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TRACKING AND FLIGHT RECONSTRUCTION
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ABSTRACT AND LIST OF KEY WORDS

This document presents the postflight trajectory for the Apollo/Saturn V AS-509 flight. Included is an analysis of the orbital and powered flight trajectories of the launch vehicle and the free flight trajectories of the expended S-IC and S-II stages. Trajectory dependent parameters are provided in earth-fixed launch site, launch vehicle navigation, and geographic polar coordinate systems. The time history of the trajectory parameters for the launch vehicle is presented from guidance reference release to Command/Service Module (CSM) separation.

Tables of significant parameters at engine cutoff, stage separation, parking orbit insertion, and translunar injection are included in this document. Figures of such parameters as altitude, surface and cross ranges, and the magnitude of total velocity and acceleration as a function of range time for the powered flight trajectories are presented.

Apollo/Saturn V
AS-509
Postflight Trajectory
Powered Flight Trajectory
Orbital Trajectory
Spent Stage Trajectory
Apollo 14

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REFERENCES

1. NASA Document SE 008-001-1, "Project Apollo Coordinate System Standards," June 1965.

2. NASA Document M-D E 8020.008B, "Natural Environment and Physical Standards for the Apollo Program," April 1965.

3. NASA Document MPR-SAT-FE-71-1, "Saturn V Launch Vehicle Flight Evaluation Report - AS-509 Apollo 14 Mission," April 1, 1971.

4. NASA Listing (MSFC/S&E-AERO), "AS-509 Apollo 14 Mission Postlaunch Operational Trajectory," January 31, 1971.

5. Lockheed Document TM 54/30-150, "Manual for the GATE Program," September 1967.

6. MSC-04040, "Apollo 14 30-Day Failure and Anomaly Listing Report," March 1971.

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GLOSSARY OF TERMS

Altitude	The distance between the vehicle and its subvehicle point on the surface of the Fischer Ellipsoid.
Ascent Phase	The segment of the vehicle flight from launch to parking orbit insertion.
Azimuth Angle	The angle, positive clockwise, from true north to the projection of the slant range vector on the ground station tangent plane (PACSS3a)
Cross Range	The vehicle lateral position measured in the earth-fixed launch site centered coordinate system (PACSS10)
Dynamic Pressure	The force of the atmosphere on the vehicle resulting from its motion through the atmosphere.
Elevation Angle	The angle between the slant range vector and its projection on the ground station tangent plane. This angle is positive above the ground station tangent plane (PACSS3a).
Flight Path Angle	The angle between the vehicle space-fixed velocity vector and a plane normal to a vector from the center of the earth to the vehicle. This angle is positive above the plane.
Inertial Acceleration	The magnitude of the vehicle acceleration in the launch vehicle platform-accelerometer coordinate system (PACSS12).
Latitude	The geodetic latitude which is the angle measured positive northward between the line normal to the ellipsoidal surface at a specified point and the projection of the line on the equatorial plane.

GLOSSARY OF TERMS (Continued)

Longitude	The angle between the plane of the Greenwich Meridian and the plane of the meridian containing the specified point measured positive eastward from the Greenwich Meridian.
Mach Number	The ratio of the vehicle velocity relative to the surrounding atmosphere to the speed of sound in the atmosphere.
Measured Parameter	A primary measurement made by any ground station, e.g., elevation angle
Parking Orbit Phase	The segment of the vehicle flight from parking orbit insertion to S-IVB reignition.
Post TLI Phase	The segment of the vehicle flight from TLI to CSM separation.
Second Burn Phase	The segment of the vehicle flight from S-IVB reignition to TLI.
Slant Range	The distance between a ground station and the vehicle (PACSS3a, PACSS3c, and PACSS3d).
Slant Range Rate	The velocity of the vehicle along a vector from the ground station to the vehicle (PACSS3c and PACSS3d).
Space-Fixed Velocity	The magnitude of the vehicle velocity in the launch vehicle navigation coordinate system (PACSS13).
Subvehicle Point	The point of intersection of the ellipsoidal surface and a line normal to this surface passing through the vehicle center of mass.
Surface Range	The arc length between the launch site and subvehicle point measured along the surface of the Fischer Ellipsoid.

GLOSSARY OF TERMS (Continued)

X-Angle	30' Antennas - The angle measured in the plane of the ground station prime vertical from the zenith to the projection of the slant range vector onto this plane, positive eastward. 85' Antennas - The angle measured in the meridian plane of the ground station from the zenith to the projection of the slant range vector onto this plane, positive southward (PACSS3c and PACSS3d, respectively).
Y-Angle	30' Antennas - The angle between the slant range vector and its projection onto the plane of the ground station prime vertical, positive when the slant range vector is north of the plane. 85' Antennas - The angle between the slant range vector and its projection onto the meridian plane of the radar site, positive when the slant range vector is east of the meridian plane (PACSS3c and PACSS3d, respectively).

LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION/STATION
BDA (67.16)	Bermuda (FPS-16M)
BDQ (67.18)	Bermuda (FPQ-6)
CECO	Center Engine Cutoff
CNV (1.16)	Cape Kennedy
CRO	Carnarvon C-Band
CRS	Carnarvon S-Band
CSM	Command Service Module
CYN	Canary Island
EMR	Engine Mixture Ratio
EPO	Earth Parking Orbit
GATE	Guidance and Tracking Evaluation Program
GCS1 (1st GCS)	First Guidance Cutoff Signal
GCS2 (2nd GCS)	Second Guidance Cutoff Signal
GDS	Goldstone, California
GRR	Range Time of Guidance Reference Release
GTK (7.18)	Grand Turk
IP Raw MP	Impact Predictor Raw Measured Parameters
LM	Lunar Module
MLA (19.18)	Merritt Island
MSFN	Manned Space Flight Network
OCP	Orbital Correction Program
OECO	Outboard Engine Cutoff
OMPT	Observed Mass Point Trajectory
PACSS	Project Apollo Coordinate System Standards
PAT (0.18)	Patrick Air Force Base
REV	Revolution
rms	Root Mean Square
rss	Root Sum Square
STDV	Start Tank Discharge Valve
TEX	Corpus Christi, Texas
TLI	Translunar Injection
USB	Unified S-Band

SOURCE DATA PAGE

The following listed government-furnished documentation was used in the preparation of this document:

EXHIBIT FF LINE ITEM NUMBER	GFD TITLE	DATE RECEIVED
S&E-AERO-P-#35c	OMPT Format	12/15/70
S&E-AERO-P-#17	Tracking and Network Specifications	3/1/71
	Postlaunch Operational Trajectory Certified Data	1/31/71
I-MO-#4a	Insertion Point and/or Orbital Elements	2/2/71
I-MO-#4c	Six Seconds Raw Radar	
	Basic Parking and Post TLI Orbits Data Sets	2/8/71
	Additional Post TLI Data Set	5/7/71
I-MO-#4f	Meteorological Data (Final)	2/8/71
I-MO-#6	IP Raw MP	2/1/71
I-MO-#9	Pulse Radar: Bermuda, MLA and Carnarvon USB, MLA and Bermuda C-Band	2/8/71
I-MO-#17c	Final Significant Time of Events	4/1/71
I-MO-#18a	Preliminary Guidance Velocities	2/4/71
I-MO-#18c	Orbital Venting Acceleration Data Cards	3/23/71

SECTION 1

SUMMARY AND INTRODUCTION

The Apollo/Saturn V AS-509 vehicle was launched from Launch Complex 39, Pad A at the Kennedy Space Center on January 31, 1971, at 4:03:02 P.M. Eastern Standard Time (Range Time Zero) at an azimuth of 90 degrees east of north. Guidance reference release (GRR) was established to have occurred at -16.960 seconds. First motion occurred at 0.2 second. At 12.8 seconds, a roll maneuver was initiated orienting the vehicle to a flight azimuth of 75.558 degrees east of north.

The trajectory parameters were close to nominal from liftoff to parking orbit insertion. The vehicle was inserted into a parking orbit at 710.56 seconds at an altitude of 190.9 km (103.1 nmi) and a total space-fixed velocity of 7,792.5 m/s (25,565.9 ft/s). The vehicle remained in orbit for approximately one and one-half revolutions. The S-IVB stage was restarted during the second revolution over Australia at 8,912.4 seconds.

At 9,273.24 seconds, the vehicle was injected onto a circumlunar trajectory at an altitude of 332.5 km (179.5 nmi) and a total space-fixed velocity of 10,823.9 m/s (35,511.5 ft/s). At 10,949.4 seconds, the CSM separated from the launch vehicle at an altitude of 7,943.9 km (4,289.4 nmi) and a total space-fixed velocity of 7,346.4 m/s (24,102.4 ft/s).

The impact location of the expended S-IC stage was determined to be 29.835 degrees north latitude and 74.052 degrees west longitude at 546.2 seconds. The impact location of the expended S-II stage was determined to be 29.049 degrees north latitude and 33.567 degrees west longitude at 1,246.3 seconds.

The postflight mass point trajectory related parameters and analytical procedures are presented in Sections 3 through 6. The trajectory is divided into five phases:

a. Ascent Phase

b. Orbital Phase

c. Second Burn Phase

d. Post TLI Phase

e. Free Flight Phase

The coordinate systems and launch parameters used for the postflight trajectory analysis are defined in Section 2. This section also defines the reference ellipsoid, launch complex geographic coordinates, and the vehicle launch, flight, and platform alignments.

The ascent phase, covering the portion of flight from guidance reference release to orbital insertion (710.56 seconds), is discussed in Section 3. This trajectory was established from tracking data provided by external C-Band and S-Band radars and telemetered onboard data obtained from the ST-124M inertial platform.

The second burn phase, also discussed in Section 3, covers the portion of flight from 8,810 seconds to translunar injection (9,273.24 seconds). This trajectory was established by the integration of the telemetered guidance accelerometer data and constrained to the state vectors obtained from the orbital and post-TLI trajectory phases.

The orbital phase, discussed in Section 4, covers the portion of flight from orbital insertion to 8,810 seconds. The orbital trajectory was established from data provided by the radars of the Manned Space Flight Network.

The post-TLI phase, discussed in Section 4, covers the portion of flight from the translunar injection to CSM separation (10,949.4 seconds). This trajectory was established from data provided by the radars of the Manned Space Flight Network.

The error analysis of the reconstructed trajectory is discussed in Section 5. The criteria for error analysis are included and trajectory uncertainty limits are assigned to the ascent, parking orbit, second burn, and post-TLI phases.

The free flight phase, discussed in Section 6, covers the trajectories of the expended S-IC and S-II stages. These trajectories are based on initial conditions obtained from the postflight trajectory at separation. The nominal separation impulses for both stages were used in the simulations.

Appendix A provides a detailed definition of the symbols, nomenclature, and coordinate systems used througout the document.

Appendix B tabulates the time history of selected trajectory parameters in metric units.

Appendix C tabulates the time history of selected trajectory parameters in English units.

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SECTION 2

COORDINATE SYSTEMS AND LAUNCH PARAMETERS

The time history of Observed Mass Point Trajectory parameters in both metric and English units is tabulated in Appendices B and C, respectively. These tabulations are earth-fixed launch site, launch vehicle navigation, and geographic polar coordinate systems. These coordinate systems are defined in Reference 1, "Project Apollo Coordinate System Standards," (PACSS) and are designated PACSS10, PACSS13, and PACSS1, respectively. Range time, which is referenced to Range Time Zero, is used throughout this document unless otherwise specified.

The Fischer Ellipsoid of 1960 (Reference 2) is used as the representative model for the earth and its gravitational field. All latitude and longitude coordinates are defined with respect to this ellipsoid.

The geographic coordinates for Launch Complex 39, Pad A, at the Kennedy Space Center are as follows:

Geodetic Latitude	28.608422 degrees north
Longitude	80.604133 degrees west

The height of the Instrument Unit of the launch vehicle above the reference ellipsoid is 111.65 m (366.31 ft).

The azimuth alignments are as follows:

Launch Azimuth	90.0 degrees east of north
Flight Azimuth	75.558 degrees east of north
ST-124M Platform Azimuth	75.557 degrees east of north

The flight azimuth, dependent on the launch time, launch day and month, is calculated using polynomial coefficients taken from the guidance presettings in order to achieve the desired translunar targeting parameters. The translunar targeting parameters are functions of the moon position, earth parking orbit inclination, earth-moon distance, and moon travel rate.

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SECTION 3

POWERED FLIGHT TRAJECTORY RECONSTRUCTION

3.1 POWERED FLIGHT TRAJECTORIES

The vehicle was launched from Kennedy Space Center at 4:03:02 Eastern Standard Time. The parameters from launch to parking orbit insertion were close to nominal. The space-fixed velocity and altitude at S-IC OECO were 5.0 m/sec (16.4 ft/sec) and 0.4 km (0.2 nmi) greater than nominal, respectively. At S-II OECO, the space-fixed velocity and altitude were 5.5 m/sec (18.0 ft/sec) and 0.8 km (0.4 nmi) greater than nominal, respectively. The space-fixed velocity was 0.8 m/sec (2.6 ft/sec) less than nominal and the altitude was nominal at S-IVB first guidance cutoff signal. The maximum acceleration was 37.46 m/s (3.82 g) during the S-IC phase.

At 8,912.4 seconds, the S-IVB was reignited during the second pass over Australia. The parameters at S-IVB second guidance cutoff signal (GCS2) were close to nominal. The space-fixed velocity was 5.1 m/sec (16.7 ft/sec) greater than nominal and the altitude was 7.4 km (4.0 nmi) less than nominal.

A comparison of actual and nominal times for significant flight events is presented in Table 3-I. The actual times for these events are taken from Reference 3. The nominal times and data values are taken from Reference 4.

The tracking stations and the vehicle ground track for the ascent phase are shown in Figure 3-1.

The actual altitude, surface range, and cross range are shown in Figures 3-2 through 3-4, respectively, for the entire ascent trajectory. The magnitude of the total space-fixed velocity vector and the associated flight path angle are shown in Figure 3-5. The magnitude of the total inertial acceleration vector is shown in Figure 3-6. Mach number and dynamic pressure are shown during the S-IC phase of the ascent trajectory in Figure 3-7.

Pertinent trajectory parameters, such as altitude, velocity, and acceleration, are given at significant event times in Table 3-II.

Engine cutoff and stage separation conditions are given in Tables 3-III and 3-IV, respectively.

The ascent trajectory, from guidance reference release to parking orbit insertion, is tabluated in Tables B-1 through

3.1 (Continued)

B-III in metric units, and in Tables C-I through C-III in English units. These tables present the trajectory in the earth-fixed launch site (PACSS10), launch vehicle navigation (PACSS13), and geographic polar (PACSS1) coordinate systems. The definitions pertaining to the trajectory symbols and the coordinate systems are given in Appendix A.

A comparison of actual and nominal times for significant flight events pertaining to the second burn phase is included in Table 3-I. The actual altitude is shown in Figure 3-8. The magnitude of the total space-fixed velocity vector and the associated flight path angle are shown in Figure 3-9. The magnitude of the total inertial acceleration vector is shown in Figure 3-10. The maximum total inertial acceleration and earth-fixed velocity are shown in Table 3-II.

The second burn trajectory, from the time of S-IVB restart preparations to CSM separation, is tabulated in Tables B-V through B-VII in metric units, and in Tables C-V through C-VII in English units. These tables present the trajectory in the earth-fixed launch site (PACSS10), launch vehicle navigation (PACSS13), and geographic polar (PACSS1) coordinate systems. The definitions pertaining to the trajectory symbols and the coordinate systems are given in Appendix A.

The actual and nominal targeting parameters are given in Table 3-V. These nominal parameters are taken from References 3 and 4 as terminal conditions for the powered flight phases. The actual parameters achieved were close to nominal.

3.2 POWERED FLIGHT DATA SOURCES

3.2.1 Ascent Phase

Tracking data and telemetered guidance velocity data were received during the period from first motion through orbital insertion. The time periods for which tracking system coverage was available are shown in Figure 3-11 and itemized in Table 3-VI. The geographic locations of the tracking stations and the ground track for the ascent trajectory are shown in Figure 3-1.

C-Band and S-Band tracking data were available from the stations located at Patrick Air Force Base, Cape Kennedy, Merritt Island, Grand Turk Island, Bermuda Island, and

3.2.1 (Continued)

the Vanguard Insertion Ship. The C-Band tracking data were provided in azimuth angle, elevation angle, and slant range measured parameters. These measurements are defined in Reference 1 and designated as PACSS3a. The USB tracking data were provided in X-angle, Y-angle, range, and range rate measured parameters. These measurements are defined in Reference 1 and designated as PACSS3c.

Comparisons between these data and the ascent trajectory were calculated in PACSS3a and PACSS3c. The position components of the ascent trajectory in PACSS10 were transformed into the measured parameters of PACSS3a and PACSS3c. Differences or deviations (tracking data minus corresponding parameters derived from the ascent trajectory) were calculated, smoothed, and plotted as functions of time, and are shown in Figures 3-13 through 3-15 for C-Band, and in Figures 3-16 through 3-19 for S-Band data.

3.2.1.1 C-Band Tracking Data

Patrick (0.18) radar provided tracking data from 25 to 527 seconds. The azimuth angle measurements were of good quality except in the time interval of 220 to 410 seconds, where the measurements were noisy. The Patrick azimuth angles deviated considerably from the trajectory up to 200 seconds. They converged to the trajectory thereafter with a maximum deviation of 0.02 degree. The elevation angle measurements were noisy during the early portion (25 to 90 seconds) and the latter portion (440 to 527 seconds) of the tracking. These measurements also deviated considerably from the trajectory up to about 80 seconds and agreed favorably with the trajectory within the time interval from 80 to 427 seconds with a maximum deviation of 0.02 degree. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 110m (361 ft) from the trajectory. Since the 0.18 radar was reported to have been on skin track for the entire tracking period (Reference 3), the discontinuity in the slant range at about 175 seconds is attributed to a switch from tracking the spent S-IC stage to the S-II stage following S-IC/S-II separation.

Merritt Island (19.18) radar furnished data from 16 to 528 seconds. The azimuth angle measurements were noisy from 80 to 125 seconds and 410 to 528 seconds. The elevation angle measurements were noisy from 410 to 528 seconds. The azimuth angle reached a maximum deviation of 0.05 degree at 105 seconds and decreased to a maximum of 0.015 degree after 230 seconds. The elevation angle

3.2.1.1 (Continued)

deviated a maximum of 0.035 degree and decreased to a maximum of 0.01 degree from 230 to 410 seconds. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 79 m (259 ft).

Cape Kennedy (1.16) radar furnished data from 150 to 388 seconds. The azimuth and elevation angle measurements were noisy for the total tracking period. The azimuth and elevation angles were in good agreement with the trajectory from 200 seconds to the end of the tracking interval with maximum deviations through this period of 0.01 degree and 0.02 degree, respectively. The slant range measurements were of good quality throughout the tracking period, however, they were not in good agreement with the trajectory. The minimum and maximum deviations for the tracking interval were 150 m (492 ft) and 300 m (984 ft), respectively.

Grand Turk (7.18) radar supplied data from 231 to 605 seconds. The azimuth angle measurements were noisy between 525 and 605 seconds. The elevation angle measurements were noisy for the total tracking period with a maximum deviation of 0.08 degree. Outside the time interval of noisy measurements, the azimuth angle had a maximum deviation of 0.015 degree. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 119 m (390 ft).

Bermuda (67.16) radar provided data from 268 to 706 seconds. The elevation angle measurements were noisy from 268 to 390 seconds. The elevation angle measurements agreed favorably with the trajectory with a maximum deviation of 0.021 degree. The azimuth angle measurements were in good agreement with the trajectory with a maximum deviation of 0.01 degree, except in the interval from 500 to 575 seconds where the measurements deviated a maximum of 0.019 degree. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 71 m (233 ft).

Bermuda (67.18) radar supplied data from 262 to 710 seconds. The azimuth angle measurements were in good agreement with the trajectory with a maximum deviation of 0.018 degree, except in the interval of 500 to 575 seconds where a characteristic deviation occurred with a maximum deviation of 0.025 degree. The elevation angle measurements were noisy from 262 to 410 seconds and agreed favorably with the trajectory with a maximum deviation of 0.021 degree. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 119 m (390 ft).

3.2.1.1 (Continued)

Vanguard Insertion Ship radar provided data from 574 to 712 seconds. The azimuth angle measurements were of good quality and agreed favorably with the trajectory with a maximum deviation of 0.011 degree. The elevation angle measurements were biased from the trajectory by approximately -0.3 degree which may be attributed to a tracker location error. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 191 m (627 ft).

3.2.1.2 USB Tracking Data

Merritt Island radar furnished data from 33 to 360 seconds with a significant data gap from 166 to 233 seconds. The X- and Y-angle measurements were noisy from 33 to 115 seconds. The X-angle measurements were not in good agreement with the trajectory with a maximum deviation of 0.10 degree. After 160 seconds, the Y-angle measurements agreed favorably with the trajectory with a maximum deviation of 0.015 degree. The range rate measurements were noisy from 70 to 80 seconds and 125 to 140 seconds. The range rate measurements had a maximum deviation of 1.21 m/sec (3.97 sec). The slant range measurements were of good quality throughout the tracking interval with a maximum deviation of 208 m (682 ft).

Bermuda Island radar provided data from 278 to 715 seconds. The X- and Y-angle measurements were noisy from 278 to 375 seconds and were of good quality throughout the remainder of the tracking interval. The X- and Y-angle measurements agreed favorably with the trajectory with a maximum deviation of 0.025 and 0.020 degree, respectively. The range rate measurements did not agree with the trajectory from 278 to 385 seconds and 630 to 715 seconds. A characteristic closest approach phenomenon was exhibited by the range rate from 510 to 605 seconds with a maximum deviation of 1.35 m/sec (4.43 ft/sec). Except for the above mentioned intervals, the range rate agreed favorably with the trajectory with a maximum deviation of 0.4 m/sec (1.3 ft/sec). The slant range measurements were of good quality from 278 to 630 seconds with a maximum deviation of 175 m (574 ft).

3.2.2 Second Burn Phase

Telemetered guidance velocity data during the S-IVB second burn period were used as generating parameters in reconstructing the second burn trajectory. Carnarvon USB tracking data were available for the early portion of the second burn phase (see Figure 3-12). Due to inconsistencies between the X-/Y-angles and the range rate/range measurements, the track-

3.2.2 (Continued)

ing data were not used in the reconstruction. However, differences or deviations (tracking data minus corresponding parameters derived from the second burn trajectory) were calculated, smoothed, and plotted as functions of time, and are shown in Figures 3-20 through 3-23.

3.2.2.1 USB Tracking Data

Carnarvon, Australia, S-Band radar furnished measured parameter (PACSS3c) data from 8,761 to 9,091 seconds. The data from 8,810 to 9,091 seconds is discussed below. The X-angle measurements were noisy throughout the tracking interval and had a maximum deviation of 0.081 degree. The Y-angle measurements were of good quality and had a maximum deviation of 0.022 degree. The range rate measurements were of good quality and had a maximum deviation of 5.75 m/sec (18.9 ft/sec). The X-angle, Y-angle, and range rate measurements exhibited the characteristic closest approach phenomenon from 8,890 to 8,950 seconds. The slant range measurements were of good quality and had a maximum deviation of 995 m (3,264 ft).

3.3 TRAJECTORY RECONSTRUCTION

3.3.1 Ascent Phase

The ascent trajectory from guidance reference release to orbital insertion was established by a composite solution of available tracking data and telemetered onboard guidance velocity data.

Before the data were used in the trajectory solution, one or more of the following processing steps were performed:

a. Inspecting for format and parity errors

b. Time editing

c. Data editing and filtering

d. Refraction correction

e. Reformatting

f. Coordinate transformation

The position components of the tracking point of the vehicle in PACSS10 were established by merging the launch phase and ascent phase trajectory segments.

3.3.1 (Continued)

The launch phase (from first motion to 20 seconds) was established by integrating the telemetered guidance accelerometer data and constraining it to the early portion of the ascent phase trajectory. The ascent phase (from 20 seconds to orbital insertion at 710.56 seconds) was based on a composite fit of external tracking data and telemetered onboard guidance velocity data and was constrained to the insertion vector obtained from the orbital analysis as described in Section 4. The reconstructed trajectory is referenced to the vehicle Instrument Unit.

In the above analysis, a computer program (GATE), which uses a guidance error model, was utilized. The telemetered guidance velocity data were used as the generating parameter, and error coefficients were estimated to best fit the tracking observations. The Kalman recursive method was used for the estimation. Reference 5 gives a theoretical discussion of the GATE program.

The position components, in PACSS10, were filtered and differentiated to obtain vehicle velocity and acceleration components. Since numerical differentiators tend to distort the data through the transient areas (engine cutoffs), the guidance velocity data were integrated and used to fill in these areas.

The trajectory data in PACSS10 were then transformed to several coordinate systems. Various trajectory parameters were also calculated and are presented in Appendices B and C.

In calculating the Mach number and dynamic pressure, measured meteorological data were used.

3.3.2 Second Burn Phase

The second burn trajectory was established by combining an orbital trajectory segment and a powered flight trajectory segment.

The orbital trajectory segment covers the portion of flight from the beginning of S-IVB restart preparations (8,334.2 seconds) to 8,810 seconds. This trajectory segment was obtained from the orbital solution as described in Section 4.

The powered flight trajectory segment covers the time span from 8,810 seconds to translunar injection (9,273.24 seconds). This trajectory segment was established by integrating the telemetered guidance velocities, which were used as generating parameters, and was constrained to the translunar

3.3.2 (Continued)

injection vector (obtained from the post TLI trajectory of Section 4).

Two independent second burn solutions of the restart vector at 8,810 seconds were made utilizing the available tracking data. One solution used only the X- and Y-angles, and the other solution used only the range and range rate measurements. Each solution produced a different trajectory, however, the solution using only the angles agreed best with the final trajectory. Because of this incompatibility and the lack of redundant data to resolve the difference, no tracking data was used in reconstructing this trajectory segment. The GATE program was utilized for the solutions.

