. ***107. HRS,  4. MINS,  5.246 SECS   G.E.T. ***  T    1.07068124+02 HRS
XL     -7.8445818+02  YL      5.9395157+02  ZL      1.6117114+02  DXL     3.2838893+03  DYL     3.8860202+03  DZL     1.6484575+03
XS      5.4227534+02  YS      8.3336655+02  ZS     -7.4611201+01  DXS     4.4975692+03  DYS    -2.9188120+03  DZS     8.5905366+01
ALTS    5.8566747+01  LATS  -4.2915227+00  LONS    5.6947766+01  VRS     5.3623661+03  PTR     7.6193695-04  AZR    -8.9379442+01
LIN     1.7561046+02  LAN   -2.0898202+01  LAP    -8.3579749-01  LTS     1.1857258+00  LNS     3.7801744+01  DEM    -2.8258018+01
THETA -1.9636794-05  BETA   8.9999986+01  MASS    3.7011006+04  DRTX    0.0000000     DRTY    7.3702687+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721099.1
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  4 HRS,  1 MINS, 42.175 SECS   G.M.T. ***107. HRS,  4. MINS,  9.362 SECS   G.E.T. ***  T    1.07069267+02 HRS
XL     -7.8223280+02  YL      5.9657078+02  ZL      1.6230980+02  DXL     3.2912664+03  DYL     3.8492392+03  DZL     1.7144026+03
XS      5.4531922+02  YS      8.3138615+02  ZS     -7.4527690+01  DXS     4.4889302+03  DYS    -2.9298499+03  DZS     1.6384592+02
ALTS    5.8566798+01  LATS  -4.2867102+00  LONS    5.6738551+01  VRS     5.3628710+03  PTR     7.6420081-04  AZR    -8.8276431+01
LIN     1.7537843+02  LAN   -1.1273563+01  LAP     3.9606894+00  SMAS    9.9737681+02  ECCS    3.1757963-04  PERS    1.9788216+00
RPS     9.9706906+02  APOS   9.9769354+02  RANS    1.6801774+02  INCS    1.5892461+02  LTS     1.1857248+00  LNS     3.7901161+01
LTE     6.6250295+00  LNE   -3.9263934+00  THETA  1.5986180-03  BETA    8.9209672+01  PROP    2.6818652+02  BARC    2.0806799-01
DELV    7.3703137+01  MASS   3.6742819+04  PLCHNG 7.8983505-01
*****************************************************************************************************************

ID     0721099.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 20 HRS, 20 MINS, 43.237 SECS   G.M.T. ***123. HRS, 23. MINS, 10.423 SECS   G.E.T. ***  T    1.23386229+02 HRS
XL      5.1174391+02  YL      7.1904371+02  ZL      3.2105741+02  DXL     4.2032452+03  DYL    -3.1884872+03  DZL    -8.6649243+02
XS      7.4139050+02  YS     -6.6612175+02  ZS      3.0820180+01  DXS    -3.5828476+03  DYS    -3.9698927+03  DZS     3.9977644+02
ALTS    5.8666433+01  LATS   1.7711777+00  LONS   -4.1938939+01  VRS     5.3625242+03  PTR     4.9703388-03  AZR    -8.5722743+01
LIN     1.7535024+02  LAN   -1.9546826+01
*****************************************************************************************************************

ID     0721099.1
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  4 HRS, 57 MINS, 11.762 SECS   G.M.T. ***131. HRS, 59. MINS, 38.947 SECS   G.E.T. ***  T    1.31994152+02 HRS
XL      2.6294007+02  YL     -9.0651705+02  ZL     -3.2188219+02  DXL    -5.1413353+03  DYL    -1.1841247+03  DZL    -8.6406897+02
XS     -9.9003450+02  YS     -1.1256580+02  ZS      4.0980167+01  DXS    -6.1927767+02  DYS     5.3132878+03  DZS    -3.7377207+02
ALTS    5.8762091+01  LATS   2.3551153+00  LONS   -1.7351339+02  VRS     5.3622977+03  PTR    -3.2728601-03  AZR    -9.4000225+01
LIN     1.7534857+02  LAN   -2.3877491+01  LAP     1.4419412+01  LTS     1.1621203+00  LNS     2.5139593+01  DEM    -2.8217877+01
THETA -4.8294363+00  BETA    7.6245356+00  MASS    3.6811520+04  DRTX    3.0659212+03  DRTY    4.0895061+02  DRTZ    2.7225423+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721099.1
TRANSEARTH INJECTION BURN TERMINATION
 27    JULY 1969  4 HRS, 59 MINS, 40.323 SECS   G.M.T. ***132. HRS,  2. MINS,   7.510 SECS   G.E.T. ***   T    1.32035419+02 HRS
XL      1.0014012+02  YL      -9.3438177+02  ZL      -3.4051598+02  DXL    -8.3107388+03  DYL    -1.1221534+03  DZL    -6.5961543+02
XS     -9.9751279+02  YS       5.3712281+01  ZS       3.3640240+01  DXS     4.3864309+00  DYS     8.4254033+03  DZS    -2.1644276+02
ALTS    6.1030991+01  LATS     1.9287257+00  LONS     1.7691782+02  VRS     8.4281841+03  PTR     3.0000257+00  AZR    -9.1575567+01
LIN     1.7750780+02  LAN     -5.3770474+01  LAP     -1.8030688+02  SMAS   -2.0730965+03  ECCS    1.4810302+00  PERS    5.9298951+00
RPS     9.9722195+02  APOS    -5.1434149+03  RANS     1.7537611+02  INCS    1.5975522+02  INMPS   1.7162054+02  SEM     1.5241072+02
RBVS    2.8365298+01  LTS      1.1620810+00  LNS      2.5118629+01  LTE     6.4231660+00  LNE    -1.9707133+00  THETA   4.6676940+00
RETA    4.8318431+00  PROP     9.6824736+03  BARC     9.5489588+00  DELV    3.0931988+03  MASS    2.7129046+04  PLCHNG 2.7818897+00
*****************************************************************************************************************

ID     0721099.1
ENTRY AND TOUCHDOWN
 29    JULY 1969 21 HRS, 35 MINS, 19.411 SECS   G.M.T. ***196. HRS, 37. MINS, 46.596 SECS   G.E.T. ***   T    1.96629610+02 HRS
X       7.7209378+02  Y       3.2580573+03  Z       1.0487841+03  DX     -3.0795770+04  DY     -3.0782551+03  DZ      1.8583017+04
R       3.5087054+03  DEC     1.7392094+01  RA      7.6667996+01  V       3.6099634+04  PTH    -6.4900407+00  AZ      5.4651780+01
ALT     6.5807956+01  LAT     1.7500082+01  LON     1.6547591+02  VE      3.4908148+04  PTE    -6.6479163+00  AZE     5.3223023+01
SMA     1.3344608+05  ECC     9.7404733-01  INC     3.8889272+01  RAN     5.3816855+01  APF     4.1585319+01  RP      3.4632817+03
INMP    3.1305058+01  SEM     1.6854006+02  RBVS    1.3048453+02  RAM    -3.8962323+01  DEM    -1.8298796+01  RAS     1.2895852+02
DES     1.8633729+01  SPSPR   4.4969460+03  DVRES   1.8602149+03  PERNAD 9.0399470+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   2.9199554+01  LONTD   1.8500035+02  AZTD    6.1035980+01  SEATD  6.1358108+01  DTSUN   7.2097380+00
*****************************************************************************************************************

ID     0721099.1
CIRCUMLUNAR PERICYNTHION
 24    JULY 1969 21 HRS, 34 MINS, 32.483 SECS   G.M.T. *** 76. HRS, 36. MINS, 59.671 SECS   G.E.T. ***   T    7.66165752+01 HRS
XL     -7.9150129+02  YL      -1.3627700+03  ZL      -7.3424568+02  DXL    -5.9142342+03  DYL     2.7426620+03  DZL     1.2850015+03
XS     -1.7215629+03  YS       1.6938775+02  ZS      -1.7395957+02  DXS     6.3800528+02  DYS     6.6403274+03  DZS     1.5189839+02
ALTS    8.0010733+02  LATS    -5.7424656+00  LONS     1.7438065+02  VRS     6.6726359+03  PTR    -1.3639136-06  AZR    -8.8688977+01
LIN     1.7410905+02  LAN      9.7316113+01  LAP      1.2965720+02  LTS     1.2134196+00  LNS     5.3278600+01  DEM    -2.5414873+01
SEM     1.2072252+02  RBVS     5.8936294+01  SMAS    -2.5056953+03  ECCS    1.6938597+00  INCS    1.5232263+02  RANS    1.7719468+02
APFS   -6.5396039+01  RPS      1.7386009+03  RM       1.9860054+05  DEMP    4.8930587-01  RAMP   -1.7981644+02
*****************************************************************************************************************

ID     0721099.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27    JULY 1969 18 HRS, 37 MINS, 53.996 SECS   G.M.T. ***145. HRS, 40. MINS, 21.181 SECS   G.E.T. ***   T    1.45672550+02 HRS
X       2.6598354+03  Y       2.0521098+03  Z       1.0128153+03  DX     -2.6333650+04  DY     1.9948343+04  DZ      1.4548962+04
R       3.5087994+03  DEC     1.6777156+01  RA      3.7650817+01  V       3.6098058+04  PTH    -6.5150961+00  AZ      6.2733844+01
ALT     6.5832076+01  LAT     1.6881785+01  LON     1.7290728+02  VE      3.4790505+04  PTE    -6.7113112+00  AZE     6.1592001+01
SMA     1.3284628+05  ECC     9.7393211-01  INC     3.1673702+01  RAN     8.3993400+00  APF     4.6553490+01  RP      3.4630233+03
INMP    5.8561875+00  RAM    -7.2630336+01  DEM    -2.7222257+01  RAS     1.2687929+02  DES     1.9129705+01  SEM     1.6035709+02
RBVS    9.6126895+01  PERNAD 8.9204105+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD   2.5849774+01  LONTD   1.9376506+02
AZTD    6.9257295+01  SEATD  3.0250599+01  DTSUN   9.6555703+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721108.1
LAUNCH TIME      21   JULY 1969    18 HRS,    39 MINS,  20.548 SECS    G.M.T.
LAUNCH AZIMUTH  108.                                INJECTION OPPORTUNITY     1
*****************************************************************************************************************

ID     0721108.1
EARTH PARKING ORBIT INSERTION
 21    JULY 1969 18 HRS, 50 MINS, 44.061 SECS   G.M.T. ***  0. HRS, 11. MINS, 23.513 SECS   G.E.T. ***   T    1.89864811-01 HRS
X      -3.2279079+03  Y       9.0193231+02  Z       1.1517784+03  DX     -9.8170758+03  DY     -2.0745626+04  DZ     -1.1267329+04
ALT     1.0122462+02  LAT    -1.9080753+01  LON     3.0234145+02  V       2.5567727+04  PTH    -1.8862450-07  AZ      1.1777379+02
R       3.5439334+03  DEC    1.8965575+01  RA      1.6438873+02  RAS     1.2095091+02  DES     2.0399482+01  RAN     1.6067534+01
INC     3.3200204+01  MASS   2.9613124+05
*****************************************************************************************************************

ID     0721108.1
3.5 MINS PRIOR TO TLI INITIATION
 21    JULY 1969 21 HRS, 19 MINS, 23.397 SECS   G.M.T. ***  2. HRS, 40. MINS,  2.849 SECS   G.E.T. ***   T    2.66745806+00 HRS
X       2.4680249+03  Y       2.3169975+03  Z       1.0344827+03  DX     -1.7956630+04  DY      1.3863417+04  DZ      1.1869403+04
ALT     9.6799675+01  LAT    1.7097446+01  LON     1.4387928+02  V       2.5598907+04  PTH     4.6457322-02  AZ      6.1038635+01
*****************************************************************************************************************

ID     0721108.1
TRANSLUNAR INJECTION INITIATION
 21    JULY 1969 21 HRS, 22 MINS, 53.397 SECS   G.M.T. ***  2. HRS, 43. MINS, 32.849 SECS   G.E.T. ***   T    2.72579136+00 HRS
X       1.7772176+03  Y       2.7192264+03  Z       1.4079127+03  DX     -2.1809959+04  DY      9.2323772+03  DZ      9.6367379+03
ALT     9.8367458+01  LAT    2.3568953+01  LON     1.5664207+02  V       2.5593804+04  PTH     4.7252440-02  AZ      6.5791430+01
R       3.5404678+03  DEC    2.3432154+01  RA      5.6832385+01  RAS     1.2105625+02  DES     2.0378837+01  RAN     1.5340068+01
INC     3.3191789+01  MASS   2.9291092+05
*****************************************************************************************************************

ID     0721108.1
TRANSLUNAR INJECTION TERMINATION
 21    JULY 1969 21 HRS, 28 MINS, 13.771 SECS   G.M.T. ***  2. HRS, 48. MINS, 53.224 SECS   G.E.T. ***   T    2.31478435+00 HRS
X       2.7819437+02  Y       3.7681455+03  Z       1.8794131+03  DX     -3.4571843+04  DY      3.6917723+03  DZ      7.4679023+03
ALT     1.6796206+02  LAT    3.1548789+01  LON     1.8329018+02  V       3.5561370+04  PTH     7.0471037+00  AZ      8.0369612+01
R       3.6087535+03  DEC    3.1385448+01  RA      9.4819052+01  RAS     1.2105994+02  DES     2.0378081+01  DEM    -1.0656130+01
SEM     9.2503408+01  RBVS   1.4576837+02  RAN     1.3401039+01  INC     3.2765437+01  ECC     9.7336079-01  SMA     1.1389544+05
RP      3.5536068+03  APF    5.9904740+01  INMP    8.6231581+00  C3TLI  -5.7188527-01  DAZTLI  1.1387275+00  MASS    1.3757054+05
PROP    1.5534038+05
*****************************************************************************************************************

ID     0721108.1
TRANSLUNAR INJECTION + 2 HOURS
 21    JULY 1969 23 HRS, 28 MINS, 13.771 SECS   G.M.T. ***  4. HRS, 48. MINS, 53.224 SECS   G.E.T. ***   T    4.81478435+00 HRS
X      -1.9115170+04  Y      -8.8796508+03  Z      -2.7242708+03  DX     -8.9679860+03  DY     -9.7654686+03  DZ     -4.7873259+03
ALT     1.7809540+04  LAT    -7.3727593+00  LON     2.7330547+02  V       1.4091917+04  PTH     5.4828847+01  AZ      1.2202366+02
R       2.1252284+04  DEC    -7.3648499+00  RA     -1.5598352+02  RAS     1.2114300+02  DES     2.0361727+01
*****************************************************************************************************************

ID     0721108.1
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22    JULY 1969  3 HRS, 39 MINS, 20.547 SECS   G.M.T. ***  8. HRS, 59. MINS, 59.999 SECS   G.E.T. ***   T    8.99999976+00 HRS
X      -3.4089453+04  Y      -2.8823097+04  Z      -1.2995208+04  DX     -4.4211807+03  DY     -6.8795953+03  DZ     -3.6536106+03
ALT     4.3051452+04  LAT    -1.6237993+01  LON     2.2565386+02  V       8.9568149+03  PTH     7.2139613+01  AZ      1.1887667+02
R       4.6494484+04  DEC    -1.6239365+01  RA     -1.3978502+02  RAS     1.2131674+02  DES     2.0327393+01  DEM    -1.2160478+01
SEM     9.5641157+01  RBVS   7.6296662+01  RAN     1.3337130+01  INC     3.2777572+01  ECC     9.7019997-01  SMA     1.1923130+05
RP      3.5542899+03  APF    5.9980059+01  INMP    8.6022207+00  THETA  -3.0949781+01  BETA   -1.5060225+02  MASS    9.6792101+04
DRTX   -1.5109513+01  DRTY  -8.5079694+00  DRTZ    1.0393937+01
*****************************************************************************************************************

ID     0721108.1
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22    JULY 1969  3 HRS, 39 MINS, 23.536 SECS   G.M.T. ***  9. HRS,  0. MINS,  2.958 SECS   G.E.T. ***   T    9.00082159+00 HRS
X      -3.4091606+04  Y      -2.8826444+04  Z      -1.2936983+04  DX     -4.4222093+03  DY     -6.8685284+03  DZ     -3.6364049+03
ALT     4.3055602+04  LAT    -1.6238781+01  LON     2.2554299+02  V       8.9418149+03  PTH     7.2242903+01  AZ      1.1869531+02
R       4.6498634+04  DEC    -1.6231153+01  RA     -1.3978353+02  RAS     1.2131674+02  DES     2.0327375+01  DEM    -1.2160677+01
SEM     9.5641577+01  RBVS   7.6295085+01  RAN     1.3155777+01  INC     3.2624443+01  ECC     9.7012252-01  SMA     1.1765033+05
RP      3.5153662+03  APF    5.9914141+01  INMP    8.4308035+00  THETA  -3.0951164+01  BETA   -1.5042254+02  MASS    9.6599276+04
PROP    1.9282422+02  DELV   2.0209962+01  MASS    9.6599276+04  PLCHNG-1.7893918-01
*****************************************************************************************************************

ID     0721108.1
LUNAR ORBIT INSERTION BURN INITIATION
 24    JULY 1969 22 HRS, 59 MINS, 47.003 SECS   G.M.T. *** 76. HRS, 20. MINS, 26.455 SECS   G.E.T. ***   T    7.63406820+01 HRS
XL     -5.4191898+02  YL     -7.7549254+02  ZL     -3.2219832+02  DXL    -6.7487766+03  DYL     4.6052242+03  DZL     1.2604733+03
XS     -9.7741911+02  YS      2.0819245+02  ZS     -1.0439136+01  DXS     2.0392240+03  DYS     8.0390441+03  DZS    -5.6860433+02
ALTS    4.0904822+01  LATS   -5.9848770-01  LONS    1.6797613+02  VRS     8.2831464+03  PTR    -2.2161114+00  AZR    -9.3962605+01
LIN     1.7599486+02  LAN    -3.4653635+00  LAP    -1.6809986+02  LTS     1.2121554+00  LNS     5.2556314+01  DEM    -2.5609033+01
THETA  -5.0223234-02  BETA   -1.7929057+02  MASS    9.4994620+04  DRTX   -2.7543923+03  DRTY   -3.5534130+01  DRTZ    7.9744321+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721108.1
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 23 HRS,  5 MINS, 46.212 SECS  G.M.T. *** 76. HRS, 26. MINS, 25.664 SECS  G.E.T. ***  T   7.64404621+01 HRS
XL     -8.4042640+02  YL     -5.1135388+02  ZL     -2.4504946+02  DXL    -3.1641215+03  DYL     4.1768822+03  DZL     1.2996607+03
XS     -8.2697812+02  YS      5.8521688+02  ZS     -3.8430800+01  DXS     2.9652944+03  DYS     4.5165098+03  DZS    -3.6327611+02
ALTS    7.5335140+01  LATS   -2.1724088+00  LONS    1.4471460+02  VRS     5.4151454+03  PTR     2.1385379+00  AZR    -9.3770700+01
LIN     1.7563912+02  LAN    -5.4549856+00  LAP    -2.2376947+02  SMAS    1.0528084+03  ECCS    5.2628998-02  PERS    2.1460596+00
RPS     9.9740018+02  APOS    1.1082167+03  RANS    1.6912052+02  INCS    1.5965299+02  LTS     1.2120670+00  LNS     5.2505581+01
LTE     6.2596520+00  LNE    -5.7443916+00  THETA  -2.3300006+01  BETA   -1.7883427+02  PROP    2.3411406+04  BARC    2.3252471+01
DELV    2.8677252+03  MASS    7.1583214+04  PLCHNG-3.7342423-01
*****************************************************************************************************************

ID     0721108.1
CIRCULARIZATION BURN INITIATION
 25    JULY 1969  3 HRS,  7 MINS, 36.423 SECS  G.M.T. *** 80. HRS, 28. MINS, 15.874 SECS  G.E.T. ***  T   8.04710760+01 HRS
XL     -1.4423249+02  YL     -9.2391032+02  ZL     -3.4674461+02  DXL    -5.4146620+03  DYL     8.7036968+02  DZL    -6.2560392+01
XS     -9.8121590+02  YS     -1.7698117+02  ZS      2.3196957+01  DXS    -9.8147023+02  DYS     5.3977287+03  DZS    -3.9740782+02
ALTS    5.8825418+01  LATS    1.3327809+00  LONS   -1.6977553+02  VRS     5.5006083+03  PTR    -1.5466145-02  AZR    -9.4143874+01
LIN     1.7563584+02  LAN    -7.5250338+00  LAP     1.7890545+02  LTS     1.2084655+00  LNS     5.0456543+01  DEM    -2.6142256+01
THETA   3.8947104-01  BETA    1.7999300+02  MASS    7.1533814+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721108.1
CIRCULARIZATION BURN TERMINATION
 25    JULY 1969  3 HRS,  7 MINS, 51.320 SECS  G.M.T. *** 80. HRS, 28. MINS, 30.770 SECS  G.E.T. ***  T   8.04752140+01 HRS
XL     -1.5732810+02  YL     -9.2172453+02  ZL     -3.4686650+02  DXL    -5.2674364+03  DYL     9.1257442+02  DZL    -3.6860412+01
XS     -9.8350776+02  YS     -1.6389862+02  ZS      2.2232924+01  DXS    -8.8801181+02  DYS     5.2737466+03  DZS    -3.8895299+02
ALTS    5.8825174+01  LATS    1.2773834+00  LONS   -1.7053877+02  VRS     5.3621126+03  PTR     3.8482119-03  AZR    -9.4160851+01
LIN     1.7563583+02  LAN    -7.5272524+00  LAP     1.6339251+02  SMAS    9.9760696+02  ECCS    2.9668970-04  PERS    1.9795066+00
RPS     9.9731097+02  APOS    9.9790292+02  RANS    1.6910637+02  INCS    1.5964310+02  LTS     1.2084621+00  LNS     5.0454441+01
LTE     6.3465647+00  LNE    -5.5263012+00  THETA  -3.7328264-01  BETA    1.8000000+02  PROP    9.7093945+02  BARC    7.6289409-01
DELV    1.3850210+02  MASS    7.0562875+04  PLCHNG 1.1657606-05
*****************************************************************************************************************

ID     0721108.1
CSM  1ST PASS OVER LUNAR LANDING SITE
 26    JULY 1969  0 HRS,  7 MINS, 14.445 SECS  G.M.T. ***101. HRS, 27. MINS, 53.894 SECS  G.E.T. ***  T   1.01464971+02 HRS
XL      7.5179140+02  YL      5.9623929+02  ZL      2.7118880+02  DXL     3.4943499+03  DYL    -3.8747985+03  DZL    -1.1683656+03
XS      7.4135722+02  YS     -6.6609729+02  ZS      3.0791762+01  DXS    -3.5841517+03  DYS    -3.9717878+03  DZS     3.7400747+02
ALTS    5.8619797+01  LATS    1.7696269+00  LONS   -4.1938873+01  VRS     5.3629397+03  PTR    -5.4699105-04  AZR    -8.5999062+01
LIN     1.7561473+02  LAN    -1.8180660+01  SEASV  8.3057613+00
*****************************************************************************************************************

ID     0721108.1
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  5 HRS, 29 MINS, 41.864 SECS  G.M.T. ***106. HRS, 50. MINS, 21.316 SECS  G.E.T. ***  T   1.06839254+02 HRS
XL     -7.9311378+02  YL      5.8376272+02  ZL      1.5736845+02  DXL     3.2214901+03  DYL     3.9278126+03  DZL     1.6655837+03
XS      5.4236992+02  YS      8.3351212+02  ZS     -7.4640848+01  DXS     4.4970413+03  DYS    -2.9191249+03  DZS     8.6325127+01
ALTS    5.8742389+01  LATS   -4.2924749+00  LONS    5.6947774+01  VRS     5.3620958+03  PTR    -5.2181939-03  AZR    -8.9078592+01
LIN     1.7560934+02  LAN    -2.0889500+01  LAP     3.1325333+01  LTS     1.1843587+00  LNS     3.7056011+01  DEM    -2.8318325+01
THETA  -1.2806605-05  BETA    8.9999990+01  MASS    3.6656176+04  DRTX    0.0000000     DRTY    7.3702687+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721108.1
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  5 HRS, 29 MINS, 45.939 SECS  G.M.T. ***106. HRS, 50. MINS, 25.391 SECS  G.E.T. ***  T   1.06840386+02 HRS
XL     -7.9094962+02  YL      5.8638490+02  ZL      1.5820769+02  DXL     3.2318453+03  DYL     3.8912785+03  DZL     1.7316126+03
XS      5.4538326+02  YS      8.3155058+02  ZS     -7.4558055+01  DXS     4.4885084+03  DYS    -2.9299992+03  DZS     1.6395111+02
ALTS    5.8741743+01  LATS   -4.2877062+00  LONS    5.6740613+01  VRS     5.3626027+03  PTR    -5.2006965-03  AZR    -8.8275636+01
LIN     1.7537723+02  LAN    -1.1267226+01  LAP     2.0131052+01  SMAS    9.9762572+02  ECCS    4.0180090-04  PERS    1.9795624+00
RPS     9.9722486+02  APOS    9.9802655+02  RANS    1.6800119+02  INCS    1.5885942+02  LTS     1.1843580+00  LNS     3.7055437+01
LTE     6.6268392+00  LNE    -3.8197705+00  THETA   1.6853492-03  BETA    8.9299549+01  PROP    2.6561230+02  BARC    2.0629716-01
DELV    7.3702610+01  MASS    3.6390563+04  PLCHNG 7.8987186-01
*****************************************************************************************************************