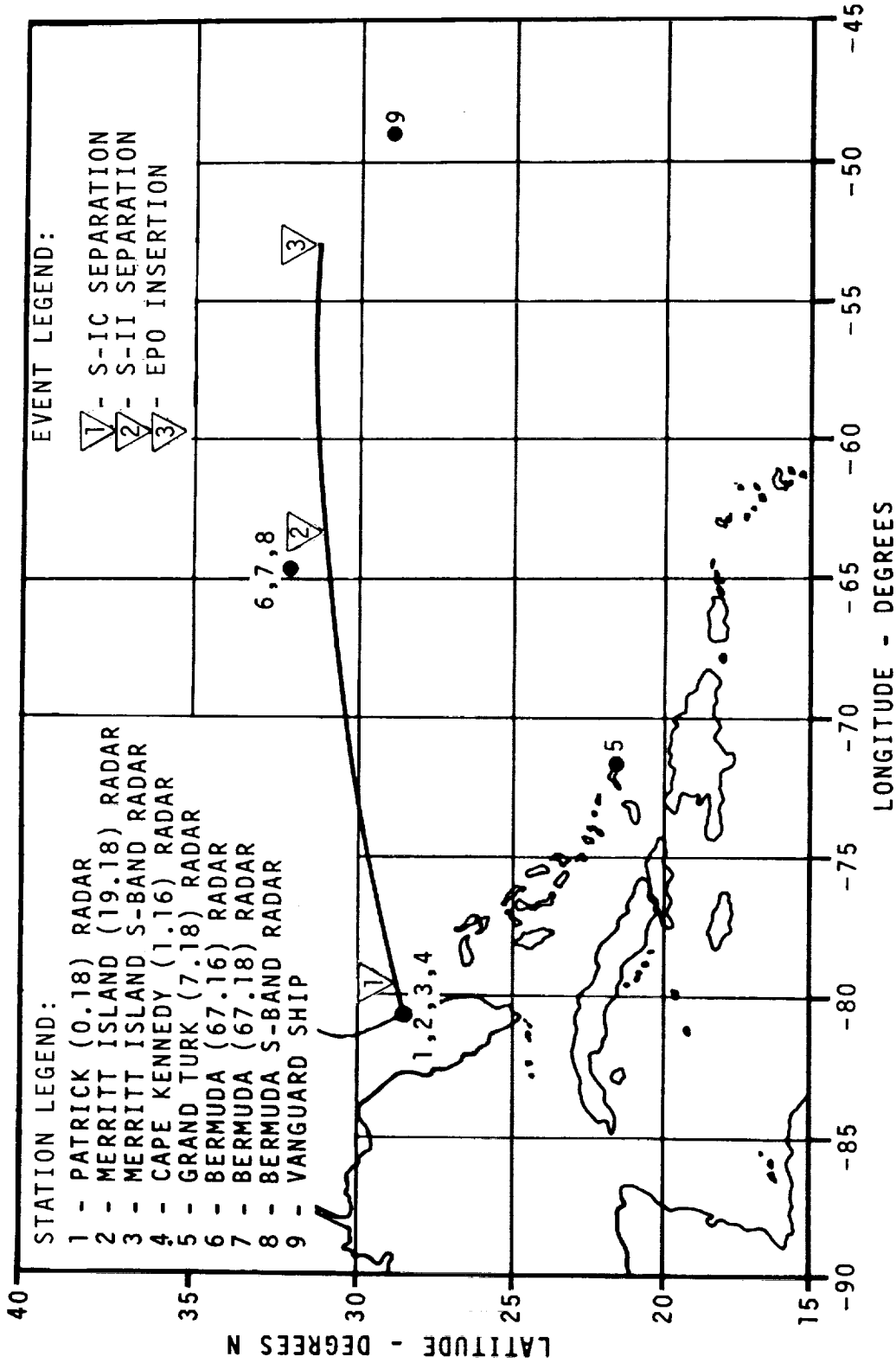

FIGURE 3-1. GROUND TRACK AND TRACKING STATIONS - ASCENT PHASE

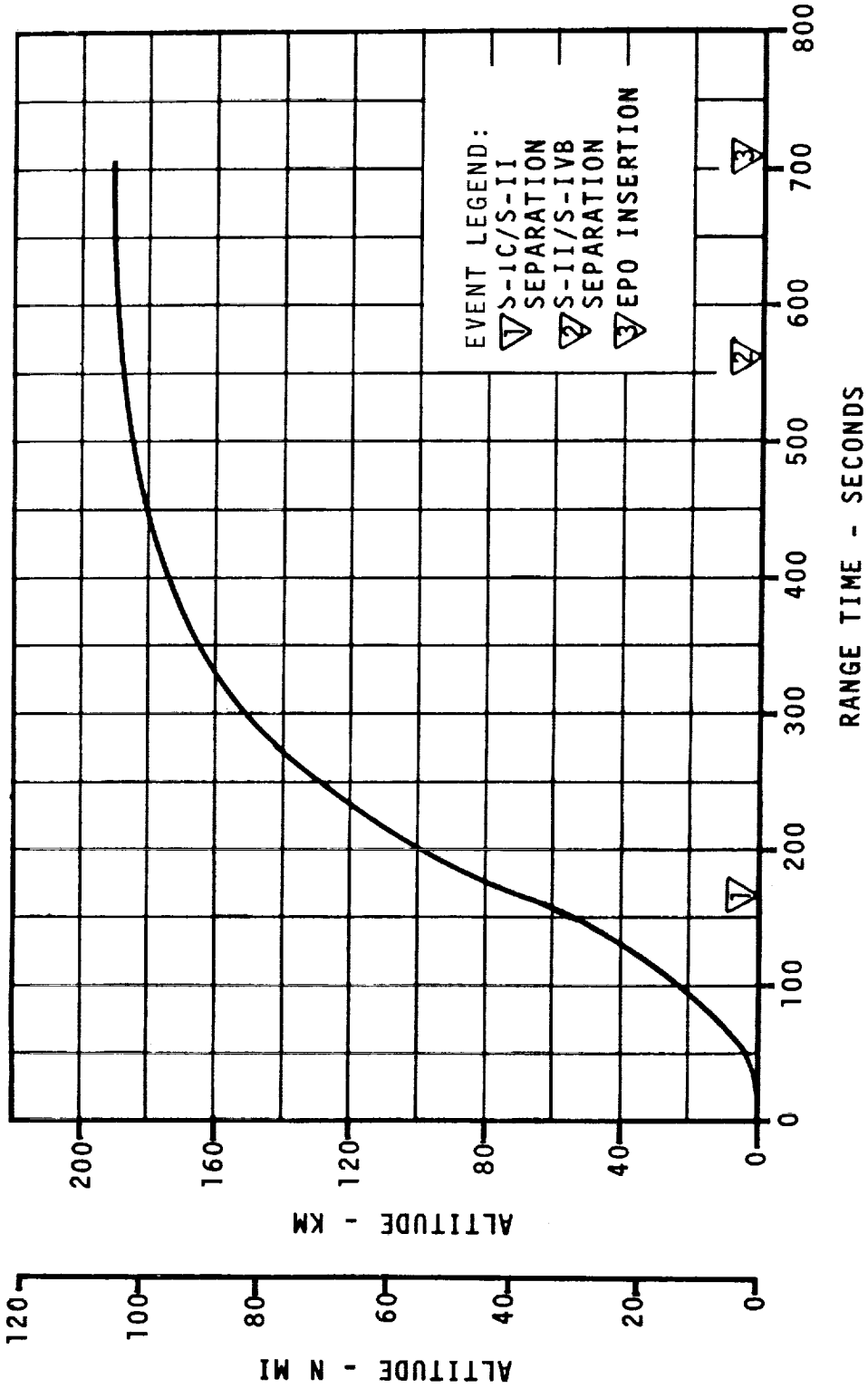

FIGURE 3-2. ALTITUDE - ASCENT PHASE

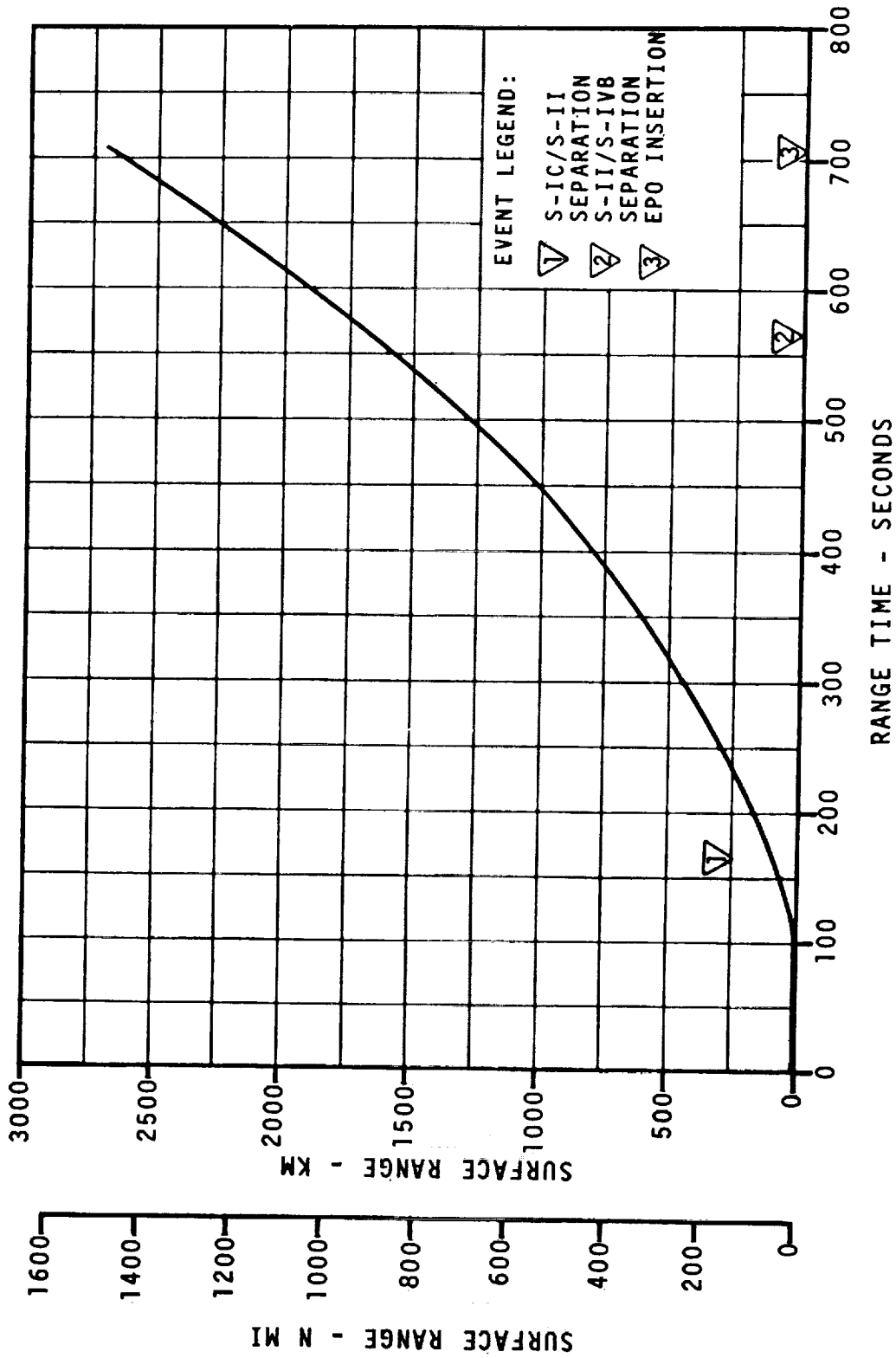

FIGURE 3-3. SURFACE RANGE - ASCENT PHASE

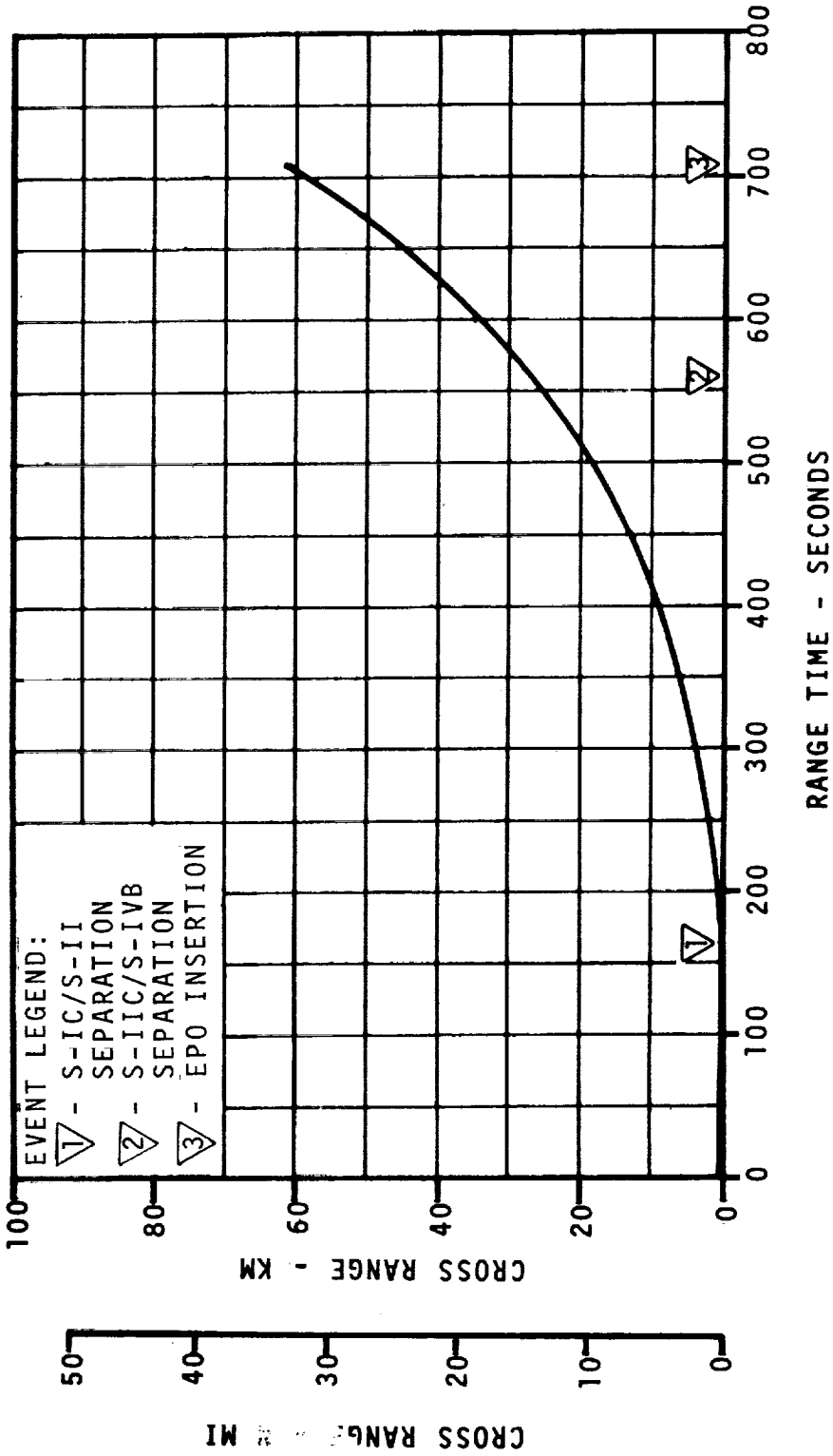

FIGURE 3-4. CROSS RANGE - ASCENT PHASE

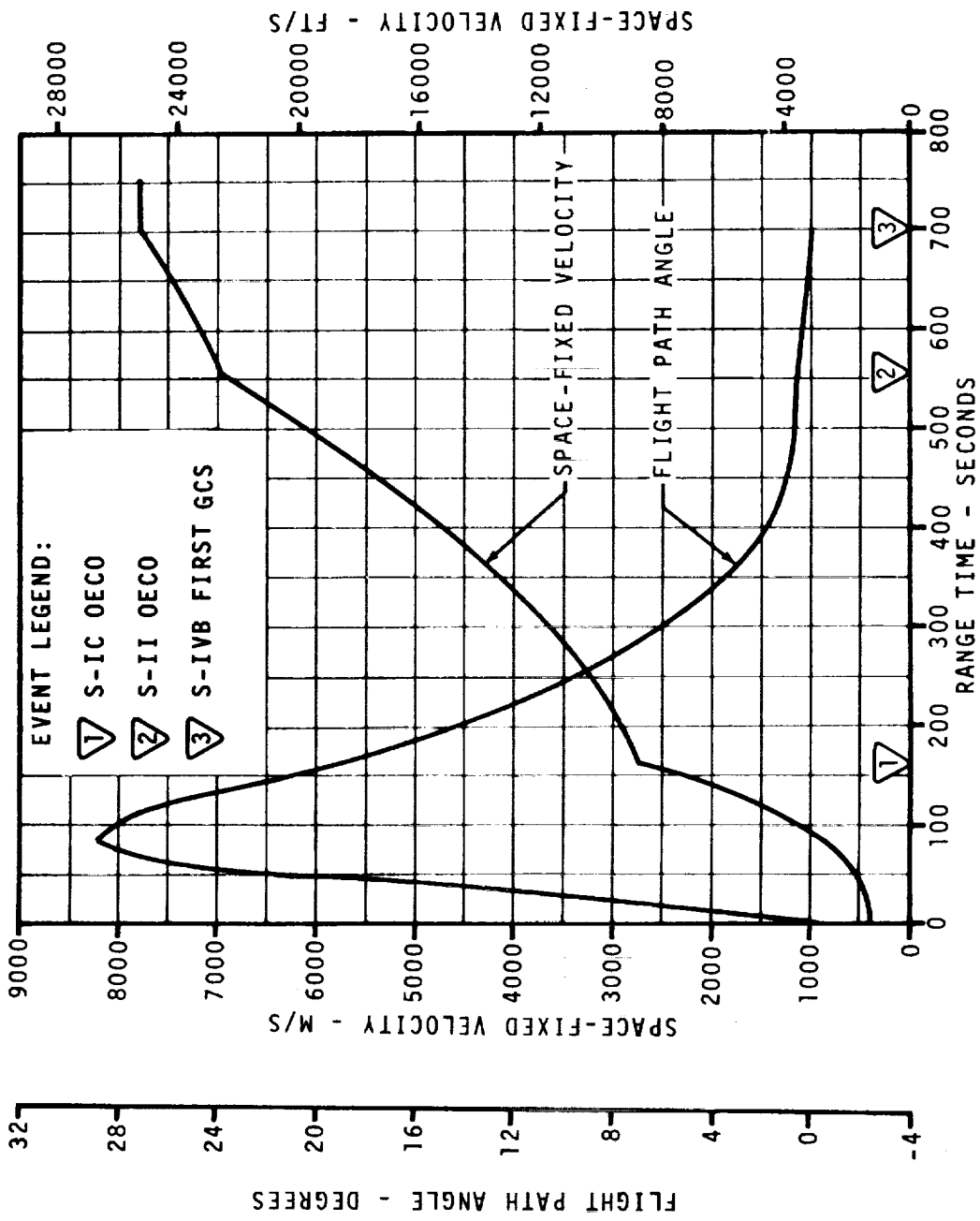

FIGURE 3-5. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - ASCENT PHASE

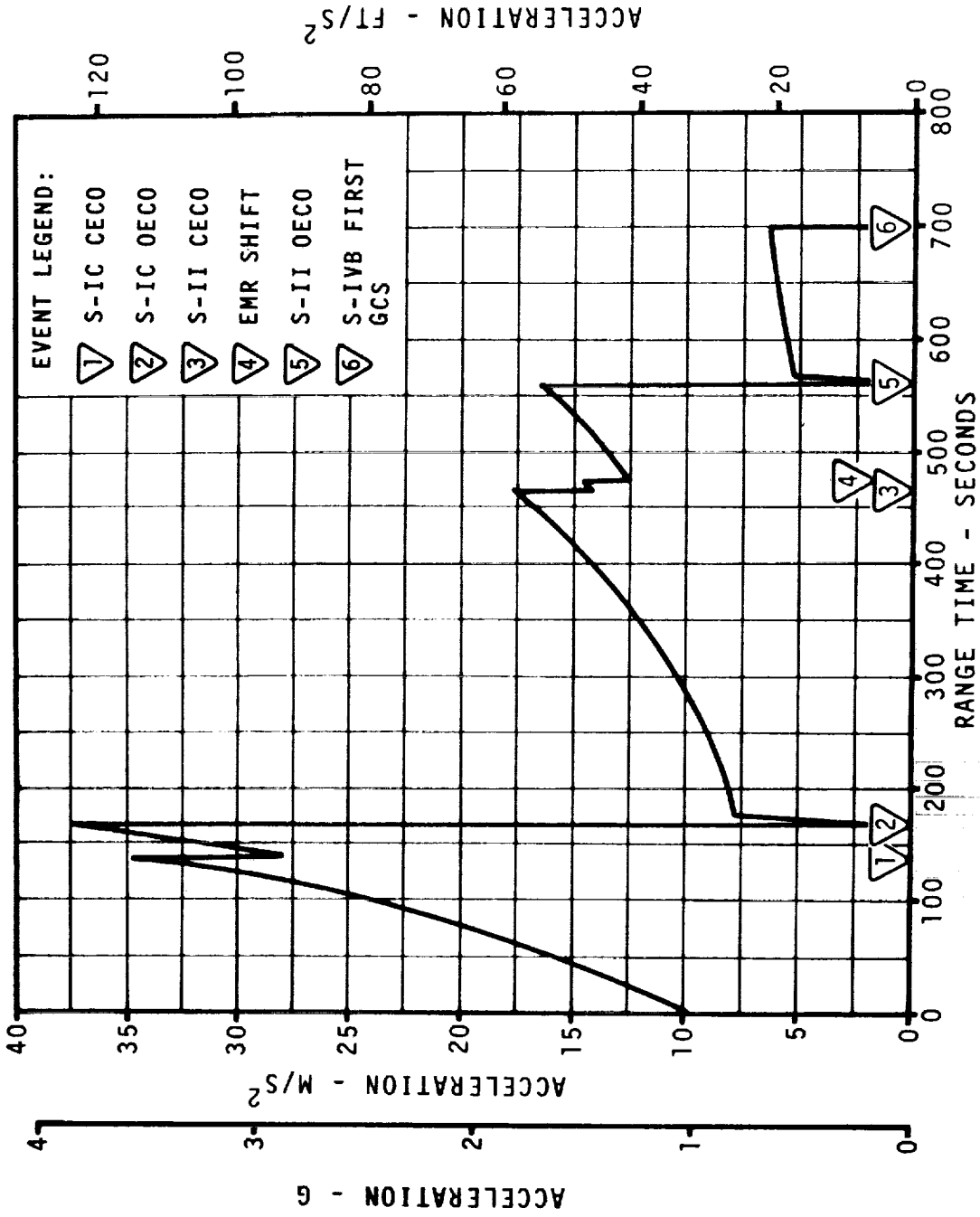

FIGURE 3-6. TOTAL INERTIAL ACCELERATION - ASCENT PHASE

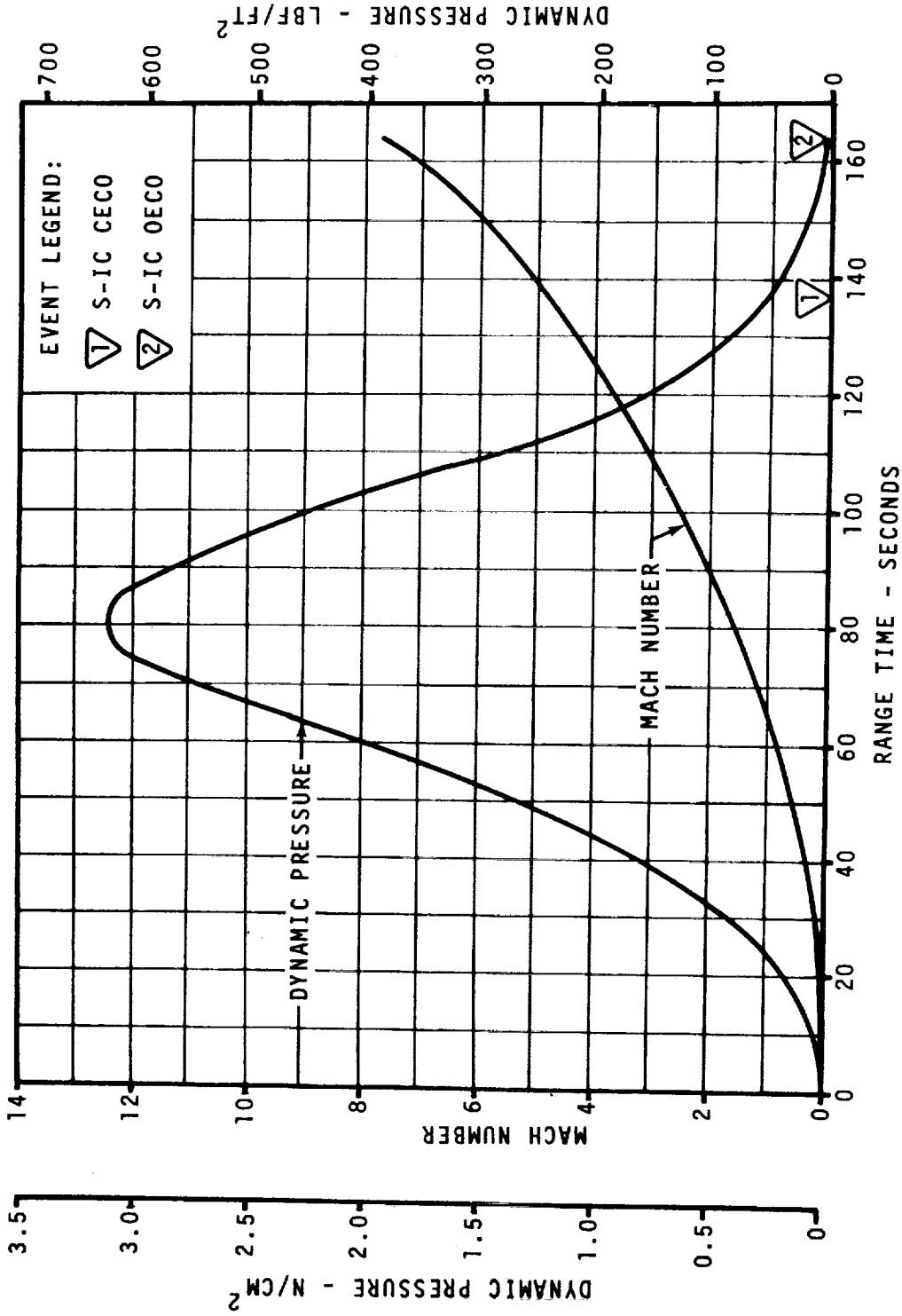

FIGURE 3-7 MACH NUMBER AND DYNAMIC PRESSURE - S-IC PHASE

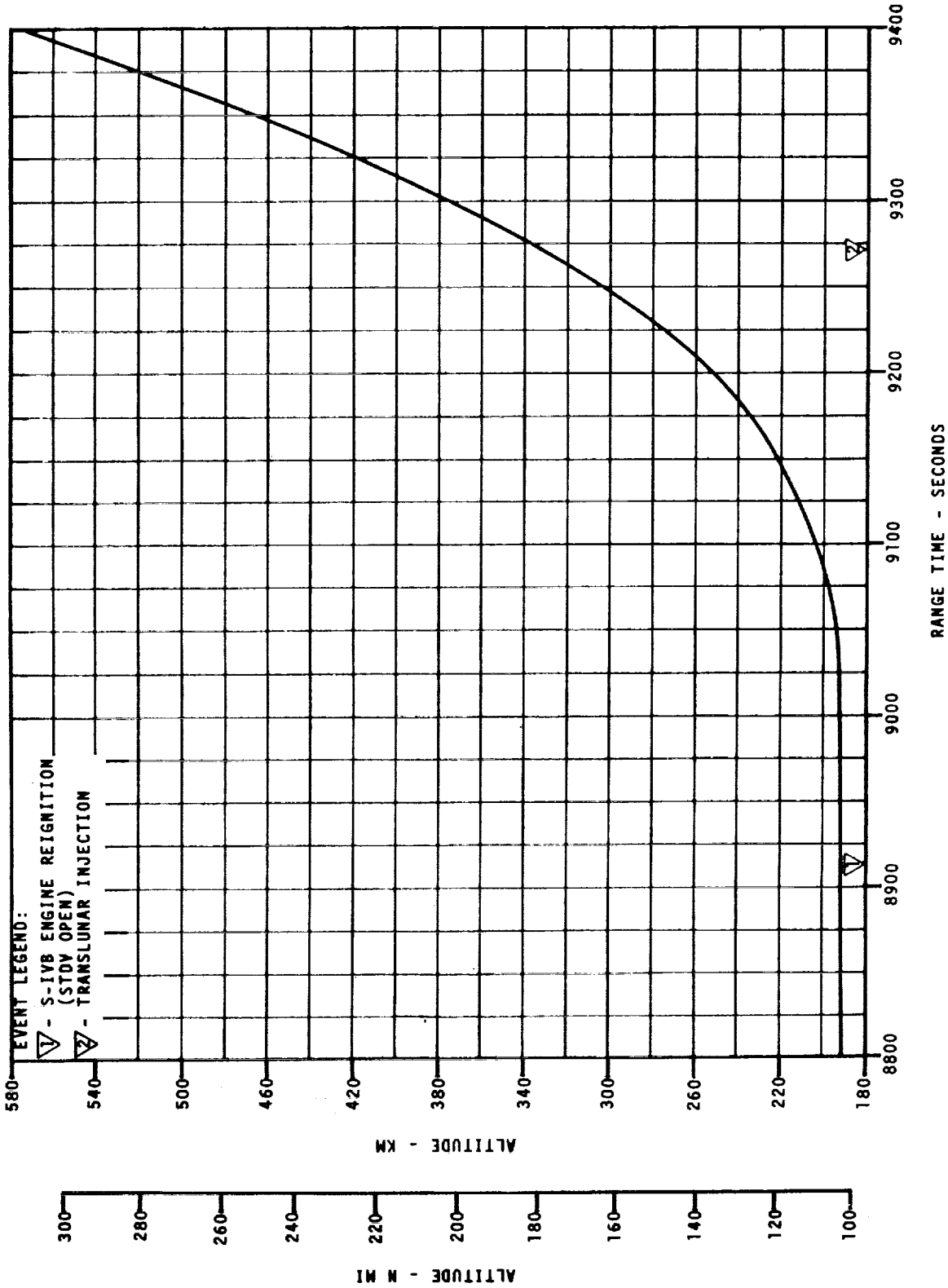

FIGURE 3-8. ALTITUDE - SECOND BURN PHASE

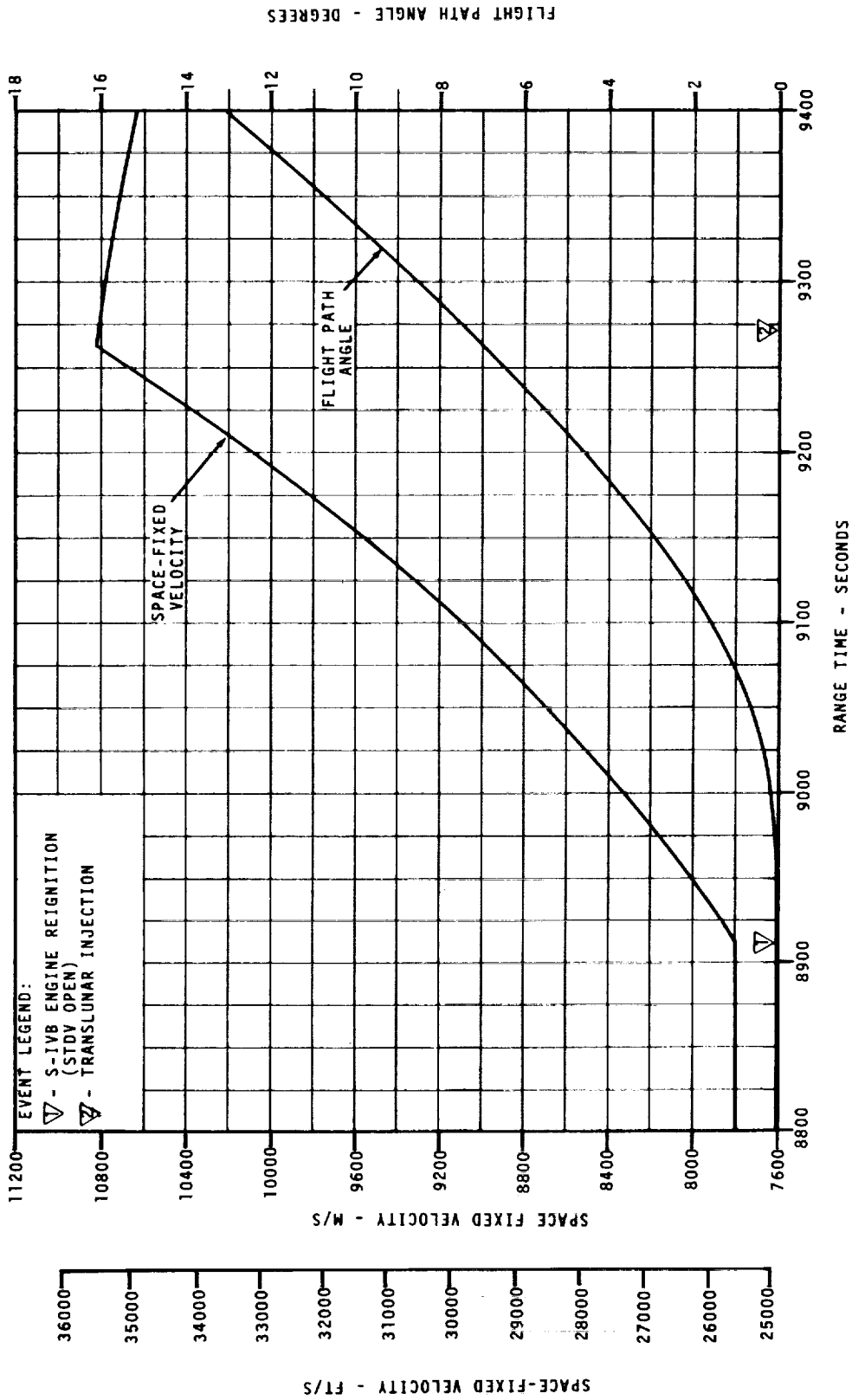

FIGURE 3-9. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - SECOND BURN PHASE

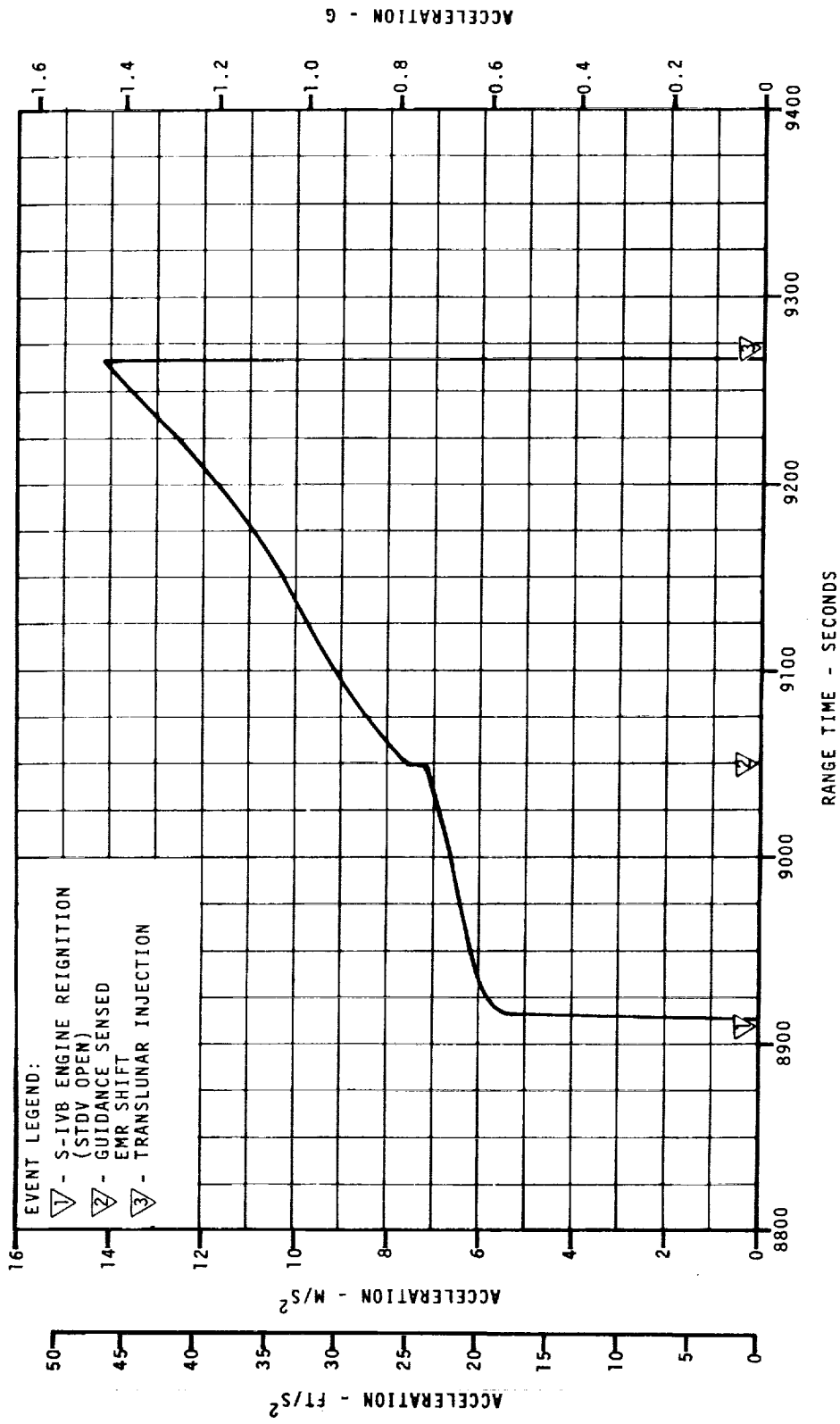

FIGURE 3-10. TOTAL INERTIAL ACCELERATION - SECOND BURN PHASE

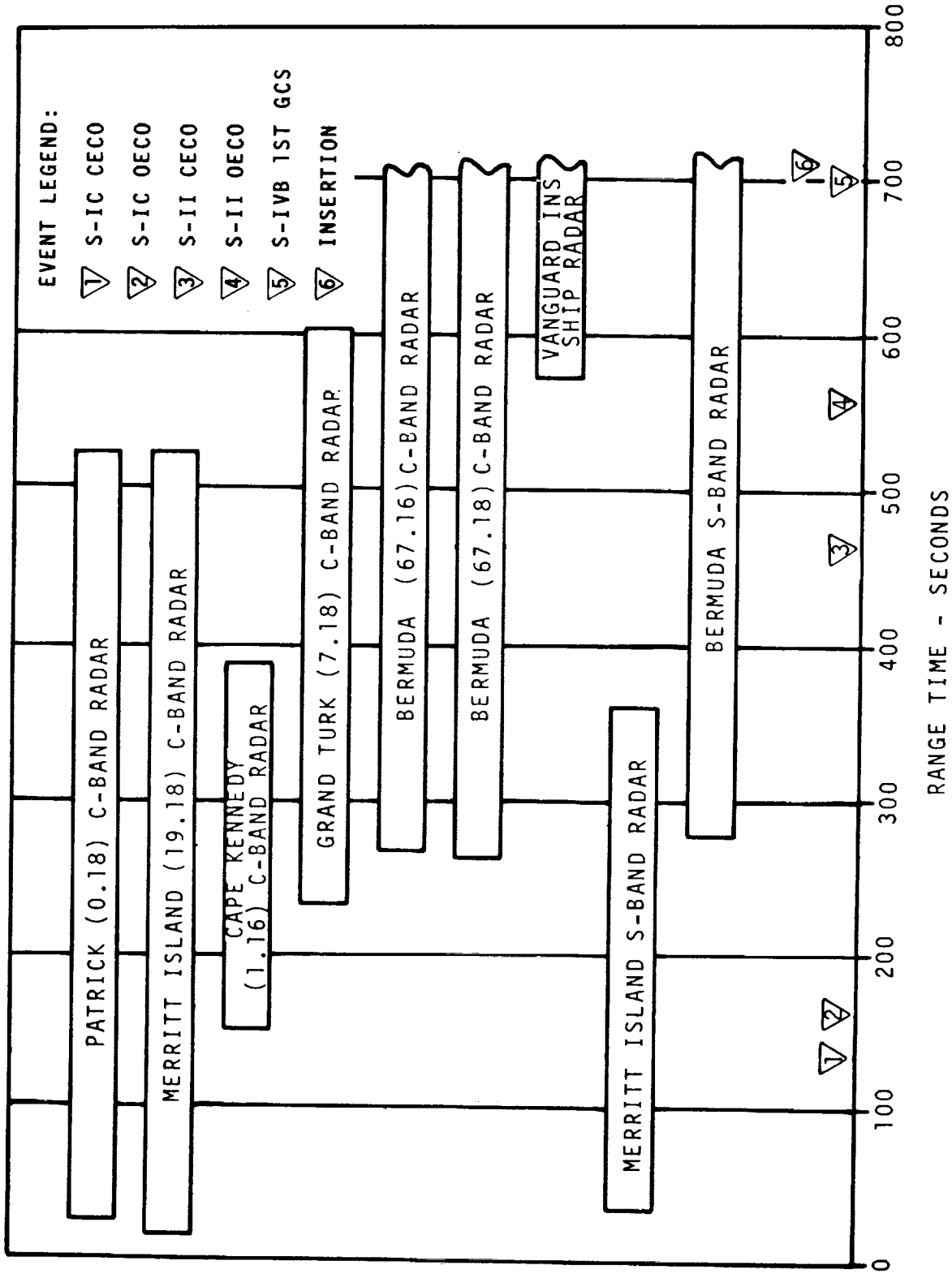

FIGURE 3-11. AVAILABLE TRACKING DATA - ASCENT PHASE

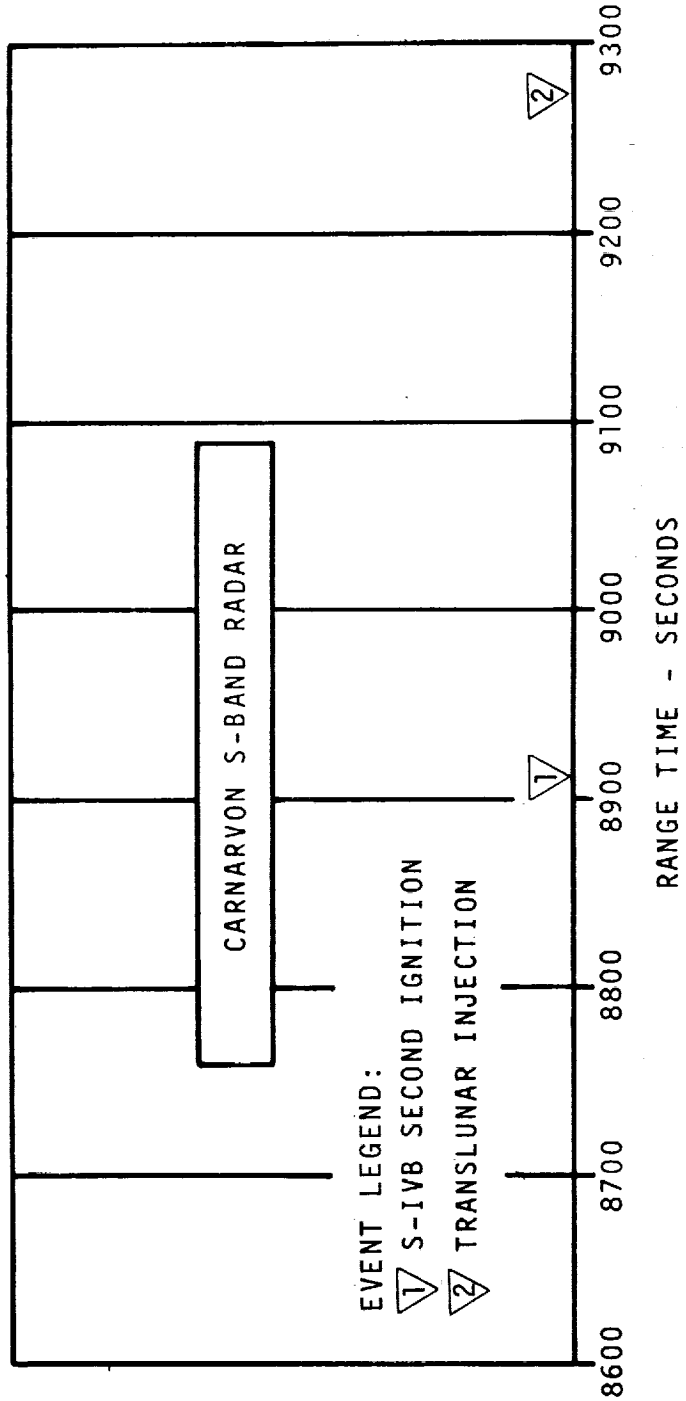

FIGURE 3-12. AVAILABLE TRACKING DATA - SECOND BURN PHASE

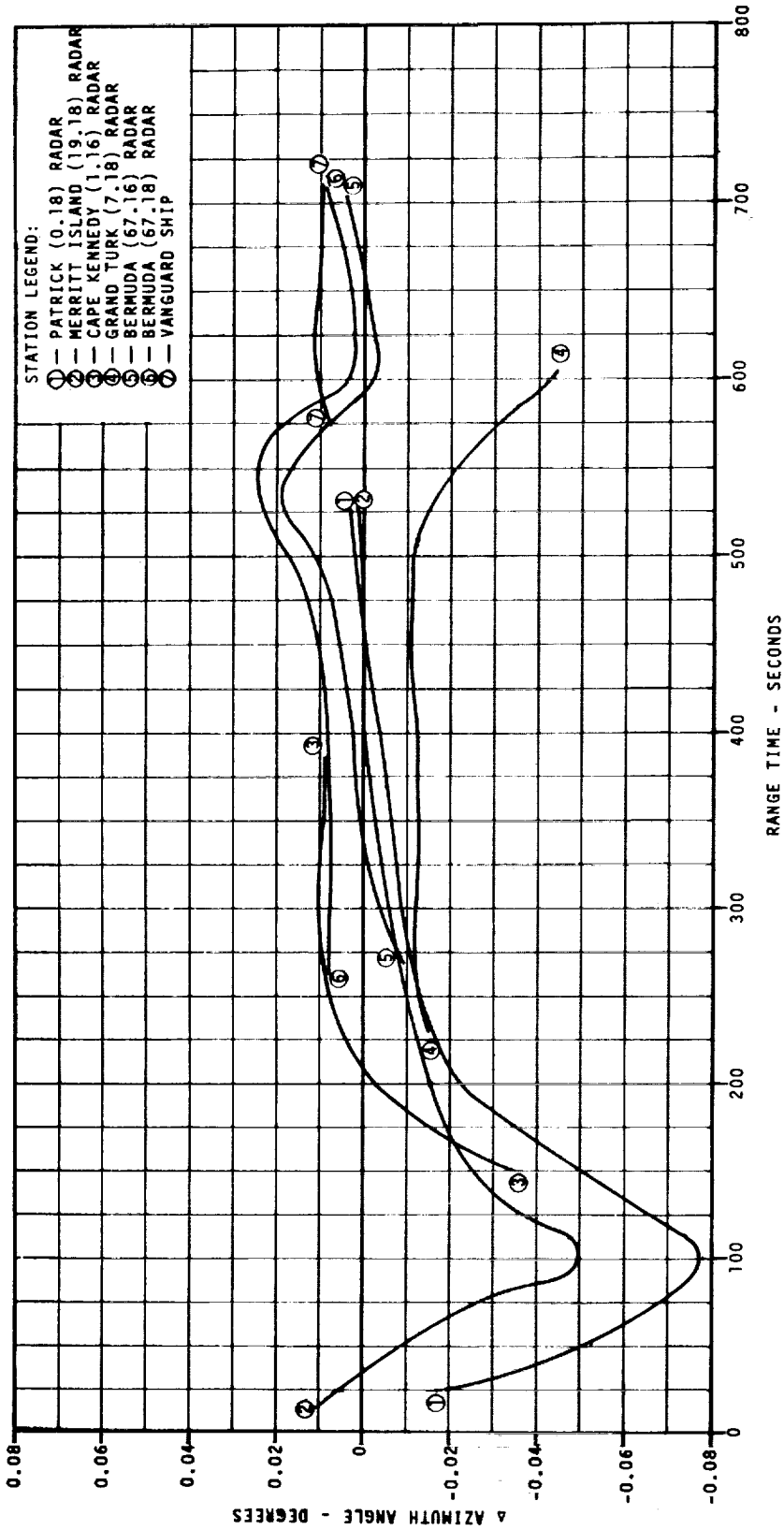

FIGURE 3-13. C-BAND RADAR AZIMUTH ANGLE TRACKING DEVIATIONS - ASCENT PHASE

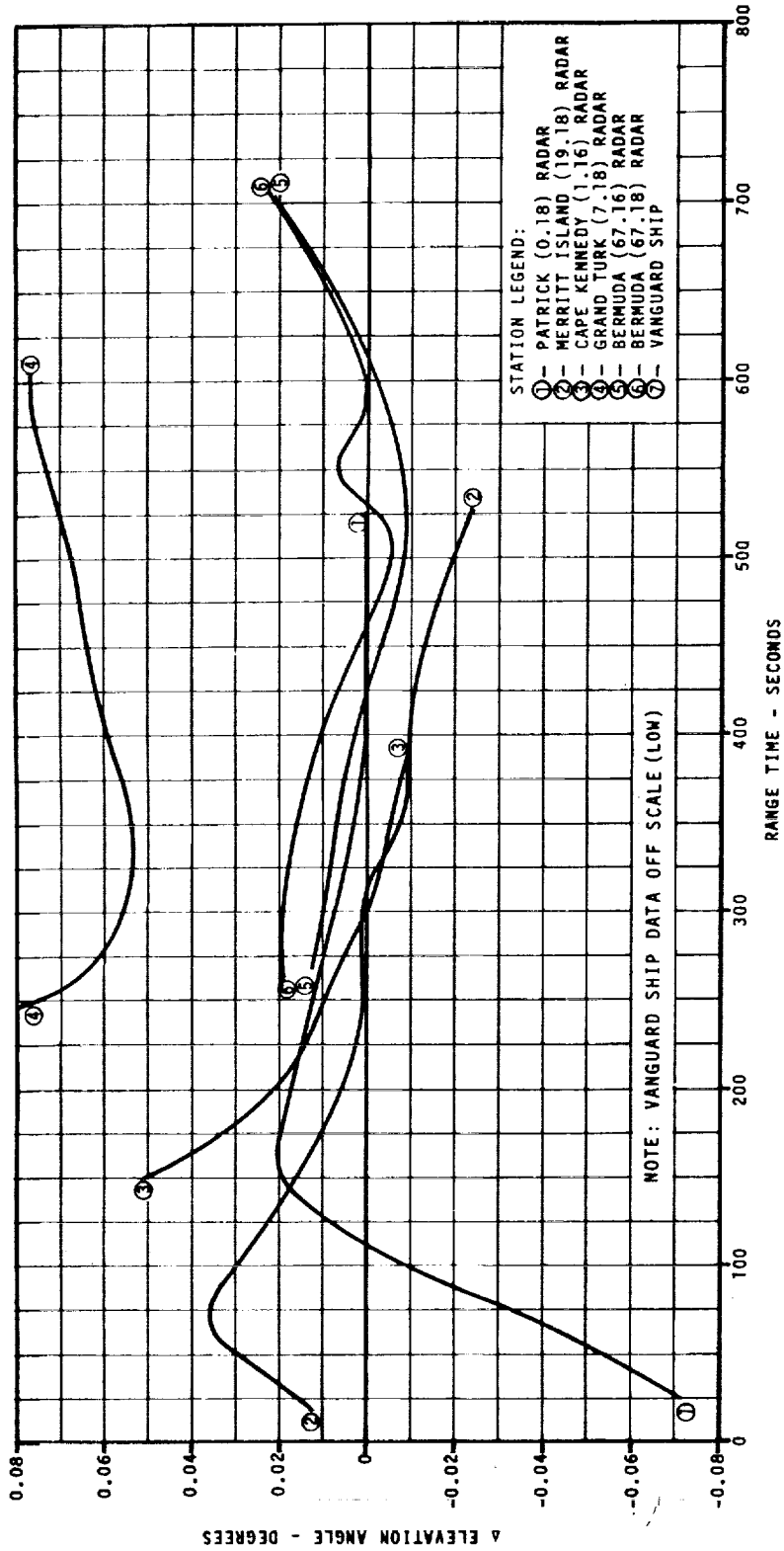

FIGURE 3-14. C-BAND RADAR ELEVATION ANGLE TRACKING DEVIATIONS - ASCENT PHASE

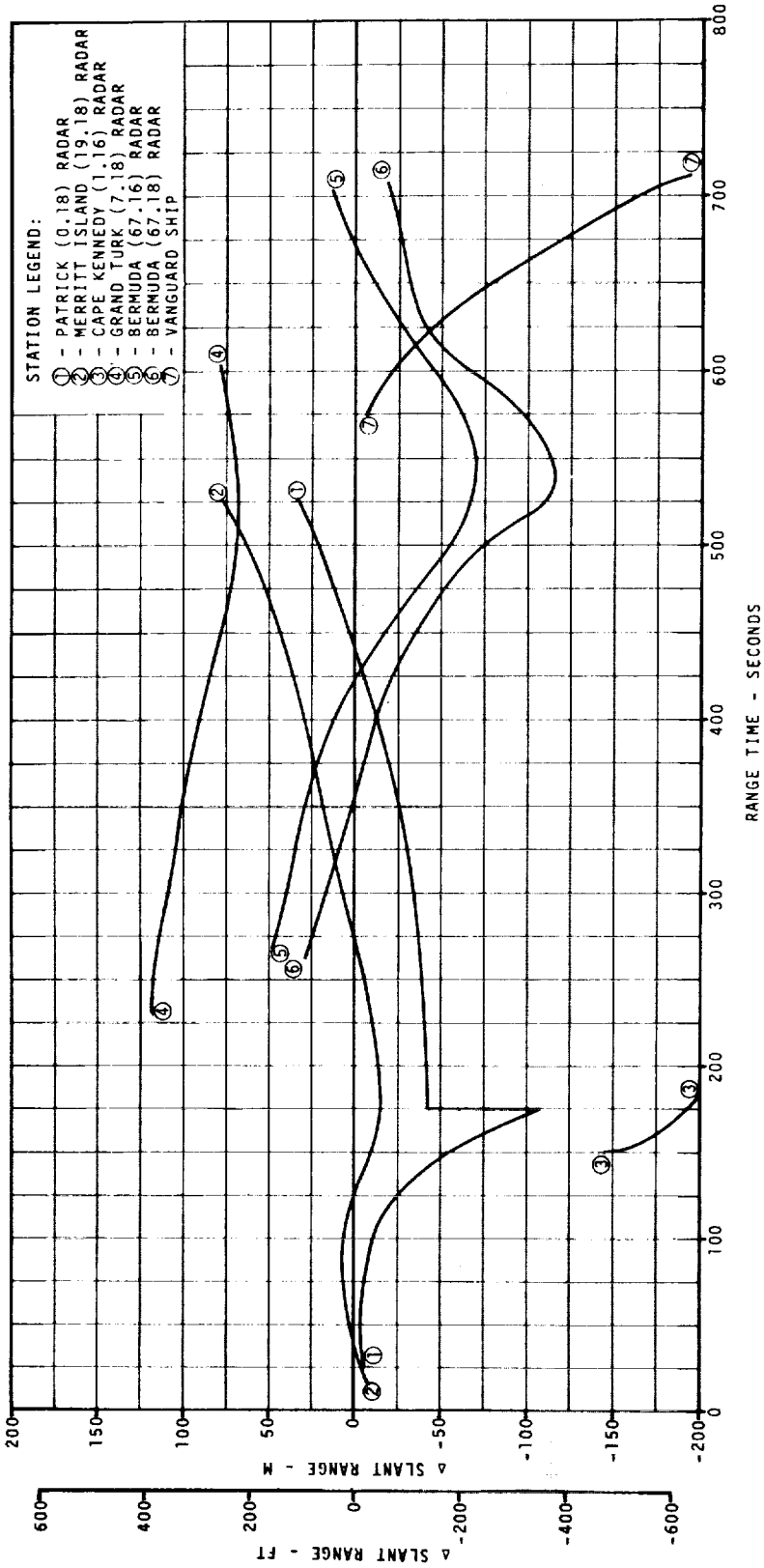

FIGURE 3-15. C-BAND RADAR SLANT RANGE TRACKING DEVIATIONS - ASCENT PHASE

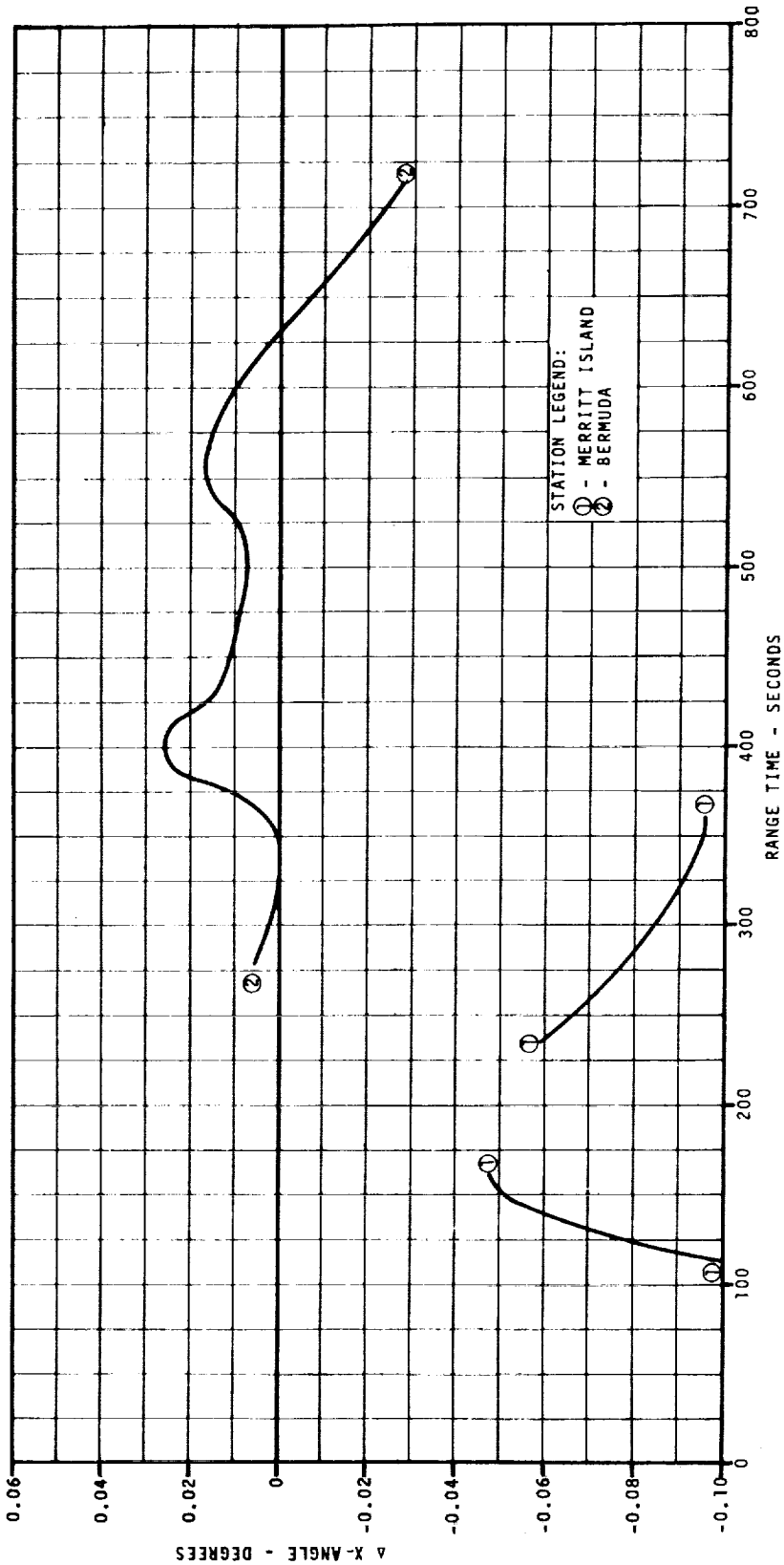

FIGURE 3-16. S-BAND RADAR X-ANGLE TRACKING DEVIATIONS - ASCENT PHASE

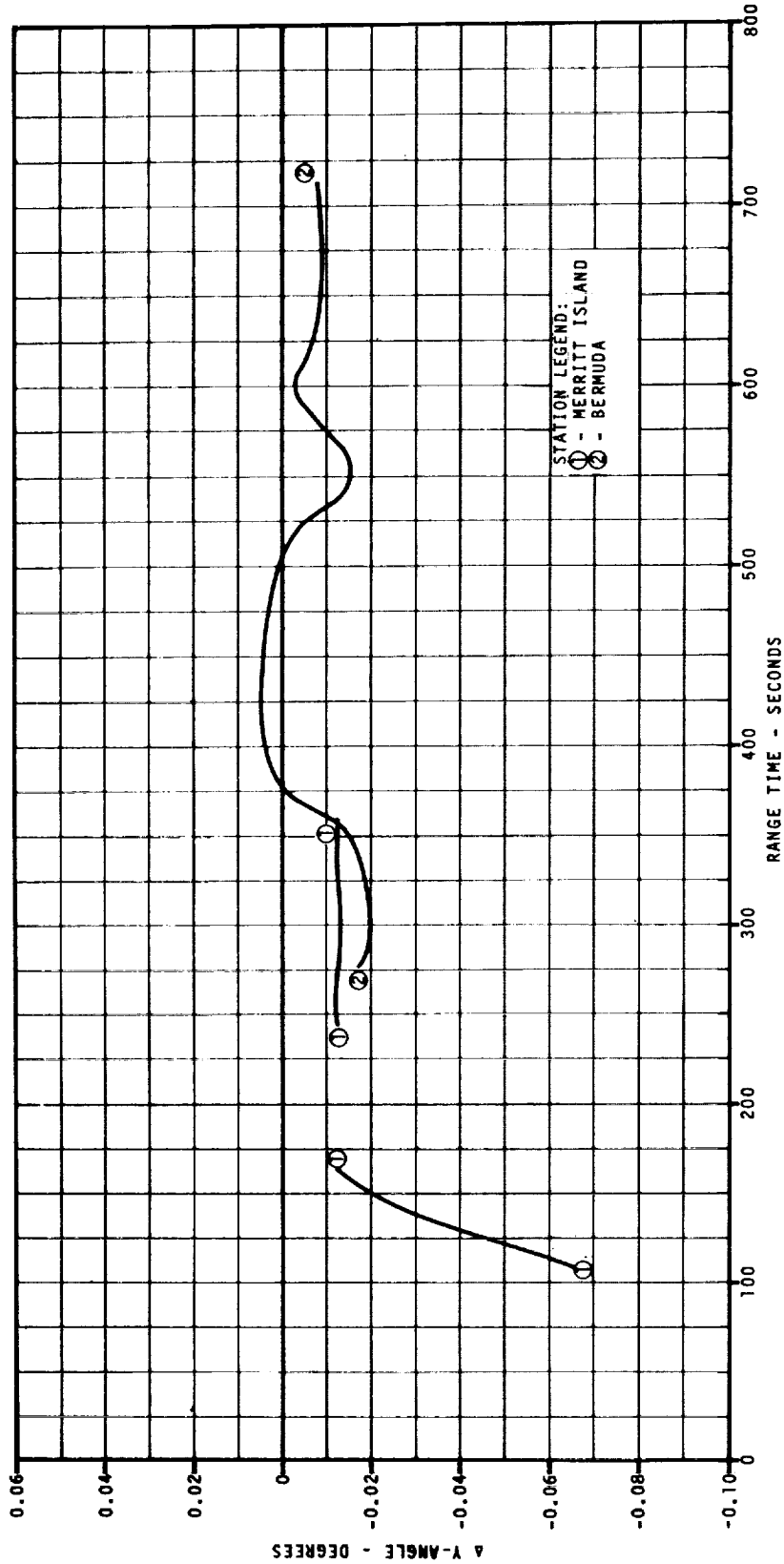

FIGURE 3-17. S-BAND RADAR Y-ANGLE TRACKING DEVIATION - ASCENT PHASE

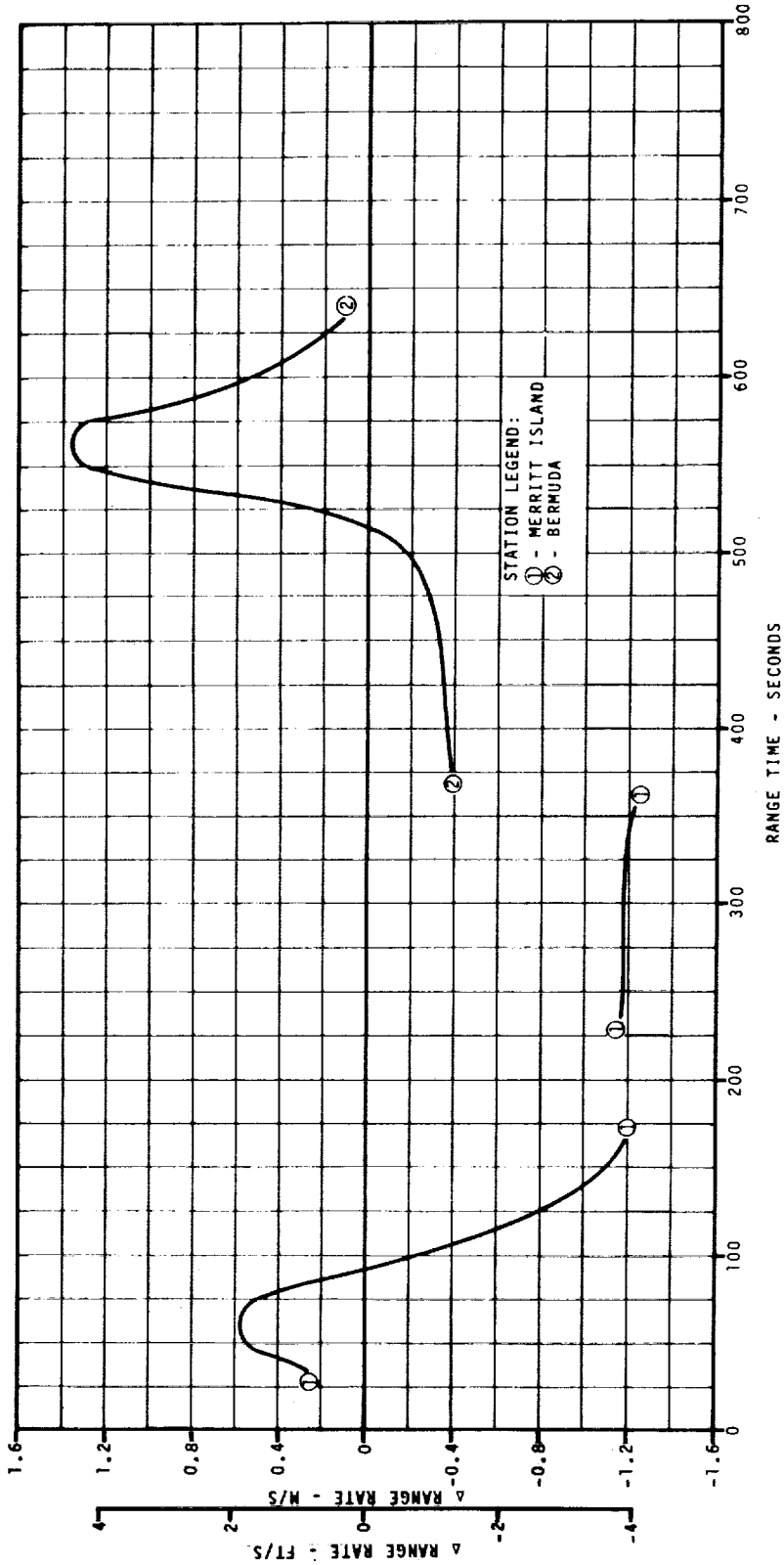

FIGURE 3-18. S-BAND RADAR RANGE RATE TRACKING DEVIATION - ASCENT PHASE

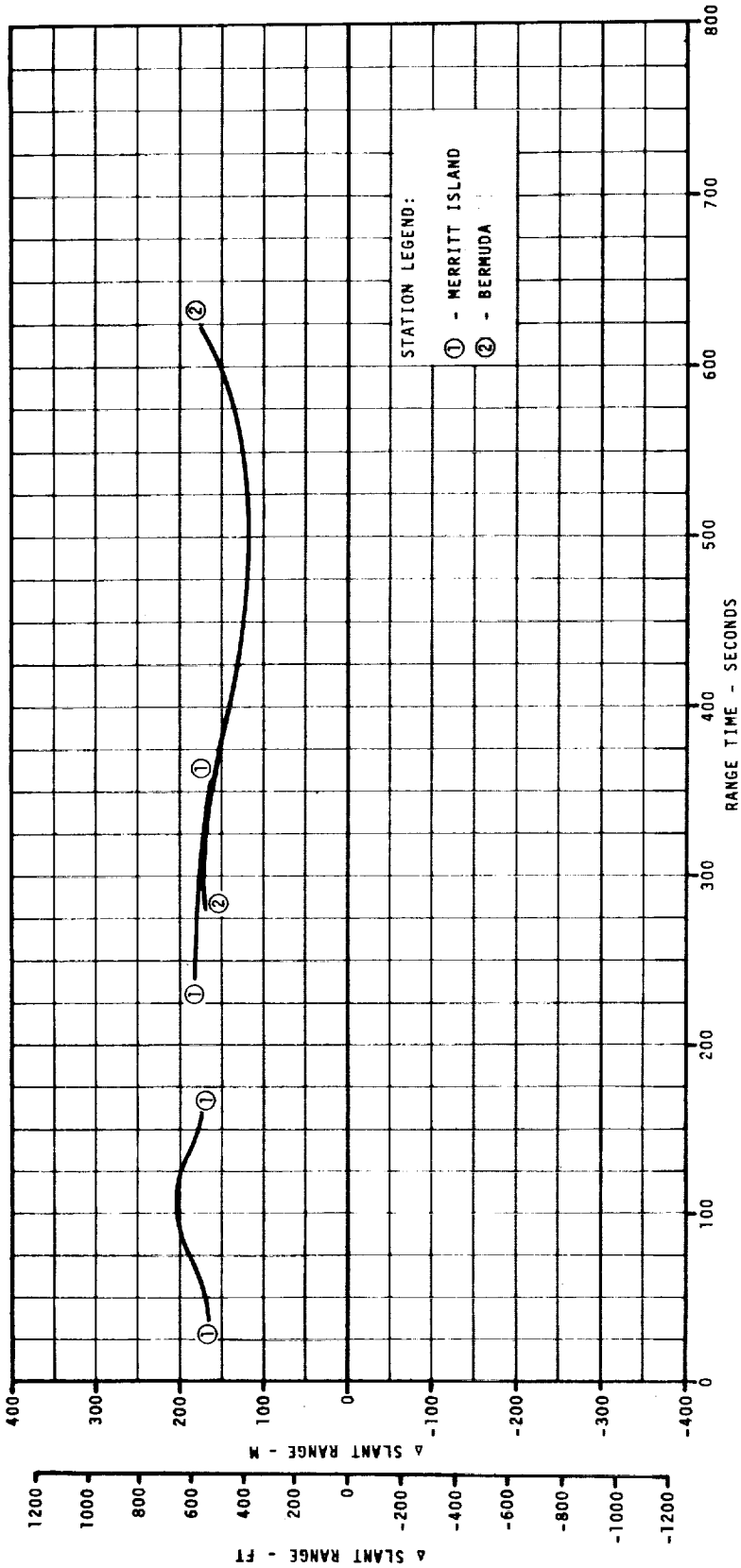

FIGURE 3-19. S-BAND RADAR SLANT RANGE TRACKING DEVIATIONS - ASCENT PHASE

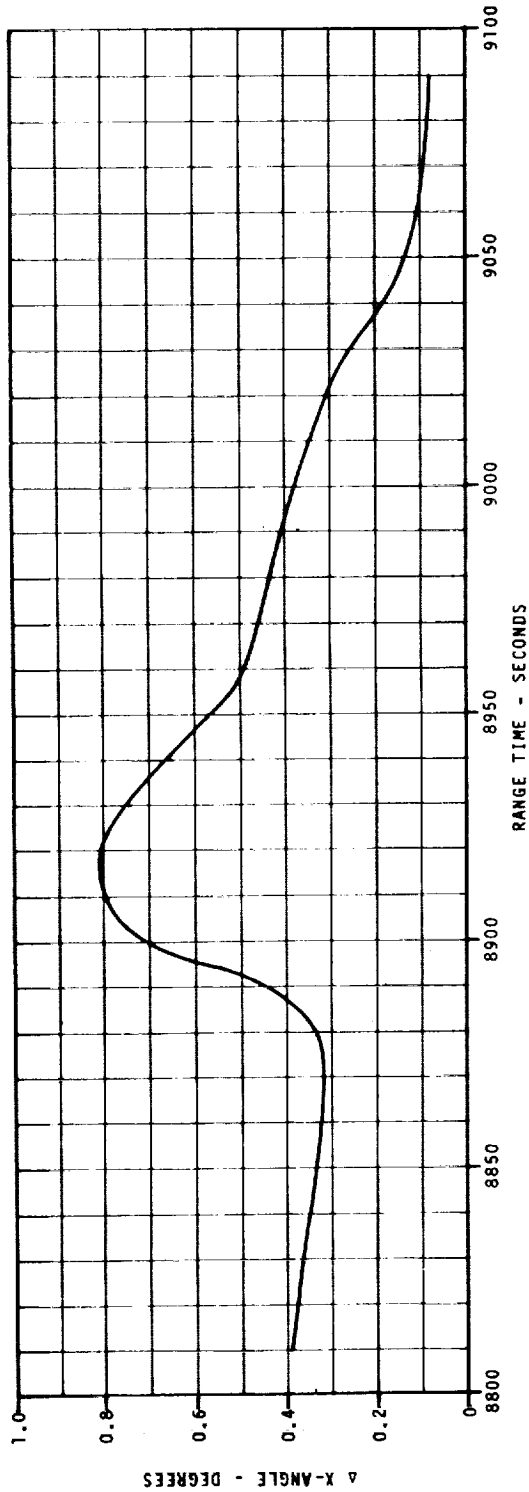

FIGURE 3-20. CARNARVON S-BAND RADAR X-ANGLE TRACKING DEVIATIONS - SECOND BURN PHASE

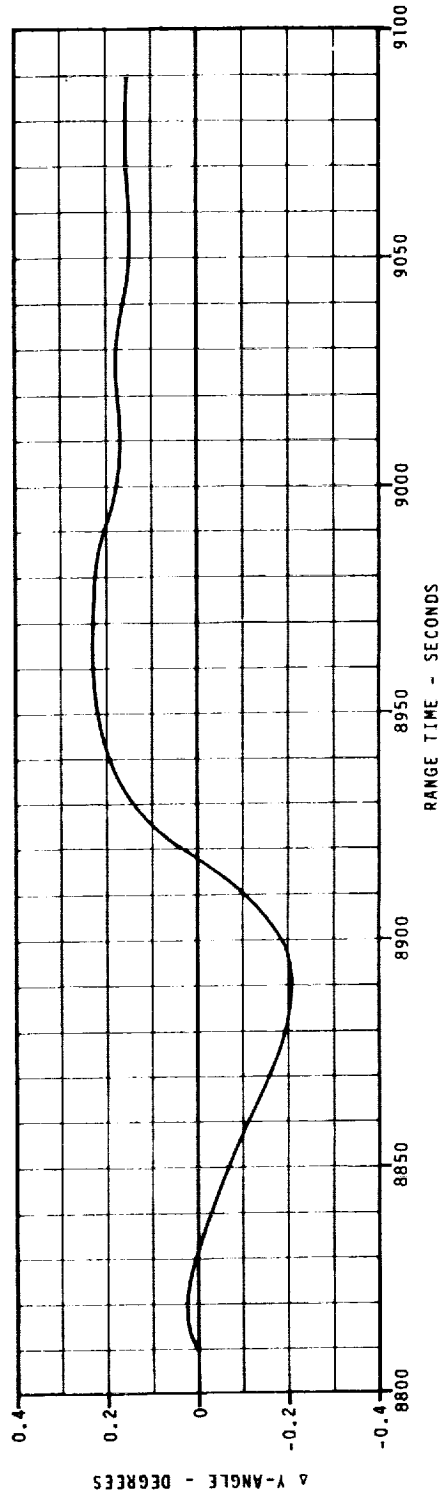

FIGURE 3-21. CARNARVON S-BAND RADAR Y-ANGLE TRACKING DEVIATIONS - SECOND BURN PHASE

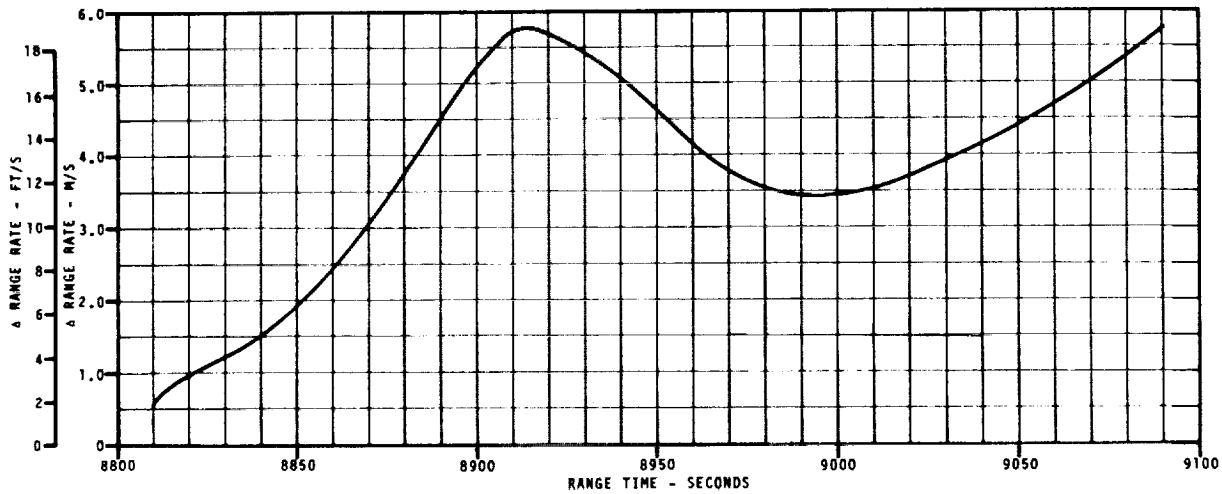

FIGURE 3-22. CARNARVON S-BAND RADAR RANGE RATE TRACKING DEVIATIONS - SECOND BURN PHASE

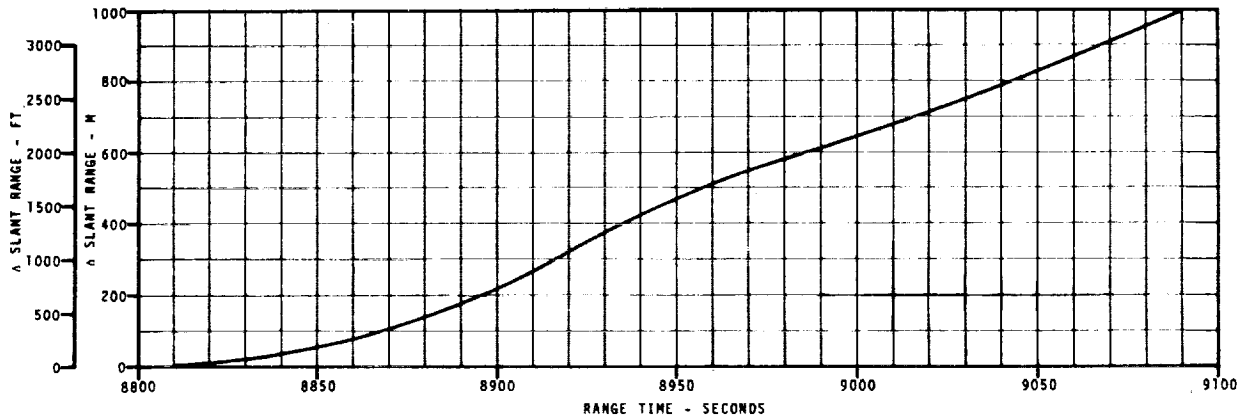

FIGURE 3-23. CARNARVON S-BAND RADAR SLANT RANGE TRACKING DEVIATIONS - SECOND BURN PHASE

TABLE 3-I. TIMES OF SIGNIFICANT EVENTS

EVENT	RANGE TIME, SECONDS		
	ACTUAL	NOMINAL	ACT-NOM
Guidance Reference Release	-16.960	-17.010	0.050
First Motion	0.2	0.2	0.0
Start of Time Base 1	0.6	0.6	0.0
Mach 1	68.0	69.2	-1.2
Maximum Dynamic Pressure	81.0	85.6	-4.6
S-IC Center Engine Cutoff	135.14	135.26	-0.12
S-IC Outboard Engine Cutoff	164.10	165.04	-0.94
S-IC/S-II Separation Command	164.8	165.8	-1.0
S-II Center Engine Cutoff	463.09	464.05	-0.96
S-II Outboard Engine Cutoff	559.05	556.90	2.15
S-II/S-IVB Separation Command	560.0	557.9	2.1
S-IVB 1st Guidance Cutoff	700.56	702.29	-1.73
Parking Orbit Insertion	710.56	712.29	-1.73
Begin S-IVB Restart Preparations	8,334.2	8,333.9	0.3
S-IVB Engine Reignition (STDV Open)	8,912.4	8,911.9	0.5
S-IVB 2nd Guidance Cutoff	9,263.24	9,268.24	-5.00
Translunar Injection	9,273.24	9,278.24	-5.00
CSM Separation (Initial)	10,949.4	10,768.4	181.0

TABLE 3-II. SIGNIFICANT TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
First Motion	Range Time, sec	0.2
	Total Inertial Acceleration, m/s^2	10.34
	(ft/s^2)	(33.92)
	(g)	(1.05)
Mach 1	Range Time, sec	68.0
	Altitude, km	8.0
	(n mi)	(4.3)
Maximum Dynamic Pressure	Range Time, sec	81.0
	Dynamic Pressure, N/cm^2	3.14
	(lbf/ft^2)	(655.80)
	Altitude, km	12.3
	(n mi)	(6.6)
Maximum Total Inertial Acceleration: S-IC	Range Time, sec	164.18
	Acceleration, m/s^2	37.46
	(ft/s^2)	(122.90)
	(g)	(3.82)
S-II	Range Time, sec	463.17
	Acceleration, m/s^2	17.71
	(ft/s^2)	(58.10)
	(g)	(1.81)
S-IVB 1st Burn	Range Time, sec	700.66
	Acceleration, m/s^2	6.59
	(ft/s^2)	(21.62)
	(g)	0.67)
S-IVB 2nd Burn	Range Time, sec	9,263.34
	Acceleration, m/s^2	14.19
	(ft/s^2)	(46.56)
	(g)	(1.45)
Maximum Earth-Fixed Velocity: S-IC	Range Time, sec	164.59
	Velocity, m/s	2,369.8
	(ft/s)	(7,774.9)
S-II	Range Time, sec	560.07
	Velocity, m/s	6,575.9
	(ft/s)	(21,574.5)
S-IVB 1st Burn	Range Time, sec	710.56
	Velocity, m/s	7,382.8
	(ft/s)	(24,221.8)
S-IVB 2nd Burn	Range Time, sec	9,263.67
	Velocity, m/s	10,422.6
	(ft/s)	(34,194.9)

TABLE 3-III. ENGINE CUTOFF CONDITIONS

PARAMETER	S-IC CECO	S-IC OECO	S-II CECO	S-II OECO	S-IVB 1ST GUIDANCE CUTOFF	S-IVB 2ND GUIDANCE CUTOFF
Range Time, sec	135.14	164.10	463.09	559.05	700.56	9263.24
Altitude, km (nmi)	43.0 (23.2)	67.3 (36.3)	181.7 (98.1)	188.1 (101.6)	190.9 (103.1)	318.9 (172.2)
Surface Range, km (nmi)	44.8 (24.2)	94.7 (51.1)	1,101.4 (594.7)	1,650.0 (890.9)	2,604.4 (1,406.3)	
Space-Fixed Velocity, m/s (ft/s)	1,915.2 (6,283.5)	2,734.8 (8,972.4)	5,655.4 (18,554.5)	6,981.7 (22,905.8)	7,790.6 (25,559.7)	10,831.2 (35,535.4)
Flight Path Angle, deg	23.554	19.584	0.829	0.621	-0.004	7.028
Heading Angle, deg	79.228	78.468	82.809	85.784	91.245	65.881
Cross Range, km (nmi)	0.4 (0.2)	0.7 (0.4)	14.9 (8.0)	28.0 (15.1)	58.7 (31.7)	
Cross Range Velocity, m/s (ft/s)	7.0 (23.0)	13.5 (44.3)	106.3 (348.8)	172.7 (566.6)	264.5 (867.8)	
Eccentricity						0.9708
C_3*, m^2/s^2 (ft^2/s^2)						-1,766,307 -19,012,370
Inclination, deg						30.835
Descending Node, deg						117.393

* Twice the specific energy of orbit

$$C_3 = V^2 - \frac{2\mu}{R}$$

where v = Inertial Velocity
μ = Gravitational Constant
R = Radius from center of earth

TABLE 3-IV. STAGE SEPARATION CONDITIONS

PARAMETER	S-IC/S-II SEPARATION COMMAND	S-II/S-IVB SEPARATION COMMAND
Range Time, sec	164.8	560.0
Altitude, km (n mi)	67.9 (36.7)	188.2 (101.6)
Surface Range, km (n mi)	96.2 (51.9)	1,656.0 (894.2)
Space-Fixed Velocity, m/s (ft/s)	2,744.7 (9,004.9)	6,985.2 (22,917.3)
Flight Path Angle, deg	19.489	0.612
Heading Angle, deg	78.468	85.818
Cross Range, km (n mi)	0.7 (0.4)	28.2 (15.2)
Cross Range Velocity, m/s (ft/s)	13.6 (44.6)	173.2 (568.2)
Geodetic Latitude, deg N	28.815	31.030
Longitude, deg E	-79.648	-63.681

TABLE 3-V. TARGETING PARAMETERS

PARAMETER	ACTUAL	NOMINAL*	ACT-NOM
	S-IVB 1ST GUIDANCE CUTOFF		
Range Time, sec	700.56	702.29	-1.73
Altitude, km (n mi)	190.9 (103.1)	190.9 (103.1)	0.0 (0.0)
Space-Fixed Velocity, m/s (ft/s)	7,790.6 (25,559.7)	7,791.4 (25,562.3)	-0.8 (-2.6)
Flight Path Angle, deg	-0.004	-0.001	-0.003
	TRANSLUNAR INJECTION		
Range Time, sec	9,273.24	9,278.23	-4.99
Eccentricity	0.9722	0.9723	-0.0001
C_3, m^2/s^2 (ft^2/s^2)	-1,681,186 (-18,096,135)	-1,673,540 (-18,013,835)	-7,646 (-82,300)
Inclination, deg	30.834	30.812	0.022
Descending Node, deg	117.394	117.400	-0.006

* NOMINAL PARAMETERS ARE TAKEN FROM REFERENCES 3 AND 4 AS TERMINAL CONDITIONS FOR THE POWERED FLIGHT PHASES.

TABLE 3-VI. AVAILABLE TRACKING DATA - ASCENT AND SECOND BURN PHASES

DATA SOURCE	TIME AVAILABLE (SEC)
C-BAND*	
Patrick (0.18) Radar (FPQ-6)	25 - 527
Merritt Island (19.18) Radar (TPQ-18)	16 - 528
Cape Kennedy (1.16) Radar (FPS-16)	150 - 388
Grand Turk (7.18) Radar (TPQ-18)	231 - 605
Bermuda (67.16) Radar (FPS-16M)	268 - 706
Bermuda (67.18) Radar (FPQ-6)	262 - 710
Vanguard Insertion Ship Radar (TPQ-18)	574 - 712
USB**	
Merritt Island Radar	33 - 360
Bermuda Radar	278 - 715
Carnarvon Radar	8,761 - 9,091

* Measured parameters in azimuth angle, elevation angle, and slant range (PACSS3a).

** Measured parameters in X-angle, Y-angle, and slant range rate (PACSS3c).

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SECTION 4

ORBITAL TRAJECTORY RECONSTRUCTION

4.1 ORBITAL TRAJECTORIES

The S-IVB/LM/CSM was inserted into a near circular parking orbit at 710.56 seconds. While in parking orbit, vehicle subsystem checkout was carried out from the Mission Control Center at Houston. During the second revolution over Australia, the S-IVB stage was restarted and the vehicle was placed onto a translunar trajectory.