ID     0721108.1
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 21 HRS, 49 MINS,  8.580 SECS  G.M.T. ***123. HRS,  9. MINS, 48.029 SECS  G.E.T. ***  T   1.23163342+02 HRS
XL      6.3065791+02  YL      7.2706840+02  ZL      3.2433897+02  DXL     4.2493023+03  DYL    -3.1327817+03  DZL    -8.4412292+02
XS      7.4149761+02  YS     -6.6621656+02  ZS      3.0836011+01  DXS    -3.5824904+03  DYS    -3.9700694+03  DZS     3.9987931+02
ALTS    5.8809894+01  LATS    1.7718329+00  LONS   -4.1938878+01  VRS     5.3624240+03  PTR     9.0910974-03  AZR    -8.5721687+01
LIN     1.7535801+02  LAN    -1.9544316+01
*****************************************************************************************************************

ID     0721108.1
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  6 HRS, 26 MINS, 31.117 SECS  G.M.T. ***131. HRS, 47. MINS, 10.566 SECS  G.E.T. ***  T   1.31786268+02 HRS
XL      2.4072892+02  YL     -9.1139425+02  ZL     -3.2659483+02  DXL    -5.1711889+03  DYL    -1.0696168+03  DZL    -8.2636922+02
XS     -9.9402353+02  YS     -7.5491112+01  ZS      3.8371010+01  DXS    -4.1946665+02  DYS     5.3309153+03  DZS    -3.8172569+02
ALTS    5.9130674+01  LATS    2.2042763+00  LONS   -1.7565701+02  VRS     5.3610004+03  PTR    -1.3306284-03  AZR    -9.4786145+01
LIN     1.7534729+02  LAN    -2.3883138+01  LAP     1.7588785+02  LTS     1.1606863+00  LNS     2.4383483+01  DEM    -2.8142753+01
THETA  -4.9216183+00  BETA    7.9653916+00  MASS    3.6459264+04  DRTX    3.1025724+03  DRTY    4.3251886+02  DRTZ    3.2219173+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0721108.1
TRANSEARTH INJECTION BURN TERMINATION
 27   JULY 1969  6 HRS, 28 MINS, 59.863 SECS  G.M.T. ***131. HRS, 49. MINS, 39.314 SECS  G.E.T. ***  T   1.31827587+02 HRS
XL     7.0624252+01  YL     -9.3577564+02  ZL     -3.4380775+02  DXL    -8.3754550+03  DYL    -9.4704714+02  DZL    -5.7739043+02
XS    -9.9519293+02  YS      9.1533821+01  ZS      3.1042097+01  DXS     3.2620831+02  DYS     8.4559225+03  DZS    -2.0587226+02
ALTS   6.1381983+01  LATS    1.7790885+00  LONS    1.7474495+02  VRS     8.4647159+03  PTR     3.0001230+00  AZR    -9.1489536+01
LIN    1.7767802+02  LAN    -5.5252666+01  LAP     1.6692252+02  SMAS   -1.9814341+03  ECCS    1.5334668+00  PERS    5.5409877+00
RPS    9.9758627+02  APOS   -4.9604544+03  RANS    1.7580007+02  INCS    1.5966419+02  INMPS   1.7173523+02  SEM     1.5327867+02
RRVS   2.9759953+01  LTS     1.1606462+00  LNS     2.4362503+01  LTE     6.3954209+00  LNE    -1.8463788+00  THETA   4.6309446+00
BETA   5.3228314+00  PROP    9.6944600+03  RAPC    9.5789926+00  DELV    3.1327453+03  MASS    2.6764804+04  PLCHNG  2.9298873+00
*****************************************************************************************************************

ID    0721108.1
ENTRY AND TOUCHDOWN
 28   JULY 1969 21 HRS, 38 MINS, 13.137 SECS  G.M.T. ***194. HRS, 58. MINS, 52.585 SECS  G.E.T. ***  T   1.94981274+02 HRS
X      7.3408882+02  Y      3.2696161+03  Z      1.0490065+03  DX    -3.0870766+04  DY    -3.3124591+03  DZ     1.8434675+04
R      3.5386876+03  DEC    1.7242045+01  RA     7.7345884+01  V      3.6138361+04  PTH   -6.4900413+00  AZ     5.5118363+01
ALT    4.5772957+01  LAT    1.7349219+01  LON    1.6542796+02  VE     3.4910293+04  PTE   -6.6501881+00  AZE    5.3501403+01
SMA    1.3941763+05  ECC    9.7497945-01  INC    3.8508498+01  RAN    5.4388138+01  APF    4.1575700+01  RP     3.4632859+03
INMP   3.1327901+01  SEM    1.6851329+02  RBVS   1.3174404+02  RAM   -3.8932881+01  DEM   -1.8287335+01  RAS    1.2896048+02
DES    1.8433248+01  SPSPR  4.1327339+03  DVRES  1.7216177+03  PERNAD 9.3983191+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD  2.8936819+01  LONTD  1.8500054+02  AZTD   6.1367736+01  SEATD  6.2037519+01  DTSUN  7.1694395+00
*****************************************************************************************************************

ID    0721108.1
CIRCUMLUNAR PERICYNTHION
 24   JULY 1969 23 HRS,  2 MINS, 10.078 SECS  G.M.T. *** 76. HRS, 22. MINS, 49.528 SECS  G.E.T. ***  T   7.63804245+01 HRS
XL    -7.6618079+02  YL    -1.3741329+03  ZL    -7.3999073+02  DXL   -5.9629221+03  DYL    2.7330308+03  DZL    1.1344183+03
XS    -1.7218995+03  YS     1.6528149+02  ZS    -1.7497719+02  DXS    6.3923643+03  DYS    6.6478094+03  DZS   -1.1376937+01
ALTS   8.7714397+02  LATS  -5.7763491+00  LONS   1.7451708+02  VRS    6.6784815+03  PTR   -2.4934155-06  AZR   -9.0195387+01
LIN    1.7422315+02  LAN    8.3563979+01  LAP   -1.2035334+02  LTS    1.2121203+00  LNS    5.2536106+01  DEM   -2.5614356+01
SEM    1.2153483+02  RRVS   5.9063779+01  SMAS  -2.4985554+03  ECCS   1.6986533+00  INCS   1.5281501+02  RANS   1.7454059+02
APES  -6.3695584+ 1  RPS    1.7386375+03  RM    1.9943759+05  DEMP   4.9190282-01  RAMP  -1.7975539+02
*****************************************************************************************************************

ID    0721108.1
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27   JULY 1969 22 HRS,  5 MINS, 30.135 SECS  G.M.T. ***145. HRS, 26. MINS,  9.582 SECS  G.E.T. ***  T   1.45436995+02 HRS
X      2.6733439+03  Y      2.1561028+03  Z      9.2759819+02  DX    -2.6256827+04  DY     1.7602527+04  DZ     1.7427881+04
R      3.5089570+03  DEC    1.5329424+01  RA     3.9577515+01  V      3.6097104+04  PTH   -6.5135446+00  AZ     5.7645094+01
ALT    4.5833923+01  LAT    1.5424954+01  LON    1.5287344+02  VE     3.4948173+04  PTE   -6.6945091+00  AZE    5.6306962+01
SMA    1.3277359+05  ECC    9.7391649-01  INC    3.5442435+01  RAN    1.6927873+01  APF    4.0323195+01  RP     3.4531996+03
INMP   1.1883564+01  RAM   -7.1605924+01  DEM   -2.7376174+01  RAS    1.2693902+02  DES    1.9115819+01  SEM    1.6126524+02
RRVS   3.7381527+01  PERNAD 8.8722498+00  ENTDT  2.3333333-01  ENTRG  1.2850000+03  LATTD  2.6255799+01  LONTD  1.7267624+02
AZTD   5.3333328+01  SEATD  3.0979250+01  DTSUN  9.5937084+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721072.2
LAUNCH TIME      21   JULY 1969    14 HRS,     9 MINS,   7.419 SECS   G.M.T.
LAUNCH AZIMUTH   72.                            INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID     0721072.2
EARTH PARKING ORBIT INSERTION
 21    JULY 1969 14 HRS, 20 MINS, 31.461 SECS  G.M.T. ***  0. HRS, 11. MINS, 24.042 SECS  G.E.T. ***  T   1.90011725-01 HRS
X      -5.2408382+02  Y       2.9369150+03  Z       1.9129378+03  DX     -2.5066135+04  DY     -4.9792881+03  DZ      7.7733313+02
ALT     1.0337523+02  LAT     3.2838504+01  LON     3.0580793+02  V       9.5567727+04  PTH    -1.1789031-08  AZ      8.7930247+01
R       3.5439334+03  DEC     3.2668535+01  RA      1.0011777+02  RAS     1.2076378+02  DES     2.0436044+01  RAN     1.3948176+01
INC     3.2726784+01  MASS    2.9588213+05
*****************************************************************************************************************

ID     0721072.2
3.5 MINS PRIOR TO TLI INITIATION
 21    JULY 1969 18 HRS, 31 MINS, 12.806 SECS  G.M.T. ***  4. HRS, 22. MINS,  5.388 SECS  G.E.T. ***  T   4.36816329+00 HRS
X       2.5749562+03  Y       2.2085905+03  Z       1.0235015+03  DX     -1.7303446+04  DY      1.4760939+04  DZ      1.1705655+04
ALT     1.0245412+02  LAT     1.6892523+01  LON     1.8346664+02  V       2.5579619+04  PTH     1.6442980-02  AZ      6.1451405+01
*****************************************************************************************************************

ID     0721072.2
TRANSLUNAR INJECTION INITIATION
 21    JULY 1969 18 HRS, 34 MINS, 42.806 SECS  G.M.T. ***  4. HRS, 25. MINS, 35.388 SECS  G.E.T. ***  T   4.42649562+00 HRS
X       1.9033881+03  Y       2.6450998+03  Z       1.3920872+03  DX     -2.1356452+04  DY      1.0368281+04  DZ      9.5127751+03
ALT     1.0149994+02  LAT     2.3266756+01  LON     1.9623049+02  V       2.5575226+04  PTH     1.1464371-02  AZ      6.6147459+01
R       3.5436345+03  DEC     2.3131432+01  RA      5.4261576+01  RAS     1.2093982+02  DES     2.0401656+01  RAN     1.2641006+01
INC     3.2747576+01  MASS    2.9167004+05
*****************************************************************************************************************

ID     0721072.2
TRANSLUNAR INJECTION TERMINATION
 21    JULY 1969 18 HRS, 40 MINS,   .928 SECS  G.M.T. ***  4. HRS, 30. MINS, 53.509 SECS  G.E.T. ***  T   4.51486355+00 HRS
X       4.3243104+02  Y       3.0578035+03  Z       1.8581265+03  DX     -3.4353870+04  DY      4.8749863+03  DZ      7.8947310+03
ALT     1.5328129+02  LAT     3.1197004+01  LON     2.2259045+02  V       3.5584837+04  PTH     6.5907779+00  AZ      7.8981679+01
R       3.6041355+03  DEC     3.1034491+01  RA      8.1950672+01  RAS     1.2094349+02  DES     2.0400938+01  DEM    -9.9675843+00
SEM     8.1088077+01  RRVS    1.4350402+02  RAN     1.2641003+01  INC     3.2747575+01  ECC     9.7037897-01  SMA     1.2004749+05
RP      3.5559309+03  APF     5.8993949+01  INMP    8.2804455+00  C3TLI  -5.7116054-01  DAZTLI 0.0000000      MASS    1.3742237+05
PROP    1.5424767+05
*****************************************************************************************************************

ID     0721072.2
TRANSLUNAR INJECTION + 2 HOURS
 21    JULY 1969 20 HRS, 40 MINS,   .928 SECS  G.M.T. ***  6. HRS, 30. MINS, 53.509 SECS  G.E.T. ***  T   6.51486355+00 HRS
X      -1.9353600+04  Y      -8.3518252+03  Z      -2.5335932+03  DX     -9.2677163+03  DY     -9.5361086+03  DZ     -4.6902392+03
ALT     1.7786725+04  LAT    -6.8612459+00  LON     3.1399971+02  V       1.4100577+04  PTH     6.4808856+01  AZ      1.2211153+02
R       2.1230494+04  DEC    -6.8538668+00  RA     -1.5665794+02  RAS     1.2102657+02  DES     2.0384640+01
*****************************************************************************************************************

ID     0721072.2
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22    JULY 1969  0 HRS, 39 MINS,  7.419 SECS  G.M.T. *** 10. HRS, 30. MINS,   .000 SECS  G.E.T. ***  T   1.05000000+01 HRS
X      -3.4395885+04  Y      -2.7108584+04  Z      -1.2235371+04  DX     -4.7340778+03  DY     -6.8462229+03  DZ     -3.6362128+03
ALT     4.2020325+04  LAT    -1.5580505+01  LON     2.6885980+02  V       9.0831879+04  PTH     7.2028763+01  AZ      1.1919064+02
R       4.5463427+04  DEC    -1.5572987+01  RA     -1.4175714+02  RAS     1.2119206+02  DES     2.0352050+01  DEM    -1.1432669+01
SEM     8.4114375+01  RRVS    7.8184463+01  RAN     1.2576388+01  INC     3.2759085+01  ECC     9.7020034-01  SMA     1.1935238+05
RP      3.5566598+03  APF     5.9070707+01  INMP    8.2588416+00  THETA  -2.8691891+01  BETA   -1.5228474+02  MASS    9.6792101+04
DRTX   -1.5702938+01  DRTY   -8.2496353+00  DRTZ    9.7083304+00
*****************************************************************************************************************

ID     0721072.2
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22    JULY 1969  0 HRS, 39 MINS, 10.379 SECS  G.M.T. *** 10. HRS, 30. MINS,  2.960 SECS  G.E.T. ***  T   1.05008222+01 HRS
X      -3.4398191+04  Y      -2.7111917+04  Z      -1.2207138+04  DX     -4.7354486+03  DY     -6.8349713+03  DZ     -3.6191448+03
ALT     4.2024531+04  LAT    -1.5581338+01  LON     2.6884900+02  V       9.0686003+03  PTH     7.2104792+01  AZ      1.1902061+02
R       4.5467634+04  DEC    -1.5573820+01  RA     -1.4175558+02  RAS     1.2119209+02  DES     2.0352042+01  DEM    -1.1432870+01
SEM     8.4114793+01  RRVS    7.8182808+01  RAN     1.2420239+01  INC     3.2611916+01  ECC     9.7014461-01  SMA     1.1780261+05
RP      3.5170422+03  APF     5.8988015+01  INMP    8.1037861+00  THETA  -2.8693542+01  BETA   -1.5211466+02  MASS    9.6599173+04
PROP    1.9292773+02  DELV    2.0220836+01  MASS    9.6599173+04  PLCHNG-1.6961717-01
*****************************************************************************************************************

ID     0721072.2
LUNAR ORBIT INSERTION BURN INITIATION
 24    JULY 1969 20 HRS, 21 MINS, 24.799 SECS  G.M.T. *** 78. HRS, 12. MINS, 17.378 SECS  G.E.T. ***  T   7.82048273+01 HRS
XL     -4.9501686+02  YL     -8.0945737+02  ZL     -3.3065756+02  DXL    -6.7757103+03  DYL     4.5240095+03  DZL     1.2773068+03
XS     -9.9673176+02  YS      1.2685483+02  ZS     -5.5617858+00  DXS     1.7608732+03  DYS     8.0561119+03  DZS    -5.2296622+02
ALTS    5.6293661+01  LATS   -3.1715023-01  LONS    1.7274691+02  VRS     8.2628751+03  PTR    -5.0460584+00  AZR    -9.3670989+01
LIN     1.7630812+02  LAN    -2.3318211+00  LAP     9.0388741+00  LTS     1.2145018+00  LNS     5.3898255+01  DEM    -2.5244086+01
THETA   5.6711994+00  BETA   -1.7862435+02  MASS    9.4994518+04  DRTX   -2.7846840+03  DRTY   -6.7243138+01  DRTZ    4.4319453+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721072.2
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 20 HRS, 27 MINS, 18.831 SECS   G.M.T. *** 78. HRS, 18. MINS, 11.409 SECS   G.E.T. ***   T    7.83031693+01 HRS
XL     -7.9699866+02  YL     -5.5487315+02  ZL     -2.5671542+02  DXL    -3.4027704+03  DYL     4.0694042+03  DZL     1.2391868+03
XS     -8.6627780+02  YS      5.0710882+02  ZS     -3.2223619+01  DXS     2.6457476+03  DYS     4.7651795+03  DZS    -3.7976017+02
ALTS    6.5814679+01  LATS   -1.8386729+00  LONS    1.4965580+02  VRS     5.4636191+03  PTR     1.4280575+00  AZR    -9.3943038+01
LIN     1.7563932+02  LAN    -5.4478525+00  LAP     1.4622437+02  SMAS    1.0525936+03  ECCS    5.2228195-02  PERS    2.1454026+00
RPS     9.9761851+02  APOS    1.1075686+03  RANS    1.6921025+02  INCS    1.5975819+02  LTS     1.2144148+00  LNS     5.3348256+01
LTE     6.1968788+00  LNE    -5.8804231+00  THETA -1.6401781+01   BETA   -1.7785031+02  PROP    2.3073924+04  BARC    2.3382520+01
DELV    2.8200597+03  MASS    7.1920594+04  PLCHNG-7.0224302-01
*****************************************************************************************************************

ID     0721072.2
CIRCULARIZATION BURN INITIATION
 25    JULY 1969  0 HRS, 34 MINS, 49.111 SECS   G.M.T. *** 82. HRS, 25. MINS, 41.691 SECS   G.E.T. ***   T    8.24282475+01 HRS
XL     -3.7978860+02  YL     -8.5894451+02  ZL     -3.3748922+02  DXL    -5.0589541+03  DYL     2.0747239+03  DZL     4.0199367+02
XS     -9.9669993+02  YS      4.1317816+01  ZS      6.8932727+01  DXS     2.2570093+02  DYS     5.4783378+03  DZS    -4.1547984+02
ALTS    5.9086253+01  LATS   3.9591679-01   LONS    1.7762618+02  VRS     5.4987043+03  PTR    -1.5324765-02  AZR    -9.4333374+01
LIN     1.7563892+02  LAN    -7.5689271+00  LAP    -3.3702332+00  LTS     1.2107433+00  LNS     5.1751072+01  DEM    -2.5819042+01
THETA   3.9106589-01  BETA   -1.8000000+02  MASS    7.1871194+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721072.2
CIRCULARIZATION BURN TERMINATION
 25    JULY 1969  0 HRS, 35 MINS,  4.079 SECS   G.M.T. *** 82. HRS, 25. MINS, 56.663 SECS   G.E.T. ***   T    8.24324055+01 HRS
XL     -3.9106653+02  YL     -8.5382445+02  ZL     -3.3648246+02  DXL    -4.9042725+03  DYL     2.0821083+03  DZL     4.1536786+02
XS     -9.9666669+02  YS      5.4639356+01  ZS      5.8821390+01  DXS     2.9001693+02  DYS     5.3369757+03  DZS    -4.0543031+02
ALTS    5.9086014+01  LATS   3.3784143-01   LONS    1.7686017+02  VRS     5.3602045+03  PTR     3.7341578-03  AZR    -9.4337921+01
LIN     1.7563592+02  LAN    -7.5712049+00  LAP    -3.3779841+02  SMAS    9.9741486+02  ECCS    1.7759096-04  PERS    1.9789348+00
RPS     9.9723773+02  APOS    9.9759197+02  RANS    1.6919503+02  INCS    1.5974841+02  LTS     1.2107396+00  LNS     5.1748955+01
LTE     6.2929897+00  LNE    -5.6653786+00  THETA -3.7490823-01   BETA   -1.8000001+02  PROP    9.7551953+02  BARC    7.6596608-01
DELV    1.3850210+02  MASS    7.0895675+04  PLCHNG 6.4648165-06
*****************************************************************************************************************

ID     0721072.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 25    JULY 1969 21 HRS, 29 MINS, 55.139 SECS   G.M.T. ***103. HRS, 23. MINS, 47.717 SECS   G.E.T. ***   T    1.23346588+02 HRS
XL      7.5751915+02  YL      5.7819234+02  ZL      2.6385459+02  DXL     3.9944666+03  DYL    -3.9566322+03  DZL    -1.2004530+03
XS      7.4[illegible]93366+02  YS     -6.5568068+02  ZS      3.0767995+01  DXS    -3.5852959+03  DYS    -3.9744480+03  DZS     3.7420549+02
ALTS    5.8025975+01  LATS   1.7693502+00  LONS   -4.1938898+01  VRS     5.3656884+03  PTR     9.4160116-03  AZR    -8.5993379+01
LIN     1.7561507+02  LAN    -1.8182640+01  SEASV  6.9742640+00
*****************************************************************************************************************

ID     0721072.2
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  2 HRS, 52 MINS, 18.169 SECS   G.M.T. ***108. HRS, 43. MINS, 10.748 SECS   G.E.T. ***   T    1.08719652+02 HRS
XL     -7.7756017+02  YL      6.0191816+02  ZL      1.6635071+02  DXL     3.3301279+03  DYL     3.8598529+03  DZL     1.6344778+03
XS      8.4221642+02  YS      8.3327698+02  ZS     -7.4613918+01  DXS     4.4965692+03  DYS    -2.9216343+03  DZS     8.6203117+01
ALTS    5.8460042+01  LATS  -4.2921394+00   LONS    5.6947798+01  VRS     5.3633692+03  PTR    -3.0529569-02  AZR    -8.9078724+01
LIN     1.7560973+02  LAN    -2.0890623+01  LAP     6.8805854+01  LTS     1.1868002+00  LNS     3.8388859+01  DEM    -2.8205207+01
THETA -1.7929246-05   BETA    8.9999983+01  MASS    3.6988976+04  DRTX    0.0000000     DRTY    7.3702687+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721072.2
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  2 HRS, 52 MINS, 22.281 SECS   G.M.T. ***108. HRS, 43. MINS, 14.861 SECS   G.E.T. ***   T    1.08720795+02 HRS
XL     -7.7530285+02  YL      6.0451196+02  ZL      1.6547921+02  DXL     3.3403921+03  DYL     3.8139723+03  DZL     1.7003825+03
XS      8.4525679+02  YS      8.3129586+02  ZS     -7.4530256+01  DXS     4.4879340+03  DYS    -2.9326649+03  DZS     1.6114298+02
ALTS    5.8458105+01  LATS  -4.2873261+00   LONS    5.6738657+01  VRS     5.3635848+03  PTR    -3.0491899-02  AZR    -8.8275779+01
LIN     1.7537763+02  LAN    -1.1269261+01  LAP     5.7972031+01  SMAS    9.9742635+02  ECCS    7.1514223-04  PERS    1.9789690+00
RPS     9.9671365+02  APOS    9.9813964+02  RANS    1.6832758+02  INCS    1.5897528+02  LTS     1.1867992+00  LNS     3.8388278+01
LTE     6.6224238+00  LNE    -4.0094760+00  THETA   9.0243873-04  BETA    8.9209717+01  PROP    2.6802539+02  BARC    2.0795041-01
DELV    7.3702987+01  MASS    3.6720950+04  PLCHNG 7.8972790-01
*****************************************************************************************************************

ID     0721072.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 19 HRS, 11 MINS, 26.138 SECS   G.M.T. ***125. HRS,  2. MINS, 18.716 SECS   G.E.T. ***   T    1.25038532+02 HRS
XL      6.2[illegible]1057+02  YL      7.1236626+02  ZL      3.1834025+02  DXL    -4.1693646+03  DYL    -3.2326287+03  DZL    -8.8382510+02
XS      7.4101895+02  YS     -6.6578690+02  ZS      3.0315051+01  DXS    -3.5841328+03  DYS    -3.9724947+03  DZS     4.0006763+02
ALTS    5.8166333+01  LATS   1.7717718+00   LONS   -4.1938896+01  VRS     5.3653309+03  PTR     1.3422015-02  AZR    -8.5722117+01
LIN     1.7535945+02  LAN    -1.9542879+01
*****************************************************************************************************************

ID     0721072.2
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  3 HRS, 47 MINS, 25.922 SECS   G.M.T. ***133. HRS, 38. MINS, 18.499 SECS   G.E.T. ***   T    1.33638472+02 HRS
XL      2.7825413+02  YL     -9.0359459+02  ZL     -3.1871459+02  DXL    -5.1155013+03  DYL    -1.2634219+03  DZL    -4.8943864+02
XS     -9.8723944+02  YS     -1.3929468+02  ZS      4.2867303+01  DXS    -7.6452929+02  DYS     5.2922770+03  DZS    -3.6753433+02
ALTS    5.9247668+01  LATS   2.4623341+00   LONS   -1.7196725+02  VRS     5.3598303+03  PTR     1.7992478-02  AZR    -9.3936377+01
LIN     1.7534784+02  LAN    -2.3869447+01  LAP    -1.0886199+02  LTS     1.1632392+00  LNS     2.5730138+01  DEM    -2.8273832+01
THETA -4.6960467+00   BETA    7.3308852+00  MASS    3.6789650+04  DRTX    3.0407221+03  DRTY    3.8987216+02  DRTZ    2.1569823+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721072.2
TRANSEARTH INJECTION BURN TERMINATION
 27   JULY 1969  3 HRS, 49 MINS, 53.265 SECS  G.M.T. ***133. HRS, 40. MINS, 45.845 SECS  G.E.T. ***  T   1.33679401+02 HRS
XL     1.1770745+02  YL     -9.3373181+02  ZL     -3.3823066+02  DXL    -8.2580953+03  DYL    -1.2507549+03  DZL    -7.2117085+02
XS    -9.9910960+02  YS      2.5002929+01  ZS      3.5565829+01  DXS    -2.3812452+02  DYS     8.3930890+03  DZS    -2.2527246+02
ALTS   6.1561521+01  LATS    2.0380895+00  LONS    1.7856646+02  VRS     8.3994877+03  PTR     3.0009077+00  AZR    -9.1646861+01
LIN    1.7737792+02  LAN    -5.2426230+01  LAP    -7.5925595+00  SMAS   -2.1435566+03  ECCS    1.4654603+00  PERS    6.2347662+00
RPS    9.9774040+02  APOS   -5.2848536+03  RANS    1.7502881+02  INCS    1.5981484+02  INMPS   1.7153919+02  SEM     1.5173287+02
RBVS   2.7326382+01  LTS     1.1631997+00  LNS     2.5709353+01  LTE     6.4436150+00  LNE    -2.0673881+00  THETA   4.7124172+00
BETA   4.6612339+00  PROP    9.6030391+03  BARC    9.4460396+00  DELV    3.0656939+03  MASS    2.7186611+04  PLCHNG 2.6610744+00
*****************************************************************************************************************