The parking orbit insertion conditions were close to nominal (Reference 4). The space-fixed velocity at insertion was 0.6 m/sec (2.0 ft/sec) less than nominal, the flight path angle was 0.002 degree less than nominal, and the eccentricity was 0.0002 greater than nominal. The apogee and perigee were 0.1 km (0.1 nmi) greater than and 1.8 km (1.0 nmi) less than nominal, respectively.

The translunar injection parameters were also compatible with the nominal values. The eccentricity was 0.0001 less than nominal, the inclination 0.022 degree greater than nominal and the angle of the descending node 0.006 degree less than nominal. The space-fixed velocity was 5.8 m/sec (19.0 ft/sec) greater than nominal, the altitude 7.6 km (4.1 nmi) less than nominal and C_3 was 7,646 m^2/sec^2 (82,301 ft^2/sec^2) less than nominal.

The parking orbit trajectory analysis spans the interval from insertion to 8,904 seconds but was terminated at 8,810 seconds for the second burn restart point. The post-TLI trajectory covers the period from translunar injection (9,273.24 seconds) to CSM separation (10,949.4 seconds). These two orbital trajectories were established by integration of the orbital model equations using the insertion/injection vector as the initial conditions.

The insertion/injection conditions, as determined by the Orbital Correction Program (OCP), were obtained by a differential correction procedure which adjusted the estimated insertion/injection conditions to fit the tracking data in accordance with weights assigned to the data. After all available tracking data were analyzed, the stations and passes providing the better quality data were used in the determination of the insertion/injection conditions.

4.2 ORBITAL DATA SOURCES

4.2.1 Orbital Tracking Data

Orbital tracking was conducted by the NASA Manned Space Flight Network (MSFN). A summary of the orbital tracking data is given in Table 4-I. Mutually consistent C-Band and Unified S-Band tracking data were selected and provide the basis of the reconstructed trajectory.

4.2.2 Orbital Venting Acceleration Data

During the parking orbit, no major thrusting occurred; however, the orbit was continuously perturbed by low-level LH_2 venting. This perturbation is considered in this analysis. The venting model was built from telemetered guidance velocity data from the ST-124M guidance platform. The guidance velocity data were fitted in segments by polynomials in time. The polynomials were analytically differentiated to model the component accelerations sensed by the guidance platform. Table 4-II lists the acceleration polynomials derived by this method. Figure 4-1 reflects the best estimate of the total parking orbit venting acceleration (rss of components) after atmospheric effects and biases have been removed.

4.3 TRAJECTORY RECONSTRUCTION

4.3.1 Parking Orbit Insertion Conditions

The Orbital Correction Program (OCP) was used to solve for the parking orbit insertion conditions utilizing the tracking data and the defined vent model. The insertion conditions are given in Table 4-III. The parking orbit solution is based on a composite fit of the two Bermuda C-Band stations at insertion, first and second passes of Carnarvon S-Band angle and available range data, S-Band angular data from first pass Goldstone and Texas and all observations from the C-Band trackers at Merritt Island (MLA) and Bermuda FPS-16M (BDA) during second pass. Figure 4-2 indicates that the parking orbit measured parameter tracking deviations are acceptable. The ground track from parking orbit insertion to CSM separation is given in Figure 4-3. The parking orbit trajectory in PACSS1 is given in Tables B-IV and C-IV.

4.3.2 Translunar Injection and CSM Separation Conditions

The translunar injection (TLI) conditions were determined by the Orbital Correction Program (OCP) and are given in Table 4-IV. The associated command service module (CSM) separation conditions are given in Table 4-V. The post-TLI

4.3.2 (Continued)

trajectory segment was reconstructed by using post-CSM separation tracking data with two sets of acceleration components modeling orbit perturbations (see Table 4-II). Merritt Island (MLA) and Bermuda FPQ-6 (BDQ) C-Band radars furnished the tracking data used in the reconstruction. One set of acceleration components were derived from the telemetered guidance velocity data and cover the time period from TLI to CSM separation. The other set of acceleration components cover the time period from CSM separation to 13,788 seconds and were derived separately as discussed below.

The unavailability of tracking data between TLI and CSM separation plus the loss of IU telemetry data after CSM separation at 10,955.9 seconds precluded the direct solution of the TLI state vector. Initial analysis of the tracking data residuals disclosed an apparent acceleration affecting the orbit in the post-CSM separation time period. Since no telemetered guidance velocity data were available to determine these acceleration components, they were modeled and solved for as venting acceleration bias components in conjunction with a CSM separation state vector by using the OCP program. These apparent accelerations (constant over the time interval from CSM separation to 13,788 seconds) were then incorporated with the first set of acceleration components into a TLI solution as platform sensed accelerations. The termination of the apparent acceleration at 13,788 seconds was determined from data analyses where a definite break in the residual characteristics was noted.

The two-step trajectory reconstruction activity gave a suitable TLI state vector which closely matched the vector obtained by integrating the second burn guidance velocity data from the parking orbit solution. Figures 4-4 and 4-5 indicate that the post-CSM separation measured parameter tracking deviations are acceptable. The Goldstone Wing Site and Merritt Island S-Band data were used to verify the solution produced by the C-Band trackers.

4.3.3 Docking Maneuvers

Table 4-VI, obtained from Reference 6, outlines the several docking attempts. Some of these post-CSM separation docking attempts during the interval from 11,633 to 12,222 seconds show in the Goldstone Wing Site range rate data and are depicted in Figure 4-6. The fourth docking attempt at 12,221.7 seconds is particularly evident where CSM thrusting was maintained for 6.2 seconds after contact. The docking attempts which are not visible in Figure 4-6

4.3.3 (Continued)

are masked by noise in the data or cannot be resolved on the time scale used.

4.4 ORBITAL TRACKING ANALYSIS

The stations used to obtain the parking orbit insertion conditions and translunar injection conditions are given by Table 4-VI and 4-VII, respectively. These two tables also include the number of data points used and the mean and root-mean-square errors of the residual for each data type. These errors represent the difference between the actual observations and the calculated observations based on the orbital ephemeris defined by the initial conditions. The rms residual errors include high frequency errors (assumed Gaussian), systematic errors due to instrumentation biases, mathematical model error, and errors in the correction for atmospheric refraction.

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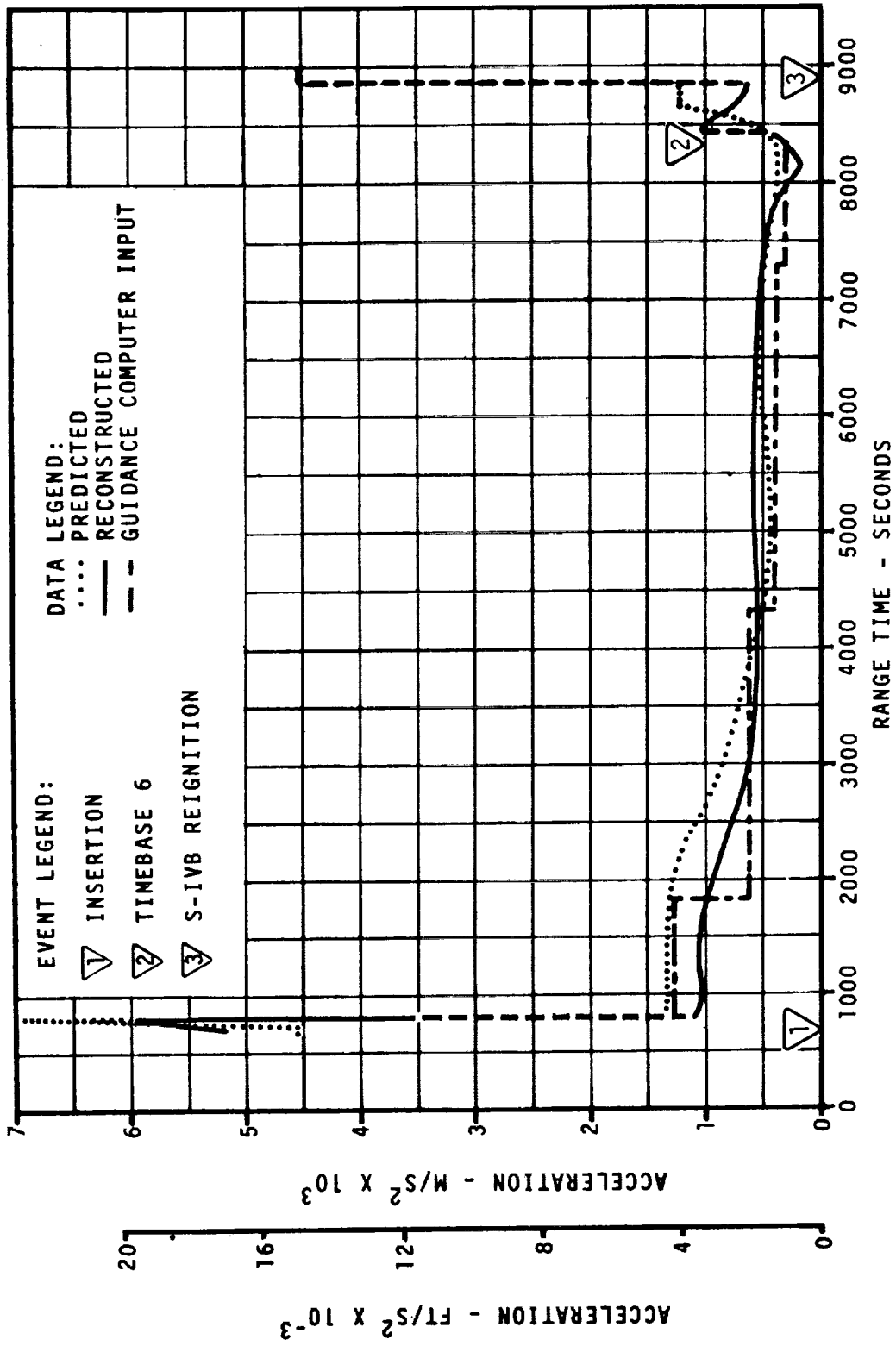

FIGURE 4-1. PARKING ORBIT ACCELERATION

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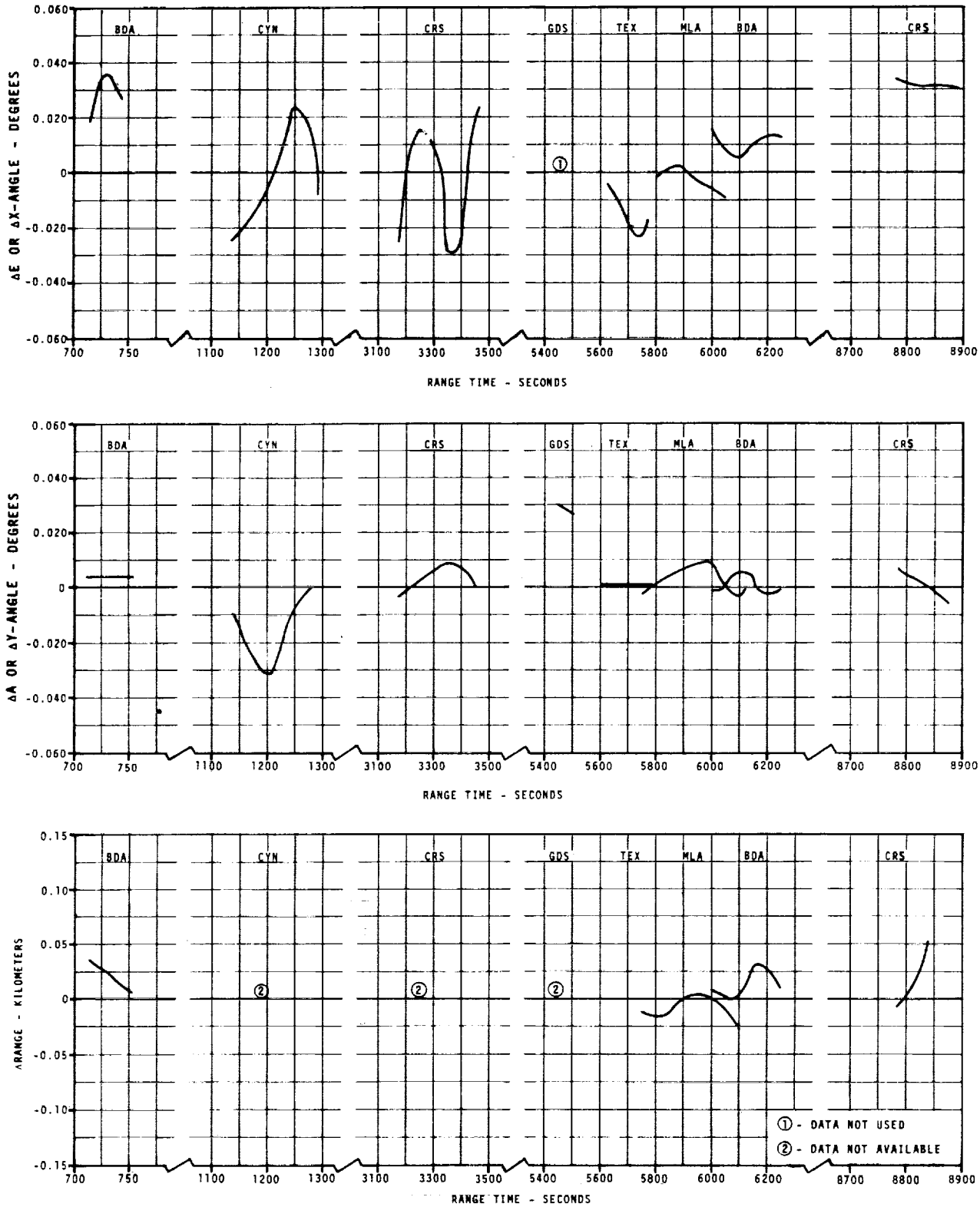

FIGURE 4-2. MEASURED PARAMETER TRACKING DEVIATIONS - PARKING ORBIT PHASE

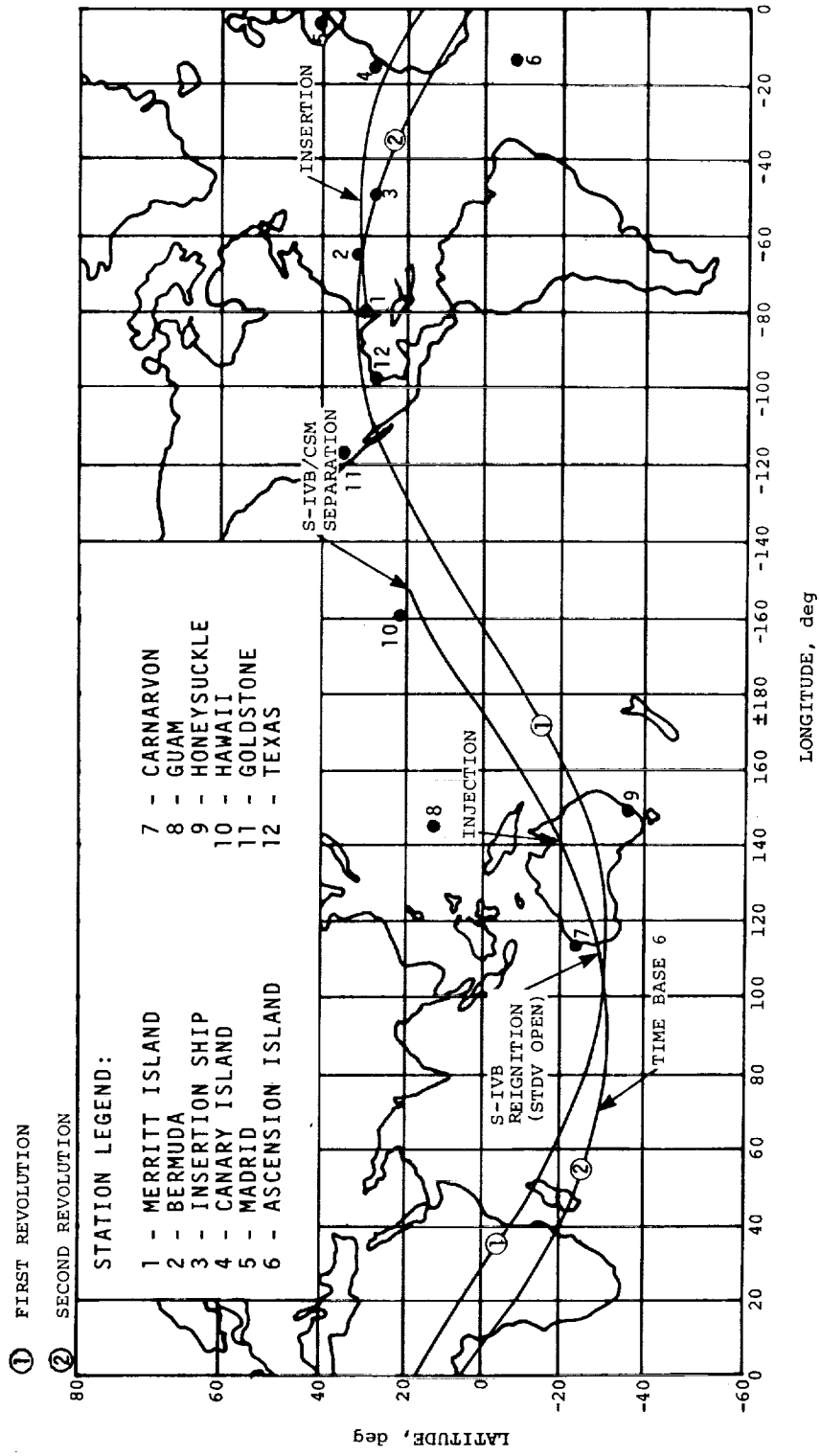

FIGURE 4-3. AS-509 LAUNCH VEHICLE GROUND TRACK

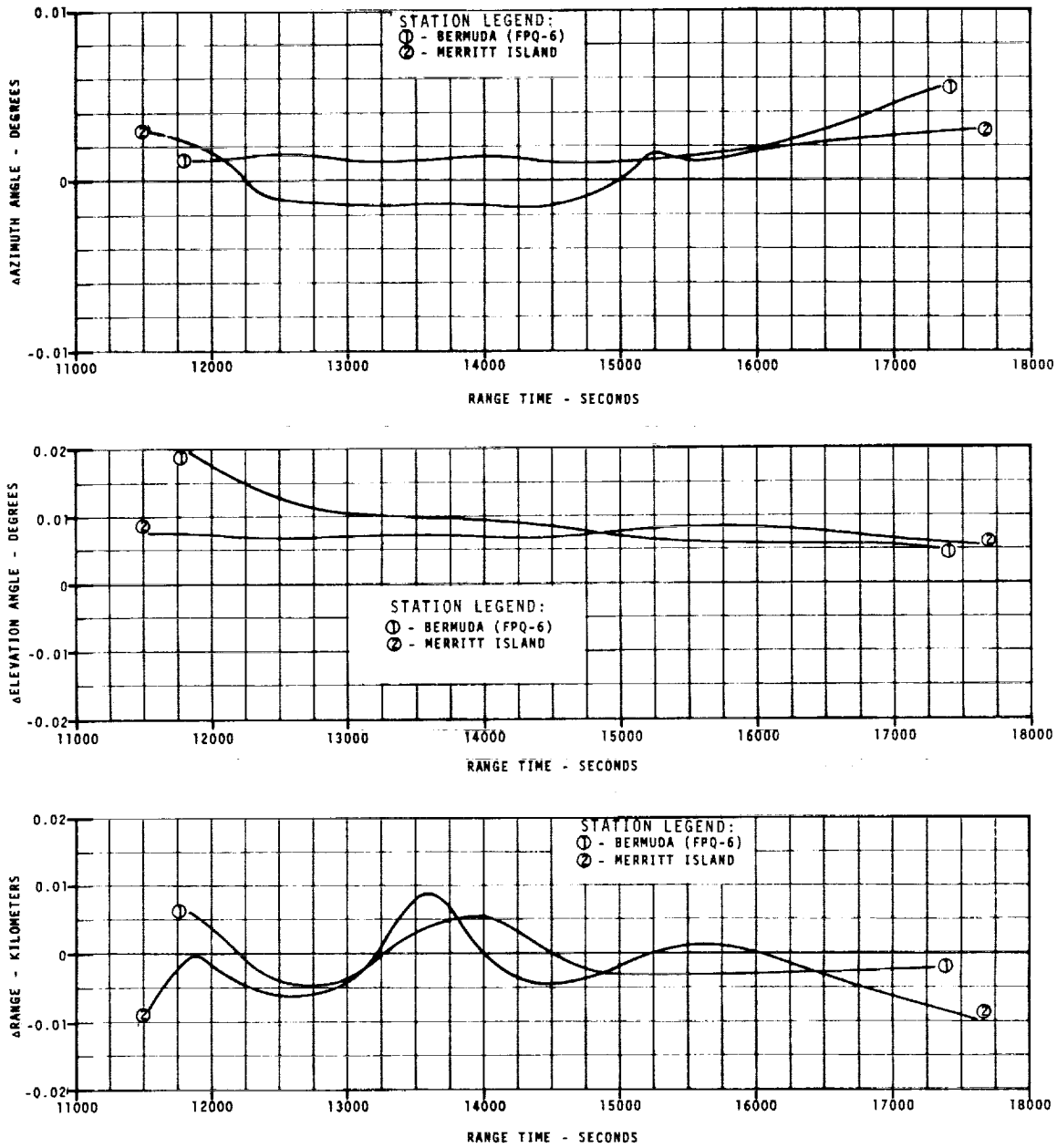

FIGURE 4-4. C-BAND RADAR MEASURED PARAMETER TRACKING DEVIATIONS - POST TRANSLUNAR INJECTION PHASE

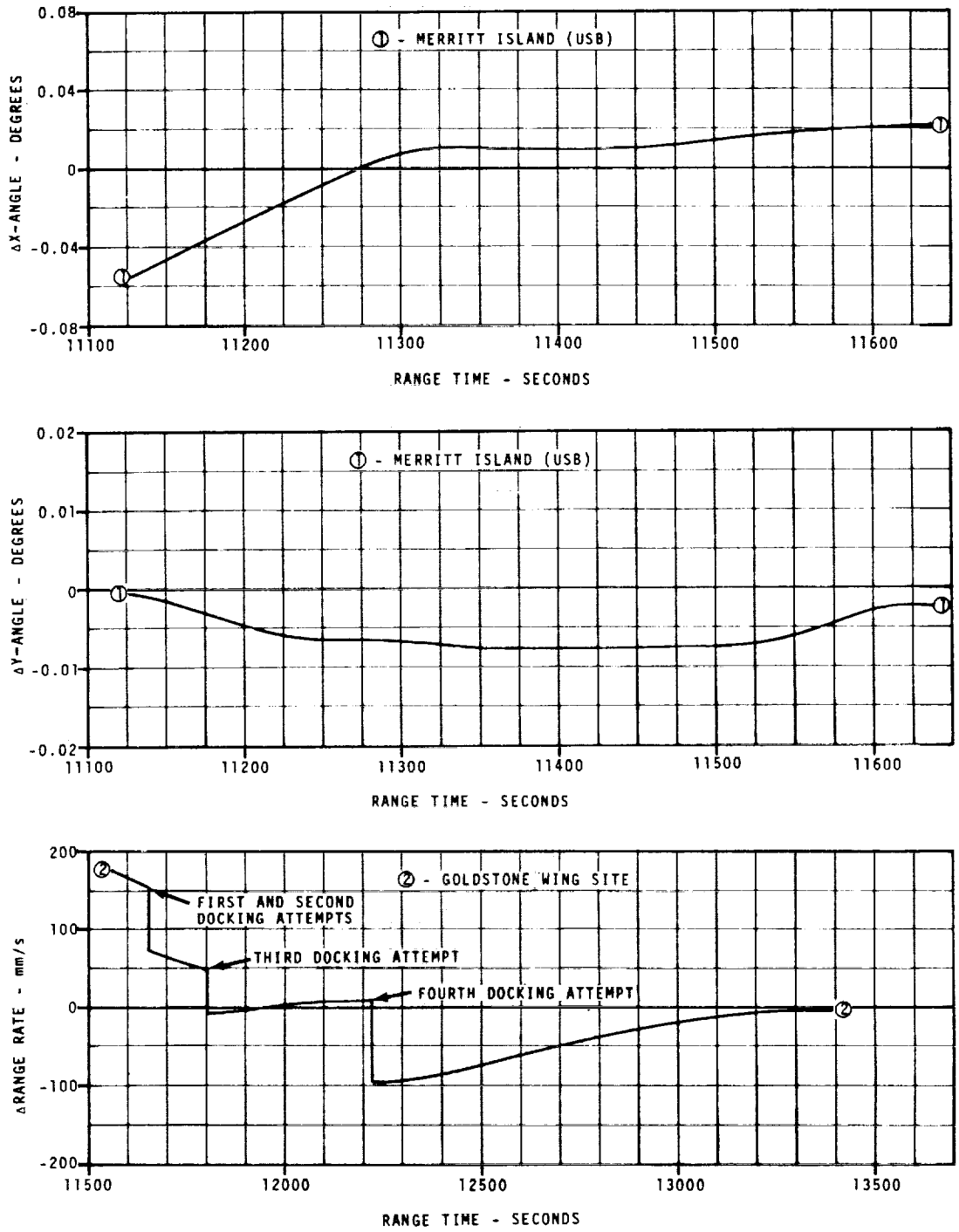

FIGURE 4-5. S-BAND RADAR MEASURED PARAMETER TRACKING DEVIATIONS - POST TRANSLUNAR INJECTION PHASE

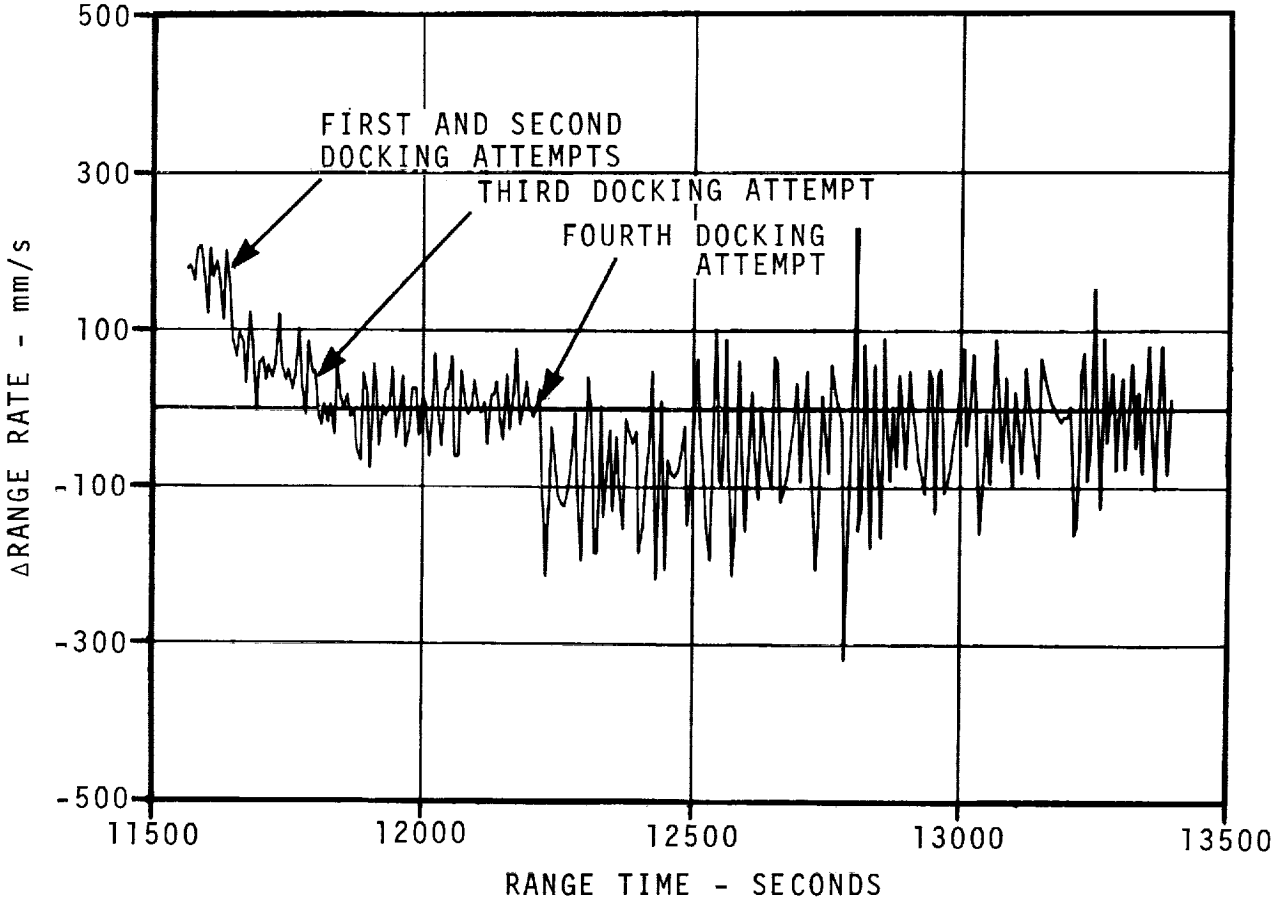

FIGURE 4-6. GOLDSTONE RANGE RATE DEVIATIONS - POST CSM SEPARATION

TABLE 4-I. SUMMARY OF AVAILABLE ORBITAL TRACKING DATA

STATION	TYPE OF RADARS	REV 1	REV 2	POST TLI
Bermuda	FPS-16M	X	X	
Bermuda	FPQ-6	X		X
Vanguard Ship	FPS-16M	X	X	
Canary Island	USB-30'	X	X	
Carnarvon	USB-30'	X	X	
Guam	USB-30'			X
Merritt Island	TPQ-18		X	X
Goldstone*	USB-85'			X
Hawaii	USB-30'			X
Merritt Island	USB-30'			X
Corpus Christi	USB-30'	X		
Goldstone	USB-85'	X		

* Jet Propulsion Laboratory Wing Site measuring hour angle, declination, and range rate (PACSS3b).

TABLE 4-II. ORBITAL ACCELERATION POLYNOMINALS

	SEG. NO.	START TIME	END TIME	C_0	C_1	C_2	C_3	C_4	C_5
	X1	710.56	800.00	$0.15640639 \times 10^{-5}$	$-0.17326855 \times 10^{-6}$	$0.14814108 \times 10^{-8}$	0.	0.	0.
	X2	800.00	8,376.00	$-0.48592947 \times 10^{-7}$	$-0.22455026 \times 10^{-8}$	$0.21755530 \times 10^{-11}$	$-0.64539064 \times 10^{-15}$	$0.75431215 \times 10^{-19}$	$-0.30047469 \times 10^{-23}$
	X3	8,376.00	8,830.00	$0.41419503 \times 10^{-6}$	$0.94288882 \times 10^{-9}$	0.	0.	0.	0.
	X4	8,830.00	8,904.00	$0.32789775 \times 10^{-5}$	0.	0.	0.	0.	0.
†	X5	9,273.24	9,462.24	$0.84562321 \times 10^{-5}$	$-0.66553464 \times 10^{-6}$	$0.28340544 \times 10^{-7}$	$-0.47808224 \times 10^{-9}$	$0.32724009 \times 10^{-11}$	$-0.77061012 \times 10^{-14}$
†	X6	9,462.24	10,120.00	$0.30831543 \times 10^{-6}$	0.	0.	0.	0.	0.
†	X7	10,120.00	10,496.00	$-0.63650532 \times 10^{-5}$	$0.28708940 \times 10^{-6}$	$-0.42000717 \times 10^{-8}$	$0.27035020 \times 10^{-10}$	$-0.78564210 \times 10^{-13}$	$0.83897214 \times 10^{-16}$
†	X8	10,496.00	10,949.4	$0.28625015 \times 10^{-6}$	0.	0.	0.	0.	0.
*†	X9	10,949.4	13,786.00	$-0.11662100 \times 10^{-6}$	0.	0.	0.	0.	0.
	Y1	710.56	800.00	0.	0.	0.	0.	0.	0.
	Y2	800.00	8,376.00	$0.66659170 \times 10^{-7}$	$0.65972206 \times 10^{-10}$	$-0.52617483 \times 10^{-13}$	$0.16765642 \times 10^{-16}$	$-0.24300416 \times 10^{-20}$	$0.13717342 \times 10^{-24}$
	Y3	8,376.00	8,830.00	$0.17305074 \times 10^{-6}$	0.	0.	0.	0.	0.
	Y4	8,830.00	8,904.00	$0.17305074 \times 10^{-6}$	0.	0.	0.	0.	0.
†	Y5	9,273.24	9,422.24	$0.33545790 \times 10^{-6}$	0.	0.	0.	0.	0.
†	Y6	9,422.24	9,586.00	$0.95256915 \times 10^{-7}$	0.	0.	0.	0.	0.
†	Y7	9,586.00	9,960.00	$0.10548301 \times 10^{-6}$	0.	0.	0.	0.	0.
†	Y8	9,960.00	10,504.00	$0.21386702 \times 10^{-6}$	0.	0.	0.	0.	0.
†	Y9	10,504.00	10,949.4	$0.10548301 \times 10^{-6}$	0.	0.	0.	0.	0.
*†	Y10	10,949.4	13,786.00	$-0.20207600 \times 10^{-7}$	0.	0.	0.	0.	0.
	Z1	710.56	800.00	$0.48488245 \times 10^{-5}$	$0.16740970 \times 10^{-7}$	$-0.47176758 \times 10^{-9}$	0.	0.	0.
	Z2	800.00	8,376.00	$0.88180457 \times 10^{-6}$	$-0.13016756 \times 10^{-8}$	$-0.15931786 \times 10^{-12}$	$0.31573304 \times 10^{-15}$	$-0.68307945 \times 10^{-19}$	$0.42408568 \times 10^{-23}$
	Z3	8,376.00	8,830.00	$-0.13605433 \times 10^{-5}$	$0.19107128 \times 10^{-8}$	0.	0.	0.	0.
	Z4	8,830.00	8,904.00	$-0.36048433 \times 10^{-5}$	0.	0.	0.	0.	0.
†	Z5	9,273.24	9,483.24	$-0.71717246 \times 10^{-5}$	$0.49959780 \times 10^{-6}$	$-0.11421543 \times 10^{-7}$	$0.10820443 \times 10^{-9}$	$-0.45277811 \times 10^{-12}$	$0.69347664 \times 10^{-15}$
†	Z6	9,483.24	10,223.00	$0.54054054 \times 10^{-7}$	0.	0.	0.	0.	0.
†	Z7	10,223.00	10,949.4	$-0.10456993 \times 10^{-6}$	$-0.69738170 \times 10^{-8}$	$0.30954435 \times 10^{-10}$	$-0.30950408 \times 10^{-13}$	0.	0.
*†	Z8	10,949.4	13,786.00	$0.23579400 \times 10^{-6}$	0.	0.	0.	0.	0.

† DENOTES POST-TLI SEGMENTS

* DENOTES SOLVED FOR ACCELERATION SEGMENT

NOTES: POLYNOMINALS ARE OF THE FORM $A = C_0+C_1t+C_2t^2+C_3t^3+C_4t^4+C_5t^5$ WHERE A IS THE ACCELERATION COMPONENT (km/s^2) AND $t=T-T_b$ WHERE $T_b \leq T < T_e$. THE BEGIN TIME (T_b) AND END TIME (T_e) FOR THE POLYNOMINAL SEGMENTS ARE EXPRESSED IN SECONDS.

THE ACCELERATION COMPONENTS ARE EXPRESSED IN THE LAUNCH VEHICLE PLATFORM - ACCELEROMETER SYSTEM (PACSS12)

TABLE 4-III. PARKING ORBIT INSERTION CONDITIONS

PARAMETER	VALUE
Range Time, sec	710.56
Altitude, km (n mi)	190.9 (103.1)
Space-Fixed Velocity, m/s (ft/s)	7,792.5 (25,565.9)
Flight Path Angle, deg	-0.003
Heading Angle, deg	91.656
Inclination, deg	31.120
Descending Node, deg	117.455
Eccentricity	0.0002
Apogee*, km (n mi)	185.3 (100.1)
Perigee*, km (n mi)	183.2 (98.9)
Period, min	88.18
Geodetic Latitude, deg N	31.246
Longitude, deg E	-52.983

* Based on a spherical earth of radius 6,378.165 km (3,443.934 n mi).