ID     0721072.2
ENTRY AND TOUCHDOWN
 29   JULY 1969 21 HRS, 33 MINS,  2.098 SECS  G.M.T. ***199. HRS, 23. MINS, 54.677 SECS  G.E.T. ***  T   1.99398521+02 HRS
X      8.0219392+02  Y       3.2488843+03  Z       1.0547989+03  DX     -3.0730202+04  DY     -2.8922502+03  DZ      1.8708572+04
R      3.5087554+03  DEC     1.7494791+01  RA      7.6130308+01  V       3.6093227+04  PTH    -6.4900150+00  AZ      5.4349367+01
ALT    6.5869846+01  LAT     1.7603332+01  LON     1.6551193+02  VE      3.4907061+04  PTE    -6.6460983+00  AZE     5.2910808+01
SMA    1.3012047+05  ECC     9.7338378-01  INC     3.9195030+01  RAN     5.3390907+01  APF     4.1562675+01  RP      3.4633165+03
INMP   3.1303423+01  SEM     1.6856120+02  RBVS    1.2994854+02  RAM    -3.8985598+01  DEM    -1.8307852+01  RAS     1.2895696+02
DES    1.8634109+01  SPSPR   4.5545115+03  DVRES   1.8819467+03  PERNAD 8.7730714+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD  2.3396141+01  LONTD   1.8499211+02  AZTD    6.0753571+01  SEATD  6.0818402+01  DTSUN   7.2424288+00
*****************************************************************************************************************

ID     0721072.2
CIRCUMLUNAR PERICYNTHION
 24   JULY 1969 20 HRS, 25 MINS, 33.249 SECS  G.M.T. *** 78. HRS, 16. MINS, 25.831 SECS  G.E.T. ***  T   7.82738419+01 HRS
XL    -8.3866489+02  YL     -1.3548289+03  ZL     -7.3014777+02  DXL    -5.8786088+03  DYL     2.8673327+03  DZL     1.1902795+03
XS    -1.7215808+03  YS      1.6966910+02  ZS     -1.7316993+02  DXS     6.5302295+02  DYS     6.6439769+03  DZS     1.7591784+01
ALTS   8.0007372+02  LATS   -5.7164232+00  LONS    1.7437143+02  VRS     6.6760150+03  PTR    -2.7081643-06  AZR    -8.9848370+01
LIN    1.7428155+02  LAN     8.5900707+01  LAP     1.3776345+02  LTS     1.2144407+00  LNS     5.3863166+01  DEM    -2.5253862+01
SPM    1.2028494+02  RBVS    5.9525726+01  SMAS   -2.4959989+03  ECCS    1.6965417+00  INCS    1.5283572+02  RANS    1.7477050+02
APES   -6.6910452+01  RPS     1.7385672+03  RM      1.9872987+05  DEMP    4.8968380-01  RAMP   -1.7976796+02
*****************************************************************************************************************

ID     0721072.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27   JULY 1969 17 HRS, 33 MINS, 55.826 SECS  G.M.T. ***147. HRS, 24. MINS, 49.407 SECS  G.E.T. ***  T   1.47413446+02 HRS
X      2.6628777+03  Y       2.0989447+03  Z       9.3948411+02  DX     -2.5697731+04  DY      1.8280627+04  DZ      1.7563798+04
R      3.5289885+03  DEC     1.5021825+01  RA      3.8266964+01  V       3.6097669+04  PTH    -6.3613760+00  AZ      5.7532727+01
ALT    6.5834077+01  LAT     1.5116607+01  LON     1.8955959+02  VE      3.4848160+04  PTE    -6.5377266+00  AZE     5.6189376+01
SMA    1.3317534+05  ECC     9.7397915-01  INC     3.5425819+01  RAN     1.6103179+01  APF     3.9454095+01  RP      3.4653360+03
INMP   1.1523758+01  RAM    -7.3379773+01  DEM    -2.7324172+01  RAS     1.2683566+02  DES     1.9139832+01  SEM     1.5973711+02
RBVS   9.6184458+01  PERNAD 8.8885349+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD   2.6004944+01  LONTD   2.0324019+02
AZTD   6.3165275+01  SEATD  2.9814731+01  DTSUN   9.6851256+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0721081.2
LAUNCH TIME      21   JULY 1969    14 HRS,    33 MINS,  42.338 SECS    G.M.T.
LAUNCH AZIMUTH   81.                              INJECTION OPPORTUNITY     2
*****************************************************************************************************************

ID    0721081.2
EARTH PARKING ORBIT INSERTION
 21   JULY 1969 14 HRS, 45 MINS,  3.665 SECS  G.M.T. ***  0. HRS, 11. MINS, 21.326 SECS  G.E.T. ***  T   1.89257342-01 HRS
X     -8.5364765+02  Y       2.9757909+03  Z       1.7249402+03  DX     -2.4794082+04  DY     -5.8489747+03  DZ     -2.1798348+03
ALT    1.0274514+02  LAT     2.9285035+01  LON     3.0554547+02  V       2.5567727+04  PTH    -4.0082705-07  AZ      9.5600888+01
R      3.5439934+03  DEC     2.9125906+01  RA      1.0600628+02  RAS     1.2078078+02  DES     2.0432731+01  RAN     4.6148285+00
INC    2.9613119+01  MASS    2.9716536+05
*****************************************************************************************************************

ID    0721081.2
3.5 MINS PRIOR TO TLI INITIATION
 21   JULY 1969 18 HRS, 54 MINS, 25.242 SECS  G.M.T. ***  4. HRS, 20. MINS, 42.904 SECS  G.E.T. ***  T   4.34525102+00 HRS
X      2.5769557+03  Y       2.1496460+03  Z       1.1362903+03  DX     -1.7531145+04  DY      1.5944637+04  DZ      9.6308768+03
ALT    1.0025701+02  LAT     1.8820000+01  LON     1.7686281+02  V       2.5579802+04  PTH     2.6434277-02  AZ      6.6587717+01
*****************************************************************************************************************

ID    0721081.2
TRANSLUNAR INJECTION INITIATION
 21   JULY 1969 18 HRS, 57 MINS, 55.242 SECS  G.M.T. ***  4. HRS, 24. MINS, 12.904 SECS  G.E.T. ***  T   4.40358436+00 HRS
X      1.8975234+03  Y       2.6284542+03  Z       1.4304024+03  DX     -2.1581403+04  DY      1.1619615+04  DZ      7.3003869+03
ALT    1.0131792+02  LAT     2.3947096+01  LON     1.9032509+02  V       2.5574754+04  PTH     2.0800466-02  AZ      7.1829547+01
R      3.5433624+03  DEC     2.3808749+01  RA      5.4173875+01  RAS     1.2095589+02  DES     2.0398507+01  RAN     3.2863508+00
INC    2.9625522+01  MASS    2.9296619+05
*****************************************************************************************************************

ID    0721081.2
TRANSLUNAR INJECTION TERMINATION
 21   JULY 1969 19 HRS,  3 MINS, 14.801 SECS  G.M.T. ***  4. HRS, 29. MINS, 32.462 SECS  G.E.T. ***  T   4.49235064+00 HRS
X      4.0584414+02  Y       3.1202216+03  Z       1.7582231+03  DX     -3.4645792+04  DY      6.5218821+03  DZ      4.8321280+03
ALT    1.6324311+02  LAT     2.9352535+01  LON     2.1740528+02  V       3.5583918+04  PTH     6.6193902+00  AZ      8.4735346+01
R      3.6744196+03  DEC     2.9195852+01  RA      8.2589198+01  RAS     1.2095957+02  DES     2.0397784+01  DEM    -1.0062896+01
SEM    8.1284116+01  RRVS    1.4424227+02  RAN     3.2863509+00  INC     2.9625520+01  ECC     9.7043531-01  SMA     1.2327168+05
RP     3.5557955+03  APF     6.7233497+01  INMP    2.5256316+00  C3TLI  -5.7009637-01  DAZTLI  0.0000000     MASS    1.3802140+05
PROP   1.5494479+05
*****************************************************************************************************************

ID    0721081.2
TRANSLUNAR INJECTION + 2 HOURS
 21   JULY 1969 21 HRS,  3 MINS, 14.801 SECS  G.M.T. ***  6. HRS, 29. MINS, 32.462 SECS  G.E.T. ***  T   6.49235064+00 HRS
X     -1.9419226+04  Y      -7.7145676+03  Z      -3.7606415+03  DX     -9.2494845+03  DY     -9.3775840+03  DZ     -5.0308205+03
ALT    1.7787615+04  LAT    -1.0213384+01  LON     3.0640010+02  V       1.4099688+04  PTH     6.4808158+01  AZ      1.1797701+02
R      3.1231187+04  DEC    -1.0202527+01  RA     -1.5833384+02  RAS     1.2104265+02  DES     2.0381480+01
*****************************************************************************************************************

ID    0721081.2
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22   JULY 1969  1 HRS,  3 MINS, 42.338 SECS  G.M.T. *** 10. HRS, 30. MINS,   .000 SECS  G.E.T. ***  T   1.05000000+01 HRS
X     -3.4465443+04  Y      -2.6391870+04  Z      -1.3888510+04  DX     -4.6958135+03  DY     -6.8089570+03  DZ     -3.7174601+03
ALT    4.2134415+04  LAT    -1.7750001+01  LON     2.6189766+02  V       9.0681899+03  PTH     7.2044675+01  AZ      1.1413637+02
R      4.5577277+04  DEC    -1.7741584+01  RA     -1.4255696+02  RAS     1.2120907+02  DES     2.0348690+01  DEM    -1.1532259+01
SEM    8.4322289+01  RRVS    7.8260338+01  RAN     3.2249345+00  INC     2.9637294+01  ECC     9.7017332-01  SMA     1.1924392+05
RP     3.5566509+03  APF     6.7316547+01  INMP    2.5039748+00  THETA  -3.0771668+01  BETA   -1.4913584+02  MASS    9.6792101+04
DRTX  -1.4546800+01  DRTY   -8.6937810+00  DRTZ    1.0091213+01
*****************************************************************************************************************

ID    0721081.2
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22   JULY 1969  1 HRS,  3 MINS, 45.226 SECS  G.M.T. *** 10. HRS, 30. MINS,  2.887 SECS  G.E.T. ***  T   1.05008020+01 HRS
X     -3.4467676+04  Y      -2.6395103+04  Z      -1.3890272+04  DX     -4.6970503+03  DY     -6.7976613+03  DZ     -3.7010017+03
ALT    4.2138512+04  LAT    -1.7750679+01  LON     2.6188719+02  V       9.0536121+03  PTH     7.2113117+01  AZ      1.1395676+02
R      4.5581375+04  DEC    -1.7742263+01  RA     -1.4255536+02  RAS     1.2120910+02  DES     2.0348682+01  DEM    -1.1532457+01
SEM    8.4322700+01  RRVS    7.8258713+01  RAN     3.0007480+00  INC     2.9496407+01  ECC     9.7009397-01  SMA     1.1769887+05
RP     3.5199063+03  APF     6.7309975+01  INMP    2.3411545+00  THETA  -3.0773125+01  BETA   -1.4895627+02  MASS    9.6603911+04
PROP   1.8818945+02  DELV    1.9723827+01  MASS    9.6603911+04  PLCHNG-1.7912580-01
*****************************************************************************************************************

ID    0721081.2
LUNAR ORBIT INSERTION BURN INITIATION
 24   JULY 1969 20 HRS, 44 MINS, 50.139 SECS  G.M.T. *** 78. HRS, 11. MINS,  7.770 SECS  G.E.T. ***  T   7.81854916+01 HRS
XL    -4.3462634+02  YL     -8.4554270+02  ZL     -3.4658215+02  DXL    -6.9118482+03  DYL     4.2281330+03  DZL     1.3797915+03
XS    -1.0101188+03  YS      5.9806638+01  ZS     -6.6947210+00  DXS     1.5196559+03  DYS     8.0877184+03  DZS    -3.1772846+02
ALTS   7.3416389+01  LATS   -3.7906741-01  LONS    1.7661161+02  VRS     8.2353805+03  PTR    -7.2328963+00  AZR    -9.2277009+01
LIN    1.7768716+02  LAN     6.0397238+00  LAP    -1.6693357+02  LTS     1.2141555+00  LNS     5.3699785+01  DEM    -2.5299210+01
THETA  9.7115821+00  BETA   -1.7575418+02  MASS    9.4999200+04  DRTX   -2.7963303+03  DRTY   -2.0561616+02  DRTZ    2.7811111+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721081.2
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 20 HRS, 50 MINS, 43.894 SECS   G.M.T. *** 78. HRS, 17. MINS,  1.553 SECS   G.E.T. ***   T    7.82837648+01 HRS
XL     -7.4641905+02  YL     -6.0331352+02  ZL     -2.7034407+02  DXL    -3.5995485+03  DYL     3.9644259+03  DZL     1.1882731+03
XS     -8.9206406+02  YS      4.4462531+02  ZS     -2.7288300+01  DXS     2.4808715+03  DYS     4.8945452+03  DZS    -3.8828471+02
ALTS    5.8609533+01  LATS   -1.5681279+00  LONS    1.5350727+02  VRS     5.5010963+03  PTR    -2.7433101-01  AZR    -9.4056567+01
LIN     1.7564023+02  LAN    -5.4492348+00  LAP     1.0460660+01  SMAS    1.0526280+03  ECCS    5.2966347-02  PERS    2.1455078+00
RPS     9.9687410+02  APOS    1.1083818+03  RANS    1.6919907+02  INCS    1.5974244+02  LTS     1.2140684+00  LNS     5.3649825+01
LTE     6.2064441+00  LNE    -5.8606588+00  THETA -1.3276560+01   BETA   -1.7350537+02  PROP    2.3057850+04  BARC    2.3077258+01
DELV    2.8176354+03  MASS    7.1941351+04  PLCHNG-2.1423533+00
*****************************************************************************************************************

ID     0721081.2
CIRCULARIZATION BURN INITIATION
 25    JULY 1969  1 HRS,  9 MINS, 46.177 SECS   G.M.T. *** 82. HRS, 36. MINS,  3.836 SECS   G.E.T. ***   T    8.26010656+01 HRS
XL     -8.0485593+02  YL     -5.3281944+02  ZL     -2.4902784+02  DXL    -3.2160060+03  DYL     4.2452634+03  DZL     1.3169270+03
XS     -8.2344121+02  YS      5.6079597+02  ZS     -3.4013730+01  DXS     3.1018861+03  DYS     4.5293563+03  DZS    -3.7300069+02
ALTS    5.8353749+01  LATS   -1.9553863+00  LONS    1.4574359+02  VRS     5.5023536+03  PTR    -1.5552377-02  AZR    -9.3889822+01
LIN     1.7563681+02  LAN    -7.6753969+00  LAP     8.6332186+00  LTS     1.2102229+00  LNS     5.1454937+01  DEM    -2.5894566+01
THETA   3.9173013-01  BETA   -1.7999300+02  MASS    7.1891951+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721081.2
CIRCULARIZATION BURN TERMINATION
 25    JULY 1969  1 HRS, 10 MINS,  1.148 SECS   G.M.T. *** 82. HRS, 36. MINS, 18.809 SECS   G.E.T. ***   T    8.26052246+01 HRS
XL     -8.1261089+02  YL     -5.2244501+02  ZL     -2.4580236+02  DXL    -3.0782045+03  DYL     4.1750123+03  DZL     1.3309961+03
XS     -8.1582273+02  YS      5.7176743+02  ZS     -3.4918301+01  DXS     3.0815218+03  DYS     4.3754577+03  DZS    -3.6117035+02
ALTS    5.8353518+01  LATS   -2.0074099+00  LONS    1.4497540+02  VRS     5.3638466+03  PTR     4.0739552-03  AZR    -9.3863113+01
LIN     1.7563682+02  LAN    -7.6776361+00  LAP     1.6045231+02  SMAS    9.9731319+02  ECCS    4.7279922-04  PERS    1.9786322+00
RPS     9.9684164+02  APOS    9.9778471+02  RANS    1.6918410+02  INCS    1.5973259+02  LTS     1.2102195+00  LNS     5.1452819+01
LTE     6.3056335+00  LNE    -5.6339948+00  THETA -3.7547342-01   BETA    1.7999300+02  PROP    9.7580078+02  BARC    7.6724245-01
DELV    1.3850225+02  MASS    7.0916150+04  PLCHNG 7.7643249-06
*****************************************************************************************************************

ID     0721081.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 25    JULY 1969 21 HRS, 54 MINS, 20.051 SECS   G.M.T. ***103. HRS, 20. MINS, 37.713 SECS   G.E.T. ***   T    1.03343809+02 HRS
XL      7.6554788+02  YL      5.8135442+02  ZL      2.6513440+02  DXL     3.4071626+03  DYL    -3.9424130+03  DZL    -1.1951425+03
XS      7.4139345+02  YS     -6.6612441+02  ZS      3.0769313+01  DXS    -3.5838879+03  DYS    -3.9708813+03  DZS     3.7386297+02
ALTS    5.8668819+01  LATS    1.7682494+00  LONS   -4.1938940+01  VRS     5.3620820+03  PTR    -4.9983614-03  AZR    -8.5999842+01
LIN     1.7561598+02  LAN    -1.8193092+01  SEASV  7.1808346+00
*****************************************************************************************************************

ID     0721081.2
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  3 HRS, 16 MINS, 40.205 SECS   G.M.T. ***108. HRS, 42. MINS, 57.866 SECS   G.E.T. ***   T    1.08716074+02 HRS
XL     -7.8002717+02  YL      5.9914820+02  ZL      1.6325181+02  DXL     3.3105045+03  DYL     3.8648390+03  DZL     1.6397505+03
XS      5.4225996+02  YS      8.3334266+02  ZS     -7.4607041+01  DXS     4.4982737+03  DYS    -2.9181406+03  DZS     8.5817854+01
ALTS    5.8538111+01  LATS   -4.2914065+00  LONS    5.6947759+01  VRS     5.3625903+03  PTR     1.0931077-02  AZR    -8.9079655+01
LIN     1.7561062+02  LAN    -2.0900624+01  LAP    -4.0694519+01  LTS     1.1864229+00  LNS     3.8182513+01  DEM    -2.8224302+01
THETA   1.3660378-05  BETA    8.9999970+01  MASS    3.7009451+04  DRTX    0.0000000     DRTY    7.3702687+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721081.2
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  3 HRS, 16 MINS, 44.319 SECS   G.M.T. ***108. HRS, 43. MINS,  1.979 SECS   G.E.T. ***   T    1.08717216+02 HRS
XL     -7.7778187+02  YL      6.0175294+02  ZL      1.6438451+02  DXL     3.3208135+03  DYL     3.8279904+03  DZL     1.7056687+03
XS      5.4530319+02  YS      8.3136279+02  ZS     -7.4523591+01  DXS     4.4896348+03  DYS    -2.9291790+03  DZS     1.6075847+02
ALTS    5.8538791+01  LATS   -4.2865945+00  LONS    5.6738536+01  VRS     5.3630917+03  PTR     1.0945276-02  AZR    -8.8276644+01
LIN     1.7537863+02  LAN    -1.1275873+01  LAP    -1.9443825+01  SMAS    9.9740333+02  ECCS    4.1839824-04  PERS    1.9789005+00
RPS     9.9698602+02  APOS    9.9782063+02  RANS    1.6802604+02  INCS    1.5895782+02  LTS     1.1864217+00  LNS     3.8181931+01
LTE     6.6234582+00  LNE    -3.9803604+00  THETA  1.3481086-03   BETA    8.9209781+01  PROP    2.6817480+02  BARC    2.0806799-01
DELV    7.3702987+01  MASS    3.6741276+04  PLCHNG 7.8980311-01
*****************************************************************************************************************

ID     0721081.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 19 HRS, 35 MINS, 47.990 SECS   G.M.T. ***125. HRS,  2. MINS,  5.649 SECS   G.E.T. ***   T    1.25034903+02 HRS
XL      6.1749898+02  YL      7.1510548+02  ZL      3.1945790+02  DXL     4.1789934+03  DYL    -3.2155599+03  DZL    -8.7738647+02
XS      7.4154202+02  YS     -6.6625790+02  ZS      3.0821674+01  DXS    -3.5819373+03  DYS    -3.9693477+03  DZS     3.9969952+02
ALTS    5.8470091+01  LATS    1.7709019+00  LONS   -4.1938940+01  VRS     5.3615068+03  PTR     8.2681353-03  AZR    -8.5722847+01
LIN     1.7535945+02  LAN    -1.9549453+01
*****************************************************************************************************************

ID     0721081.2
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  4 HRS, 11 MINS, 58.139 SECS   G.M.T. ***133. HRS, 38. MINS, 15.799 SECS   G.E.T. ***   T    1.33637722+02 HRS
XL      2.7307025+02  YL     -9.0426906+02  ZL     -3.1967683+02  DXL    -5.1266591+03  DYL    -1.2354641+03  DZL    -8.8057646+02
XS     -9.8779583+02  YS     -1.3015594+02  ZS      4.2212955+01  DXS    -7.1315562+02  DYS     5.3019993+03  DZS    -3.6983382+02
ALTS    5.8734187+01  LATS    2.4260729+00  LONS   -1.7249372+02  VRS     5.3625147+03  PTR    -1.3353280-02  AZR    -9.3957611+01
LIN     1.7534881+02  LAN    -2.3877482+01  LAP     3.6717778+01  LTS     1.1628458+00  LNS     2.5522438+01  DEM    -2.8252780+01
THETA  -4.7066261+00  BETA    7.4514819+00  MASS    3.6809977+04  DRTX    3.0485251+03  DRTY    3.9736279+02  DRTZ    2.1783505+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID    0721081.2
TRANSEARTH INJECTION BURN TERMINATION
 27   JULY 1969  4 HRS, 14 MINS, 25.922 SECS  G.M.T. ***133. HRS, 40. MINS, 43.579 SECS  G.E.T. ***  T   1.33678772+02 HRS
XL     1.1168187+02  YL     -9.3363594+02  ZL     -3.3888583+02  DXL    -8.2776045+03  DYL    -1.2075113+03  DZL    -6.9942562+02
XS    -9.9827653+02  YS      3.4900345+01  ZS      3.4905625+01  DXS    -1.5455619+02  DYS     8.4061960+03  DZS    -2.2133854+02
ALTS   6.1002584+01  LATS    2.0013603+00  LONS    1.7799772+02  VRS     8.4105295+03  PTR     2.9999434+00  AZR    -9.1615991+01
LIN    1.7742593+02  LAN    -5.3016465+01  LAP    -8.9960368+00  SMAS   -2.1190823+03  ECCS    1.4705752+00  PERS    6.1282924+00
RPS    9.9718755+02  APOS   -5.2353522+03  RANS    1.7516675+02  INCS    1.5979680+02  INMPS   1.7156619+02  SEM     1.5197126+02
RBVS   2.7680715+01  LTS     1.1628063+00  LNS     2.5501583+01  LTE     6.4365454+00  LNE    -2.0334334+00  THETA   4.7324579+00
BETA   4.7339898+00  PROP    9.6316855+03  BARC    9.4884143+00  DELV    3.0743934+03  MASS    2.7178291+04  PLCHNG  2.7086743+00
*****************************************************************************************************************

ID    0721081.2
ENTRY AND TOUCHDOWN
 29   JULY 1969 21 HRS, 33 MINS, 49.704 SECS  G.M.T. ***199. HRS,  0. MINS,  7.361 SECS  G.E.T. ***  T   1.99002045+02 HRS
X      7.9184288+02  Y       3.2519140+03  Z       1.0531756+03  DX     -3.0761794+04  DY     -2.9521376+03  DZ      1.8651587+04
R      3.5087231+03  DEC     1.7467165+01  RA      7.6314773+01  V       3.6095495+04  PTH    -6.4900391+00  AZ      5.4479230+01
ALT    6.5834385+01  LAT     1.7575558+01  LON     1.6549749+02  VE      3.4907151+04  PTE    -6.6468226+00  AZE     5.3044984+01
SMA    1.3123781+05  ECC     9.7361059-01  INC     3.9070128+01  RAN     5.3508739+01  APF     4.1596776+01  RP      3.4632896+03
INMP   3.1277270+01  SEM     1.6855387+02  RBVS    1.3011656+02  RAM    -3.8977525+01  DEM    -1.8304713+01  RAS     1.2895750+02
DES    1.8633976+01  SPSPR   4.5461912+03  DVRES   1.8788085+03  PERNAD  8.8660616+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD  2.9327277+01  LONTD   1.8499984+02  AZTD    6.0881319+01  SEATD   6.1009685+01  DTSUN   7.2307947+00
*****************************************************************************************************************