TABLE 4-IV. TRANSLUNAR INJECTION CONDITIONS

PARAMETER	VALUE
Range Time, sec	9,273.24
Altitude, km (n mi)	332.5 (179.5)
Space-Fixed Velocity, m/s (ft/s)	10,823.9 (35,511.5)
Flight Path Angle, deg	7.480
Heading Angle, deg	65.583
Inclination, deg	30.834
Descending Node, deg	117.394
Eccentricity	0.9722
C_3*, m^2/s^2 (ft^2/s^2)	-1,681,186 (18,096,135)
Geodetic Latitude, deg N	-19.554
Longitude, deg E	141.731

* Twice the specific energy of orbit

$$C_3 = V^2 - \frac{2\mu}{R}$$

where V = Inertial Velocity
μ = Gravitational Constant
R = Radius from center of earth

TABLE 4-V. CSM SEPARATION CONDITIONS

PARAMETER	VALUE
Range Time, sec	10,949.4
Altitude, km (n mi)	7,943.9 (4,289.4)
Space-Fixed Velocity, m/s (ft/s)	7,346.4 (24,102.4)
Flight Path Angle, deg	46.810
Heading Angle, deg	65.369
Geodetic Latitude, deg N	19.213
Longitude, deg E	-153.446

TABLE 4-VI. DOCKING MANEUVERS (from Reference 6)

Docking Attempt	Contact, Hr:Min:Sec* (sec)*	Estimated Velocity, ft/sec	Contact Position, Clock-Oriented	Socket Contact Time, Seconds[1]	+X Thrusting After Contact, Seconds	Comments
1A	3:13:53.7 (11,633.7)	0.1	11:00	1.55	None	a. No thruster activity b. Contact moderately close to apex
1B	3:14:01.5 (11,641.5)	0.14 max[2]	9:00	1.65	None	Contact close to apex
1C	3:14:04.45 (11,644.45)	0.14 max[2]	4:30	1.4	0.55	Contact close to apex
1D	3:14:09.0 (11,649.0)	0.29 max[2]	4:00	2.35	1.95	Contact close to apex
2	3:14:43.7 (11,683.7)	0.4 to 0.5	8:30	1.7	None	Contact close to apex
3	3:16:43.4 (11,803.4)	0.4	7:00	2.45	None	Contact close to apex
4	3:23:41.7 (12,221.7)	0.4 to 0.5	3:00	6.5	6.2	Contact close to apex
5	4:32:29.3 (16,349.3)	0.25	6:00	2.9	None	Contact close to apex
6	4:56:44.9 (17,804.9)	0.2	7:00	In and hard docked	14.3	a. Contact moderately close to apex. b. Retract cycle began 6.9 seconds after contact. c. Initial latch triggered 11.8 seconds after contact.

Notes: 1. The maximum capture-latch response time is 80 milliseconds.
2. Estimated velocity from X-thruster activity time. These are maximums with some velocity being used to null out small separation velocity. Other estimated velocities from film interpretation.

* Range Time

TABLE 4-VII PARKING ORBIT TRACKING UTILIZATION SUMMARY

STATION	TIME OF TRACK (SECONDS) BEGIN	END	DATA TYPE	VALID OBSERVATIONS	MEAN ERROR OF RESIDUALS	RMS ERROR OF RESIDUALS
Bermuda (FPS-16M)	712	754	Azimuth Elevation Range	8 6 7	0.006 deg 0.027 deg 22 m (72 ft)	0.011 deg 0.028 deg 29 m (95 ft)
Bermuda (FPQ-6)	712	754	Azimuth Elevation Range	6 6 6	0.011 deg 0.026 deg -1 m (-3 ft)	0.011 deg 0.032 deg 5 m (16 ft)
Canary Island (USB-30)	1,078	1,396	X-Angle Y-Angle	23 26	-0.005 deg -0.004 deg	0.015 deg 0.006 deg
Carnarvon (USB-30)	3,154	3,502	X-Angle Y-Angle	40 41	0.002 deg 0.003 deg	0.020 deg 0.005 deg
Goldstone (USB-85)	5,386	5,512	Y-Angle	9	0.028 deg	0.029 deg
Corpus Cristi (USB-30)	5,530	5,782	X-Angle Y-Angle	27 27	-0.014 deg 0.000 deg	0.016 deg 0.002 deg
Merritt Island (TPQ-18)	5,740	6,118	Azimuth Elevation Range	47 35 52	0.002 deg -0.001 deg -10 m (33 ft)	0.006 deg 0.005 deg 13 m (43 ft)
Bermuda (FPS-16M)	5,938	6,334	Azimuth Elevation Range	44 47 64	0.001 deg 0.009 deg -10 m (33 ft)	0.005 deg 0.011 deg 22 m (72 ft)
Canary Island (USB-30)	6,724	6,838	Y-Angle	17	-0.023 deg	0.025 deg
Carnarvon (USB-30)	8,762	8,900	X-Angle Y-Angle Range	17 17 11	0.033 deg 0.003 deg 6 m (20 ft)	0.034 deg 0.007 deg 10 m (33 ft)

TABLE 4-VIII POST-TLI TRACKING UTILIZATION SUMMARY

STATION	TIME OF TRACK (SECONDS) BEGIN	END	DATA TYPE	VALID OBSERVATIONS	MEAN ERROR OF RESIDUALS	RMS ERROR OF RESIDUALS
Merritt Island (TPQ-18)	11,566	17,632	Azimuth Elevation Range	260 260 260	0.001 deg 0.007 deg -1 m (3 ft)	0.006 deg 0.010 deg 14 m (46 ft)
Bermuda (FPQ-6)	11,848	17,302	Azimuth Elevation Range	216 216 216	0.002 deg 0.011 deg 0 m	0.008 deg 0.015 deg 19 m (62 ft)

SECTION 5

TRAJECTORY ERROR ANALYSIS

5.1 ERROR ANALYSIS

The confidence level or uncertainty that is assigned to a reconstructed trajectory depends on the following factors:

a. Quantity of Tracking Data

b. Quality of Tracking Data

c. Consistency between Tracking and Guidance Velocity Data

d. Continuity between Trajectory Segments

These factors vary from flight to flight. Therefore, a rigorous statistical error analysis of the reconstructed trajectory is difficult to obtain. The following paragraphs summarize the results for this flight, and lead to the position and velocity uncertainties for the reconstructed trajectory.

5.1.1 Quantity of Tracking Data

The available tracking data for the ascent and second burn phases are summarized in Figures 3-11, 3-12, and Table 3-VI. The tracking coverages for the parking orbit and post-TLI phases are summarized in Tables 4-I, 4-VII and 4-VIII.

The tracking stations for the ascent phase provided redundant coverage. The available tracking data during parking orbit provided adequate coverage with the last data set continuing into the second burn phase. No tracking coverage existed in the post-TLI phase until 2287 seconds following TLI, although Hawaii tracking data should have been available starting at approximately 450 seconds after TLI.

5.1.2 Quality of Tracking Data

The C-Band tracking data were of good quality from liftoff to CSM separation. Comparisons of the C-Band data in measured parameters (PACSS3a) with the ascent trajectory are shown in Figures 3-13 through 3-15. Comparisons of the C-Band data in measured parameters (PACSS3a) with the parking orbit and post-TLI orbit trajectories are shown in Figures 4-2 and 4-4. These plots indicate that the tracking data from the different stations were mutually consistent and the data deviations were of acceptable magnitude. The tracking data were transformed into the

5.1.2 (Continued)

earth-fixed launch site coordinate system (PACSS10) and differenced with the reconstructed trajectory to provide a more direct indication of the spread of the tracking data about the trajectory. The tracking data spreads for the ascent, parking orbit, and post-TLI phases are shown in Figures 5-2 through 5-5, and 5-7. The position spreads were plotted for the entire tracker time spans to give a better indication of the quality of the tracking data. It should be noted that the plots do not reflect the data spans actually used in the analysis. Some data were eliminated due to inconsistencies, wild points, and low elevation. Due to the redundant C-Band data during the ascent phase and the lack of S-Band range data for the orbit phases, the C-Band position spreads were considered adequate to define the trajectory accuracy. Carnarvon S-Band data were the only data available for the second burn phase and the tracking data spreads for this tracker are shown in Figure 5-6.

5.1.3 Consistency Between Tracking and Guidance Velocity Data

The consistency between tracking and guidance velocity data can be obtained by examining the guidance velocity error plots during powered flight trajectory segments. These error plots give the differences between the guidance velocities from the ST-124M platform and those derived from the reconstructed trajectory which fits the tracking data.

The guidance velocity error plots for the ascent phase had reasonable shapes and magnitudes. The maximum error amounted to 1.3 m/s (4.3 ft/s) in the vertical direction, 2.1 m/s (6.9 ft/s) in the crossrange direction, and 0.8 m/s (2.6 ft/s) in the downrange direction, referenced to the launch vehicle platform-accelerometer coordinate system (PACSS12).

The guidance velocity error plots for the second burn phase also had reasonable shapes and magnitudes. The maximum error amounted to 4.5 m/s (14.8 ft/s) in the vertical direction, 3.8 m/s (12.5 ft/s) in the crossrange direction, and 4.3 m/s (14.1 ft/s) in the downrange direction, referenced to PACSS12.

5.1.4 Continuity Between Trajectory Segments

The continuity between trajectory segments can be obtained by examining the insertion and injection parameters determined by the orbital and powered flight solutions before the trajectory segments were merged together.

5.1.4 (Continued)

Comparisons of the state vectors at parking orbit insertion obtained independently by the powered flight and orbital analyses yielded good agreement. The position and velocity components of the solutions had a spread of 22m (72 ft) and 0.6 m/s (2.0 ft/s) in the vertical direction, 19 m (62 ft) and 0.5 m/s (1.6 ft/s) in the crossrange direction, and 5 m (16 ft) and 0.1 m/s (0.3 ft/s) in the downrange direction, referenced to the earth-fixed launch site coordinate system (PACSS10).

Comparisons of the TLI vectors determined independently from the powered flight and orbital analyses also yielded good agreement. The TLI vector from the powered flight analysis was obtained by propagating forward the state vector at 8,810 seconds (from parking orbit analysis) to 9,273.24 seconds, using the telemetered guidance velocity data as the generating parameter. The TLI vector from the orbital analysis was determined separately by fitting the post-TLI tracking data. The position and velocity components of the two solutions had respectively a difference of 270 m (886 ft) and 1.6 m/s (5.2 ft/s) in the vertical direction, 511 m (1,677 ft) and 3.3 m/s (10.8 ft/s) in the crossrange direction, and 1,290 m (4,232 ft) and 2.4 m/s (7.9 ft/s) in the downrange direction, referenced to the earth-fixed launch site coordinate system (PACSS10).

Additional comparisons were performed for the TLI trajectory by selecting various tracking data combinations with and without the apparent post-CSM separation acceleration components discussed in Section 4.3.2. The TLI vectors resulting from these comparisons had a spread in position and velocity components in PACSS10:

Vertical: 230 m (755 ft) - 0.3 m/s (1.0 ft/s)

Crossrange: 2,770 m (9,088 ft) - 0.3 m/s (1.0 ft/s)

Downrange: 1,830 m (6,004 ft) - 1.0 m/s (3.3 ft/s)

As an additional validity check on the post-TLI trajectory, the CSM separation state vector was propagated forward to lunar impact with all planned velocity increments accounted for. The resultant lunar impact point is in reasonable agreement with the actual lunar impact as determined by the MSFC Lunar Impact Team from deep space tracking data.

5.2 TRAJECTORY UNCERTAINTIES

Based on the information of Paragraph 5.1 and a priori knowledge, the trajectory uncertainties were conservatively estimated.

5.2 (Continued)

The uncertainties for the ascent phase are shown in Figure 5-1. At S-IC OECO, the uncertainties in position and velocity components in PACSS10 are ±70 m (±230 ft) and ±0.4 m/s (±1.3 ft/s), respectively. At S-II OECO, the uncertainties in position and velocity components in PACSS10 are ±360 m (±1,181 ft) and ±0.7 m/s (±2.3 ft/s), respectively. At insertion and throughout the parking orbit, the uncertainties in position and velocity components in PACSS10 are ±500 m (±1,640 ft) and ±1.0 m/s (±3.3 ft/s), respectively. The trajectory uncertainties increased to ±2,800 m (±9,186 ft) in position components and ±3.5 m/s (±11.5 ft/s) in velocity components at TLI and throughout the post-TLI trajectory. The total radius and velocity uncertainties at TLI are ±800 m (±2,625 ft) and ±1.0 m/s (±3.3 ft/sec), respectively.

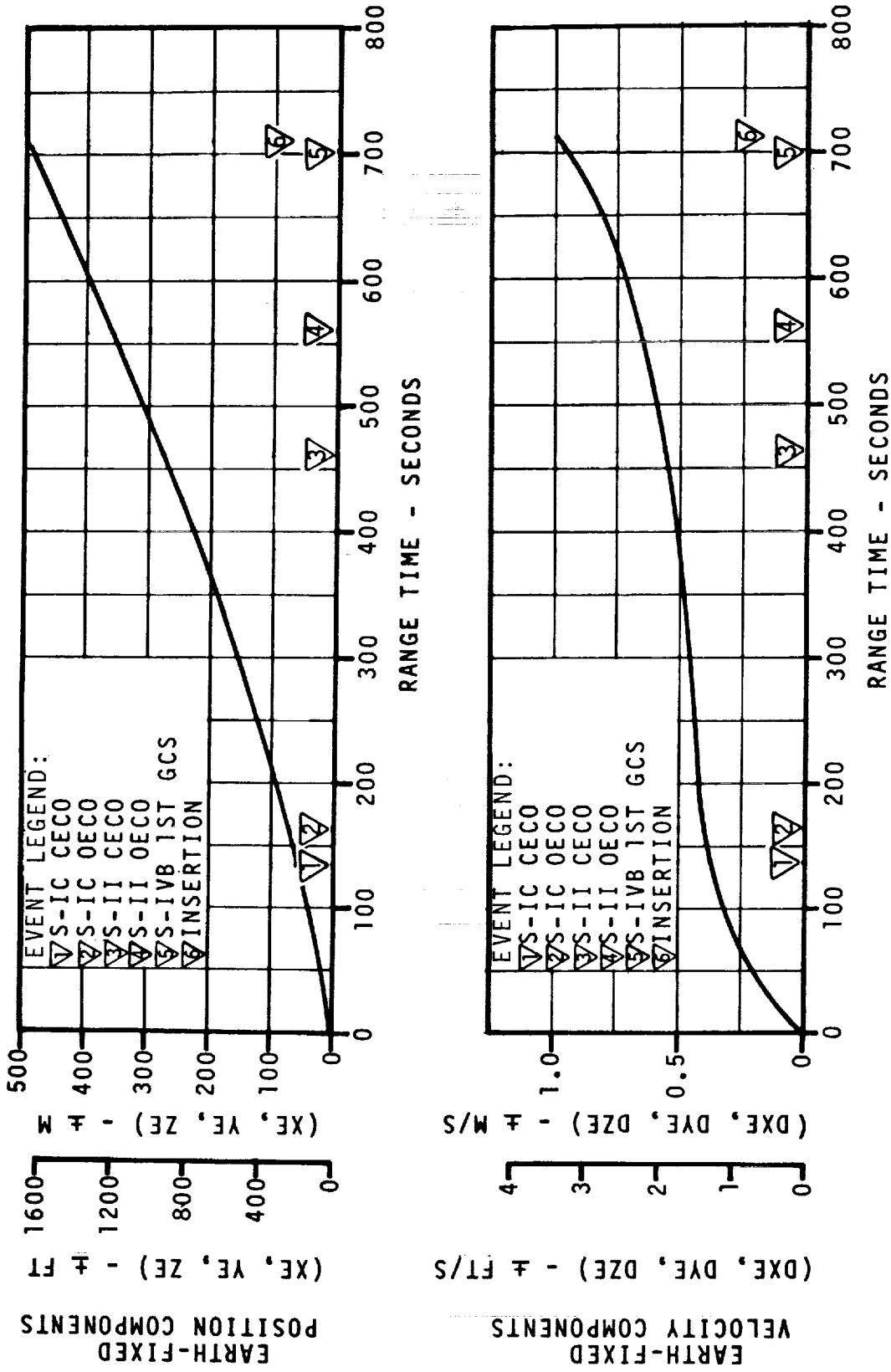

FIGURE 5-1. ESTIMATED TRAJECTORY UNCERTAINTY - ASCENT PHASE

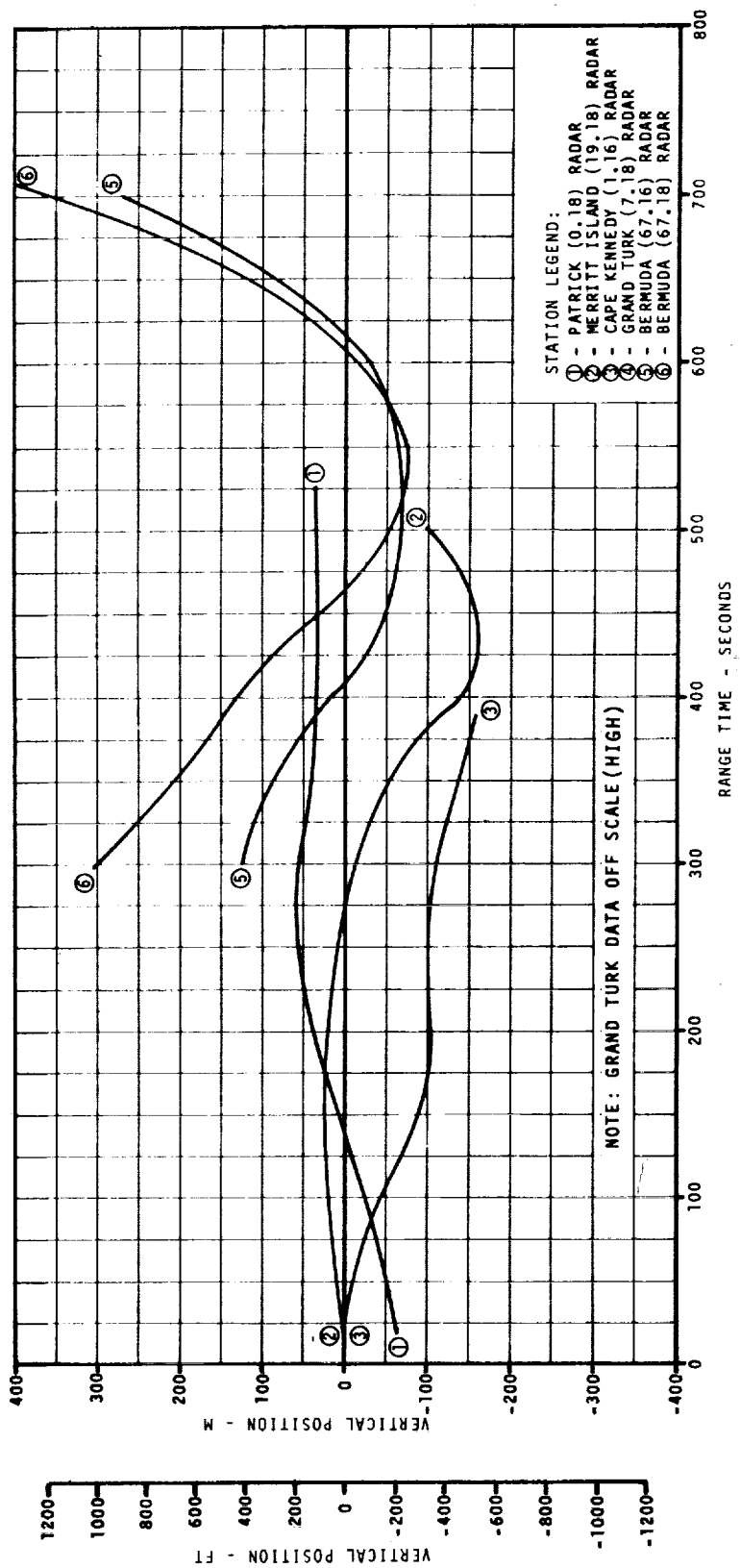

FIGURE 5-2. PACSS10 VERTICAL POSITION DEVIATIONS - ASCENT PHASE

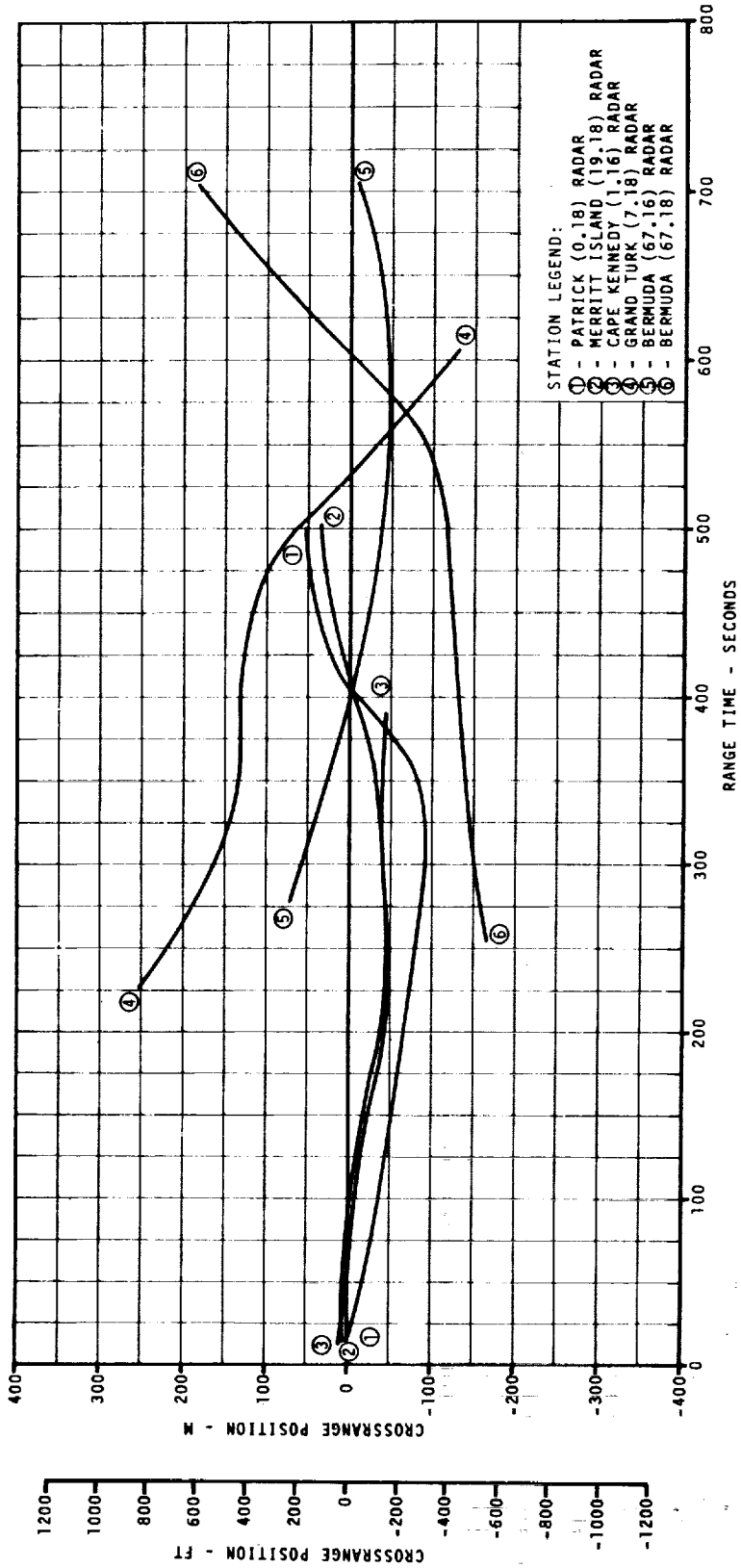

FIGURE 5-3. PACSS10 CROSS RANGE POSITION DEVIATIONS - ASCENT PHASE

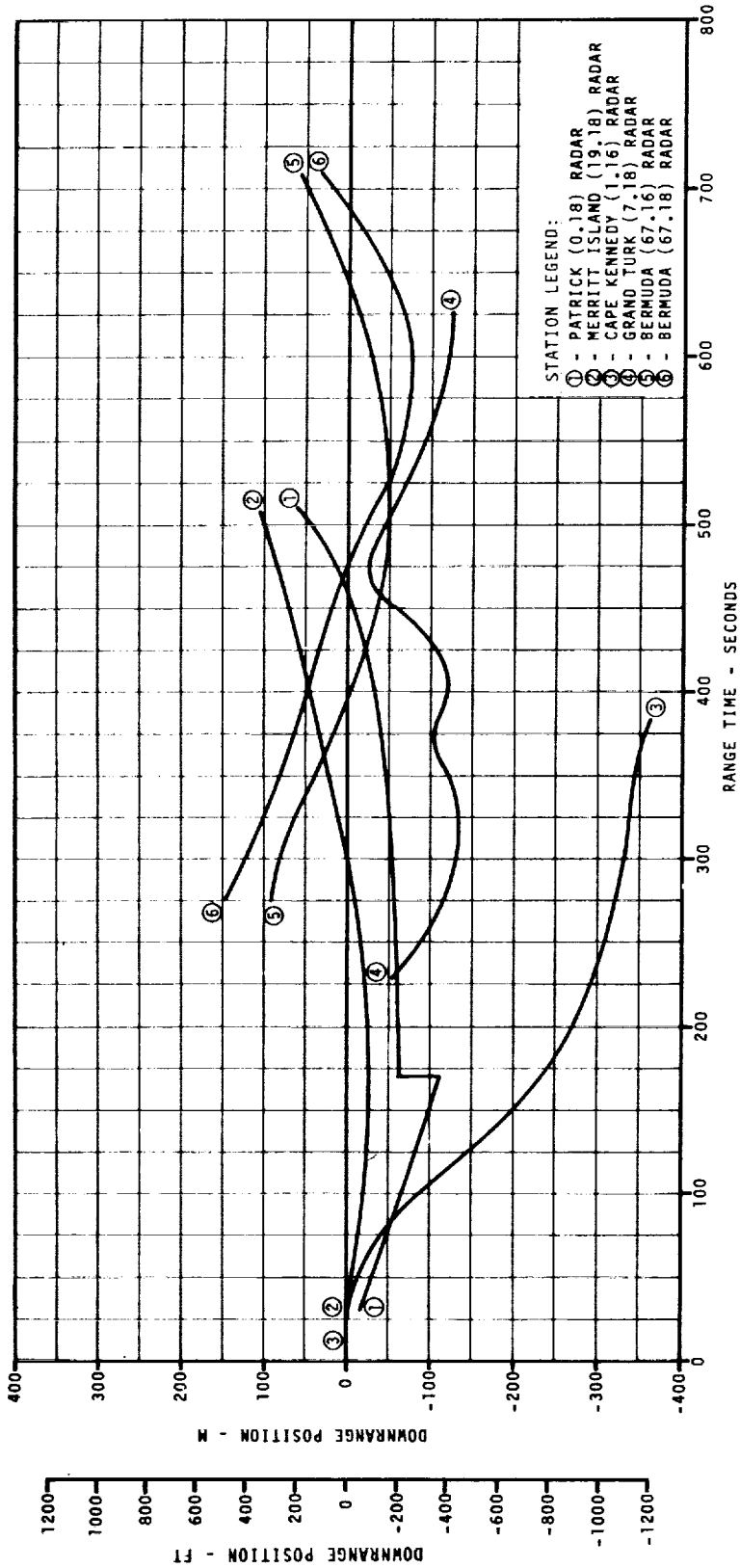

FIGURE 5-4. PACSSIO DOWN RANGE POSITION DEVIATIONS - ASCENT PHASE

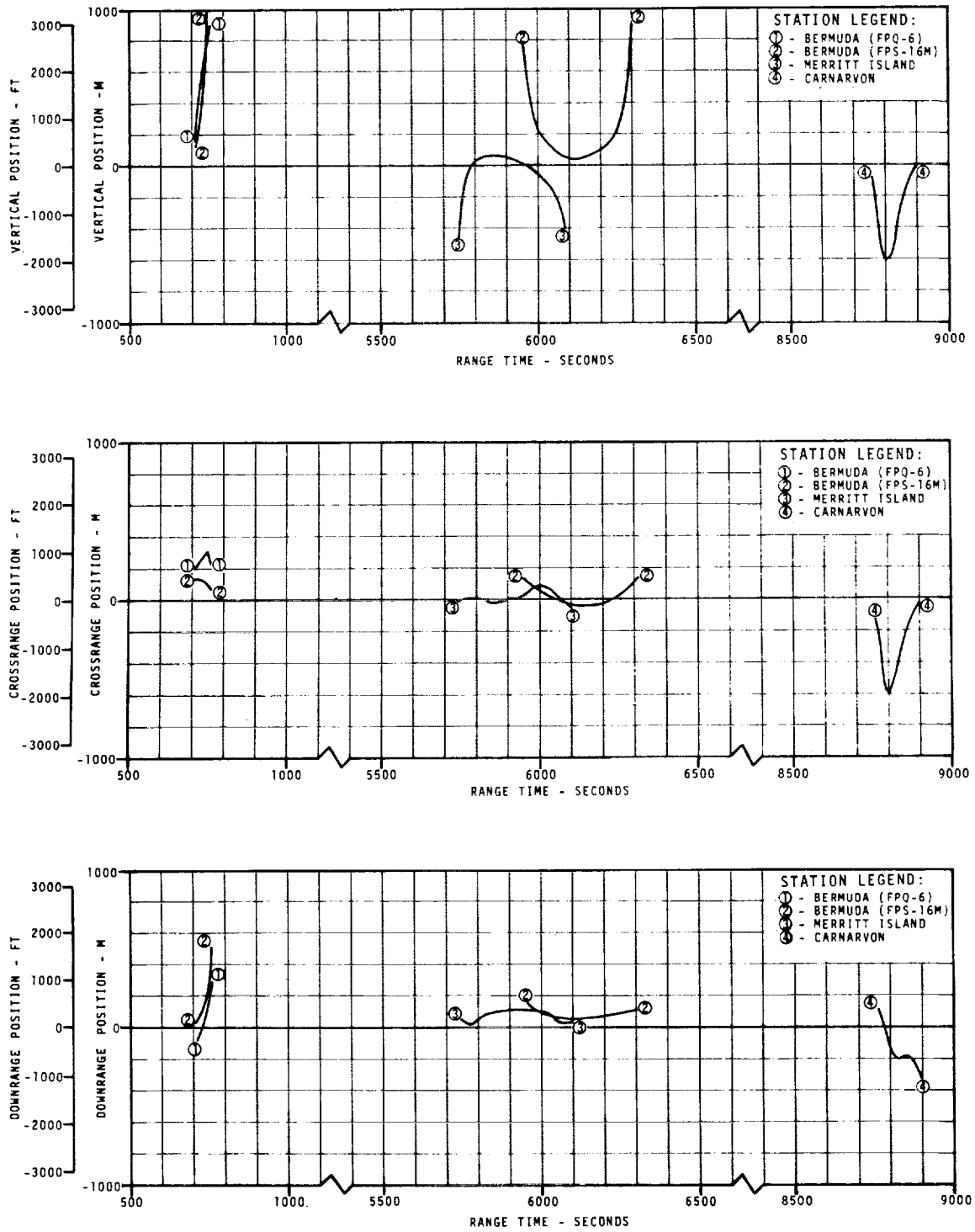

FIGURE 5-5. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE

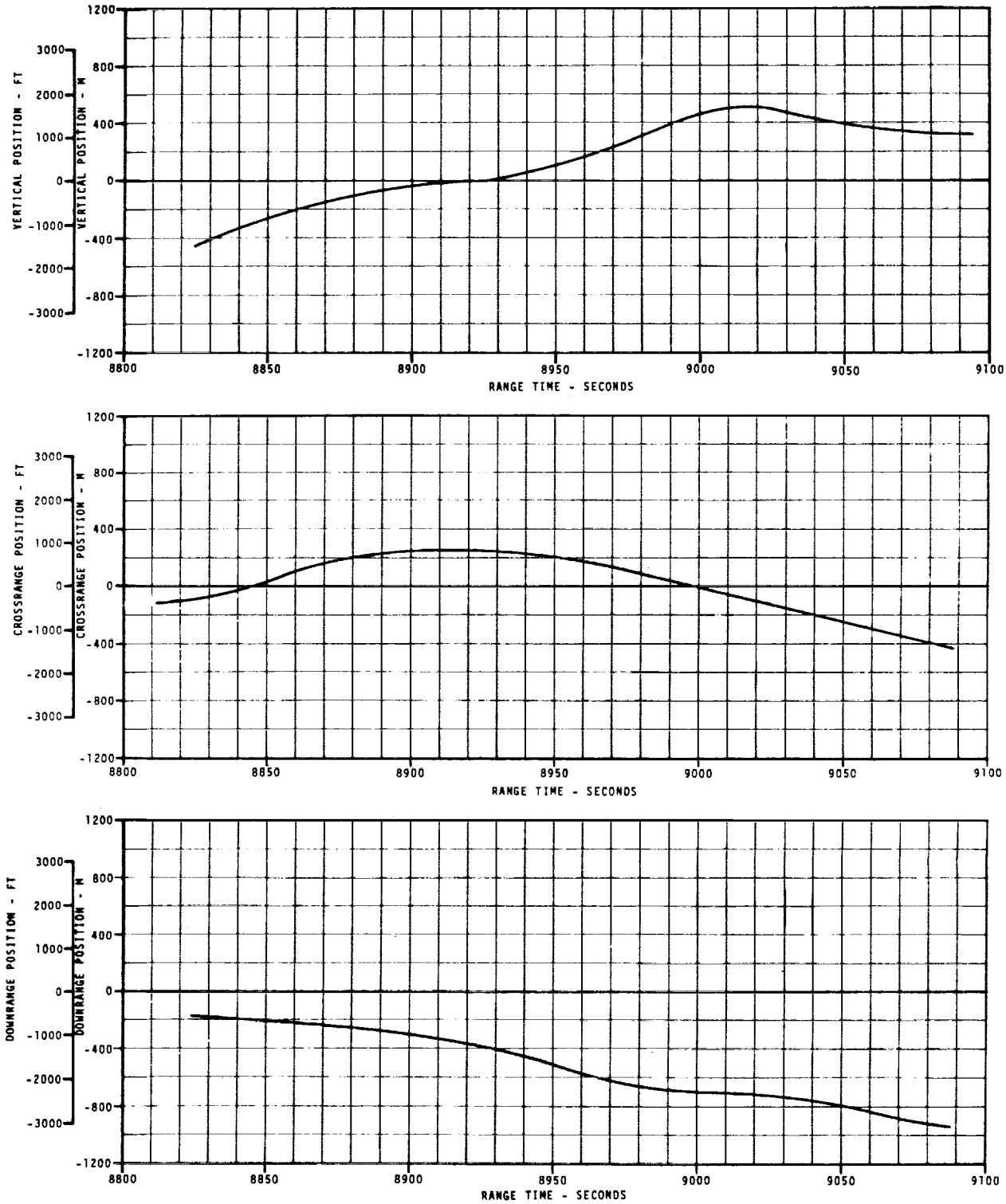

FIGURE 5-6. CARNARVON S-BAND RADAR PACSS10 POSITION DEVIATIONS - SECOND BURN PHASE

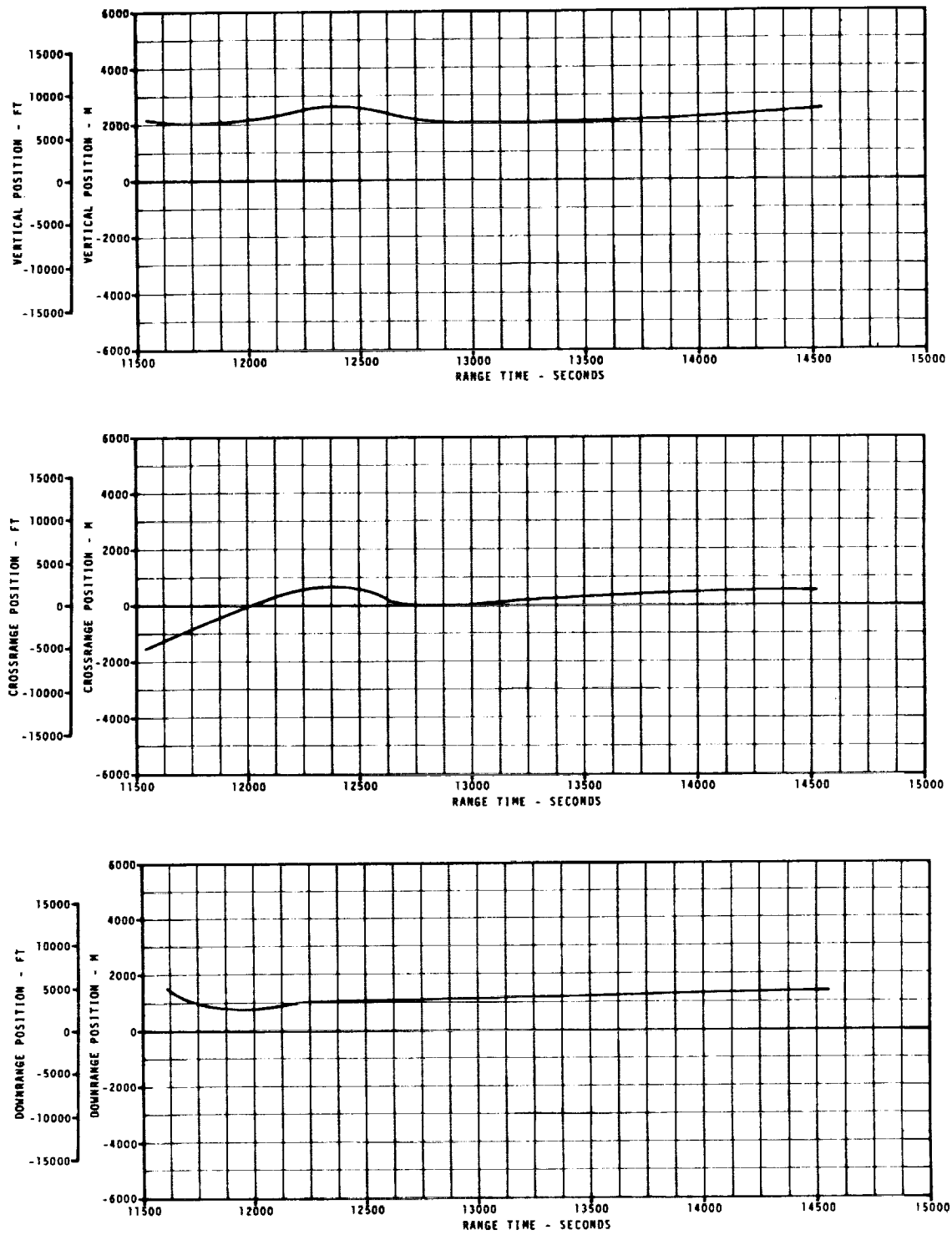

FIGURE 5-7. MERRITT ISLAND C-BAND RADAR PACSS10 POSITION DEVIATIONS - POST TRANSLUNAR INJECTION PHASE

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SECTION 6

SPENT STAGE TRAJECTORIES

6.1 S-IC SPENT STAGE TRAJECTORY

Postflight predictions of earth surface impact parameters for the spent S-IC stage were computed using a mass point trajectory simulation computer program. S-IC postflight burnout position and velocity data were combined with nominal main propulsion system decay performance and nominal retrorocket performance to initialize the simulation program.

Three separate theoretical trajectories were computed for the spent S-IC stage. These three trajectories represent the following booster atmospheric entry conditions:

a. Zero-degree angle-of-attack entry

b. Ninety-degree angle-of-attack entry

c. Tumbling entry

The tumbling booster case is considered to define actual case impact conditions although no tracking coverage was available for confirmation.

Results of the three computed S-IC spent stage trajectories are summarized in Table 6-I. The ground track is shown in Figure 6-1.

6.2 S-II SPENT STAGE TRAJECTORY

Three separate theoretical trajectories, corresponding to the zero-degree, ninety-degree, and tumbling-case trajectories computed for the S-IC stage, were computed for the spent S-II stage.

The computed results, assuming a tumbling stage, were considered to define stage impact conditions since no tracking coverage of the spent S-II stage was available.

Results of the three computed S-II spent stage trajectories are summarized in Table 6-II. The ground track is shown in Figure 6-1.

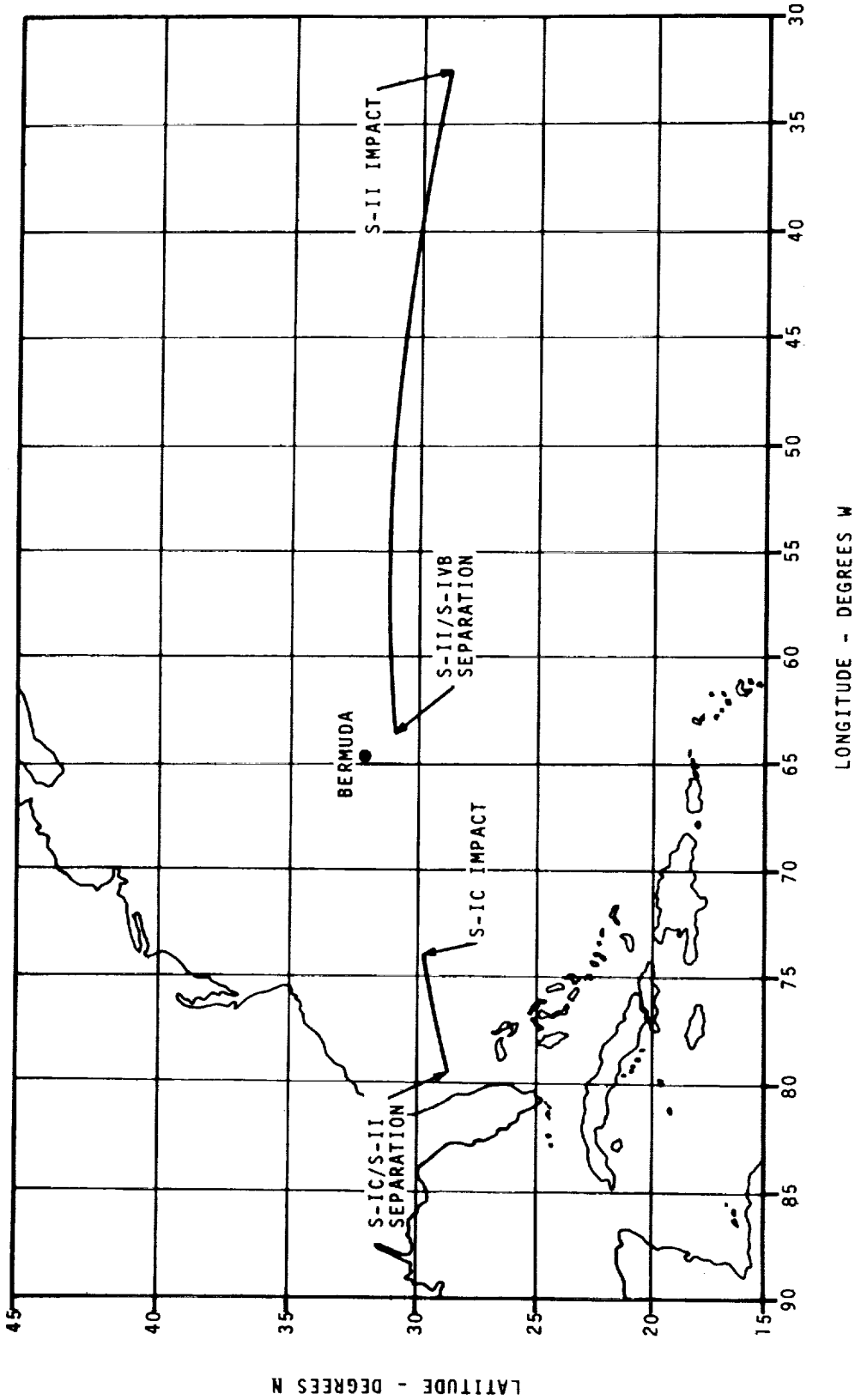

FIGURE 6-1. GROUND TRACKS FOR S-IC AND S-II SPENT STAGES

TABLE 6-I. S-IC SPENT STAGE TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	546.2
	Latitude, deg N	29.835
	Longitude, deg E	-74.052
	Surface Range, km (nmi)	651.3 (351.7)
Impact: 0° Angle-of-Attack	Range Time, sec	506.0
	Latitude, deg N	29.849
	Longitude, deg E	-73.960
	Surface Range, km (nmi)	660.3 (356.5)
Impact: 90° Angle-of-Attack	Range Time, sec	580.2
	Latitude, deg N	29.826
	Longitude, deg E	-74.114
	Surface Range, km (nmi)	645.2 (348.4)
Apex: Tumbling Case	Range Time, sec	271.8
	Altitude, km (nmi)	116.5 (62.9)
	Surface Range, km (nmi)	323.2 (174.5)

TABLE 6-II. S-II SPENT STAGE TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	1,246.3
	Latitude, deg N	29.049
	Longitude, deg E	-33.567
	Surface Range, km (nmi)	4,559.8 (2,462.1)
Impact: 0° Angle-of-Attack	Range Time, sec	1,212.2
	Latitude, deg N	28.996
	Longitude, deg E	-33.302
	Surface Range, km (nmi)	4,586.3 (2,476.4)
Impact: 90° Angle-of Attack	Range Time, sec	1,285.9
	Latitude, deg N	29.103
	Longitude, deg E	-33.840
	Surface Range, km (nmi)	4,532.6 (2,447.4)
Apex: Tumbling Case	Range Time, sec	600.2
	Altitude, km (nmi)	189.7 (102.4)
	Surface Range, km (nmi)	1,911.7 (1,032.2)

APPENDIX A

DEFINITIONS OF TRAJECTORY SYMBOLS AND COORDINATE SYSTEMS

SYMBOL	DEFINITION
XE, YE, ZE DXE, DYE, DZE DDXE, DDYE, DDZE	Position, velocity, and acceleration components of vehicle Instrument Unit in Earth-Fixed Launch Site Coordinate System. The origin of this system is at the intersection of Fischer Ellipsoid (1960) and the normal to it which passes through the launch site. The X-axis coincides with the ellipsoid normal passing through the site, positive upward. The Z-axis is parallel to the earth-fixed flight azimuth, defined at guidance reference release time, and is positive down range. The Y-axis completes a right-handed system. This coordinate system is identical to Standard Coordinate System 10 of Project Apollo Coordinate System Standards, abbreviated as PACSS10.
XS, YS, ZS DXS, DYS, DZS DDXS, DDYS, DDZS	Position, velocity, and acceleration components of vehicle Instrument Unit in Launch Vehicle Navigation Coordinate System. The origin of this system is at the center of the earth. The X-axis is parallel to Fischer Ellipsoid normal through the launch site, positive upward. The Z-axis is parallel to the flight azimuth, positive downrange. The Y-axis completes a right-handed system. The direction of the coordinate axes remains fixed in space at guidance reference release. This coordinate system is identical to Standard Coordinate System 13 of Project Apollo Coordinate System Standards, abbreviated as PACSS13.
GC DIST GC LAT GD LAT LONG	Position components of vehicle Instrument Unit in Geographic Polar Coordinate System. Position in this system is defined by the geocentric distance (GC DIST), geocentric latitude (GC LAT), geodetic latitude (GD LAT), and longitude (LONG). Geocentric distance is the

APPENDIX A (Continued)

	distance from the geocenter to vehicle Instrument Unit. Geocentric latitude is the angle between the radius vector of the subvehicle point and the equatorial plane, positive north of the equatorial plane. Geodetic latitude is the angle between the normal to the Fischer Ellipsoid through the subvehicle point and the equatorial plane, positive north of the equatorial plane. Longitude is the angle between the projection of the radius vector into the equatorial plane and the Greenwich meridian, positive east of the Greenwich meridian. This coordinate system is identical to Standard Coordinate System 1 of Project Apollo Coordinate System Standards, abbreviated as PACSS1.
EF VEL VEL-AZ VEL-EL	Earth-fixed velocity of vehicle Instrument Unit in Geographic Polar Coordinate System. Velocity in this system is given in terms of azimuth (VEL-AZ), elevation (VEL-EL), and magnitude of the velocity vector (EF VEL). Azimuth is the angle between the projection of the velocity vector into the local horizontal plane and the north direction in this plane, positive east of north. Elevation is the angle between the velocity vector and the local horizontal plane, positive above the horizontal plane. This coordinate system is identical to Standard Coordinate System 1 of Project Apollo Coordinate System Standards, abbreviated as PACSS1.
SF VEL FLT-PATH HEAD	Space-fixed velocity of vehicle Instrument Unit in Geographic Polar Coordinate System. Velocity in this system is given in terms of heading angle (HEAD), flight path angle (FLT-PATH), and magnitude of velocity vector (SF VEL). Heading angle is the angle between the projection of the velocity vector into the local horizontal plane and the north direction in this plane, positive east of north. Flight path angle is the angle between the velocity vector and

APPENDIX A (Continued)

	the local horizontal plane, positive above the horizontal plane. This coordinate system is identical to Standard Coordinate System 1 of Project Apollo Coordinate System Standards, abbreviated as PACSS1.
ALTITUDE	Perpendicular distance from vehicle Instrument Unit to Fischer Ellipsoid, positive above Fischer Ellipsoid.
RANGE	Surface range, measured along Fischer Ellipsoid from the launch site to the subvehicle point.
TIME	Range time, referenced to nearest integer second before IU umbilical disconnect.

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APPENDIX B

TIME HISTORY OF TRAJECTORY PARAMETERS - METRIC UNITS

The postflight trajectory, from guidance reference release to CSM separation, is tabulated in metric units in Tables B-I through B-VII.

Table B-I gives the earth-fixed launch site position, velocity, and acceleration components for the ascent phase of flight.

Table B-II gives the launch vehicle navigation position, velocity, and acceleration components for the ascent phase of flight.

Table B-III gives the geographic polar coordinates for the ascent phase of flight.

Table B-IV gives the geographic polar coordinates for the parking orbit phase of flight.

Table B-V gives the earth-fixed launch site position, velocity, and acceleration components for the second burn phase of flight.

Table B-VI gives the launch vehicle navigation position, velocity, and acceleration components for the second burn phase of flight.

Table B-VII gives the geographic polar coordinates for the second burn phase of flight.

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
ALL HOLDDOWN ARMS RELEASED									
0.200	112	0	0	0.1	0.0	-0.0	0.54	0.01	-0.01
LIFTOFF - START OF TIME BASE 1									
0.600	112	0	0	0.3	0.0	-0.0	0.73	-0.00	-0.01
1.0	112	0	0	0.7	0.0	-0.0	1.14	-0.02	0.00
2.0	114	0	0	2.7	-0.0	0.0	2.29	-0.02	0.04
3.0	117	0	0	5.0	-0.1	0.1	2.34	-0.06	0.05
4.0	124	0	0	7.4	-0.1	0.1	2.38	-0.06	0.05
5.0	132	0	0	9.8	-0.0	0.2	2.42	0.36	0.06
6.0	143	0	0	12.2	0.4	0.2	2.45	0.46	0.07
7.0	157	1	1	14.7	0.9	0.3	2.50	0.46	0.08
8.0	173	2	1	17.2	1.3	0.4	2.54	0.39	0.08
9.0	191	3	2	19.8	1.4	0.5	2.58	0.08	0.09
10.0	212	5	2	22.4	1.5	0.6	2.61	0.08	0.11
11.0	236	6	3	25.0	1.6	0.7	2.66	0.10	0.13
12.0	262	8	3	27.7	1.7	0.8	2.70	0.12	0.11
13.0	291	10	4	30.4	1.8	0.9	2.73	0.13	0.08
14.0	323	11	5	33.2	2.0	1.0	2.81	0.14	0.15

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
15.0	358	13	6	36.0	2.1	1.2	2.88	0.11	0.17
16.0	395	16	8	38.9	2.2	1.4	2.95	0.02	0.21
17.0	436	18	9	41.9	2.2	1.6	3.01	-0.04	0.26
18.0	479	20	11	44.9	2.1	1.9	3.07	-0.05	0.30
19.0	525	22	13	48.1	2.1	2.2	3.14	-0.05	0.35
20.0	575	24	15	51.2	2.0	2.6	3.20	-0.05	0.41
21.0	628	26	18	54.5	2.0	3.1	3.27	-0.04	0.48
22.0	684	28	22	57.8	1.9	3.6	3.34	-0.04	0.55
23.0	744	30	25	61.1	1.9	4.1	3.41	-0.04	0.62
24.0	806	32	30	64.6	1.8	4.8	3.47	-0.05	0.69
25.0	873	34	35	68.1	1.8	5.5	3.54	-0.06	0.76
26.0	943	35	41	71.7	1.7	6.3	3.61	-0.06	0.85
27.0	1016	37	48	75.3	1.7	7.2	3.68	-0.07	0.93
28.0	1093	39	55	79.0	1.6	8.2	3.75	-0.07	1.02
29.0	1174	40	64	82.8	1.5	9.3	3.82	-0.07	1.11
30.0	1259	42	74	86.7	1.5	10.4	3.89	-0.07	1.20
31.0	1347	43	85	90.6	1.4	11.7	3.97	-0.07	1.29
32.0	1440	45	97	94.6	1.3	13.0	4.04	-0.07	1.40
33.0	1537	46	111	98.7	1.3	14.5	4.12	-0.06	1.50
34.0	1637	47	126	102.8	1.2	16.0	4.19	-0.05	1.61
35.0	1742	48	143	107.1	1.2	17.7	4.26	-0.03	1.73
36.0	1852	49	162	111.4	1.1	19.5	4.34	-0.03	1.84
37.0	1965	51	182	115.7	1.1	21.4	4.41	-0.02	1.96
38.0	2083	52	204	120.2	1.1	23.4	4.48	-0.02	2.08
39.0	2206	53	229	124.7	1.1	25.5	4.56	-0.02	2.20
40.0	2333	54	256	129.3	1.0	27.8	4.63	-0.02	2.32
41.0	2464	55	285	134.0	1.0	30.1	4.70	-0.02	2.44
42.0	2601	56	316	138.7	1.0	32.7	4.78	-0.01	2.58
43.0	2742	57	350	143.5	1.0	35.3	4.86	-0.01	2.72
44.0	2888	58	387	148.4	1.0	38.1	4.94	-0.00	2.87
45.0	3039	59	426	153.4	1.0	41.1	5.02	0.01	3.04
46.0	3195	60	469	158.5	1.0	44.2	5.10	0.01	3.21
47.0	3356	61	515	163.6	1.0	47.5	5.18	0.02	3.39
48.0	3522	62	564	168.8	1.0	51.0	5.24	0.03	3.57
49.0	3693	63	617	174.1	1.1	54.6	5.30	0.04	3.75
50.0	3870	64	673	179.4	1.1	58.5	5.36	0.04	3.94
51.0	4052	65	734	184.8	1.2	62.5	5.42	0.04	4.13
52.0	4240	66	798	190.3	1.2	66.7	5.49	0.04	4.32
53.0	4433	68	867	195.8	1.2	71.1	5.55	0.03	4.52
54.0	4631	69	941	201.4	1.3	75.7	5.63	0.03	4.70
55.0	4835	70	1019	207.1	1.3	80.5	5.70	0.02	4.88
56.0	5045	71	1102	212.8	1.3	85.5	5.78	0.02	5.07
57.0	5261	73	1190	218.6	1.3	90.7	5.85	0.01	5.26

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
58.0	5483	74	1283	224.5	1.3	96.0	5.92	0.01	5.46
59.0	5710	75	1382	230.4	1.3	101.6	5.98	0.01	5.67
60.0	5943	77	1486	236.4	1.4	107.4	6.04	0.01	5.88
61.0	6183	78	1597	242.5	1.4	113.4	6.10	0.02	6.09
62.0	6429	79	1713	248.6	1.4	119.5	6.15	0.03	6.29
63.0	6680	81	1836	254.8	1.4	125.9	6.20	0.05	6.48
64.0	6938	82	1965	261.0	1.5	132.5	6.24	0.08	6.68
65.0	7202	84	2101	267.3	1.6	139.3	6.27	0.11	6.87
66.0	7473	85	2244	273.6	1.7	146.2	6.30	0.13	7.06
67.0	7750	87	2394	279.9	1.8	153.4	6.32	0.15	7.26
MACH 1									
68.000	8033	89	2551	286.2	2.0	160.8	6.35	0.16	7.46
69.0	8322	91	2715	292.6	2.2	168.3	6.38	0.17	7.66
70.0	8618	93	2887	299.0	2.3	176.1	6.43	0.19	7.86
71.0	8920	95	3067	305.5	2.5	184.1	6.48	0.21	8.07
72.0	9229	98	3256	312.0	2.8	192.2	6.55	0.27	8.27
73.0	9544	101	3452	318.6	3.1	200.6	6.62	0.36	8.46
74.0	9866	104	3657	325.2	3.5	209.1	6.70	0.46	8.66
75.0	10194	108	3870	332.0	4.1	217.9	6.80	0.73	8.86
76.0	10530	113	4093	338.8	4.8	226.9	6.88	0.73	9.08
77.0	10872	118	4324	345.7	5.5	236.1	6.95	0.59	9.34
78.0	11221	124	4565	352.7	5.9	245.6	7.02	0.29	9.62
79.0	11577	130	4815	359.7	6.1	255.4	7.05	0.09	9.95
80.0	11941	136	5076	366.8	6.1	265.5	7.05	-0.09	10.31
MAXIMUM DYNAMIC PRESSURE									
81.000	12311	142	5346	373.8	6.0	276.0	7.04	-0.18	10.70
82.0	12688	148	5628	380.8	5.8	286.9	7.01	-0.23	11.10
83.0	13073	154	5920	387.9	5.5	298.2	6.99	-0.27	11.49
84.0	13464	160	6224	394.9	5.2	309.9	6.97	-0.27	11.87
85.0	13862	165	6540	401.8	5.0	321.9	6.96	-0.26	12.24
86.0	14268	170	6868	408.8	4.7	334.3	6.96	-0.24	12.58
87.0	14680	175	7209	415.7	4.5	347.1	6.97	-0.21	12.89
88.0	15099	180	7563	422.7	4.3	360.1	6.98	-0.17	13.19
89.0	15525	184	7929	429.7	4.2	373.4	7.00	-0.05	13.49
90.0	15959	189	8310	436.7	4.2	387.1	7.03	0.03	13.80
91.0	16399	193	8704	443.8	4.2	401.1	7.06	0.08	14.10
92.0	16846	198	9112	450.9	4.3	415.3	7.09	0.09	14.41
93.0	17301	202	9534	458.0	4.4	429.9	7.12	0.08	14.73
94.0	17762	207	9972	465.1	4.5	444.8	7.13	0.08	15.06

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
95.0	18231	211	10424	472.2	4.6	460.0	7.12	0.07	15.37
96.0	18707	216	10892	479.3	4.6	475.5	7.09	0.06	15.72
97.0	19189	221	11375	486.4	4.7	491.4	7.06	0.05	16.07
98.0	19679	226	11875	493.4	4.7	507.7	7.04	0.04	16.44
99.0	20176	231	12391	500.5	4.7	524.3	7.01	0.02	16.81
100.0	20680	235	12923	507.5	4.8	541.3	6.97	0.01	17.18
101.0	21191	240	13473	514.4	4.8	558.7	6.95	-0.00	17.55
102.0	21709	245	14041	521.4	4.8	576.4	6.93	-0.01	17.90
103.0	22234	250	14626	528.3	4.7	594.5	6.92	-0.02	18.24
104.0	22766	255	15230	535.2	4.7	612.9	6.90	-0.03	18.57
105.0	23304	260	15852	542.1	4.7	631.6	6.89	-0.05	18.91
106.0	23850	264	16493	549.0	4.6	650.7	6.88	-0.10	19.25
107.0	24402	269	17154	555.8	4.5	670.1	6.86	-0.12	19.60
108.0	24961	274	17834	562.7	4.4	689.9	6.84	-0.14	19.95
109.0	25528	278	18534	569.5	4.2	710.0	6.80	-0.16	20.32
110.0	26100	282	19254	576.3	4.1	730.5	6.76	-0.16	20.67
111.0	26680	287	19995	583.0	3.9	751.4	6.73	-0.16	21.02
112.0	27267	291	20757	589.8	3.7	772.6	6.70	-0.14	21.37
113.0	27860	295	21540	596.4	3.6	794.1	6.70	-0.10	21.71
114.0	28459	298	22345	603.2	3.6	816.0	6.71	-0.05	22.03
115.0	29066	302	23172	609.9	3.5	838.2	6.76	-0.00	22.34
116.0	29679	306	24021	616.7	3.6	860.6	6.85	0.05	22.62
117.0	30299	310	24893	623.6	3.6	883.4	6.96	0.11	22.90
118.0	30927	314	25788	630.7	3.8	906.4	7.09	0.16	23.17
119.0	31561	318	26706	637.8	4.0	929.7	7.21	0.19	23.45
120.0	32202	322	27648	645.0	4.1	953.3	7.31	0.20	23.77
121.0	32851	326	28613	652.4	4.4	977.3	7.37	0.21	24.11
122.0	33507	331	29602	659.7	4.6	1001.6	7.40	0.23	24.48
123.0	34170	336	30616	667.1	4.8	1026.3	7.39	0.23	24.88
124.0	34841	341	31655	674.5	5.0	1051.4	7.36	0.23	25.29
125.0	35519	346	32719	681.9	5.3	1076.8	7.33	0.23	25.70
126.0	36205	352	33809	689.2	5.5	1102.7	7.31	0.22	26.10
127.0	36898	357	34925	696.5	5.7	1129.0	7.31	0.21	26.50
128.0	37598	363	36067	703.8	5.9	1155.7	7.33	0.20	26.93
129.0	38305	369	37236	711.2	6.1	1182.9	7.34	0.18	27.36
130.0	39020	376	38433	718.5	6.3	1210.4	7.36	0.15	27.78
131.0	39743	382	39657	725.9	6.4	1238.4	7.39	0.13	28.21
132.0	40472	389	40910	733.3	6.5	1266.9	7.43	0.12	28.64
133.0	41209	395	42191	740.7	6.6	1295.7	7.46	0.11	29.06
134.0	41954	402	43501	748.2	6.7	1325.0	7.49	0.10	29.49
135.0	42706	409	44840	755.7	6.8	1354.7	7.53	0.10	29.91
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.140	42812	410	45031	756.8	7.0	1358.9	7.53	0.10	29.97