ID    0721081.2
CIRCUMLUNAR PERICYNTHION
 24   JULY 1969 20 HRS, 49 MINS, 42.554 SECS  G.M.T. *** 78. HRS, 16. MINS,   .215 SECS  G.E.T. ***  T   7.82667265+01 HRS
XL    -8.0357961+02  YL     -1.3570786+03  ZL     -7.3129591+02  DXL    -5.8899662+03  DYL     2.7803857+03  DZL     1.3125400+03
XS    -1.7213407+03  YS      1.7065020+02  ZS     -1.7338118+02  DXS     6.4173399+02  DYS     6.6391935+03  DZS     1.6343878+02
ALTS   7.9995296+02  LATS   -5.7238190+00  LONS    1.7433831+02  VRS     6.6721378+03  PTR    -1.4332067-06  AZR    -8.8589332+01
LIN    1.7410405+02  LAN     9.8264242+01  LAP     1.2668250+02  LTS     1.2140831+00  LNS     5.3658483+01  DEM    -2.5310631+01
SEM    1.2030749+02  RBVS    5.9355412+01  SMAS   -2.5077887+03  ECCS    1.6932189+00  INCS    1.5230680+02  RANS    1.7730856+02
APFS  -6.4844646+01  RPS     1.7384465+03  RM      1.9868448+05  DEMP    4.8989818-01  RAMP   -1.7982103+02
*****************************************************************************************************************

ID    0721081.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27   JULY 1969 17 HRS, 54 MINS, 26.196 SECS  G.M.T. ***147. HRS, 20. MINS, 43.851 SECS  G.E.T. ***  T   1.47345514+02 HRS
X      2.6735988+03  Y       2.0355214+03  Z       1.0100652+03  DX     -2.6175906+04  DY      2.0177126+04  DZ      1.4518529+04
R      3.5088045+03  DEC     1.6730233+01  RA      3.7283517+01  V       3.6098229+04  PTH    -6.4589056+00  AZ      6.2826639+01
ALT    6.5832025+01  LAT     1.6834604+01  LON     1.8343556+02  VE      3.4789064+04  PTE    -6.6535673+00  AZE     6.1688273+01
SMA    1.3295497+05  ECC     9.7394750-01  INC     3.1573248+01  RAN     8.0012209+00  APF     4.6444260+01  RP      3.4638101+03
INMP   5.6285611+00  RAM    -7.3139413+01  DEM    -2.7291942+01  RAS     1.2684965+02  DES     1.9136586+01  SEM     1.5993590+02
RBVS   9.5806969+01  PERNAD  8.9254910+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD   2.5772939+01  LONTD   2.0429906+02
AZTD   6.9334373+01  SEATD   2.9946031+01  DTSUN   9.6795992+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721090.2
LAUNCH TIME      21   JULY 1969   15 HRS,   26 MINS,  44.808 SECS   G.M.T.
LAUNCH AZIMUTH   90.                          INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID     0721090.2
EARTH PARKING ORBIT INSERTION
 21    JULY 1969 15 HRS, 38 MINS,  5.136 SECS  G.M.T. ***  0. HRS, 11. MINS, 20.328 SECS  G.E.T. ***  T   1.88980065-01 HRS
X     -1.5296392+03  Y      2.8047478+03  Z      1.5339681+03  DX    -2.3063356+04  DY    -9.7234086+03  DZ    -5.2197338+03
ALT    1.0217145+02  LAT   -1.5794248+01  LON    3.0485371+02  V      2.5567727+04  PTH   -3.7724900-07  AZ     1.0308917+02
R      3.5439334+03  DEC    2.5648144+01  RA     1.1860694+02  RAS    1.2081750+02  DES    2.0425568+01  RAN    3.6383411-01
INC    2.8592230+01  MASS   2.9764634+05
*****************************************************************************************************************

ID     0721090.2
3.5 MINS PRIOR TO TLI INITIATION
 21    JULY 1969 19 HRS, 44 MINS, 38.442 SECS  G.M.T. ***  4. HRS, 17. MINS, 53.634 SECS  G.E.T. ***  T   4.29823166+00 HRS
X      2.5581807+03  Y      2.1416909+03  Z      1.1902424+03  DX    -1.7682408+04  DY     1.6296926+04  DZ     8.7300325+03
ALT    9.9663612+01  LAT    1.9752577+01  LON    1.6437507+02  V      2.5582627+04  PTH    3.7327018-02  AZ     6.8771913+01
*****************************************************************************************************************

ID     0721090.2
TRANSLUNAR INJECTION INITIATION
 21    JULY 1969 19 HRS, 48 MINS,  8.442 SECS  G.M.T. ***  4. HRS, 21. MINS, 23.634 SECS  G.E.T. ***  T   4.35656494+00 HRS
X      1.8741201+03  Y      2.6327805+03  Z      1.4518475+03  DX    -2.1696415+04  DY     1.1973184+04  DZ     6.3299388+03
ALT    1.0083891+02  LAT    2.4332266+01  LON    1.7811683+02  V      2.5576545+04  PTH    3.2211502-02  AZ     7.4272304+01
R      3.5428258+03  DEC    2.4192227+01  RA     5.4554988+01  RAS    1.2099066+02  DES    2.0391690+01  RAN   -9.4864306-01
INC    2.8595014+01  MASS   2.9347443+05
*****************************************************************************************************************

ID     0721090.2
TRANSLUNAR INJECTION TERMINATION
 21    JULY 1969 19 HRS, 53 MINS, 28.578 SECS  G.M.T. ***  4. HRS, 26. MINS, 43.770 SECS  G.E.T. ***  T   4.44549155+00 HRS
X      3.7424705+02  Y      3.1460748+03  Z      1.7180831+03  DX    -3.4728559+04  DY     6.9436017+03  DZ     3.4710496+03
ALT    1.6281624+02  LAT    2.8624327+01  LON    2.0544044+02  V      3.5585595+04  PTH    6.6316426+00  AZ     8.7210920+01
R      3.6041166+03  DEC    2.8470107+01  RA     8.3216153+01  RAS    1.2099435+02  DES    2.0390963+01  DEM   -1.0268738+01
SEM    8.1706131+01  RBVS   1.4481981+02  RAN   -9.4864946-01  INC    2.8595014+01  ECC    9.7045649-01  SMA    1.2034175+05
RP     3.5553187+03  APF    7.1406379+01  INMP   2.2457546-01  C3TLI -5.6976429-01  DAZTLI 0.0000000     MASS   1.3824987+05
PROP   1.5522456+05
*****************************************************************************************************************

ID     0721090.2
TRANSLUNAR INJECTION + 2 HOURS
 21    JULY 1969 21 HRS, 53 MINS, 28.578 SECS  G.M.T. ***  6. HRS, 26. MINS, 43.770 SECS  G.E.T. ***  T   6.44549155+00 HRS
X     -1.9352452+04  Y     -7.5878252+03  Z     -4.3231244+03  DX    -9.1612205+03  DY    -9.3719951+03  DZ    -5.1983546+03
ALT    1.7788169+04  LAT   -1.1760979+01  LON    2.9355160+02  V      1.4099118+04  PTH    6.4809367+01  AZ     1.1627146+02
R      2.1231625+04  DEC   -1.1748564+01  RA    -1.5859055+02  RAS    1.2107742+02  DES    2.0374644+01
*****************************************************************************************************************

ID     0721090.2
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22    JULY 1969  1 HRS, 56 MINS, 44.808 SECS  G.M.T. *** 10. HRS, 29. MINS, 60.000 SECS  G.E.T. ***  T   1.04999999+01 HRS
X     -3.4349628+04  Y     -2.6478264+04  Z     -1.4767720+04  DX    -4.6076808+03  DY    -6.8080414+03  DZ    -3.7565286+03
ALT    4.2372993+04  LAT   -1.8812610+01  LON    2.4878473+02  V      9.0383436+03  PTH    7.2081538+01  AZ     1.1196305+02
R      4.5815729+04  DEC   -1.8803807+01  RA    -1.4237332+02  RAS    1.2124577+02  DES    2.0341436+01  DEM   -1.1746820+01
SEM    8.4771282+01  RBVS   7.7805875+01  RAN   -1.3077948+00  INC    2.8606748+01  ECC    9.7015969-01  SMA    1.1917452+05
RP     3.5562041+03  APF    7.1490533+01  INMP   2.0125565-01  THETA -3.1882985+01  BETA  -1.4773419+02  MASS   9.6792101+04
DRTX  -1.4034237+01  DRTY  -8.8604435+00  DRTZ   1.0324296+01
*****************************************************************************************************************

ID     0721090.2
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22    JULY 1969  1 HRS, 56 MINS, 47.670 SECS  G.M.T. *** 10. HRS, 30. MINS,  2.861 SECS  G.E.T. ***  T   1.05007948+01 HRS
X     -3.4351798+04  Y     -2.6481468+04  Z     -1.4769485+04  DX    -4.6089120+03  DY    -6.7967405+03  DZ    -3.7402856+03
ALT    4.2377041+04  LAT   -1.8813218+01  LON    2.4877434+02  V      9.0237179+03  PTH    7.2146692+01  AZ     1.1177903+02
R      4.5819776+04  DEC   -1.8804416+01  RA    -1.4237172+02  RAS    1.2124580+02  DES    2.0341429+01  DEM   -1.1747012+01
SEM    8.4771686+01  RBVS   7.7804274+01  RAN   -1.2669289+00  INC    2.8471308+01  ECC    9.7007064-01  SMA    1.1763006+05
RP     3.5205934+03  APF    7.1521791+01  INMP   8.7356459-02  THETA -3.1884385+01  BETA  -1.4754990+02  MASS   9.6605603+04
PROP   1.8649805+02  DELV   1.9546377+01  MASS   9.6605603+04  PLCHNG-1.8349741-01
*****************************************************************************************************************

ID     0721090.2
LUNAR ORBIT INSERTION BURN INITIATION
 24    JULY 1969 21 HRS, 32 MINS, 41.304 SECS  G.M.T. *** 78. HRS,  5. MINS, 56.493 SECS  G.E.T. ***  T   7.80990257+01 HRS
XL    -4.2109635+02  YL    -8.5160406+02  ZL    -3.5090541+02  DXL   -6.9618475+03  DYL    4.1260107+03  DZL    1.4193394+03
XS    -1.5113767+03  YS     5.2274979+01  ZS    -8.4049585+00  DXS    1.4883505+03  DYS    8.0931171+03  DZS   -2.4305566+02
ALTS   7.4268124+01  LATS  -4.7550595-01  LONS   1.7734119+02  VRS    8.2324241+03  PTR   -7.4439473+00  AZR   -9.1768450+01
LIN    1.7816529+02  LAN    1.2057413+01  LAP   -1.5101403+02  LTS    1.2134472+00  LNS    5.3294302+01  DEM   -2.5410593+01
THETA  1.3012600+01  BETA  -1.7464814+02  MASS   9.5000872+04  DRTX  -2.8019341+03  DRTY  -2.5589684+02  DRTZ   1.1325534+02
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721090.2
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 21 HRS, 38 MINS, 34.903 SECS  G.M.T. *** 78. HRS, 11. MINS, 50.094 SECS  G.E.T. ***  T   7.81972485+01 HRS
XL    -7.3841236+02  YL     -6.1675799+02  ZL     -2.7524002+02  DXL    -3.7490072+03  DYL     3.8154095+03  DZL     1.1250833+03
XS    -9.9899920+02  YS      4.3872915+02  ZS     -2.6785331+01  DXS     2.3125688+03  DYS     4.9551497+03  DZS    -3.9163248+02
ALTS   5.2206378+01  LATS  -1.5337963+00  LONS    1.5398672+02  VRS     5.4822312+03  PTR     1.1014899+00  AZR    -9.4069160+01
LIN    1.7564054+02  LAN   -5.4503151+00  LAP    -2.0630372+01  SMAS    1.0525595+03  ECCS    5.2899457-02  PERS    2.1452984+00
RPS    9.9687967+02  APOS   1.1082393+03  RANS    1.6917242+02  INCS    1.5971055+02  LTS     1.2133598+00  LNS     5.3244358+01
LTE    6.2256798+00  LNE   -5.8199049+00  THETA -9.8709440+00  BETA   -1.7200090+02  PROP    2.3045736+04  BARC    2.3320966+01
DELV   2.9158711+03  MASS   7.1955136+04  PLCHNG-2.6664968+00
*****************************************************************************************************************

ID     0721090.2
CIRCULARIZATION BURN INITIATION
 25    JULY 1969  1 HRS, 48 MINS, 32.515 SECS  G.M.T. *** 82. HRS, 21. MINS, 47.706 SECS  G.E.T. ***  T   8.23632517+01 HRS
XL    -4.1974046+02  YL     -8.4006910+02  ZL     -3.3439825+02  DXL    -4.9626943+03  DYL     2.2879637+03  DZL     4.8589473+02
XS    -9.9203726+02  YS      9.7854944+01  ZS      2.6014878+00  DXS     5.3897885+02  DYS     5.4599787+03  DZS    -4.1711463+02
ALTS   5.9361678+01  LATS   1.4952467-01  LONS    1.7436654+02  VRS     5.5023495+03  PTR    -1.5525757-02  AZR    -9.4347544+01
LIN    1.7563713+02  LAN   -7.5936880+00  LAP     1.7570835+02  LTS     1.2096456+01  LNS     5.1126426+01  DEM    -2.5977252+01
THETA  3.9180099-01  BETA  -1.7999300+02  MASS    7.1905736+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721090.2
CIRCULARIZATION BURN TERMINATION
 25    JULY 1969  1 HRS, 48 MINS, 47.490 SECS  G.M.T. *** 82. HRS, 22. MINS,  2.678 SECS  G.E.T. ***  T   8.23674137+01 HRS
XL    -4.3178054+02  YL     -8.3442905+02  ZL     -3.3318701+02  DXL    -4.8075967+03  DYL     2.2888189+03  DZL     4.9499681+02
XS    -9.9063953+02  YS      1.1113325+02  ZS      1.5862454+00  DXS     5.9524287+02  DYS     5.3151792+03  DZS    -4.0673119+02
ALTS   5.8361434+01  LATS   9.1171945-02  LONS    1.7359913+02  VRS     5.3638488+03  PTR     4.0378669-03  AZR    -9.4348814+01
LIN    1.7563711+02  LAN   -7.5959624+00  LAP    -8.2798986+00  SMAS    9.9732986+02  ECCS    4.8136094-04  PERS    1.9786819+00
RPS    9.9684979+02  APOS   9.9789992+02  RANS    1.6915754+02  INCS    1.5970069+02  LTS     1.2096415+00  LNS     5.1124316+01
LTE    6.3193903+00  LNE   -5.5988805+00  THETA -3.7557246-01  BETA   -1.8000000+02  PROP    9.7599023+02  BARC    7.6743372-01
DELV   1.3850255+02  MASS   7.0929746+04  PLCHNG 4.8865257-06
*****************************************************************************************************************

ID     0721090.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 25    JULY 1969 23 HRS, 42 MINS, 25.305 SECS  G.M.T. ***103. HRS, 15. MINS, 40.495 SECS  G.E.T. ***  T   1.03261249+02 HRS
XL     7.6540576+02  YL      5.8668800+02  ZL      2.6728362+02  DXL     3.4389104+03  DYL    -3.9186461+03  DZL    -1.1856492+03
XS     7.4125827+02  YS     -6.6601229+02  ZS      3.0758341+01  DXS    -3.5845176+03  DYS    -3.9713057+03  DZS     3.7389453+02
ALTS   5.8520507+01  LATS   1.7679171+00  LONS   -4.1938954+01  VRS     5.3628194+03  PTR    -6.9704207-03  AZR    -8.5999989+01
LIN    1.7561626+02  LAN   -1.8196245+01  SEASV  7.5878047+00
*****************************************************************************************************************

ID     0721090.2
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  4 HRS,  4 MINS, 43.844 SECS  G.M.T. ***108. HRS, 37. MINS, 59.035 SECS  G.E.T. ***  T   1.08633065+02 HRS
XL    -7.8473483+02  YL      5.9356991+02  ZL      1.6102743+02  DXL     3.2785219+03  DYL     3.8878528+03  DZL     1.6491203+03
XS     5.4225768+02  YS      8.3333954+02  ZS     -7.4602917+01  DXS     4.4978698+03  DYS    -2.9185051+03  DZS     8.5829425+01
ALTS   5.8533954+01  LATS  -4.2911867+00  LONS    5.6947771+01  VRS     5.3624500+03  PTR     5.3115007-03  AZR    -8.9079947+01
LIN    1.7561089+02  LAN   -2.0903521+01  LAP    -3.1453541+01  LTS     1.1856782+00  LNS     3.7775523+01  DEM    -2.8260268+01
THETA -4.2688582-06  BETA   8.9999981+01  MASS    3.7023047+04  DRTX    0.0000000     DRTY    7.3687614+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721090.2
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  4 HRS,  4 MINS, 47.959 SECS  G.M.T. ***108. HRS, 38. MINS,  3.148 SECS  G.E.T. ***  T   1.08634208+02 HRS
XL    -7.9251780+02  YL      5.9619068+02  ZL      1.6216667+02  DXL     3.2889083+03  DYL     3.8510797+03  DZL     1.7150527+03
XS     5.4530113+02  YS      8.3135910+02  ZS     -7.4519454+01  DXS     4.4892288+03  DYS    -2.9295479+03  DZS     1.6375519+02
ALTS   5.8534287+01  LATS  -4.2863755+00  LONS    5.6738518+01  VRS     5.3629532+03  PTR     5.3136678-03  AZR    -8.8277083+01
LIN    1.7537900+02  LAN   -1.1279653+01  LAP    -1.0097088+01  SMAS    9.9734263+02  ECCS    3.2906348-04  PERS    1.9787199+00
RPS    9.9701443+02  APOS   9.9767081+02  RANS    1.6891890+02  INCS    1.5892278+02  LTS     1.1856771+00  LNS     3.7774941+01
LTE    6.6251222+00  LNE   -3.9226656+00  THETA  1.1790614-03  BETA    8.9209931+01  PROP    2.6821875+02  BARC    2.0806799-01
DELV   7.3687984+01  MASS   3.6754828+04  PLCHNG 7.8966232-01
*****************************************************************************************************************

ID     0721090.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 20 HRS, 23 MINS, 46.189 SECS  G.M.T. ***124. HRS, 57. MINS,  1.379 SECS  G.E.T. ***  T   1.24950383+02 HRS
XL     6.1138899+02  YL      7.1935342+02  ZL      3.2117406+02  DXL     4.2045822+03  DYL    -3.1863749+03  DZL    -8.6570812+02
XS     7.4142435+02  YS     -6.6615257+02  ZS      3.0810631+01  DXS    -3.5826238+03  DYS    -3.9696487+03  DZS     3.9971977+02
ALTS   5.8711963+01  LATS   1.7705481+00  LONS   -4.1938954+01  VRS     5.3621898+03  PTR     4.9559578-03  AZR    -8.5723083+01
LIN    1.7535979+02  LAN   -1.9552403+01
*****************************************************************************************************************

ID     0721090.2
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  5 HRS,  0 MINS, 14.515 SECS  G.M.T. ***133. HRS, 33. MINS, 29.702 SECS  G.E.T. ***  T   1.33558250+02 HRS
XL     2.6232909+02  YL     -9.0656762+02  ZL     -3.2198529+02  DXL    -5.1426249+03  DYL    -1.1808749+03  DZL    -8.6298569+02
XS    -9.9007973+02  YS     -1.1146760+02  ZS      4.0901788+01  DXS    -6.1310677+02  DYS     5.3143366+03  DZS    -3.7398692+02
ALTS   5.8480430+01  LATS   2.3508010+00  LONS   -1.7357643+02  VRS     5.3626429+03  PTR    -6.9486283-03  AZR    -9.4002090+01
LIN    1.7534913+02  LAN   -2.3882991+01  LAP     2.3193177+01  LTS     1.1620720+00  LNS     2.5113809+01  DEM    -2.8215450+01
THETA -4.9368949+00  BETA   7.6330634+00  MASS    3.6823528+04  DRTX    3.0670552+03  DRTY    4.0956030+02  DRTZ    2.7441788+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721090.2
TRANSEARTH INJECTION BURN TERMINATION
 27    JULY 1969  5 HRS,  2 MINS, 43.174 SECS  G.M.T. ***133. HRS, 35. MINS, 58.360 SECS  G.E.T. ***  T    1.33599545+02 HRS
XL      9.9376633+01  YL     -9.3434341+02  ZL     -3.4058787+02  DXL    -8.3132439+03  DYL    -1.1165606+03  DZL    -6.5708411+02
XS     -9.9736037+02  YS      5.4950568+01  ZS      3.3557091+01  DXS     1.4945428+01  DYS     8.4269297+03  DZS    -2.1619456+02
ALTS    5.0943004+01  LATS    1.9241254+00  LONS    1.7684642+02  VRS     8.4297155+03  PTR     2.9998305+00  AZR    -9.1573344+01
LIN     1.7751277+02  LAN    -5.3814301+01  LAP    -1.8066030+02  SMAS   -2.0699651+03  ECCS    1.4817160+00  PERS    5.9164645+00
RPS     9.9713531+02  APOS   -5.1370655+03  RANS    1.7538834+02  INCS    1.5975251+02  INMPS   1.7162397+02  SEM     1.5244032+02
RRVS    2.8410130+01  LTS     1.1620322+00  LNS     2.5092830+01  LTE     6.4222486+00  LNE    -1.9664818+00  THETA   4.6684402+00
RETA    4.8366302+00  PROP    9.6888604+03  BARC    9.5573237+00  DELV    3.0944043+03  MASS    2.7134668+04  PLCHNG 2.7855321+00
*****************************************************************************************************************

ID     0721090.2
ENTRY AND TOUCHDOWN
 29    JULY 1969 21 HRS, 35 MINS, 25.564 SECS  G.M.T. ***198. HRS,  8. MINS, 40.752 SECS  G.E.T. ***  T    1.98144653+02 HRS
X       7.7074316+02  Y       3.2585678+03  Z       1.0484311+03  DX     -3.0796422+04  DY     -3.0875417+03  DZ      1.8580212+04
R       3.5087771+03  DEC     1.7385688+01  RA      7.6692499+01  V       3.6099540+04  PTH    -6.4900349+00  AZ      5.4659755+01
ALT     6.5878930+01  LAT     1.7493638+01  LON     1.6547471+02  VE      3.4907866+04  PTE    -6.6479818+00  AZE     5.3231190+01
SMA     1.3360167+05  ECC     9.7407702-01  INC     3.8879770+01  RAN     5.3842629+01  APF     4.1580406+01  RP      3.4633539+03
INMP    3.1311079+01  SEM     1.6853911+02  RRVS    1.3045639+02  RAM    -3.8961280+01  DEM    -1.8298391+01  RAS     1.2895859+02
DES     1.8633712+01  SPSPR   4.5025681+03  DVRES   1.8623394+03  PERNAD 9.0518175+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03
LATTD   2.9190897+01  LONTD   1.8499960+02  AZTD    6.1041936+01  SEATD  6.1381339+01  DTSUN   7.2083422+00
*****************************************************************************************************************

ID     0721090.2
CIRCUMLUNAR PERICYNTHION
 24    JULY 1969 21 HRS, 37 MINS, 34.661 SECS  G.M.T. *** 78. HRS, 10. MINS, 49.852 SECS  G.E.T. ***  T    7.81805143+01 HRS
XL     -7.9124529+02  YL     -1.3628086+03  ZL     -7.3426286+02  DXL    -5.9152761+03  DYL     2.7108323+03  DZL     1.3429645+03
XS     -1.7214257+03  YS      1.6996894+02  ZS     -1.7396041+02  DXS     6.3345834+02  DYS     6.6382513+03  DZS     2.1755128+02
ALTS    9.0002832+02  LATS   -5.7427554+00  LONS    1.7436105+02  VRS     6.6719547+03  PTR    -1.2288545-06  AZR    -8.8122019+01
LIN     1.7395650+02  LAN     1.0257554+02  LAP     1.2462079+02  LTS     1.2133747+00  LNS     5.3252867+01  DEM    -2.5421881+01
SEM     1.2075064+02  RRVS    5.8930214+01  SMAS   -2.5079941+03  ECCS    1.6931922+00  INCS    1.5208077+02  RANS    1.7830197+02
APFS   -6.4424672+01  RPS     1.7385219+03  RM      1.9859487+05  DEMP    4.8933866-01  RAMP   -1.7983852+02
*****************************************************************************************************************

ID     0721090.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27    JULY 1969 18 HRS, 39 MINS, 41.401 SECS  G.M.T. ***147. HRS, 12. MINS, 56.589 SECS  G.E.T. ***  T    1.47215719+02 HRS
X       3.6650343+03  Y       2.0224601+03  Z       1.0575034+03  DX     -2.6417980+04  DY      2.0763089+04  DZ      1.3193765+04
R       3.5087129+03  DEC     1.7541322+01  RA      3.7194391+01  V       3.6098351+04  PTH    -6.5554005+00  AZ      6.5328603+01
ALT     6.5832692+01  LAT     1.7650115+01  LON     1.7230211+02  VE      3.4769337+04  PTE    -6.7594168+00  AZE     6.3978360+01
SMA     1.3275907+05  ECC     9.7391989-01  INC     3.0189679+01  RAN     4.2840995+00  APF     5.0110767+01  RP      3.4623720+03
INMP    3.2729802+00  RAM    -7.2609383+01  DEM    -2.7219347+01  RAS     1.2688051+02  DES     1.9129420+01  SEM     1.6037443+02
RRVS    9.5949987+01  PERNAD 8.9299968+00  ENTDT   2.3333330-01  ENTRG   1.2850000+03  LATTD   2.5742162+01  LONTD   1.9331317+02
AZTD    7.1923891+01  SEATD  3.0231559+01  DTSUN   9.6589650+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************************

ID     0721099.2
LAUNCH TIME      21   JULY 1969    16 HRS,    57 MINS,  32.812 SECS    G.M.T.
LAUNCH AZIMUTH    99.                                INJECTION OPPORTUNITY     2
*****************************************************************************************************************************

ID     0721099.2
EARTH PARKING ORBIT INSERTION
 21    JULY 1969 17 HRS,   8 MINS, 53.867 SECS   G.M.T. ***  0. HRS, 11. MINS, 21.055 SECS   G.E.T. ***   T    1.89181890-01 HRS
X      -2.5232512+03  Y       2.0955226+03  Z       1.3421823+03  DX     -1.7908392+04  DY      -1.6266134+04  DZ      -8.2710980+03
ALT     1.0166278+02  LAT     2.2386137+01  LON     3.0377244+02  V       2.5567727+04  PTH     -1.8862449-07  AZ       1.1045887+02
R       3.5439335+03  DEC     2.2254835+01  RA      1.4029087+02  RAS     1.2088040+02  DES      2.0413284+01  RAN      5.7222236+00
INC     2.9873116+01  MASS    2.9729818+05
*****************************************************************************************************************************

ID     0721099.2
3.5 MINS PRIOR TO TLI INITIATION
 21    JULY 1969 21 HRS, 10 MINS, 43.982 SECS   G.M.T. ***  4. HRS, 13. MINS, 11.170 SECS   G.E.T. ***   T    4.21976936+00 HRS
X       2.5220277+03  Y       2.2040811+03  Z       1.1491613+03  DX     -1.7920696+04  DY       1.5492998+04  DZ       9.6780470+03
ALT     9.8356527+01  LAT     1.9051853+01  LON     1.4400848+02  V       2.5590016+04  PTH      4.6138812-02  AZ       6.6449314+01
*****************************************************************************************************************************

ID     0721099.2
TRANSLUNAR INJECTION INITIATION
 21    JULY 1969 21 HRS, 14 MINS, 13.982 SECS   G.M.T. ***  4. HRS, 16. MINS, 41.170 SECS   G.E.T. ***   T    4.27810270+00 HRS
X       1.8308620+03  Y       2.6656448+03  Z       1.4444274+03  DX     -2.1866835+04  DY       1.1078543+04  DZ       7.3196303+03
ALT     9.9757833+01  LAT     2.4207958+01  LON     1.5749713+02  V       2.5582602+04  PTH      4.3617561-02  AZ       7.1758587+01
R       3.5417635+03  DEC     2.4068414+01  RA      5.5517301+01  RAS     1.2105025+02  DES      2.0379986+01  RAN      4.4606148+00
INC     2.9868079+01  MASS    2.9317215+05
*****************************************************************************************************************************

ID     0721099.2
TRANSLUNAR INJECTION TERMINATION
 21    JULY 1969 21 HRS, 19 MINS, 33.814 SECS   G.M.T. ***  4. HRS, 22. MINS,  1.001 SECS   G.E.T. ***   T    4.36694473+00 HRS
X       3.2558393+02  Y       3.1202004+03  Z       1.7719129+03  DX     -3.4810664+04  DY       5.6543161+03  DZ       4.7921426+03
ALT     1.6183015+02  LAT     2.9616149+01  LON     1.8468646+02  V       3.5590985+04  PTH      6.6275893+00  AZ       8.4833467+01
R       3.6029613+03  DEC     2.9458530+01  RA      8.4042907+01  RAS     1.2105394+02  DES      2.0379260+01  DEM     -1.0623747+01
SEM     8.2430422+01  RBVS    1.4538684+02  RAN     4.4606134+00  INC     2.9868078+01  ECC      9.7042160-01  SMA      1.2016326+05
RP      3.5542372+03  APF     6.7483250+01  INMP    3.1541774+00  C3TLI  -5.7060950-01  DAZTLI 0.0000000       MASS     1.3809519+05
PROP    1.5537697+05
*****************************************************************************************************************************

ID     0721099.2
TRANSLUNAR INJECTION + 2 HOURS
 21    JULY 1969 23 HRS, 19 MINS, 33.814 SECS   G.M.T. ***  6. HRS, 22. MINS,  1.001 SECS   G.E.T. ***   T    6.36694473+00 HRS
X      -1.9217938+04  Y      -8.1712052+03  Z      -3.8340375+03  DX     -9.0378295+03  DY      -9.5776021+03  DZ      -5.0897332+03
ALT     1.7788437+04  LAT    -1.3414506+01  LON     2.7359595+02  V       1.4098824+04  PTH      6.4813576+01  AZ       1.1916874+02
R       2.1231994+04  DEC    -1.0403445+01  RA     -1.5696547+02  RAS     1.2113700+02  DES      2.0362910+01
*****************************************************************************************************************************

ID     0721099.2
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22    JULY 1969  3 HRS, 27 MINS, 32.812 SECS   G.M.T. *** 10. HRS, 30. MINS,   .000 SECS   G.E.T. ***   T    1.05000000+01 HRS
X      -3.4117691+04  Y      -2.7674802+04  Z      -1.4350371+04  DX     -4.4605652+03  DY      -6.8555229+03  DZ      -3.7307337+03
ALT     4.2772370+04  LAT    -1.8098530+01  LON     2.2744334+02  V       8.9896167+03  PTH      7.2145089+01  AZ       1.1419470+02
R       4.6215191+04  DEC    -1.8090088+01  RA     -1.4095251+02  RAS     1.2130858+02  DES      2.0329000+01  DEM     -1.2113011+01
SEM     8.5541048+01  RBVS    7.6794829+01  RAN     4.3994679+00  INC     2.9880131+01  ECC      9.7016273-01  SMA      1.1914809+05
RP      3.5550531+03  APF     6.7565598+01  INMP    3.1325586+00  THETA  -3.1215984+01  BETA    -1.4884277+02  MASS     9.6792101+04
DRTX   -1.4556904+01  DRTY   -8.8011752+00  DRTZ    1.0308809+01
*****************************************************************************************************************************

ID     0721099.2
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22    JULY 1969  3 HRS, 27 MINS, 35.724 SECS   G.M.T. *** 10. HRS, 30. MINS,  2.912 SECS   G.E.T. ***   T    1.05008088+01 HRS
X      -3.4119819+04  Y      -2.7678085+04  Z      -1.4352155+04  DX     -4.4620388+03  DY      -6.8442652+03  DZ      -3.7140690+03
ALT     4.2776468+04  LAT    -1.8099195+01  LON     2.2743274+02  V       8.9748573+03  PTH      7.2213899+01  AZ       1.1401028+02
R       4.6219290+04  DEC    -1.8090754+01  RA     -1.4095095+02  RAS     1.2130862+02  DES      2.0328992+01  DEM     -1.2113207+01
SEM     8.5541461+01  RBVS    7.6793237+01  RAN     4.1683360+00  INC     2.9736499+01  ECC      9.7008652-01  SMA      1.1759821+05
RP      3.5177723+03  APF     6.7563117+01  INMP    2.9647295+00  THETA  -3.1217314+01  BETA    -1.4865825+02  MASS     9.6602319+04
PROP    1.8979125+02  DELV    1.9890780+01  MASS    9.6602319+04  PLCHNG-1.8393283-01
*****************************************************************************************************************************

ID     0721099.2
LUNAR ORBIT INSERTION BURN INITIATION
 24    JULY 1969 22 HRS, 51 MINS, 56.353 SECS   G.M.T. *** 77. HRS, 54. MINS, 23.551 SECS   G.E.T. ***   T    7.79065418+01 HRS
XL     -4.2775297+02  YL     -8.5113170+02  ZL     -3.4759563+02  DXL    -6.9960781+03  DYL      4.1273680+03  DZL      1.2834615+03
XS     -1.0389497+03  YS      6.5353231+01  ZS     -5.5130694+00  DXS     1.5323150+03  DYS      8.0876296+03  DZS     -3.6974931+02
ALTS    7.2585567+01  LATS   -3.1224590-01  LONS    1.7629393+02  VRS     8.2398091+03  PTR     -7.0009227+00  AZR     -9.2629678+01
LIN     1.7734663+02  LAN     3.0472895+00  LAP    -1.6279471+02  LTS     1.2122720+00  LNS      5.2622773+01  DEM     -2.5591366+01
THETA   1.1724149+01  BETA   -1.7644304+02  MASS    9.4997627+04  DRTX   -2.7983307+03  DRTY    -1.7065001+02  DRTZ     1.7869350+02
*****************************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721099.2
LUNAR ORBIT INSERTION BURN TERMINATION
 24    JULY 1969 22 HRS, 57 MINS, 49.225 SECS   G.M.T. *** 78. HRS,  0. MINS, 16.411 SECS   G.E.T. ***  T    7.80045586+01 HRS
XL     -7.3838902+02  YL      -6.1674920+02  ZL      -2.7619872+02  DXL    -3.7480479+03  DYL     3.8140487+03  DZL     1.1265661+03
XS     -8.9369401+02  YS       4.4992048+02  ZS      -2.7680327+01  DXS     2.3747565+03  DYS     4.9243503+03  DZS    -3.8978425+02
ALTS    6.2447857+01  LATS   -1.5846764+00  LONS     1.5327753+02  VRS     5.4809329+03  PTR     1.0867426+00  AZR    -9.4050264+01
LIN     1.7564008+02  LAN    -5.4468694+00  LAP     -2.0594786+01  SMAS    1.0525402+03  ECCS    5.2576019-02  PERS    2.1452394+00
RPS     9.9720182+02  APOS    1.1078785+03  RANS     1.6912695+02  INCS    1.5965746+02  LTS     1.2121847+00  LNS     5.2572947+01
LTE     6.2566119+00  LNE    -5.7513447+00  THETA   -1.1208748+01  BETA   -1.7463820+02  PROP    2.2997678+04  BARC    2.2994167+01
DELV    2.8092152+03  MASS    7.1999949+04  PLCHNG-1.7783448+00
*****************************************************************************************************************

ID     0721099.2
CIRCULARIZATION BURN INITIATION
 25    JULY 1969  3 HRS,  7 MINS, 51.130 SECS   G.M.T. *** 82. HRS, 10. MINS, 18.317 SECS   G.E.T. ***  T    8.21717548+01 HRS
XL     -4.2362252+02  YL      -8.3824658+02  ZL      -3.3503412+02  DXL    -4.9514696+03  DYL     2.3065037+03  DZL     4.9327119+02
XS     -9.9057441+02  YS       1.1455029+02  ZS       1.3207261+00  DXS     6.3063785+02  DYS     5.4484129+03  DZS    -4.1721070+02
ALTS    5.8693086+01  LATS    7.5886312-02  LONS     1.7340360+02  VRS     5.5006338+03  PTR    -1.1776946-02  AZR    -9.4349920+01
LIN     1.7563663+02  LAN    -7.5909933+00  LAP      4.2459409-01  LTS     1.2084619+00  LNS     5.0454463+01  DEM    -2.6142761+01
THETA   6.9825365-31  BETA    1.7999300+02  MASS     7.1950550+04  DRTX   -1.3789045+02  DRTY    0.0000000     DRTZ   -7.4167605-01
*****************************************************************************************************************

ID     0721099.2
CIRCULARIZATION BURN TERMINATION
 25    JULY 1969  3 HRS,  8 MINS,  6.049 SECS   G.M.T. *** 82. HRS, 10. MINS, 33.235 SECS   G.E.T. ***  T    8.21758986+01 HRS
XL     -4.3559127+02  YL      -8.3258363+02  ZL      -3.3380986+02  DXL    -4.7973598+03  DYL     2.3060998+03  DZL     5.0392151+02
XS     -9.8896105+02  YS       1.2775034+02  ZS       3.0911123-01  DXS     6.8348037+02  DYS     5.3034227+03  DZS    -4.0677743+02
ALTS    5.8684613+01  LATS    1.7760888-02  LONS     1.7263950+02  VRS     5.3627329+03  PTR     1.5569012-02  AZR    -9.4350219+01
LIN     1.7563662+02  LAN    -7.5932664+00  LAP     -3.5583107+01  SMAS    9.9755817+02  ECCS    4.6839651-04  PERS    1.9793613+00
RPS     9.9709991+02  APOS    9.9802541+02  RANS     1.6911244+02  INCS    1.5964754+02  LTS     1.2084582+00  LNS     5.0452363+01
LTE     6.3446472+00  LNE    -5.5260743+00  THETA -6.5869952-02  BETA   -1.7999300+02  PROP    9.7234375+02  BARC    7.6414357-01
DELV    1.3789477+02  MASS    7.0978206+04  PLCHNG 4.5797167-06
*****************************************************************************************************************

ID     0721099.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 26    JULY 1969  0 HRS,  1 MINS, 51.567 SECS   G.M.T. ***103. HRS,  4. MINS, 18.752 SECS   G.E.T. ***  T    1.03071876+02 HRS
XL      7.5231547+02  YL       5.9561858+02  ZL       2.7090879+02  DXL     3.4899166+03  DYL    -3.8785064+03  DZL    -1.1696273+03
XS      7.4131865+02  YS      -6.6605688+02  ZS       3.0765163+01  DXS    -3.5852850+03  DYS    -3.9709524+03  DZS     3.7393004+02
ALTS    5.8567978+01  LATS    1.7681897+00  LONS    -4.1938926+01  VRS     5.3630732+03  PTR    -1.5584418-02  AZR    -8.5999535+01
LIN     1.7561572+02  LAN    -1.8195389+01  SEASV   8.2601404+00
*****************************************************************************************************************

ID     0721099.2
CSM PLANE CHANGE BURN INITIATION
 26    JULY 1969  5 HRS, 24 MINS, 16.705 SECS   G.M.T. ***108. HRS, 26. MINS, 43.891 SECS   G.E.T. ***  T    1.08445525+02 HRS
XL     -7.9275605+02  YL       5.8451366+02  ZL       1.5736720+02  DXL     3.2242020+03  DYL     3.9245479+03  DZL     1.6640865+03
XS      5.4248024+02  YS       8.3368242+02  ZS      -7.4642891+01  DXS     4.4961773+03  DYS    -2.9182090+03  DZS     8.5862916+01
ALTS    5.8944583+01  LATS   -4.2917194+00  LONS     5.6947797+01  VRS     5.3608699+03  PTR    -1.9416659-03  AZR    -8.9979867+01
LIN     1.7561036+02  LAN    -2.3903823+01  LAP      1.5565162+02  LTS     1.1844434+00  LNS     3.7101899+01  DEM    -2.8314833+01
THETA  -8.5377364-07  BETA    8.9999964+01  MASS     3.7071507+04  DRTX    0.0000000     DRTY    7.3687614+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721099.2
CSM PLANE CHANGE BURN TERMINATION
 26    JULY 1969  5 HRS, 24 MINS, 20.826 SECS   G.M.T. ***108. HRS, 26. MINS, 48.010 SECS   G.E.T. ***  T    1.08446670+02 HRS
XL     -7.9054593+02  YL       5.8716276+02  ZL       1.5851808+02  DXL     3.2347152+03  DYL     3.8878905+03  DZL     1.7300652+03
XS      5.4552648+02  YS       8.3169963+02  ZS      -7.4559296+01  DXS     4.4875316+03  DYS    -2.9292589+03  DZS     1.6078885+02
ALTS    5.8944464+01  LATS   -4.2869045+00  LONS     5.6738423+01  VRS     5.3613757+03  PTR    -1.9767807-03  AZR    -8.8276772+01
LIN     1.7537838+02  LAN    -1.1278433+01  LAP      2.1290815+01  SMAS    9.9757193+02  ECCS    1.3863909-04  PERS    1.9794023+00
RPS     9.9743364+02  APOS    9.9771021+02  RANS     1.6800530+02  INCS    1.5886423+02  LTS     1.1844422+00  LNS     3.7101317+01
LTE     6.6267765+00  LNE    -3.8263656+00  THETA    1.3523774-03  BETA    8.9209297+01  PROP    2.6856641+02  BARC    2.0953768-01
DELV    7.3687583+01  MASS    3.6802940+04  PLCHNG 7.8988965-01
*****************************************************************************************************************

ID     0721099.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 26    JULY 1969 21 HRS, 43 MINS, 39.396 SECS   G.M.T. ***124. HRS, 46. MINS,  6.581 SECS   G.E.T. ***  T    1.24768495+02 HRS
XL      6.2135989+02  YL       7.2659377+02  ZL       3.2412315+02  DXL     4.2455187+03  DYL    -3.1370978+03  DZL    -8.4598222+02
XS      7.4150266+02  YS      -6.6622237+02  ZS       3.0814981+01  DXS    -3.5833842+03  DYS    -3.9690307+03  DZS     3.9975441+02
ALTS    5.8916874+01  LATS    1.7706117+00  LONS    -4.1938933+01  VRS     5.3622430+03  PTR    -5.5008365-03  AZR    -8.5722433+01
LIN     1.7535917+02  LAN    -1.9554756+01
*****************************************************************************************************************

ID     0721099.2
TRANSEARTH INJECTION BURN INITIATION
 27    JULY 1969  6 HRS, 20 MINS, 53.737 SECS   G.M.T. ***133. HRS, 23. MINS, 20.922 SECS   G.E.T. ***  T    1.33389145+02 HRS
XL      2.4394570+02  YL      -9.1046481+02  ZL      -3.2591000+02  DXL    -5.1680052+03  DYL    -1.0872163+03  DZL    -8.3246069+02
XS     -9.9338771+02  YS      -7.9740740+01  ZS       3.8667972+01  DXS    -4.4317823+02  DYS     5.3304842+03  DZS    -3.8378666+02
ALTS    5.8839390+01  LATS    2.2219933+00  LONS    -1.7541062+02  VRS     5.3624124+03  PTR     5.0009297-03  AZR    -9.4075283+01
LIN     1.7534845+02  LAN    -2.3892276+01  LAP      1.6183943+02  LTS     1.1607765+00  LNS     2.4431081+01  DEM    -2.8147726+01
THETA  -5.0717373+00  BETA    7.9557438+00  MASS     3.6871641+04  DRTX    3.0997710+03  DRTY    4.3150583+02  DRTZ    3.7791787+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721099.2
TRANSEARTH INJECTION BURN TERMINATION
 27    JULY 1969  6 HRS, 23 MINS, 24.048 SECS   G.M.T. ***133. HRS, 25. MINS, 51.235 SECS   G.E.T. ***   T    1.33430899+02 HRS
XL      7.8184698+01  YL     -9.3547157+02  ZL     -3.4344136+02  DXL    -8.3721904+03  DYL    -9.5921133+02  DZL    -5.8240215+02
XS     -9.9512125+02  YS      8.9036571+01  ZS      3.1272691+01  DXS     3.0510932+02  DYS     8.4551823+03  DZS    -2.0596105+02
ALTS    6.1092302+01  LATS    1.7928282+00  LONS    1.7488718+02  VRS     8.4631919+03  PTR     3.0000877+00  AZR    -9.1491129+01
LIN     1.7766645+02  LAN    -5.5297305+01  LAP     1.6708523+02  SMAS   -1.9872643+03  ECCS    1.5018438+00  PERS    5.5654613+00
RPS     9.9729631+02  APOS   -4.9718248+03  RANS    1.7578262+02  INCS    1.5967479+02  INMPS   1.7172380+02  SEM     1.5322421+02
RRVS    2.9665998+01  LTS     1.1607363+00  LNS     2.4409876+01  LTE     6.3972110+00  LNE    -1.8541874+00  THETA   4.5541541+00
BETA    5.0175043+00  PROP    9.7964912+03  BARC    9.6828218+00  DELV    3.1298922+03  MASS    2.7075149+04  PLCHNG  2.9233141+00
*****************************************************************************************************************

ID     0721099.2
ENTRY AND TOUCHDOWN
 29    JULY 1969 21 HRS, 38 MINS,  2.596 SECS   G.M.T. ***196. HRS, 40. MINS, 29.778 SECS   G.E.T. ***   T    1.96674938+02 HRS
X       7.3648753+02  Y      3.2689014+03  Z      1.0406978+03  DX    -3.0867599+04  DY    -3.2971684+03  DZ     1.8441205+04
R       3.5087293+03  DEC    1.7253653+01  RA     7.7303188+01  V      3.6107589+04  PTH   -6.4900244+00  AZ     5.5000102+01
ALT     6.5815962+01  LAT    1.7360889+01  LON    1.6542930+02  VE     3.4909860+04  PTE   -6.6500452+00  AZE    5.3582552+01
SMA     1.3808707+05  ECC    9.7491926-01  INC    3.8529085+01  RAN    5.4345973+01  APF    4.1582320+01  RP     3.4633260+03
INMP    3.1321285+01  SEM    1.6851492+02  RRVS   1.3100601+02  RAM   -3.8934669+01  DEM   -1.8288031+01  RAS    1.2896036+02
DES     1.8633276+01  SPSPR  4.4430496+03  DVRES  1.8398259+03  PERNAD 9.3749511+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD   2.8953817+01  LONTD  1.8500027+02  AZTD   6.1352809+01  SEATD  6.1995754+01  DTSUN  7.1718715+00
*****************************************************************************************************************

ID     0721099.2
CIRCUMLUNAR PERICYNTHION
 24    JULY 1969 22 HRS, 56 MINS, 39.089 SECS   G.M.T. *** 77. HRS, 59. MINS,  6.273 SECS   G.E.T. ***   T    7.79850760+01 HRS
XL     -7.6997147+02  YL     -1.3726514+03  ZL     -7.3931003+02  DXL    -5.9582671+03  DYL     2.6732463+03  DZL    1.2347977+03
XS     -1.7215474+03  YS      1.6704589+02  ZS     -1.7490682+02  DXS     6.3126193+02  DYS     6.6429495+03  DZS    1.3110076+02
ALTS    7.3996040+02  LATS   -5.7743303+00  LONS    1.7445780+02  VRS     6.6741633+03  PTR    -1.7938341-06  AZR   -8.8868736+01
LIN     1.7411535+02  LAN     9.5607679+01  LAP    -1.0292968+02  LTS     1.2122021+00  LNS     5.2582844+01  DEM   -2.5601968+01
SEM     1.2148365+02  RRVS    5.8169112+01  SMAS   -2.5018329+03  ECCS    1.6948721+00  INCS    1.5234922+02  RANS   1.7699162+02
APFS   -5.6400582+01  RPS     1.7384539+03  RM      1.9844780+05  DEMP    4.8947661-01  RAMP   -1.7980957+02
*****************************************************************************************************************

ID     0721099.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27    JULY 1969 19 HRS, 57 MINS, 25.133 SECS   G.M.T. ***146. HRS, 59. MINS, 52.316 SECS   G.E.T. ***   T    1.46997866+02 HRS
X       2.6233353+03  Y      2.0925023+03  Z      1.0252140+03  DX    -2.6676574+04  DY     1.9473030+04  DZ     1.4567429+04
R       3.5087772+03  DEC    1.6988846+01  RA     3.8577598+01  V      3.6097763+04  PTH   -6.4823807+00  AZ     6.2651711+01
ALT     6.5833770+01  LAT    1.7094637+01  LON    1.5389990+02  VE     3.4792594+04  PTE   -6.6761989+00  AZE    6.1508096+01
SMA     1.3262069+05  ECC    9.7388450-01  INC    3.1845984+01  RAN    9.1141726+00  APF    4.6764825+01  RP     3.4634565+03
INMP    6.2614833+00  RAM   -7.1700353+01  DEM   -2.7089967+01  RAS    1.2693351+02  DES    1.9117102+01  SEM    1.6112706+02
RRVS    9.6982960+01  PERNAD 8.9134619+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  2.6076648+01  LONTD  1.7478224+02
AZTD    6.9257731+01  SEATD  3.1076750+01  DTSUN  9.5898468+00
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721108.2
LAUNCH TIME      21   JULY 1969   18 HRS,   39 MINS,  20.548 SECS   G.M.T.
LAUNCH AZIMUTH  108.                          INJECTION OPPORTUNITY    2
*****************************************************************************************************************

ID     0721108.2
EARTH PARKING ORBIT INSERTION
 21   JULY 1969 18 HRS, 50 MINS, 44.061 SECS  G.M.T. ***  0. HRS, 11. MINS, 23.513 SECS  G.E.T. ***  T   1.89864811-01 HRS
X     -3.2279079+03  Y      9.0193231+02  Z      1.1517784+03  DX    -9.8170758+03  DY    -2.0745626+04  DZ    -1.1267329+04
ALT    1.0122462+02  LAT    1.9080753+01  LON    3.0234145+02  V      2.5567727+04  PTH   -1.8862450-07  AZ     1.1777379+02
R      3.5439334+03  DEC    1.8965575+01  RA     1.6438873+02  RAS    1.2095091+02  DES    2.0399482+01  RAN    1.6067534+01
INC    3.3200204+01  MASS   2.9613124+05
*****************************************************************************************************************

ID     0721108.2
3.5 MINS PRIOR TO TLI INITIATION
 21   JULY 1969 22 HRS, 47 MINS, 25.713 SECS  G.M.T. ***  4. HRS,  8. MINS,  5.165 SECS  G.E.T. ***  T   4.13476819+00 HRS
X      2.4682072+03  Y      2.3112952+03  Z      1.0466086+03  DX    -1.7977451+04  DY     1.3884632+04  DZ     1.1804169+04
ALT    9.6786537+01  LAT    1.7304111+01  LON    1.2173681+02  V      2.5599026+04  PTH    4.6635829-02  AZ     6.1154555+01
*****************************************************************************************************************

ID     0721108.2
TRANSLUNAR INJECTION INITIATION
 21   JULY 1969 22 HRS, 50 MINS, 55.713 SECS  G.M.T. ***  4. HRS, 11. MINS, 35.165 SECS  G.E.T. ***  T   4.19310147+00 HRS
X      1.7766811+03  Y      2.7144266+03  Z      1.4177376+03  DX    -2.1830510+04  DY     9.3231200+03  DZ     9.5605151+03
ALT    9.8361351+01  LAT    2.3743349+01  LON    1.3453371+02  V      2.5590920+04  PTH    4.7663980-02  AZ     6.5961987+01
R      3.5404360+03  DEC    2.3605782+01  RA     5.6793940+01  RAS    1.2111718+02  DES    2.0366815+01  RAN    1.4976351+01
INC    3.3190544+01  MASS   2.9205519+05
*****************************************************************************************************************

ID     0721108.2
TRANSLUNAR INJECTION TERMINATION
 21   JULY 1969 22 HRS, 56 MINS, 14.350 SECS  G.M.T. ***  4. HRS, 16. MINS, 53.802 SECS  G.E.T. ***  T   4.28161168+00 HRS
X      2.8427028+02  Y      3.0557733+03  Z      1.8841909+03  DX    -3.4576698+04  DY     3.2106753+03  DZ     7.8379189+03
ALT    1.5045081+02  LAT    3.1711976+01  LON    1.6109370+02  V      3.5599008+04  PTH    6.6068411+00  AZ     7.9107147+01
R      3.6212130+03  DEC    3.1547822+01  RA     8.4685224+01  RAS    1.2112086+02  DES    2.0366091+01  DEM   -1.1314821+01
SEM    8.3245335+01  RRVS   1.4557143+02  RAN    1.4879108+01  INC    3.3191137+01  ECC    9.7035199-01  SMA    1.1983310+05
RP     3.5529124+03  APF    5.9475197+01  INMP   9.5251062+00  C3TLI -5.7218158-01  DAZTLI-1.6389131-03  MASS   1.3755750+05
PROP   1.5449769+05
*****************************************************************************************************************

ID     0721108.2
TRANSLUNAR INJECTION + 2 HOURS
 22   JULY 1969  0 HRS, 56 MINS, 14.350 SECS  G.M.T. ***  6. HRS, 16. MINS, 53.802 SECS  G.E.T. ***  T   6.28161168+00 HRS
X     -1.8939149+04  Y     -9.2203746+03  Z     -2.6645620+03  DX    -8.8029984+03  DY    -9.9126793+03  DZ    -4.7985991+03
ALT    1.7789453+04  LAT    -7.2171673+00  LON    2.5228511+02  V      1.4098955+04  PTH    6.4819947+01  AZ     1.2249774+02
R      2.1232205+04  DEC    -7.2094140+00  RA    -1.5404123+02  RAS    1.2120390+02  DES    2.0349739+01
*****************************************************************************************************************

ID     0721108.2
HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION
 22   JULY 1969  5 HRS,  9 MINS, 20.548 SECS  G.M.T. *** 10. HRS, 29. MINS, 60.000 SECS  G.E.T. ***  T   1.04999999+01 HRS
X     -3.3671247+04  Y     -2.9529821+04  Z     -1.3048983+04  DX    -4.2928859+03  DY    -6.9296540+03  DZ    -3.6660452+03
ALT    4.3205003+04  LAT    -1.6251863+01  LON    2.0412818+02  V      8.9380568+03  PTH    7.2214809+01  AZ     1.1936356+02
R      4.6648935+04  DEC    -1.6244254+01  RA    -1.3874911+02  RAS    1.2137899+02  DES    2.0315031+01  DEM   -1.2521824+01
SEM    8.6405795+01  RRVS   7.5403316+01  RAN    1.4815031+01  INC    3.3203304+01  ECC    9.7018503-01  SMA    1.1918441+05
RP     3.5534799+03  APF    5.9550698+01  INMP   9.5036553+00  THETA -3.0133008+01  BETA  -1.5136032+02  MASS   9.6792101+04
DRTX  -1.5516390+01  DRTY  -8.4738128+00  DRTZ   1.0262322+01
*****************************************************************************************************************

ID     0721108.2
HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION
 22   JULY 1969  5 HRS,  9 MINS, 23.540 SECS  G.M.T. *** 10. HRS, 30. MINS,  2.992 SECS  G.E.T. ***  T   1.05008312+01 HRS
X     -3.3673361+04  Y     -2.9533232+04  Z     -1.3050784+04  DX    -4.2944304+03  DY    -6.9185483+03  DZ    -3.6486327+03
ALT    4.3209192+04  LAT    -1.6252668+01  LON    2.0411717+02  V      8.9230579+03  PTH    7.2290092+01  AZ     1.1918428+02
R      4.6652224+04  DEC    -1.6245059+01  RA    -1.3874761+02  RAS    1.2137903+02  DES    2.0315024+01  DEM   -1.2522025+01
SEM    8.6406223+01  RRVS   7.5401735+01  RAN    1.4647495+01  INC    3.3049654+01  ECC    9.7012911-01  SMA    1.1761734+05
RP     3.5133354+03  APF    5.9476108+01  INMP   9.3394693+00  THETA -3.0134366+01  BETA  -1.5118087+02  MASS   9.6597063+04
PROP   1.9503711+02  DELV   2.0442232+01  MASS   9.6597063+04  PLCHNG-1.7886083-01
*****************************************************************************************************************

ID     0721108.2
LUNAR ORBIT INSERTION BURN INITIATION
 25   JULY 1969  0 HRS, 18 MINS, 59.758 SECS  G.M.T. *** 77. HRS, 39. MINS, 39.210 SECS  G.E.T. ***  T   7.76608915+01 HRS
XL    -3.7054216+02  YL    -8.8045364+02  ZL    -3.4898380+02  DXL   -7.1022006+03  DYL    4.0026917+03  DZL    9.6168351+02
XS    -1.0167375+03  YS     2.2720478+01  ZS     4.2889656+00  DXS    1.3859329+03  DYS    8.0837212+03  DZS   -6.2198281+02
ALTS   7.8506874+01  LATS   2.4163251-01  LONS   1.7871985+02  VRS    8.2252185+03  PTR   -8.4425122+00  AZR   -9.4348458+01
LIN    1.7563605+02  LAN   -4.4481166+00  LAP    1.5447001+01  LTS    1.2109787+00  LNS    5.1885134+01  DEM   -2.5784546+01
THETA  1.5966679+01  BETA   1.7999300+02  MASS   9.4992434+04  DRTX  -2.8064796+03  DRTY   0.0000000     DRTZ  -3.6750000+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721108.2
LUNAR ORBIT INSERTION BURN TERMINATION
 25   JULY 1969  0 HRS, 24 MINS, 52.328 SECS   G.M.T. *** 77. HRS, 45. MINS, 31.778 SECS   G.E.T. ***  T    7.77588272+01 HRS
XL     -6.9759373+02  YL     -6.5587200+02  ZL     -2.8994599+02  DXL    -3.9728009+03  DYL     3.6090705+03  DZL     1.0399887+03
XS     -9.1229828+02  YS      4.0978600+02  ZS     -2.5711095+01  DXS     2.1561179+03  DYS     5.0261876+03  DZS    -3.9413280+01
ALTS    4.1943280+01  LATS   -1.4726562+00  LONS    1.5581134+02  VRS     5.4833152+03  PTR     1.0734722+00  AZR    -9.4096312+01
LIN     1.7563604+02  LAN    -4.5017936+00  LAP    -1.9966677+02  SMAS    1.0524397+03  ECCS    5.2855628-02  PERS    2.1449322+00
RPS     9.9681232+02  APOS    1.1080670+03  RANS    1.6901738+02  INCS    1.5953057+02  LTS     1.2108910+00  LNS     5.1835348+01
LTE     6.2892581+00  LNE    -5.6744861+00  THETA  -6.9502032+00  BETA   -1.8000000+02  PROP    2.2978674+04  BARC    2.2316768+01
DELV    2.8067180+03  MASS    7.2013760+04  PLCHNG 1.2972066-05
*****************************************************************************************************************

ID     0721108.2
CIRCULARIZATION BURN INITIATION
 25   JULY 1969  4 HRS, 34 MINS, 58.455 SECS   G.M.T. *** 81. HRS, 55. MINS, 37.904 SECS   G.E.T. ***  T    8.19271955+01 HRS
XL     -3.7557996+02  YL     -8.5793381+02  ZL     -3.4129089+02  DXL    -5.0682064+03  DYL     2.0631751+03  DZL     3.9536379+02
XS     -9.9386174+02  YS      7.6288826+01  ZS      2.9932937+00  DXS     4.2014421+02  DYS     5.4704257+03  DZS    -4.1746093+02
ALTS    5.8296400+01  LATS   1.7240055-01   LONS    1.7561058+02  VRS     5.5023950+03  PTR    -1.5512774-02  AZR    -9.4351130+01
LIN     1.7563270+02  LAN    -6.6473936+00  LAP    -1.7934800+02  LTS     1.2071591+00  LNS     4.9716342+01  DEM    -2.6318876+01
THETA   3.9215531-01  BETA    1.7999300+02  MASS    7.1964360+04  DRTX   -1.3850000+02  DRTY    0.0000000     DRTZ    0.0000000
*****************************************************************************************************************

ID     0721108.2
CIRCULARIZATION BURN TERMINATION
 25   JULY 1969  4 HRS, 35 MINS, 13.442 SECS   G.M.T. *** 81. HRS, 55. MINS, 52.893 SECS   G.E.T. ***  T    8.19313593+01 HRS
XL     -3.8789065+02  YL     -8.5283498+02  ZL     -3.4029852+02  DXL    -4.9135010+03  DYL     2.0710364+03  DZL     4.0926601+02
XS     -9.9275235+02  YS      8.9605442+01  ZS      1.9823449+00  DXS     4.7961007+02  DYS     5.3268761+03  DZS    -4.0709681+02
ALTS    5.8296169+01  LATS   1.1394597-01   LONS    1.7494248+02  VRS     5.3638943+03  PTR     4.0314710-03  AZR    -9.4352709+01
LIN     1.7563269+02  LAN    -6.6496789+00  LAP    -1.8915033+02  SMAS    9.9721663+02  ECCS    4.3386824-04  PERS    1.9783449+00
RPS     9.9679396+02  APOS    9.9764928+02  RANS    1.6900418+02  INCS    1.5952049+02  LTS     1.2071559+00  LNS     4.9714224+01
LTE     6.3752982+00  LNE    -5.6445924+00  THETA  -3.7587299-01  BETA    1.8000000+02  PROP    9.7678906+02  BARC    7.6810280-01
DELV    1.3850248+02  MASS    7.1987571+04  PLCHNG 4.9190487-05
*****************************************************************************************************************

ID     0721108.2
CSM  1ST PASS OVER LUNAR LANDING SITE
 26   JULY 1969  1 HRS, 29 MINS,  2.878 SECS   G.M.T. ***102. HRS, 49. MINS, 42.328 SECS   G.E.T. ***  T    1.02828424+02 HRS
XL      7.4294691+02  YL      6.0467063+02  ZL      2.7582592+02  DXL     3.5466773+03  DYL    -3.8320983+03  DZL    -1.1537412+03
XS      7.4112237+02  YS     -6.6587628+02  ZS      3.1921952+01  DXS    -3.5851837+03  DYS    -3.9714744+03  DZS     3.7151610+02
ALTS    5.6339765+01  LATS   1.8351171+00   LONS   -4.1938872+01  VRS     5.3633723+03  PTR    -5.8360654-03  AZR    -9.6025763+01
LIN     1.7561227+02  LAN    -1.7258018+01  SEASV   8.9991541+00
*****************************************************************************************************************

ID     0721108.2
CSM PLANE CHANGE BURN INITIATION
 26   JULY 1969  6 HRS, 51 MINS, 18.175 SECS   G.M.T. ***108. HRS, 11. MINS, 57.627 SECS   G.E.T. ***  T    1.08199341+02 HRS
XL     -8.0061292+02  YL      5.7385620+02  ZL      1.5337929+02  DXL     3.1650676+03  DYL     3.9650526+03  DZL     1.6376693+03
XS      5.4220065+02  YS      8.3324781+02  ZS     -7.4398729+01  DXS     4.4981830+03  DYS    -2.9184727+03  DZS     9.2452398+01
ALTS    5.3410264+01  LATS  -4.2793754+00   LONS    5.6947642+01  VRS     5.3628052+03  PTR     2.4582285-03  AZR    -8.9009275+01
LIN     1.7560697+02  LAN    -1.9966390+01  LAP     1.4262486+01  LTS     1.1830895+00  LNS     3.6364983+01  DEM    -2.8367392+01
THETA   1.0245284-05  BETA    8.9999967+01  MASS    3.7380872+04  DRTX    0.0000000     DRTY    6.7230935+01  DRTZ    0.0000000
*****************************************************************************************************************

ID     0721108.2
CSM PLANE CHANGE BURN TERMINATION
 26   JULY 1969  6 HRS, 51 MINS, 21.937 SECS   G.M.T. ***108. HRS, 12. MINS,  1.386 SECS   G.E.T. ***  T    1.08203385+02 HRS
XL     -7.9865041+02  YL      5.7630067+02  ZL      1.5444275+02  DXL     3.1747655+03  DYL     3.9316454+03  DZL     1.7478803+03
XS      5.4498298+02  YS      8.3143789+02  ZS     -7.4310352+01  DXS     4.4902036+03  DYS    -2.9285472+03  DZS     1.6081186+02
ALTS    5.3412418+01  LATS  -4.2743576+00   LONS    5.6756342+01  VRS     5.3632245+03  PTR     2.4590559-03  AZR    -8.8276786+01
LIN     1.7538957+02  LAN    -1.1205143+01  LAP     9.8120723+00  SMAS    9.9719660+02  ECCS    2.9661948-04  PERS    1.9782853+00
RPS     9.9690091+02  APOS    9.9749238+02  RANS    1.6802463+02  INCS    1.5879362+02  LTS     1.1830887+00  LNS     3.6364457+01
LTE     6.6270111+00  LNE    -3.7198959+00  THETA   1.2337029-03  BETA    8.9279216+01  PROP    2.4517676+02  BARC    1.9066608-01
DELV    6.7231071+01  MASS    3.6835695+04  PLCHNG 7.2342977-01
*****************************************************************************************************************

ID     0721108.2
CSM  2ND PASS OVER LUNAR LANDING SITE
 26   JULY 1969 23 HRS, 10 MINS,  7.582 SECS   G.M.T. ***124. HRS, 31. MINS, 47.032 SECS   G.E.T. ***  T    1.24513044+02 HRS
XL      5.9014579+02  YL      7.3398232+02  ZL      3.2714967+02  DXL     4.2907379+03  DYL    -3.0816920+03  DZL    -8.2594726+02
XS      7.4127941+02  YS     -6.6602036+02  ZS      3.0932528+01  DXS    -3.5831848+03  DYS    -3.9701334+03  DZS     3.9963577+02
ALTS    5.3514493+01  LATS   1.7721542+00   LONS   -4.1938872+01  VRS     5.3628428+03  PTR     3.6379056-03  AZR    -8.5735176+01
LIN     1.7537039+02  LAN    -1.9476552+01
*****************************************************************************************************************

ID     0721108.2
TRANSEARTH INJECTION BURN INITIATION
 27   JULY 1969  7 HRS, 47 MINS, 44.552 SECS   G.M.T. ***133. HRS,  8. MINS, 23.998 SECS   G.E.T. ***  T    1.33139999+02 HRS
XL      2.2362792+02  YL     -9.1383511+02  ZL     -3.3010992+02  DXL    -5.1950121+03  DYL    -9.8289191+02  DZL    -7.9718741+02
XS     -2.9536189+02  YS     -4.5133293+01  ZS      3.5976263+01  DXS    -2.5586905+02  DYS     5.3428915+03  DZS    -3.8717671+02
ALTS    5.8540359+01  LATS   2.0678692+00   LONS   -1.7740378+02  VRS     5.3630089+03  PTR    -4.1699642-03  AZR    -9.4142557+01
LIN     1.7535965+02  LAN    -2.3817273+01  LAP    -1.2461755+02  LTS     1.1593791+00  LNS     2.3695945+01  DEM    -2.8367324+01
THETA  -5.3286492+00  BETA    8.2689189+00  MASS    3.6934395+04  DRTX    3.1390927+03  DRTY    4.5426051+02  DRTZ    4.8013157+01
*****************************************************************************************************************
```

```
*****************************************************************************************************************

ID     0721108.2
TRANSEARTH INJECTION BURN TERMINATION
 27    JULY 1969  7 HRS, 50 MINS, 16.726 SECS   G.M.T. ***133. HRS, 10. MINS, 56.172 SECS   G.E.T. ***  T    1.33182270+02 HRS
XL      5.4712003+01  YL     -9.3568245+02  ZL     -3.4639800+02  DXL    -8.4372028+03  DYL    -7.8399892+02  DZL    -4.9893415+02
XS     -9.9083731+02  YS      1.2614783+02  ZS      2.8542936+01  DXS     6.2501774+02  DYS     8.4791287+03  DZS    -1.9427802+02
ALTS    6.0749481+01  LATS    1.6368513+00  LONS    1.7274446+02  VRS     8.5043525+03  PTR     3.0002770+00  AZR    -9.1397194+01
LIN     1.7784632+02  LAN    -5.6708850+01  LAP    -3.2765477+00  SMAS   -1.8975956+03  ECCS    1.5253849+00  PERS    5.1930588+00
RPS     9.9696814+02  APOS   -4.7921594+03  RANS    1.7621287+02  INCS    1.5957161+02  INMPS   1.7184802+02  SEM     1.5406848+02
RBVS    3.1052451+01  LTS     1.1593384+00  LNS     2.3674478+01  LTE     6.3686457+00  LNE    -1.7326987+00  THETA   4.4621215+00
BETA    5.1870374+00  PROP    9.9179707+03  BARC    9.8328475+00  DELV    3.1721573+03  MASS    2.6986425+04  PLCHNG  3.0627257+00
*****************************************************************************************************************

ID     0721108.2
ENTRY AND TOUCHDOWN
 29    JULY 1969 21 HRS, 40 MINS, 47.459 SECS   G.M.T. ***195. HRS,  1. MINS, 26.909 SECS   G.E.T. ***  T    1.95024141+02 HRS
X       7.0111739+02  Y      3.2792473+03  Z      1.0327076+03  DX    -3.0960327+04  DY    -3.5006240+03  DZ     1.8265082+04
R       3.5087765+03  DEC    1.7116842+01  RA     7.7931612+01  V      3.6116609+04  PTH   -6.4900150+00  AZ     5.5416253+01
ALT     5.5847523+01  LAT    1.7223332+01  LON    1.6536892+02  VE     3.4911655+04  PTE   -6.6524607+00  AZE    5.4012373+01
SMA     1.4382370+05  ECC    9.7591915-01  INC    3.8109681+01  RAN    5.4813881+01  APF    4.1623320+01  RP     3.4633980+03
INMP    3.1271795+01  SEM    1.6848952+02  RBVS   1.3157174+02  RAM   -3.8906739+01  DEM   -1.8277153+01  RAS    1.2896223+02
DES     1.8632821+01  SPSPR  4.3543250+03  DVRES  1.8061719+03  PERNAD 9.7416883+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03
LATTD   2.8686698+01  LONTD  1.8499985+02  AZTD   6.1741646+01  SEATD  6.2646240+01  DTSUN  7.1341568+00
*****************************************************************************************************************

ID     0721108.2
CIRCUMLUNAR PERICYNTHION
 25    JULY 1969  0 HRS, 23 MINS, 58.469 SECS   G.M.T. *** 77. HRS, 44. MINS, 37.921 SECS   G.E.T. ***  T    7.77438669+01 HRS
XL     -7.4345201+02  YL    -1.3837901+03  ZL     -7.4492625+02  DXL    -6.0057487+03  DYL     2.6654206+03  DZL    1.0425246+03
XS     -1.7219472+03  YS     1.6270307+02  ZS     -1.7588758+02  DXS     6.3294836+02  DYS     6.6506173+03  DZS   -4.4500834+01
ALTS    8.3004351+02  LATS  -5.8065414+00  LONS    1.7460227+02  VRS     6.6808168+03  PTR    -3.4211814-06  AZR   -9.0383533+01
LIN     1.7418074+02  LAN    8.0799929+01  LAP    -1.6130011+02  LTS     1.2109045+00  LNS     5.1842949+01  DEM   -2.5795421+01
SEM     1.2229452+02  RBVS   5.7291326+01  SMAS   -2.4822209+03  ECCS    1.7003958+00  INCS    1.5285559+02  RANS   1.7404476+02
APFS   -6.9911481+01  RPS    1.7385370+03  RM      1.9828683+05  DEMP    4.9214076-01  RAMP   -1.7974178+02
*****************************************************************************************************************

ID     0721108.2
CIRCUMLUNAR ENTRY AND TOUCHDOWN
 27    JULY 1969 21 HRS, 25 MINS,  6.925 SECS   G.M.T. ***146. HRS, 45. MINS, 46.376 SECS   G.E.T. ***  T    1.46762882+02 HRS
X       2.5748959+03  Y      2.1964862+03  Z      9.2636065+02  DX    -2.6475964+04  DY     1.6977443+04  DZ     1.7713301+04
R       3.5089578+03  DEC    1.5307469+01  RA     4.0465465+01  V      3.6096693+04  PTH   -6.5613329+00  AZ     5.7070679+01
ALT     6.5832486+01  LAT    1.5403880+01  LON    1.3380361+02  VE     3.4856105+04  PTE   -6.7416371+00  AZE    5.5711644+01
SMA     1.3255009+05  ECC    9.7387759-01  INC    3.5946597+01  RAN    1.8288554+01  APF    4.0025100+01  RP     3.4625273+03
INMP    1.2808151+01  RAM   -7.0676950+01  DEM   -2.6936924+01  RAS    1.2699330+02  DES    1.9133182+01  SEM    1.6197513+02
RBVS    9.8137851+01  PERNAD 8.8569916+00  ENTDT  2.3333330-01  ENTRG  1.2850000+03  LATTD  2.6429940+01  LONTD  1.5344324+02
AZTD    6.2788632+01  SEATD  3.1638098+01  DTSUN  9.5412135+00
*****************************************************************************************************************
```

TABLE IV.- SUMMARY OF MISSIONS FOR JULY 21 LAUNCH WINDOW - Concluded

(b) Mission parameters across launch azimuth range (72° - 108°)

LAUNCH TIME

LAZ	DAY	MONTH	YEAR	HRS	MINS	SECS
72.	21	JULY	1969	14	9	7.419
81.	21	JULY	1969	14	33	42.338
90.	21	JULY	1969	15	26	44.808
99.	21	JULY	1969	16	57	32.812
108.	21	JULY	1969	18	39	20.548

EARTH PARKING ORBIT INSERTION

LAZ	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	MASS	LAT	LON
72.	21	JULY	14	20	31.461	0.	11.	24.042	2.95882+05	3.2839+01	3.0581+02
81.	21	JULY	14	45	3.665	0.	11.	21.326	2.97165+05	2.9285+01	3.0555+02
90.	21	JULY	15	38	5.134	0.	11.	20.328	2.97646+05	2.5794+01	3.0485+02
99.	21	JULY	17	8	53.867	0.	11.	21.055	2.97298+05	2.2386+01	3.0377+02
108.	21	JULY	18	50	44.361	0.	11.	23.513	2.96131+05	1.9081+01	3.0234+02

3.5 MINS PRIOR TO TLI INITIATION

LAZ	OPP	** G.E.T. HRS	MINS	SECS **	ALT	LAT	LON	V	PTH	AZ
72.	1	2.	53.	57.734	1.0046+02	1.6655+01	2.0557+02	2.55794+04	1.6215-02	6.1322+01
81.	1	2.	52.	30.781	1.0022+02	1.9437+01	1.9853+02	2.55798+04	2.6224-02	6.6294+01
90.	1	2.	49.	40.827	9.9617+01	1.9348+01	1.8588+02	2.55827+04	3.7057-02	6.8408+01
99.	1	2.	45.	1.693	9.8322+01	1.8677+01	1.6569+02	2.55901+04	4.5807-02	6.6159+01
108.	1	2.	40.	2.849	9.6800+01	1.7097+01	1.4388+02	2.55989+04	4.6457-02	6.1039+01
72.	2	4.	22.	5.388	1.0045+02	1.6893+01	1.8347+02	2.55795+04	1.6443-02	6.1451+01
81.	2	4.	20.	42.904	1.0026+02	1.8820+01	1.7686+02	2.55798+04	2.6434-02	6.6588+01
90.	2	4.	17.	53.634	9.9664+01	1.9753+01	1.6438+02	2.55826+04	3.7327-02	6.8772+01
99.	2	4.	13.	11.170	9.8357+01	1.9052+01	1.4401+02	2.55900+04	4.6139-02	6.6449+01
108.	2	4.	8.	5.165	9.6787+01	1.7304+01	1.2174+02	2.55990+04	4.6636-02	6.1155+01

TRANSLUNAR INJECTION INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	** DELTA T FROM EPOI ** HRS	MINS	SECS	MASS	LAT	LON	AZ
72.	1	21	JULY	17	6	35.153	2.	57.	27.734	2.	46.	3.692	2.92527+05	2.3066+01	2.1830+02	6.5956+01
81.	1	21	JULY	17	29	43.119	2.	56.	.781	2.	44.	39.454	2.93824+05	2.3645+01	2.1193+02	7.1432+01
90.	1	21	JULY	18	19	55.635	2.	53.	10.827	2.	41.	50.499	2.94332+05	2.4028+01	1.9955+02	7.3797+01
99.	1	21	JULY	19	46	4.416	2.	48.	31.603	2.	37.	10.548	2.94029+05	2.3913+01	1.7911+02	7.1366+01
108.	1	21	JULY	21	22	53.397	2.	43.	32.849	2.	32.	9.336	2.92911+05	2.3569+01	1.5664+02	6.5791+01
72.	2	21	JULY	18	34	42.806	4.	25.	35.388	4.	14.	11.346	2.91670+05	2.3267+01	1.9623+02	6.6147+01
81.	2	21	JULY	18	57	55.242	4.	24.	12.904	4.	12.	51.577	2.92966+05	2.3947+01	1.9033+02	7.1830+01
90.	2	21	JULY	19	48	8.442	4.	21.	23.634	4.	10.	3.306	2.93474+05	2.4332+01	1.7812+02	7.4272+01
99.	2	21	JULY	21	14	13.982	4.	16.	41.170	4.	5.	20.115	2.93172+05	2.4208+01	1.5750+02	7.1759+01
108.	2	21	JULY	22	50	55.713	4.	11.	35.165	4.	0.	11.652	2.92055+05	2.3743+01	1.3453+02	6.5962+01

TRANSLUNAR INJECTION CUTOFF

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	DTBURN(SEC)	MASS	PROP USED	ENERGY	PLCHNG
72.	1	21	JULY	17	11	54.935	3.	2.	47.517	3.1978+02	1.37473+05	1.55053+05	-5.7080-01	1.0743+00
81.	1	21	JULY	17	35	3.872	3.	1.	21.533	3.2075+02	1.38300+05	1.55524+05	-5.6976-01	5.9638-01
90.	1	21	JULY	18	25	16.833	2.	58.	32.025	3.2120+02	1.38592+05	1.55740+05	-5.6950-01	3.9494-01
99.	1	21	JULY	19	51	25.465	2.	53.	52.653	3.2105+02	1.38361+05	1.55668+05	-5.7033-01	6.3016-01
108.	1	21	JULY	21	28	13.771	2.	48.	53.224	3.2037+02	1.37571+05	1.55340+05	-5.7189-01	1.1387+00
72.	2	21	JULY	18	40	.928	4.	30.	53.509	3.1812+02	1.37422+05	1.54248+05	-5.7116-01	0.0000
81.	2	21	JULY	19	3	14.801	4.	29.	32.462	3.1956+02	1.38021+05	1.54945+05	-5.7010-01	0.0000
90.	2	21	JULY	19	53	28.578	4.	26.	43.770	3.2014+02	1.38250+05	1.55225+05	-5.6976-01	0.0000
99.	2	21	JULY	21	19	33.814	4.	22.	1.001	3.1983+02	1.38095+05	1.55077+05	-5.7061-01	0.0000
108.	2	21	JULY	22	56	14.350	4.	16.	53.802	3.1864+02	1.37557+05	1.54498+05	-5.7218-01	-1.6380-03

TRANSLUNAR INJECTION CUTOFF - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INMP
72.	1	1.7025+02	3.1026+01	2.4473+02	3.55500+04	6.9973+00	7.9840+01	7.4381+00
81.	1	1.6668+02	2.9221+01	2.3901+02	3.55667+04	6.8031+00	8.4852+01	2.1556+00
90.	1	1.6502+02	2.8540+01	2.3688+02	3.55746+04	6.7432+00	8.7052+01	5.9347-02
99.	1	1.6549+02	2.9496+01	2.3831+02	3.55727+04	6.8243+00	8.4993+01	2.7539+00
108.	1	1.6796+02	3.1549+01	1.8329+02	3.55614+04	7.0471+00	8.0070+01	8.6232+00
72.	2	1.6328+02	3.1197+01	2.2259+02	3.55848+04	6.5908+00	7.8982+01	8.2804+00
81.	2	1.6324+02	2.9353+01	2.1741+02	3.55839+04	6.6194+00	8.4735+01	2.5256+00
90.	2	1.6282+02	2.8624+01	2.0544+02	3.55856+04	6.6316+00	8.7211+01	2.2458-01
99.	2	1.6183+02	2.9616+01	1.8469+02	3.55910+04	6.6276+00	8.4833+01	3.1542+00
108.	2	1.6045+02	3.1712+01	1.6109+02	3.55990+04	6.6068+00	7.9107+01	9.5251+00

TRANSLUNAR INJECTION CUTOFF + 2 HOURS

LAZ	OPP	** HRS	G.E.T. MINS	** SECS	ALT	LAT	LON	V	PTH	AZ
72.	1	5.	2.	47.517	1.7805+04	-5.9787+00	3.3497+02	1.40941+04	6.4817+01	1.2167+02
81.	1	5.	1.	21.533	1.7796+04	-1.0066+01	3.2765+02	1.40970+04	6.4811+01	1.1787+02
90.	1	4.	53.	33.025	1.7793+04	-1.1498+01	3.1486+02	1.40976+04	6.4811+01	1.1630+02
99.	1	4.	53.	52.655	1.7797+04	-1.0288+01	2.9482+02	1.40959+04	6.4817+01	1.1805+02
108.	1	4.	48.	53.224	1.7803+04	-7.1729+00	2.7331+02	1.40919+04	6.4829+01	1.2203+02
72.	2	6.	33.	53.509	1.7787+04	-5.8612+00	3.1390+02	1.41006+04	6.4809+01	1.2211+02
81.	2	6.	29.	32.462	1.7788+04	-1.0213+01	3.0640+02	1.40997+04	6.4808+01	1.1798+02
90.	2	6.	26.	43.773	1.7788+04	-1.1761+01	2.9355+02	1.40991+04	6.4809+01	1.1627+02
99.	2	6.	22.	1.001	1.7789+04	-1.1415+01	2.7360+02	1.40988+04	6.4814+01	1.1817+02
108.	2	6.	16.	53.802	1.7788+04	-7.2172+00	2.5229+02	1.40990+04	6.4820+01	1.2258+02

HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS	** DELTA T FROM TLI HRS	MINS	SECS	MASS	** HYB TRANS TARGET PARAMETERS DRTX	DRTY	DRTZ **
72.	1	21	JULY	23	9	7.418	9.	0.	.000	5.	57.	12.483	9.67921+04	-1.5146+01	-8.2990+00	9.9331+00
81.	1	21	JULY	23	33	42.338	9.	0.	.000	5.	58.	38.466	9.67921+04	-1.4418+01	-8.6163+00	1.0085+01
90.	1	22	JULY	1	26	44.808	9.	0.	.000	6.	1.	27.974	9.67921+04	-1.4070+01	-8.7662+00	1.0225+01
99.	1	22	JULY	2	57	32.812	9.	0.	.000	6.	6.	7.346	9.67921+04	-1.4369+01	-8.7312+00	1.0336+01
108.	1	22	JULY	3	29	20.547	9.	0.	.000	6.	11.	6.776	9.67921+04	-1.5161+01	-8.5080+00	1.0394+01
72.	2	22	JULY	2	39	7.419	10.	30.	.000	5.	59.	6.491	9.67921+04	-1.5703+01	-8.2496+00	9.7083+00
81.	2	22	JULY	1	3	42.338	10.	30.	.000	6.	0.	27.538	9.67921+04	-1.4547+01	-8.6938+00	1.0091+01
90.	2	22	JULY	1	56	44.808	10.	30.	.000	6.	3.	16.230	9.67921+04	-1.4034+01	-8.8604+00	1.0324+01
99.	2	22	JULY	3	27	32.812	10.	30.	.000	6.	7.	58.999	9.67921+04	-1.4557+01	-8.8012+00	1.0309+01
108.	2	22	JULY	5	9	20.548	10.	30.	.000	6.	13.	6.198	9.67921+04	-1.5516+01	-8.4738+00	1.0262+01

HYBRID TRANSFER MIDCOURSE MANEUVER INITIATION - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ
72.	1	4.1871+04	-1.5540+01	2.9041+02	9.10215+03	7.2004+01	1.1874+02
81.	1	4.1986+04	-1.7551+01	2.8353+02	9.08738+03	7.2021+01	1.1409+02
90.	1	4.2224+04	-1.8545+01	2.7045+02	9.05717+03	7.2058+01	1.1209+02
99.	1	4.2622+04	-1.7915+01	2.4997+02	9.00838+03	7.2121+01	1.1413+02
108.	1	4.3051+04	-1.6238+01	2.2565+02	8.95691+03	7.2191+01	1.1887+02
72.	2	4.2020+04	-1.5581+01	2.6896+02	9.08319+03	7.2029+01	1.1919+02
81.	2	4.2134+04	-1.7750+01	2.6190+02	9.06819+03	7.2045+01	1.1414+02
90.	2	4.2373+04	-1.8813+01	2.4874+02	9.03834+03	7.2082+01	1.1196+02
99.	2	4.2772+04	-1.8039+01	2.2744+02	8.98962+03	7.2145+01	1.1419+02
108.	2	4.3205+04	-1.6252+01	2.0413+02	8.93806+03	7.2215+01	1.1936+02

HYBRID TRANSFER MIDCOURSE MANEUVER TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	21	JULY 23	9	10.335	9.	0.	2.916	2.9165+00	9.66020+04	1.9009+02	1.9924+01	-1.7002-01
81.	1	21	JULY 23	33	45.206	9.	0.	2.867	2.8680+00	9.66052+04	1.8692+02	1.9591+01	-1.7692-01
90.	1	22	JULY 0	26	47.659	9.	0.	2.851	2.8517+00	9.66063+04	1.8584+02	1.9478+01	-1.8094-01
99.	1	22	JULY 1	57	35.701	9.	0.	2.889	2.8895+00	9.66038+04	1.8831+02	1.9737+01	-1.8184-01
108.	1	22	JULY 3	39	23.506	9.	0.	2.958	2.9586+00	9.65993+04	1.9282+02	2.0210+01	-1.7894-01
72.	2	22	JULY 0	39	10.379	10.	30.	2.960	2.9599+00	9.65992+04	1.9293+02	2.0221+01	-1.6962-01
81.	2	22	JULY 1	3	45.226	10.	30.	2.887	2.8873+00	9.66039+04	1.8819+02	1.9724+01	-1.7913-01
90.	2	22	JULY 1	56	47.670	10.	30.	2.861	2.8616+00	9.66056+04	1.8650+02	1.9546+01	-1.8350-01
99.	2	22	JULY 3	27	35.724	10.	30.	2.912	2.9118+00	9.66023+04	1.8978+02	1.9891+01	-1.8393-01
108.	2	22	JULY 5	9	23.540	10.	30.	2.992	2.9929+00	9.65971+04	1.9504+02	2.0442+01	-1.7886-01

LUNAR ORBIT INSERTION BURN INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	** DELTA T FROM TLI ** HRS	MINS	SECS	MASS	LOI TARGET PARAMETERS DRTX	DRTY	** DRTZ
72.	1	24	JULY 18	59	24.278	76.	56.	16.859	73.	47.	29.345	9.49973+04	-2.7915+03	-1.0027+02	2.9276+02
81.	1	24	JULY 19	22	42.593	76.	49.	.165	73.	47.	38.632	9.50005+04	-2.7970+03	-2.2742+02	2.4965+02
90.	1	24	JULY 20	10	23.286	76.	43.	38.478	73.	45.	6.454	9.50015+04	-2.7999+03	-2.7278+02	2.2053+02
99.	1	24	JULY 21	29	53.550	76.	32.	20.735	73.	38.	28.083	9.49991+04	-2.7962+03	-1.9315+02	2.8542+02
108.	1	24	JULY 22	59	47.063	76.	20.	26.455	73.	31.	33.233	9.49946+04	-2.7544+03	-3.5504+01	7.9744+02
72.	2	24	JULY 20	21	24.799	78.	12.	17.378	73.	41.	23.871	9.49945+04	-2.7847+03	-6.7243+01	4.4019+02
81.	2	24	JULY 20	44	50.109	78.	11.	7.770	73.	41.	35.308	9.49992+04	-2.7963+03	-2.0562+02	2.7811+02
90.	2	24	JULY 21	32	41.304	78.	5.	56.493	73.	39.	12.726	9.50009+04	-2.8019+03	-2.5590+02	1.1326+02
99.	2	24	JULY 22	51	56.363	77.	54.	23.551	73.	32.	22.551	9.49976+04	-2.7983+03	-1.7065+02	1.7869+02
108.	2	25	JULY [illegible]	19	59.758	77.	39.	39.210	73.	22.	45.408	9.49924+04	-2.8065+03	0.0000	-3.6750+01

LUNAR ORBIT INSERTION BURN INITIATION - CONCLUDED

LAZ	OPP	SELENOGRAPHIC POLAR COORDINATES ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	6.9399+01	-2.6785-01	1.7450+02	8.25056+03	-6.0967+00	-9.3341+01
81.	1	7.3834+01	-4.2637-01	1.7673+02	8.23292+03	-7.3318+00	-9.2057+01
90.	1	7.4519+01	-5.1605-01	1.7710+02	8.23067+03	-7.5091+00	-9.1598+01
99.	1	7.4217+01	-3.5328-01	1.7653+02	8.23656+03	-7.1716+00	-9.2403+01
108.	1	6.9156+01	-5.9849-01	1.6798+02	8.28315+03	-2.2161+00	-9.3963+01
72.	2	6.6234+01	-3.1715-01	1.7275+02	8.26288+03	-5.0451+00	-9.3671+01
81.	2	7.3416+01	-3.7907-01	1.7661+02	8.23538+03	-7.2329+00	-9.2277+01
90.	2	7.4268+01	-4.7551-01	1.7704+02	8.23242+03	-7.4439+00	-9.1768+01
99.	2	7.2586+01	-3.1225-01	1.7629+02	8.23981+03	-7.0009+00	-9.2630+01
108.	2	7.8507+01	2.4163-01	1.7872+02	8.22522+03	-8.4425+00	-9.4348+01

LUNAR ORBIT INSERTION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	24	JULY 19	5	17.673	76.	56.	9.651	3.5279+02	7.20040+04	2.2993+04	2.8086+03	-1.0456+00
81.	1	24	JULY 19	28	35.262	76.	54.	53.921	3.5376+02	7.19444+04	2.3054+04	2.8173+03	-2.3697+00
90.	1	24	JULY 2	16	17.536	76.	49.	32.725	3.5425+02	7.19134+04	2.3088+04	2.8218+03	-2.9424+00
99.	1	24	JULY 21	35	47.339	76.	38.	14.495	3.5376+02	7.19429+04	2.3056+04	2.8174+03	-2.0126+00
108.	1	24	JULY 23	5	46.212	76.	26.	25.664	3.5921+02	7.15832+04	2.3411+04	2.8677+03	-3.7342-01
72.	2	24	JULY 2[illegible]	27	18.831	78.	18.	11.409	3.5403+02	7.19206+04	2.3074+04	2.8201+03	-7.0224-01
81.	2	24	JULY 2[illegible]	50	43.894	78.	17.	1.553	3.5378+02	7.19414+04	2.3058+04	2.8176+03	-2.1424+00
90.	2	24	JULY 21	38	34.903	78.	11.	50.094	3.5360+02	7.19551+04	2.3046+04	2.8159+03	-2.6665+00
99.	2	24	JULY 22	57	49.225	78.	0.	16.411	3.5286+02	7.19999+04	2.2998+04	2.8092+03	-1.7783+00
108.	2	25	JULY [illegible]	24	52.328	77.	45.	31.778	3.5257+02	7.20138+04	2.2979+04	2.8067+03	1.2972-05

LUNAR ORBIT INSERTION BURN TERMINATION - CONCLUDED

LAZ	OPP	** ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR	** RPS	APOS
72.	1	6.3838+01	-1.7116+00	1.5148+02	5.47392+03	1.2975+00	-9.3999+01	9.9695+02	1.1083+03
81.	1	5.8944+01	-1.5592+00	1.5363+02	5.49910+03	-1.3955-01	-9.4060+01	9.9738+02	1.1077+03
90.	1	5.8971+01	-1.5348+00	1.5397+02	5.49894+03	-9.2101-02	-9.4069+01	9.9744+02	1.1076+03
99.	1	5.8737+01	-1.5740+00	1.5343+02	5.50034+03	-2.5511-01	-9.4054+01	9.9703+02	1.1081+03
108.	1	7.5335+01	-2.1724+00	1.4471+02	5.41515+03	2.1385+00	-9.3771+01	9.9740+02	1.1082+03
72.	2	6.5815+01	-1.8387+00	1.4965+02	5.46362+03	1.4281+00	-9.3943+01	9.9762+02	1.1076+03
81.	2	5.8610+01	-1.5681+00	1.5351+02	5.50110+03	-2.7433-01	-9.4057+01	9.9687+02	1.1084+03
90.	2	6.2206+01	-1.5338+00	1.5399+02	5.48223+03	1.1015+00	-9.4069+01	9.9688+02	1.1082+03
99.	2	6.2448+01	-1.5847+00	1.5328+02	5.48093+03	1.0867+00	-9.4050+01	9.9720+02	1.1079+03
108.	2	6.1943+01	-1.4727+00	1.5581+02	5.48332+03	1.0735+00	-9.4096+01	9.9681+02	1.1081+03

CIRCULARIZATION BURN INITIATION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS	** DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** CIRCULARIZATION TARGET PARAMETERS ** DRTX	DRTY	DRTZ
72.	1	24	JULY	23	13	53.144	81.	4.	45.723	4.	8.	36.072	7.19546+04	-1.3850+02	0.0000	0.0000
81.	1	24	JULY	23	46	45.341	81.	13.	3.599	4.	18.	9.579	7.18950+04	-1.3766+02	0.0000	-7.1235-01
90.	1	25	JULY	[illegible]	34	15.986	81.	7.	31.174	4.	17.	58.449	7.18640+04	-1.3783+02	0.0000	0.0000
99.	1	25	JULY	1	54	41.636	80.	57.	8.823	4.	18.	54.328	7.18935+04	-1.3850+02	0.0000	0.0000
108.	1	25	JULY	3	7	36.423	80.	28.	15.474	4.	1.	50.210	7.15338+04	-1.3850+02	0.0000	0.0000
72.	2	25	JULY	[illegible]	34	49.111	82.	25.	41.691	4.	7.	30.282	7.18712+04	-1.3850+02	0.0000	0.0000
81.	2	25	JULY	1	9	46.177	82.	36.	3.836	4.	19.	2.283	7.18920+04	-1.3850+02	0.0000	0.0000
90.	2	25	JULY	1	48	32.515	82.	21.	47.706	4.	9.	57.612	7.19057+04	-1.3850+02	0.0000	0.0000
[illegible]	2	25	JULY	3	7	51.130	82.	10.	18.317	4.	10.	1.937	7.19505+04	-1.3789+02	0.0000	-7.4168-01
[illegible]	2	25	JULY	4	34	58.455	81.	55.	37.904	4.	10.	6.126	7.19644+04	-1.3850+02	0.0000	0.0000

CIRCULARIZATION BURN INITIATION - CONCLUDED

LAZ	OPP	ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR
72.	1	5.8426+01	2.8336-01	1.7614+02	5.50219+03	-1.5525-02	-9.4342+01
81.	1	5.8861+01	-1.7669+00	1.4848+02	5.49948+03	-1.2111-02	-9.3978+01
90.	1	5.8922+01	-1.7034+00	1.4939+02	5.49915+03	7.3380-03	-9.4005+01
99.	1	5.8512+01	-1.9358+00	1.4603+02	5.50144+03	-1.5496-02	-9.3900+01
108.	1	5.8825+01	1.3328+00	-1.6978+02	5.50061+03	-1.5466-02	-9.4144+01
72.	2	5.9586+01	3.9592-01	1.7763+02	5.49870+03	-1.5325-02	-9.4333+01
81.	2	5.8354+01	-1.9554+00	1.4574+02	5.50235+03	-1.5552-02	-9.3890+01
90.	2	5.8362+01	1.4952-01	1.7437+02	5.50235+03	-1.5526-02	-9.4348+01
99.	2	5.8683+01	7.5886-02	1.7340+02	5.50063+03	-1.1777-02	-9.4350+01
108.	2	5.8296+01	1.7240-01	1.7561+02	5.50240+03	-1.5513-02	-9.4351+01

CIRCULARIZATION BURN TERMINATION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS	** HRS	G.E.T. MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	24	JULY	23	14	8.129	81.	5.	.710	1.4986+01	7.09779+04	9.7665+02	1.3850+02	5.7407-06
81.	1	24	JULY	23	47	.724	81.	13.	18.383	1.4883+01	7.09250+04	9.6999+02	1.3767+02	6.5004-06
90.	1	25	JULY	[illegible]	34	30.880	81.	7.	46.071	1.4997+01	7.08932+04	9.7075+02	1.3783+02	6.2261-06
99.	1	25	JULY	1	54	56.608	80.	57.	23.795	1.4972+01	7.09177+04	9.7582+02	1.3850+02	7.6936-06
108.	1	25	JULY	3	7	51.320	80.	28.	30.770	1.4897+01	7.05629+04	9.7094+02	1.3850+02	1.1658-05
72.	2	25	JULY	[illegible]	35	4.079	82.	25.	56.660	1.4969+01	7.08957+04	9.7552+02	1.3850+02	6.4648-06
81.	2	25	JULY	1	10	1.148	82.	36.	18.800	1.4972+01	7.09162+04	9.7580+02	1.3850+02	7.7643-06
90.	2	25	JULY	1	48	47.490	82.	22.	2.678	1.4972+01	7.09297+04	9.7599+02	1.3850+02	4.8865-06
99.	2	25	JULY	3	8	6.049	82.	10.	33.235	1.4917+01	7.09782+04	9.7234+02	1.3789+02	4.5797-06
108.	2	25	JULY	4	35	13.442	81.	55.	52.893	1.4989+01	7.09876+04	9.7679+02	1.3850+02	4.9190-06

CIRCULARIZATION BURN TERMINATION - CONCLUDED

LAZ	IPP	** SELENOGRAPHIC POLAR COORDINATES ** ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	5.8425+01	2.2503-01	1.7537+02	5.36369+03	4.0527-03	-9.4345+01
81.	1	5.8862+01	-1.8198+00	1.4772+02	5.36181+03	1.4767-02	-9.3954+01
90.	1	5.8927+01	-1.7567+00	1.4863+02	5.36128+03	2.7041-02	-9.3982+01
99.	1	5.8512+01	-1.9880+00	1.4527+02	5.36293+03	3.9895-03	-9.3873+01
108.	1	5.8825+01	1.2774+00	-1.7054+02	5.36211+03	3.8482-03	-9.4161+01
72.	2	5.9086+01	3.3784-01	1.7686+02	5.36020+03	3.7342-03	-9.4338+01
81.	2	5.8354+01	-2.0074+00	1.4498+02	5.36385+03	4.0740-03	-9.3863+01
90.	2	5.8361+01	9.1172-02	1.7360+02	5.36385+03	4.0379-03	-9.4349+01
99.	2	5.8685+01	1.7761-02	1.7264+02	5.36273+03	1.5569-02	-9.4350+01
108.	2	5.8296+01	1.1395-01	1.7484+02	5.36389+03	4.0315-03	-9.4353+01

CSM LUNAR LANDING SITE PASS

LAZ	IPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	** DELTA T FROM LOI ** HRS	MINS	SECS	LATS	LONS	AZR	SEA
72.	1	25	JULY	20	8	28.582	101.	59.	21.160	25.	3.	11.509	1.7690+00	-4.1939+01	-8.5999+01	6.2850+00
81.	1	25	JULY	20	32	41.990	101.	58.	59.651	25.	4.	5.730	1.7679+00	-4.1939+01	-8.6000+01	6.4899+00
90.	1	25	JULY	21	20	23.147	101.	53.	38.338	25.	4.	5.613	1.7677+00	-4.1939+01	-8.6000+01	6.8935+00
99.	1	25	JULY	22	39	18.31	101.	41.	45.497	25.	3.	31.003	1.7685+00	-4.1939+01	-8.6000+01	7.5615+00
108.	1	26	JULY	[illegible]	7	14.445	101.	27.	53.894	25.	1.	28.231	1.7696+00	-4.1939+01	-8.5999+01	8.3058+00
72.	2	25	JULY	21	29	55.139	103.	20.	47.717	25.	2.	36.308	1.7694+00	-4.1939+01	-8.5999+01	6.9743+00
81.	2	25	JULY	21	54	20.151	103.	23.	37.713	25.	3.	36.159	1.7682+00	-4.1939+01	-8.6000+01	7.1808+00
90.	2	25	JULY	22	42	25.305	103.	15.	40.495	25.	3.	50.403	1.7679+00	-4.1939+01	-8.6000+01	7.5878+00
99.	2	26	JULY		1	51.567	103.	4.	18.752	25.	4.	2.341	1.7682+00	-4.1939+01	-8.6000+01	8.2601+00
108.	2	26	JULY	[illegible]	29	2.878	102.	49.	42.328	25.	4.	10.550	1.8351+00	-4.1939+01	-8.6026+01	8.9992+00

LUNAR ORBIT PLANE CHANGE BURN INITIATION

LAZ	IPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS	** DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** LOPC TARGET PARAMETERS ** DRTX	DRTY	DRTZ
72.	1	26	JULY	1	30	49.071	107.	21.	41.650	30.	25.	31.999	3.70712+04	0.0000	7.3703+01	0.0000
81.	1	26	JULY	1	55	9.203	107.	21.	26.863	30.	26.	32.942	3.70183+04	0.0000	7.3703+01	0.0000
90.	1	26	JULY	2	42	48.022	107.	16.	3.213	30.	26.	30.487	3.69865+04	0.0000	7.3703+01	0.0000
99.	1	26	JULY	4	1	38.060	107.	4.	5.246	30.	25.	50.751	3.70110+04	0.0000	7.3703+01	0.0000
108.	1	26	JULY	5	29	41.964	106.	50.	21.316	30.	23.	55.652	3.66562+04	0.0000	7.3703+01	0.0000
72.	2	26	JULY	2	52	18.169	108.	43.	10.748	30.	24.	59.339	3.69890+04	0.0000	7.3703+01	0.0000
81.	2	26	JULY	3	16	40.205	108.	42.	57.866	30.	25.	56.313	3.70395+04	0.0000	7.3703+01	0.0000
90.	2	26	JULY	4	4	43.844	108.	37.	59.035	30.	26.	8.940	3.70230+04	0.0000	7.3688+01	0.0000
99.	2	26	JULY	5	24	16.705	108.	26.	43.891	30.	26.	27.480	3.70715+04	0.0000	7.3688+01	0.0000
108.	2	26	JULY	5	51	18.175	108.	11.	57.627	30.	26.	25.849	3.70809+04	0.0000	6.7231+01	0.0000

LUNAR ORBIT PLANE CHANGE BURN INITIATION - CONCLUDED

LAZ	IPP	** SELENOGRAPHIC POLAR COORDINATES ** ALTS	LATS	LONS	VRS	PTR	AZR
72.	1	5.8604+01	-4.2920+00	5.6948+01	5.36226+03	5.3763-03	-8.9079+01
81.	1	5.9038+01	-4.2914+00	5.6948+01	5.36057+03	-1.1415-03	-8.9080+01
90.	1	5.9207+01	-4.2912+00	5.6948+01	5.35948+03	-5.9638-03	-8.9080+01
99.	1	5.8567+01	-4.2915+00	5.6948+01	5.36237+03	7.6194-04	-8.9079+01
108.	1	5.8742+01	-4.2925+00	5.6948+01	5.36210+03	-5.2182-03	-8.9079+01
72.	2	5.8440+01	-4.2921+00	5.6948+01	5.36307+03	-3.0530-02	-8.9079+01
81.	2	5.8538+01	-4.2914+00	5.6948+01	5.36259+03	1.0931-02	-8.9080+01
90.	2	5.8534+01	-4.2912+00	5.6948+01	5.36245+03	5.3115-03	-8.9080+01
99.	2	5.8945+01	-4.2917+00	5.6948+01	5.36087+03	-1.9417-03	-8.9080+01
108.	2	5.8410+01	-4.2794+00	5.6948+01	5.36281+03	2.4582-03	-8.9079+01

LUNAR ORBIT PLANE CHANGE BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	26	JULY	1	30	53.192	107.	21.	45.773	4.1233+00	3.68026+04	2.6862+02	7.3703+01	7.8985-01
81.	1	26	JULY	1	55	13.319	107.	21.	30.979	4.1164+00	3.67501+04	2.6824+02	7.3703+01	7.9010-01
90.	1	26	JULY	2	42	52.134	107.	16.	7.326	4.1130+00	3.67185+04	2.6801+02	7.3703+01	7.9026-01
99.	1	26	JULY	4	1	42.175	107.	4.	9.362	4.1164+00	3.67428+04	2.6819+02	7.3703+01	7.8984-01
108.	1	26	JULY	5	29	45.939	106.	51.	25.391	4.0752+00	3.63906+04	2.6561+02	7.3703+01	7.8987-01
72.	2	26	JULY	2	52	22.281	108.	43.	14.861	4.1130+00	3.67210+04	2.6803+02	7.3703+01	7.8973-01
81.	2	26	JULY	3	16	44.319	108.	43.	1.979	4.1130+00	3.67413+04	2.6817+02	7.3703+01	7.8980-01
90.	2	26	JULY	4	4	47.959	108.	38.	3.148	4.1130+00	3.67548+04	2.6822+02	7.3688+01	7.8966-01
99.	2	26	JULY	5	24	20.826	108.	26.	48.010	4.1199+00	3.68029+04	2.6857+02	7.3688+01	7.8989-01
108.	2	26	JULY	6	51	21.937	108.	12.	1.386	3.7594+00	3.68357+04	2.4518+02	6.7231+01	7.2043-01

CSM LUNAR ASCENT PASS

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	DELTA T FROM LOI ** HRS	MINS	SECS	LATS	LONS	AZR
72.	1	26	JULY 17		49	57.383	123.	40.	49.961	46.	44.	40.310	1.7716+00	-4.1939+01	-8.5722+01
81.	1	26	JULY 18		14	38.525	123.	40.	56.186	46.	46.	2.265	1.7704+00	-4.1939+01	-8.5723+01
90.	1	26	JULY 19		2	11.501	123.	35.	26.692	46.	45.	53.967	1.7706+00	-4.1939+01	-8.5723+01
99.	1	26	JULY 2[illegible]		3[illegible]	43.237	123.	23.	1[illegible].423	46.	44.	55.928	1.7712+00	-4.1939+01	-8.5723+01
108.	1	26	JULY 21		49	8.580	123.	9.	48.129	46.	43.	22.366	1.7718+00	-4.1939+01	-8.5722+01
72.	2	26	JULY 19		11	26.138	125.	2.	18.716	46.	44.	7.307	1.7718+00	-4.1939+01	-8.5722+01
81.	2	26	JULY 19		35	47.990	125.	2.	5.649	46.	45.	4.096	1.7709+00	-4.1939+01	-8.5723+01
90.	2	26	JULY 2[illegible]		23	46.189	124.	57.	1.379	46.	45.	11.285	1.7705+00	-4.1939+01	-8.5723+01
99.	2	26	JULY 21		43	39.396	124.	46.	6.581	46.	45.	50.170	1.7706+00	-4.1939+01	-8.5722+01
108.	2	26	JULY 23		1[illegible]	7.582	124.	3[illegible].	47.132	46.	45.	15.254	1.7722+00	-4.1939+01	-8.5735+01

TRANSEARTH INJECTION BURN INITIATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	DELTA T FROM LOI ** HRS	MINS	SECS	MASS	** TEI TARGET PARAMETERS ** DRTX	DRTY	DRTZ
72.	1	27	JULY	2	25	20.492	132.	16.	13.073	55.	20.	3.422	3.68713+04	3.0112+03	3.7054+02	1.3403+01
81.	1	27	JULY	2	50	22.886	132.	16.	40.546	55.	21.	46.625	3.68188+04	3.0193+03	3.7673+02	1.6004+01
90.	1	27	JULY	3	38	12.574	132.	11.	27.765	55.	21.	55.043	3.67872+04	3.0357+03	3.8845+02	2.1122+01
99.	1	27	JULY	4	57	11.762	131.	59.	38.947	55.	21.	24.453	3.58115+04	3.0659+03	4.0895+02	2.7225+01
108.	1	27	JULY	6	36	31.117	131.	47.	10.566	55.	20.	44.902	3.64593+04	3.1026+03	4.3252+02	3.2219+01
72.	2	27	JULY	3	47	25.922	133.	38.	18.498	55.	20.	7.088	3.57897+04	3.0407+03	3.8987+02	2.1570+01
81.	2	27	JULY	4	11	58.139	133.	38.	15.799	55.	21.	14.249	3.68100+04	3.0485+03	3.9736+02	2.1784+01
90.	2	27	JULY	5	0	14.515	133.	33.	29.702	55.	21.	39.607	3.68235+04	3.0671+03	4.0956+02	2.7442+01
99.	2	27	JULY	6	20	53.737	133.	23.	20.922	55.	23.	4.511	3.68716+04	3.0998+03	4.3151+02	3.7792+01
108.	2	27	JULY	7	47	44.552	133.	8.	23.998	55.	22.	52.220	3.69044+04	3.1391+03	4.5426+02	4.8013+01

TRANSEARTH INJECTION BURN INITIATION - CONCLUDED

LAZ	OPP	** SELENOGRAPHIC POLAR COORDINATES ALTS	LATS	LONS	VRS	PTR	AZR **
72.	1	5.8753+01	2.5884+00	-1.7012+02	5.36242+03	-6.6825-03	-9.3855+01
81.	1	5.8883+01	2.5505+00	-1.7069+02	5.36236+03	4.8847-03	-9.3879+01
90.	1	5.8863+01	2.4777+00	-1.7175+02	5.36336+03	1.6540-02	-9.3925+01
99.	1	5.8762+01	2.3551+00	-1.7351+02	5.36230+03	-3.2729-03	-9.4000+01
108.	1	5.9131+01	2.2043+00	-1.7566+02	5.36100+03	-1.3306-03	-9.4086+01
72.	2	5.9248+01	2.4624+00	-1.7197+02	5.35983+03	1.7992-02	-9.3936+01
81.	2	5.8734+01	2.4261+00	-1.7249+02	5.36251+03	-1.3353-02	-9.3958+01
90.	2	5.8680+01	2.3508+00	-1.7358+02	5.36264+03	-6.9486-03	-9.4002+01
99.	2	5.8839+01	2.2220+00	-1.7541+02	5.36241+03	5.0009-03	-9.4075+01
108.	2	5.8540+01	2.0679+00	-1.7740+02	5.36301+03	-4.1700-03	-9.4143+01

TRANSEARTH INJECTION BURN TERMINATION

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	DTBURN(SEC)	MASS	PROP USED	DELV	PLCHNG
72.	1	27	JULY	2	27	46.852	132.	18.	39.431	1.4636+02	2.73323+04	9.5390+03	3.0340+03	2.5373+00
81.	1	27	JULY	2	52	49.399	132.	19.	7.355	1.4651+02	2.72699+04	9.5489+03	3.0427+03	2.5773+00
90.	1	27	JULY	3	40	39.696	132.	13.	54.885	1.4712+02	2.71985+04	9.5886+03	3.0606+03	2.6518+00
99.	1	27	JULY	4	59	40.323	132.	2.	7.510	1.4856+02	2.71290+04	9.6825+03	3.0932+03	2.7819+00
108.	1	27	JULY	6	28	59.863	131.	49.	39.314	1.4875+02	2.67648+04	9.6945+03	3.1327+03	2.9297+00
72.	2	27	JULY	3	49	53.265	133.	40.	45.845	1.4735+02	2.71866+04	9.6030+03	3.0657+03	2.6611+00
81.	2	27	JULY	4	14	25.922	133.	40.	43.579	1.4778+02	2.71783+04	9.6317+03	3.0744+03	2.7087+00
90.	2	27	JULY	5	2	43.174	133.	35.	58.360	1.4866+02	2.71347+04	9.6889+03	3.0944+03	2.7855+00
99.	2	27	JULY	6	23	24.048	133.	25.	51.235	1.5031+02	2.70751+04	9.7965+03	3.1299+03	2.9233+00
108.	2	27	JULY	7	50	16.726	133.	10.	56.172	1.5217+02	2.69864+04	9.9180+03	3.1722+03	3.0627+00

TRANSEARTH INJECTION BURN TERMINATION - CONCLUDED

LAZ	OPP	** ALTS	SELENOGRAPHIC POLAR COORDINATES LATS	LONS	VRS	PTR	AZR **
72.	1	6.1653+01	2.1670+00	-1.7751+02	8.37191+03	3.0002+00	-9.1707+01
81.	1	6.1192+01	2.1299+00	1.7991+02	8.38005+03	2.9995+00	-9.1686+01
90.	1	6.0976+01	2.0544+00	1.7388+02	8.39797+03	2.9999+00	-9.1647+01
99.	1	6.1331+01	1.9287+00	1.7592+02	8.42818+03	3.0001+00	-9.1576+01
108.	1	6.1382+01	1.7791+00	1.7474+02	8.46472+03	3.0001+00	-9.1490+01
72.	2	6.1552+01	2.0381+00	1.7457+02	8.39949+03	3.0003+00	-9.1647+01
81.	2	6.1[illegible]3+01	2.0014+00	1.7[illegible]+02	8.41053+03	2.9999+00	-9.1616+01
90.	2	6.0943+01	1.9241+00	1.7685+02	8.42972+03	2.9998+00	-9.1573+01
99.	2	6.1092+01	1.7928+00	1.7489+02	8.46319+03	3.0001+00	-9.1491+01
108.	2	6.0749+01	1.6369+00	1.7274+02	8.50435+03	3.0003+00	-9.1397+01

ENTRY

LAZ	OPP	** G.M.T. DAY	MONTH	HRS	MINS	SECS	** G.E.T. HRS	MINS	SECS **	** DELTA T FROM TEI ** HRS	MINS	SECS	PROP RESERVE	DV RESERVE
72.	1	29	JULY	21	30	13.495	199.	21.	6.071	67.	2.	26.640	4.70022+03	1.93674+03
81.	1	29	JULY	21	31	5.099	198.	57.	22.758	66.	38.	15.703	4.63780+03	1.91331+03
90.	1	29	JULY	21	32	41.027	198.	5.	57.117	65.	52.	2.232	4.56644+03	1.88645+03
99.	1	29	JULY	21	35	19.411	196.	37.	46.596	64.	35.	39.086	4.49695+03	1.86021+03
108.	1	29	JULY	21	38	13.137	194.	58.	52.595	63.	9.	13.271	4.13270+03	1.72162+03
72.	2	29	JULY	21	33	2.098	199.	23.	54.577	65.	43.	8.832	4.55451+03	1.88195+03
81.	2	29	JULY	21	33	49.704	199.	0.	7.361	65.	19.	23.782	4.54619+03	1.87881+03
90.	2	29	JULY	21	35	25.564	198.	8.	40.752	64.	32.	42.392	4.50257+03	1.86234+03
99.	2	29	JULY	21	38	2.596	196.	40.	29.778	63.	14.	38.542	4.44305+03	1.83983+03
108.	2	29	JULY	21	40	47.459	195.	1.	26.909	61.	50.	30.737	4.35432+03	1.80617+03

ENTRY - CONCLUDED

LAZ	OPP	ALT	LAT	LON	V	PTH	AZ	INC	INMP
72.	1	6.5860+01	1.7740+01	1.6555+02	3.60867+04	-6.4900+00	5.4073+01	3.9491+01	3.1209+01
81.	1	6.5858+01	1.7704+01	1.6554+02	3.60887+04	-6.4900+00	5.4171+01	3.9390+01	3.1222+01
90.	1	6.5877+01	1.7627+01	1.6552+02	3.60924+04	-6.4900+00	5.4343+01	3.9210+01	3.1265+01
99.	1	6.5888+01	1.7500+01	1.6548+02	3.60996+04	-6.4900+00	5.4652+01	3.8889+01	3.1305+01
108.	1	6.5873+01	1.7349+01	1.6543+02	3.61084+04	-6.4900+00	5.5018+01	3.8508+01	3.1328+01
72.	2	6.5872+01	1.7633+01	1.6551+02	3.60932+04	-6.4900+00	5.4349+01	3.9195+01	3.1303+01
81.	2	6.5884+01	1.7575+01	1.6550+02	3.60955+04	-6.4900+00	5.4479+01	3.9070+01	3.1277+01
90.	2	6.5879+01	1.7494+01	1.6547+02	3.60995+04	-6.4900+00	5.4663+01	3.8882+01	3.1311+01
99.	2	6.5816+01	1.7361+01	1.6543+02	3.61076+04	-6.4900+00	5.5003+01	3.8529+01	3.1321+01
108.	2	6.5848+01	1.7223+01	1.6537+02	3.61166+04	-6.4900+00	5.5416+01	3.8110+01	3.1272+01

TOUCHDOWN

LAZ	OPP	** G.E.T. HRS	MINS	SECS	** ENTDT HRS	MINS	SECS **	ENTRG	LAT	LON	AZ	SEATD	DTSUN
72.	1	199.	35.	6.065	0.	14.	.000	1.2850+03	2.9615+01	1.8500+02	6.0512+01	6.0178+01	7.2820+00
81.	1	199.	11.	22.752	0.	14.	.000	1.2850+03	2.9549+01	1.8500+02	6.0602+01	6.0374+01	7.2698+00
90.	1	198.	19.	57.112	0.	14.	.000	1.2850+03	2.9421+01	1.8500+02	6.0755+01	6.0748+01	7.2468+00
99.	1	196.	51.	46.590	0.	14.	.000	1.2850+03	2.9200+01	1.8500+02	6.1036+01	6.1358+01	7.2097+00
108.	1	195.	12.	52.579	0.	14.	.000	1.2850+03	2.8937+01	1.8500+02	6.1368+01	6.2038+01	7.1694+00
72.	2	199.	37.	54.671	0.	14.	.000	1.2850+03	2.9396+01	1.8499+02	6.0754+01	6.0818+01	7.2424+00
81.	2	199.	14.	7.355	0.	14.	.000	1.2850+03	2.9327+01	1.8500+02	6.0881+01	6.1010+01	7.2308+00
90.	2	198.	22.	40.746	0.	14.	.000	1.2850+03	2.9191+01	1.8500+02	6.1042+01	6.1381+01	7.2083+00
99.	2	196.	54.	29.772	0.	14.	.000	1.2850+03	2.8954+01	1.8500+02	6.1353+01	6.1996+01	7.1719+00
108.	2	195.	15.	26.903	0.	14.	.000	1.2850+03	2.8687+01	1.8500+02	6.1742+01	6.2646+01	7.1342+00

CIRCUMLUNAR PERICYNTHION

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS **	DELTA T FROM TLI ** HRS	MINS	SECS
72.	1	24	JULY 19		3	28.659	76.	54.	21.240	73.	51.	33.726
81.	1	24	JULY 19		27	33.164	76.	53.	50.825	73.	52.	29.293
90.	1	24	JULY 20		15	22.904	76.	48.	38.792	73.	50.	6.069
99.	1	24	JULY 21		34	32.493	76.	36.	59.671	73.	43.	7.019
108.	1	24	JULY 23		2	10.078	76.	22.	49.528	73.	33.	56.306
72.	2	24	JULY 20		25	33.249	78.	16.	25.831	73.	45.	32.324
81.	2	24	JULY 20		49	42.554	78.	16.	.215	73.	46.	27.753
90.	2	24	JULY 21		37	34.661	78.	10.	49.852	73.	44.	6.085
99.	2	24	JULY 22		56	39.089	77.	59.	6.273	73.	37.	5.274
108.	2	25	JULY 0		23	58.469	77.	44.	37.921	73.	27.	44.120

CIRCUMLUNAR PERICYNTHION - CONCLUDED

LAZ	OPP	** ALTS	LATS	SELENOGRAPHIC POLAR COORDINATES LONS	VRS	PTR	AZR	LIN **
72.	1	8.0005+02	-5.6825+00	1.7429+02	6.67409+03	-3.4390-06	-8.9574+01	1.7430+02
81.	1	8.0011+02	-5.6913+00	1.7426+02	6.67063+03	-1.3514-06	-8.8416+01	1.7409+02
90.	1	7.9993+02	-5.7104+00	1.7428+02	6.67092+03	-1.0967-06	-8.7993+01	1.7395+02
99.	1	8.0011+02	-5.7425+00	1.7438+02	6.67264+03	-1.3639-06	-8.8689+01	1.7411+02
108.	1	8.0014+02	-5.7760+00	1.7452+02	6.67848+03	-2.4934-06	-9.0095+01	1.7422+02
72.	2	8.0007+02	-5.7164+00	1.7437+02	6.67602+03	-2.7082-06	-8.9848+01	1.7428+02
81.	2	7.9995+02	-5.7238+00	1.7434+02	6.67214+03	-1.4332-06	-8.8589+01	1.7410+02
90.	2	8.0003+02	-5.7428+00	1.7436+02	6.67195+03	-1.2289-06	-8.8122+01	1.7396+02
99.	2	7.9996+02	-5.7743+00	1.7446+02	6.67416+03	-1.7938-06	-8.8869+01	1.7412+02
108.	2	8.0004+02	-5.8065+00	1.7460+02	6.68082+03	-3.4212-06	-9.0384+01	1.7418+02

CIRCUMLUNAR ENTRY

LAZ	OPP	** DAY	G.M.T. MONTH	HRS	MINS	SECS **	G.E.T. HRS	MINS	SECS **	DELTA T FROM PERICYNTHION** HRS	MINS	SECS
72.	1	27	JULY 16		14	16.112	146.	5.	8.681	69.	10.	47.445
81.	1	27	JULY 16		34	59.950	146.	1.	17.612	69.	7.	26.786
90.	1	27	JULY 17		20	8.887	145.	53.	24.073	69.	4.	45.981
99.	1	27	JULY 18		37	53.996	145.	40.	21.181	69.	3.	21.510
108.	1	27	JULY 20		5	30.135	145.	26.	9.582	69.	3.	20.054
72.	2	27	JULY 17		33	55.826	147.	24.	48.407	69.	8.	22.576
81.	2	27	JULY 17		54	26.196	147.	20.	43.851	69.	4.	43.640
90.	2	27	JULY 18		39	41.401	147.	12.	56.589	69.	2.	6.741
99.	2	27	JULY 19		57	25.133	146.	59.	52.316	69.	0.	46.046
108.	2	27	JULY 21		25	6.925	146.	45.	46.376	69.	1.	8.459

CIRCUMLUNAR ENTRY - CONCLUDED

LAZ	IPP	ALT	LAT	LON	V	PTH	AZ	INC	INMP
72.	1	6.5833+01	1.4933+01	2.0938+02	3.60979+04	-6.4760+00	5.7993+01	3.4945+01	1.0663+01
81.	1	6.5834+01	1.6595+01	2.0240+02	3.60984+04	-6.5079+00	6.2888+01	3.1406+01	5.2463+00
90.	1	6.5832+01	1.7520+01	1.9140+02	3.60986+04	-6.4091+00	6.5015+01	3.0130+01	3.0953+00
99.	1	6.5832+01	1.6882+01	1.7291+02	3.60981+04	-6.5151+00	6.2734+01	3.1674+01	5.8562+00
108.	1	6.5834+01	1.5425+01	1.5297+02	3.60971+04	-6.5135+00	5.7645+01	3.5442+01	1.1884+01
72.	2	6.5834+01	1.5117+01	1.8956+02	3.60977+04	-6.3614+00	5.7533+01	3.5426+01	1.1524+01
81.	2	6.5832+01	1.6835+01	1.8344+02	3.60982+04	-6.4589+00	6.2827+01	3.1573+01	5.6286+00
90.	2	6.5833+01	1.7650+01	1.7200+02	3.60984+04	-6.5554+00	6.5029+01	3.0190+01	3.2730+00
99.	2	6.5834+01	1.7095+01	1.5390+02	3.60978+04	-6.4824+00	6.2652+01	3.1846+01	6.2615+00
108.	2	6.5832+01	1.5404+01	1.3380+02	3.60967+04	-6.5613+00	5.7071+01	3.5947+01	1.2808+01

CIRCUMLUNAR TOUCHDOWN

LAZ	IPP	** HRS	G.E.T. MINS	SECS	** HRS	ENTDT MINS	SECS **	ENTRG	LAT	LON	AZ	SEATD	DTSUN
72.	1	146.	19.	8.676	0.	14.	.000	1.2850+03	2.5677+01	2.2812+02	6.3576+01	2.8844+01	9.7633+00
81.	1	146.	15.	17.606	0.	14.	.000	1.2850+03	2.5529+01	2.2323+02	6.9303+01	2.9089+01	9.7477+00
90.	1	146.	7.	24.167	0.	14.	.000	1.2850+03	2.5626+01	2.1268+02	7.1858+01	2.9758+01	9.6962+00
99.	1	145.	54.	21.175	0.	14.	.000	1.2850+03	2.5850+01	1.9377+02	6.9257+01	3.0251+01	9.6556+00
108.	1	145.	46.	9.576	0.	14.	.000	1.2850+03	2.6256+01	1.7263+02	6.3399+01	3.0979+01	9.5937+00
72.	2	147.	38.	48.401	0.	14.	.000	1.2850+03	2.6005+01	2.0924+02	6.3165+01	2.9815+01	9.6851+00
81.	2	147.	34.	43.846	0.	14.	.000	1.2850+03	2.5773+01	2.0430+02	6.9334+01	2.9946+01	9.6796+00
90.	2	147.	26.	56.583	0.	14.	.000	1.2850+03	2.5742+01	1.9331+02	7.1924+01	3.0232+01	9.6590+00
99.	2	147.	13.	52.310	0.	14.	.000	1.2850+03	2.6077+01	1.7479+02	6.9258+01	3.1077+01	9.5898+00
108.	2	146.	59.	46.37[illegible]	0.	14.	.000	1.2850+03	2.6430+01	1.5344+02	6.2789+01	3.1638+01	9.5412+00