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
136.0	43464	416	46207	761.0	7.0	1381.0	4.13	0.10	24.36
137.0	44226	423	47598	765.2	7.2	1405.4	4.14	0.11	24.36
138.0	44993	430	49016	769.3	7.3	1429.7	4.14	0.11	24.36
139.0	45765	438	50458	773.4	7.4	1454.2	4.15	0.15	24.61
140.0	46541	445	51925	777.6	7.6	1478.9	4.16	0.22	24.87
141.0	47320	453	53416	781.8	7.8	1504.0	4.18	0.23	25.22
142.0	48104	461	54932	785.9	8.0	1529.4	4.20	0.24	25.56
143.0	48892	469	56475	790.1	8.3	1555.4	4.22	0.26	25.90
144.0	49685	477	58043	794.4	8.5	1581.4	4.24	0.26	26.27
145.0	50481	486	59638	798.6	8.8	1607.9	4.26	0.26	26.62
146.0	51282	495	61259	802.9	9.1	1634.7	4.27	0.25	26.99
147.0	52087	504	62907	807.2	9.3	1661.8	4.29	0.24	27.36
148.0	52897	514	64583	811.6	9.5	1689.4	4.32	0.23	27.72
149.0	53711	523	66286	816.0	9.8	1717.3	4.35	0.23	28.08
150.0	54529	533	68017	820.3	10.0	1745.5	4.39	0.22	28.45
151.0	55351	543	69777	824.7	10.2	1774.2	4.43	0.22	28.84
152.0	56178	554	71566	829.2	10.4	1803.2	4.48	0.22	29.24
153.0	57010	564	73384	833.7	10.7	1832.6	4.52	0.22	29.63
154.0	57846	575	75231	838.2	10.9	1862.3	4.55	0.23	30.03
155.0	58686	586	77109	842.8	11.1	1892.5	4.58	0.23	30.39
156.0	59531	597	79016	847.4	11.4	1923.2	4.61	0.24	30.83
157.0	60381	609	80955	852.0	11.6	1954.2	4.64	0.25	31.26
158.0	61235	620	82925	856.7	11.9	1985.6	4.68	0.26	31.69
159.0	62094	632	84926	861.4	12.1	2017.5	4.71	0.26	32.11
160.0	62958	645	86960	866.1	12.4	2049.8	4.74	0.27	32.55
161.0	63826	657	89027	870.8	12.6	2082.6	4.77	0.27	33.00
162.0	64700	670	91126	875.6	12.9	2115.8	4.80	0.26	33.45
163.0	65578	683	93259	880.4	13.2	2149.5	4.83	0.26	33.90
164.0	66461	696	95425	885.3	13.4	2183.6	4.86	0.27	34.34
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
164.100	66549	698	95644	885.8	13.5	2187.1	4.87	0.26	34.39
S-IC/S-II SEPARATION COMMAND									
164.800	67168	707	97178	884.1	13.6	2198.0	-7.96	0.16	4.35
166.0	68225	723	99822	873.2	13.8	2199.1	-9.23	0.13	0.19
168.0	69949	751	104211	855.5	14.0	2200.7	-7.99	0.13	3.97
170.0	71647	780	108625	840.9	14.3	2209.9	-7.10	0.12	4.90
172.0	73314	808	113055	827.0	14.6	2221.0	-6.54	0.16	6.65
174.0	74955	838	117510	814.3	14.9	2234.4	-6.30	0.16	6.79
176.0	76571	868	121993	801.6	15.2	2248.1	-6.27	0.15	6.87

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
178.0	78162	899	126503	789.0	15.5	2261.9	-6.22	0.17	6.98
180.0	79727	930	131040	776.6	15.8	2275.9	-6.21	0.17	7.00
182.0	81268	962	135606	764.2	16.2	2290.0	-6.19	0.16	7.05
184.0	82784	995	140200	751.9	16.5	2304.1	-6.18	0.17	7.08
186.0	84276	1028	144823	739.5	16.8	2318.3	-6.16	0.17	7.11
188.0	85743	1062	149473	727.2	17.2	2332.5	-6.13	0.18	7.14
190.0	87185	1097	154153	715.0	17.5	2346.8	-6.11	0.17	7.16
192.0	88603	1132	158861	702.8	17.9	2361.2	-6.09	0.17	7.19
194.0	89996	1168	163597	690.6	18.2	2375.6	-6.07	0.18	7.23
196.0	91365	1205	168363	678.5	18.6	2390.1	-6.04	0.19	7.26
198.0	92710	1243	173158	666.5	19.0	2404.6	-6.02	0.19	7.29
200.0	94031	1281	177982	654.4	19.4	2419.2	-5.99	0.19	7.33
202.0	95328	1320	182835	642.5	19.8	2434.0	-5.97	0.20	7.38
204.0	96601	1360	187717	630.6	20.2	2448.8	-5.94	0.19	7.43
206.0	97850	1401	192630	618.7	20.5	2463.6	-5.88	0.18	7.44
208.0	99076	1442	197572	607.1	20.9	2478.5	-5.76	0.16	7.40
210.0	100279	1484	202544	595.8	21.2	2493.2	-5.54	0.14	7.33
212.0	101459	1527	207545	585.0	21.4	2507.8	-5.29	0.13	7.25
214.0	102619	1570	212575	574.6	21.7	2522.3	-5.08	0.12	7.19
216.0	103758	1614	217634	564.6	21.9	2536.6	-4.95	0.13	7.16
218.0	104877	1658	222721	554.7	22.2	2550.9	-4.91	0.13	7.18
220.0	105977	1702	227838	544.9	22.5	2565.3	-4.90	0.13	7.21
222.0	107057	1748	232983	535.1	22.7	2579.8	-4.90	0.14	7.25
224.0	108117	1793	238157	525.3	23.0	2594.3	-4.90	0.14	7.29
226.0	109158	1840	243360	515.5	23.3	2609.0	-4.90	0.13	7.34
228.0	110179	1887	248593	505.7	23.6	2623.7	-4.91	0.14	7.38
230.0	111181	1934	253855	495.9	23.8	2638.5	-4.91	0.15	7.42
232.0	112163	1982	259147	486.0	24.1	2653.4	-4.92	0.16	7.46
234.0	113125	2031	264468	476.2	24.5	2668.3	-4.93	0.17	7.50
236.0	114067	2080	269820	466.3	24.8	2683.4	-4.93	0.16	7.55
238.0	114990	2130	275202	456.5	25.1	2698.5	-4.93	0.16	7.59
240.0	115893	2180	280614	446.6	25.4	2713.8	-4.93	0.16	7.64
242.0	116777	2231	286057	436.7	25.8	2729.1	-4.93	0.17	7.67
244.0	117640	2283	291530	426.9	26.1	2744.5	-4.93	0.17	7.71
246.0	118484	2336	297035	417.0	26.5	2759.9	-4.94	0.17	7.76
248.0	119308	2389	302570	407.1	26.8	2775.5	-4.94	0.18	7.80
250.0	120113	2443	308137	397.3	27.1	2791.1	-4.94	0.18	7.84
252.0	120897	2498	313735	387.4	27.5	2806.9	-4.94	0.18	7.88
254.0	121662	2553	319364	377.5	27.9	2822.7	-4.94	0.18	7.93
256.0	122407	2609	325026	367.6	28.2	2838.6	-4.94	0.19	7.98
258.0	123133	2666	330719	357.7	28.6	2854.6	-4.94	0.19	8.02
260.0	123838	2724	336444	347.8	29.0	2870.7	-4.95	0.19	8.07
262.0	124524	2782	342202	337.9	29.4	2886.9	-4.96	0.19	8.11

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
264.0	125190	2841	347992	328.0	29.7	2903.1	-4.96	0.19	8.15
266.0	125836	2901	353814	318.1	30.1	2919.5	-4.95	0.20	8.20
268.0	126463	2961	359670	308.2	30.5	2935.9	-4.94	0.20	8.26
270.0	127069	3023	365558	298.3	30.9	2952.5	-4.95	0.20	8.31
272.0	127656	3085	371480	288.4	31.3	2969.1	-4.98	0.20	8.35
274.0	128223	3148	377435	278.4	31.7	2985.9	-5.00	0.21	8.39
276.0	128770	3212	383423	268.4	32.1	3002.7	-5.00	0.21	8.44
278.0	129297	3277	389446	258.4	32.5	3019.6	-5.00	0.20	8.49
280.0	129803	3342	395502	248.5	33.0	3036.7	-4.99	0.21	8.54
282.0	130290	3409	401592	238.5	33.4	3053.8	-4.99	0.22	8.59
284.0	130757	3476	407717	228.5	33.8	3071.0	-5.01	0.23	8.64
286.0	131204	3544	413877	218.4	34.3	3088.4	-5.06	0.24	8.69
288.0	131631	3613	420071	208.3	34.8	3105.8	-5.07	0.24	8.74
290.0	132037	3683	426300	198.2	35.3	3123.3	-5.04	0.24	8.79
292.0	132424	3754	432564	188.1	35.7	3141.0	-5.01	0.24	8.84
294.0	132790	3826	438864	178.1	36.2	3158.7	-5.02	0.24	8.89
296.0	133136	3899	445199	168.0	36.7	3176.5	-5.05	0.24	8.94
298.0	133462	3973	451570	157.9	37.2	3194.4	-5.06	0.24	9.00
300.0	133767	4048	457977	147.8	37.7	3212.5	-5.07	0.25	9.05
302.0	134053	4124	464420	137.6	38.2	3230.6	-5.08	0.25	9.10
304.0	134318	4200	470899	127.5	38.7	3248.9	-5.09	0.25	9.16
306.0	134563	4278	477415	117.3	39.2	3267.3	-5.10	0.25	9.21
308.0	134787	4357	483968	107.1	39.7	3285.7	-5.10	0.27	9.27
310.0	134991	4437	490559	96.9	40.2	3304.3	-5.11	0.27	9.33
312.0	135174	4518	497186	86.6	40.8	3323.1	-5.12	0.26	9.40
314.0	135337	4600	503851	76.4	41.3	3341.9	-5.13	0.25	9.46
316.0	135480	4683	510554	66.1	41.8	3360.9	-5.15	0.26	9.52
318.0	135602	4767	517295	55.8	42.3	3380.0	-5.16	0.27	9.58
320.0	135703	4852	524074	45.5	42.9	3399.2	-5.17	0.28	9.63
322.0	135783	4938	530892	35.1	43.4	3418.5	-5.19	0.28	9.69
324.0	135843	5026	537748	24.7	44.0	3438.0	-5.21	0.28	9.76
326.0	135882	5114	544644	14.3	44.5	3457.6	-5.22	0.29	9.82
328.0	135900	5204	551578	3.8	45.1	3477.3	-5.23	0.30	9.88
330.0	135897	5295	558553	-6.6	45.7	3497.1	-5.24	0.30	9.94
332.0	135874	5387	565567	-17.1	46.3	3517.0	-5.26	0.30	10.01
334.0	135829	5480	572621	-27.7	46.9	3537.1	-5.28	0.30	10.07
336.0	135763	5574	579715	-38.2	47.5	3557.3	-5.29	0.30	10.13
338.0	135676	5670	586850	-48.8	48.1	3577.6	-5.30	0.31	10.20
340.0	135568	5767	594026	-59.4	48.7	3598.1	-5.32	0.31	10.27
342.0	135438	5865	601243	-70.1	49.4	3618.7	-5.35	0.31	10.34
344.0	135287	5964	608501	-80.8	50.0	3639.5	-5.37	0.32	10.41
346.0	135115	6065	615801	-91.5	50.7	3660.3	-5.37	0.34	10.47
348.0	134921	6167	623142	-102.3	51.4	3681.3	-5.38	0.35	10.53

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
350.0	134706	6271	630526	-113.1	52.1	3702.5	-5.40	0.35	10.60
352.0	134469	6375	637952	-123.9	52.7	3723.7	-5.43	0.34	10.67
354.0	134210	6481	645421	-134.8	53.4	3745.2	-5.46	0.34	10.74
356.0	133929	6589	652933	-145.8	54.1	3766.7	-5.47	0.34	10.82
358.0	133627	6698	660488	-156.7	54.8	3788.4	-5.48	0.35	10.89
360.0	133303	6808	668087	-167.7	55.5	3810.3	-5.50	0.36	10.96
362.0	132956	6920	675730	-178.7	56.2	3832.3	-5.52	0.36	11.04
364.0	132588	7033	683416	-189.8	57.0	3854.4	-5.54	0.37	11.11
366.0	132197	7148	691147	-200.9	57.7	3876.7	-5.57	0.37	11.19
368.0	131784	7264	698923	-212.1	58.5	3899.2	-5.61	0.38	11.29
370.0	131349	7382	706744	-223.3	59.2	3921.9	-5.64	0.38	11.36
372.0	130891	7501	714611	-234.6	60.0	3944.7	-5.64	0.39	11.42
374.0	130411	7622	722523	-245.9	60.8	3967.5	-5.66	0.39	11.47
376.0	129907	7744	730481	-257.2	61.6	3990.6	-5.68	0.40	11.55
378.0	129382	7868	738485	-268.6	62.4	4013.8	-5.71	0.40	11.65
380.0	128833	7993	746536	-280.1	63.2	4037.2	-5.73	0.40	11.74
382.0	128261	8121	754634	-291.5	64.0	4060.7	-5.76	0.40	11.82
384.0	127667	8249	762779	-303.1	64.8	4084.5	-5.79	0.41	11.91
386.0	127049	8380	770972	-314.7	65.6	4108.4	-5.83	0.42	11.99
388.0	126408	8512	779213	-326.4	66.5	4132.4	-5.85	0.43	12.07
390.0	125743	8645	787502	-338.1	67.3	4156.7	-5.87	0.43	12.15
392.0	125055	8781	795840	-349.9	68.2	4181.0	-5.89	0.43	12.24
394.0	124344	8918	804226	-361.7	69.0	4205.6	-5.94	0.44	12.34
396.0	123608	9057	812662	-373.6	69.9	4230.4	-5.99	0.44	12.44
398.0	122849	9198	821148	-385.7	70.8	4255.3	-6.03	0.45	12.52
400.0	122066	9340	829684	-397.7	71.7	4280.5	-6.04	0.45	12.60
402.0	121258	9485	838270	-409.8	72.6	4305.8	-6.05	0.46	12.69
404.0	120426	9631	846907	-422.0	73.5	4331.2	-6.09	0.46	12.80
406.0	119570	9779	855595	-434.2	74.5	4356.9	-6.13	0.47	12.89
408.0	118690	9929	864335	-446.5	75.4	4382.8	-6.17	0.48	12.98
410.0	117784	10081	873126	-458.8	76.4	4408.9	-6.20	0.48	13.07
412.0	116854	10235	881970	-471.3	77.4	4435.1	-6.24	0.49	13.17
414.0	115899	10390	890867	-483.8	78.3	4461.5	-6.28	0.49	13.27
416.0	114919	10548	899817	-496.4	79.3	4488.2	-6.32	0.50	13.37
418.0	113914	10708	908820	-509.1	80.3	4515.0	-6.36	0.50	13.47
420.0	112883	10869	917877	-521.8	81.3	4542.1	-6.40	0.51	13.57
422.0	111826	11033	926988	-534.7	82.4	4569.3	-6.44	0.52	13.66
424.0	110744	11199	936154	-547.6	83.4	4596.7	-6.48	0.52	13.76
426.0	109636	11367	945375	-560.6	84.5	4624.4	-6.52	0.53	13.93
428.0	108502	11537	954652	-573.6	85.5	4652.4	-6.56	0.54	14.09
430.0	107341	11709	963985	-586.8	86.6	4680.7	-6.60	0.55	14.19
432.0	106155	11883	973375	-600.0	87.7	4709.1	-6.65	0.55	14.25
434.0	104941	12060	982822	-613.4	88.8	4737.7	-6.69	0.55	14.33

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
436.0	103701	12238	992326	-626.8	89.9	4766.5	-6.73	0.56	14.48
438.0	102434	12419	1001888	-640.3	91.0	4795.6	-6.78	0.57	14.60
440.0	101140	12602	1011509	-653.9	92.2	4824.9	-6.82	0.58	14.70
442.0	99818	12788	1021188	-667.6	93.4	4854.4	-6.87	0.59	14.81
444.0	98469	12976	1030926	-681.4	94.5	4884.1	-6.92	0.59	14.93
446.0	97093	13166	1040725	-695.3	95.7	4914.1	-6.96	0.59	15.06
448.0	95688	13359	1050583	-709.2	96.9	4944.4	-7.00	0.60	15.19
450.0	94256	13554	1060502	-723.3	98.1	4974.9	-7.06	0.60	15.32
452.0	92795	13751	1070483	-737.5	99.3	5005.7	-7.12	0.62	15.46
454.0	91306	13951	1080525	-751.7	100.6	5036.7	-7.14	0.63	15.59
456.0	89788	14154	1090630	-766.1	101.8	5068.0	-7.18	0.63	15.74
458.0	88241	14359	1100797	-780.5	103.1	5099.6	-7.27	0.64	15.86
460.0	86666	14566	1111028	-795.2	104.4	5131.5	-7.35	0.62	15.99
462.0	85061	14776	1121323	-809.9	105.6	5163.6	-7.43	0.65	16.11
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
463.090	84173	14892	1126961	-818.1	106.3	5181.2	-7.47	0.60	16.17
464.0	83426	14989	1131681	-824.9	106.9	5193.6	-7.59	0.59	12.58
466.0	81760	15204	1142092	-840.3	108.0	5218.9	-7.71	0.55	12.68
468.0	80064	15421	1152555	-855.7	109.0	5244.3	-7.74	0.50	12.79
470.0	78337	15640	1163069	-871.2	110.1	5270.0	-7.72	0.50	12.89
472.0	76579	15861	1173635	-886.6	111.2	5295.9	-7.65	0.56	13.00
474.0	74790	16084	1184252	-901.6	112.3	5320.6	-7.41	0.55	11.30
476.0	72973	16310	1194915	-916.2	113.3	5342.7	-7.20	0.51	10.97
478.0	71126	16538	1205622	-930.5	114.4	5364.6	-7.14	0.55	11.00
480.0	69250	16767	1216373	-944.9	115.5	5386.6	-7.23	0.55	11.03
482.0	67346	16999	1227168	-959.5	116.6	5408.7	-7.31	0.55	11.07
484.0	65412	17234	1238008	-974.1	117.7	5430.9	-7.35	0.56	11.13
486.0	63449	17470	1248892	-988.9	118.8	5453.2	-7.36	0.58	11.18
488.0	61457	17709	1259821	-1003.6	120.0	5475.6	-7.36	0.59	11.25
490.0	59435	17950	1270795	-1018.3	121.2	5498.2	-7.35	0.61	11.30
492.0	57384	18193	1281814	-1033.0	122.4	5520.9	-7.37	0.63	11.36
494.0	55303	18439	1292878	-1047.8	123.7	5543.7	-7.44	0.64	11.43
496.0	53192	18688	1303988	-1062.8	125.0	5566.6	-7.53	0.65	11.51
498.0	51051	18939	1315145	-1078.0	126.3	5589.7	-7.63	0.65	11.59
500.0	48880	19193	1326347	-1093.3	127.6	5612.9	-7.72	0.65	11.66
502.0	46678	19450	1337596	-1108.8	128.9	5636.3	-7.80	0.66	11.72
504.0	44445	19709	1348892	-1124.5	130.2	5659.8	-7.87	0.67	11.80
506.0	42180	19970	1360236	-1140.3	131.6	5683.5	-7.95	0.68	11.88
508.0	39883	20235	1371627	-1156.3	132.9	5707.4	-8.02	0.69	11.96
510.0	37555	20502	1383065	-1172.4	134.3	5731.3	-8.08	0.70	12.03
512.0	35194	20772	1394552	-1188.6	135.7	5755.5	-8.14	0.70	12.10

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
514.0	32800	21045	1406087	-1205.0	137.1	5779.7	-8.19	0.71	12.18
516.0	30374	21321	1417671	-1221.4	138.6	5804.2	-8.25	0.71	12.26
518.0	27914	21600	1429304	-1238.0	140.0	5828.7	-8.30	0.73	12.33
520.0	25422	21881	1440986	-1254.6	141.5	5853.5	-8.36	0.73	12.41
522.0	22896	22165	1452718	-1271.4	142.9	5878.4	-8.41	0.74	12.50
524.0	20336	22453	1464500	-1288.3	144.4	5903.5	-8.48	0.74	12.59
526.0	17743	22743	1476332	-1305.3	145.9	5928.8	-8.54	0.75	12.67
528.0	15115	23036	1488215	-1322.4	147.4	5954.2	-8.59	0.76	12.74
530.0	12453	23333	1500149	-1339.7	149.0	5979.7	-8.65	0.77	12.82
532.0	9756	23632	1512134	-1357.0	150.5	6005.5	-8.71	0.78	12.92
534.0	7025	23935	1524171	-1374.5	152.1	6031.4	-8.79	0.79	13.01
536.0	4258	24241	1536260	-1392.2	153.7	6057.5	-8.86	0.80	13.10
538.0	1456	24550	1548401	-1410.0	155.3	6083.8	-8.92	0.80	13.18
540.0	-1382	24862	1560595	-1427.9	156.8	6110.3	-8.98	0.80	13.26
542.0	-4256	25177	1572843	-1445.9	158.4	6136.9	-9.04	0.80	13.35
544.0	-7165	25495	1585143	-1464.0	160.1	6163.6	-9.11	0.81	13.44
546.0	-10112	25817	1597497	-1482.3	161.7	6190.6	-9.18	0.81	13.53
548.0	-13095	26142	1609906	-1500.8	163.3	6217.8	-9.26	0.82	13.62
550.0	-16115	26470	1622368	-1519.3	165.0	6245.1	-9.32	0.83	13.71
552.0	-19172	26802	1634886	-1538.0	166.6	6272.6	-9.39	0.84	13.82
554.0	-22267	27137	1647459	-1556.9	168.3	6300.3	-9.47	0.86	13.88
556.0	-25400	27475	1660087	-1575.9	170.0	6328.1	-9.55	0.85	13.96
558.0	-28571	27817	1672771	-1595.1	171.8	6356.1	-9.63	0.89	14.04
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
559.050	-30251	27998	1679453	-1605.2	172.7	6370.8	-9.68	0.74	14.08
S-II/S-IVB SEPARATION COMMAND									
560.000	-31779	28162	1685505	-1613.3	173.2	6372.4	-8.06	0.44	-2.24
562.0	-35022	28510	1698247	-1629.4	174.1	6368.0	-8.09	0.48	-2.15
564.0	-38297	28859	1710977	-1645.7	175.0	6363.9	-8.26	0.44	-1.75
566.0	-41606	29210	1723706	-1662.6	176.0	6365.8	-8.67	0.51	2.71
568.0	-44948	29563	1736444	-1679.9	177.1	6371.7	-8.57	0.60	3.02
570.0	-48325	29918	1749194	-1697.1	178.3	6377.7	-8.63	0.59	3.05
572.0	-51737	30276	1761955	-1714.4	179.5	6383.8	-8.74	0.56	3.07
574.0	-55183	30636	1774729	-1732.0	180.6	6390.0	-8.84	0.53	3.10
576.0	-58665	30999	1787515	-1749.7	181.6	6396.2	-8.86	0.54	3.12
578.0	-62183	31363	1800313	-1767.4	182.7	6402.5	-8.85	0.56	3.14
580.0	-65735	31729	1813124	-1785.2	183.9	6408.7	-8.88	0.57	3.14
582.0	-69323	32098	1825948	-1803.0	185.0	6414.9	-8.94	0.59	3.14
584.0	-72947	32470	1838784	-1820.9	186.2	6421.2	-8.98	0.60	3.13

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
586.0	-76607	32843	1851633	-1838.9	187.4	6427.4	-9.00	0.62	3.12
588.0	-80303	33219	1864494	-1857.0	188.7	6433.7	-9.02	0.62	3.11
590.0	-84035	33598	1877367	-1875.0	189.9	6439.9	-9.05	0.63	3.10
592.0	-87803	33979	1890253	-1893.2	191.2	6446.1	-9.08	0.63	3.10
594.0	-91608	34363	1903152	-1911.4	192.5	6452.3	-9.11	0.64	3.10
596.0	-95449	34749	1916062	-1929.6	193.7	6458.5	-9.13	0.65	3.10
598.0	-99326	35138	1928986	-1947.9	195.1	6464.7	-9.15	0.65	3.09
600.0	-103240	35529	1941921	-1966.2	196.4	6470.8	-9.16	0.66	3.09
602.0	-107191	35923	1954869	-1984.5	197.7	6477.0	-9.18	0.66	3.08
604.0	-111179	36320	1967829	-2002.9	199.0	6483.2	-9.19	0.65	3.07
606.0	-115203	36719	1980802	-2021.3	200.3	6489.3	-9.21	0.65	3.06
608.0	-119264	37121	1993786	-2039.8	201.6	6495.4	-9.25	0.66	3.05
610.0	-123362	37525	2006783	-2058.3	202.9	6501.5	-9.29	0.67	3.04
612.0	-127497	37933	2019792	-2076.9	204.3	6507.6	-9.31	0.67	3.04
614.0	-131670	38342	2032813	-2095.5	205.6	6513.7	-9.31	0.68	3.05
616.0	-135879	38755	2045847	-2114.1	207.0	6519.8	-9.30	0.68	3.05
618.0	-140126	39170	2058892	-2132.8	208.3	6525.9	-9.32	0.68	3.05
620.0	-144410	39588	2071950	-2151.4	209.7	6531.9	-9.35	0.67	3.03
622.0	-148732	40009	2085020	-2170.2	211.0	6538.0	-9.39	0.67	3.02
624.0	-153091	40432	2098102	-2189.0	212.4	6544.0	-9.40	0.67	3.02
626.0	-157488	40858	2111196	-2207.7	213.7	6550.1	-9.39	0.67	3.03
628.0	-161922	41287	2124303	-2226.5	215.1	6556.1	-9.39	0.68	3.03
630.0	-166394	41719	2137421	-2245.3	216.4	6562.2	-9.40	0.68	3.02
632.0	-170903	42153	2150551	-2264.2	217.8	6568.2	-9.44	0.68	3.01
634.0	-175450	42590	2163694	-2283.1	219.1	6574.2	-9.48	0.68	2.99
636.0	-180036	43029	2176848	-2302.1	220.5	6580.2	-9.50	0.67	2.99
638.0	-184659	43472	2190015	-2321.1	221.8	6586.2	-9.50	0.68	2.99
640.0	-189320	43917	2203193	-2340.1	223.2	6592.2	-9.50	0.68	2.99
642.0	-194019	44364	2216383	-2359.1	224.5	6598.2	-9.53	0.68	2.99
644.0	-198756	44815	2229586	-2378.2	225.9	6604.1	-9.55	0.69	2.98
646.0	-203532	45268	2242800	-2397.3	227.3	6610.1	-9.56	0.69	2.97
648.0	-208345	45724	2256026	-2416.4	228.7	6616.0	-9.57	0.69	2.97
650.0	-213197	46182	2269264	-2435.6	230.0	6622.0	-9.58	0.69	2.96
652.0	-218088	46644	2282514	-2454.8	231.4	6627.9	-9.61	0.68	2.96
654.0	-223016	47108	2295775	-2474.0	232.8	6633.8	-9.62	0.67	2.96
656.0	-227984	47575	2309049	-2493.2	234.1	6639.7	-9.63	0.67	2.96
658.0	-232989	48044	2322334	-2512.5	235.4	6645.6	-9.64	0.67	2.96
660.0	-238034	48517	2335631	-2531.8	236.8	6651.5	-9.66	0.67	2.97
662.0	-243117	48992	2348940	-2551.1	238.1	6657.5	-9.67	0.68	2.97
664.0	-248238	49469	2362261	-2570.5	239.5	6663.4	-9.68	0.68	2.96
666.0	-253399	49950	2375594	-2589.9	240.9	6669.3	-9.69	0.68	2.94
668.0	-258598	50433	2388939	-2609.3	242.2	6675.2	-9.73	0.68	2.92
670.0	-263836	50918	2402295	-2628.8	243.6	6681.0	-9.81	0.68	2.90

TABLE B-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
672.0	-269113	51407	2415662	-2648.5	244.9	6686.8	-9.87	0.68	2.88
674.0	-274430	51898	2429042	-2668.3	246.3	6692.5	-9.88	0.68	2.88
676.0	-279786	52392	2442432	-2688.0	247.7	6698.3	-9.86	0.69	2.89
678.0	-285182	52889	2455835	-2707.7	249.0	6704.1	-9.85	0.68	2.89
680.0	-290617	53388	2469249	-2727.4	250.4	6709.8	-9.85	0.68	2.89
682.0	-296092	53890	2482674	-2747.1	251.7	6715.6	-9.85	0.68	2.89
684.0	-301606	54395	2496111	-2766.8	253.1	6721.4	-9.83	0.68	2.89
686.0	-307159	54903	2509560	-2786.4	254.5	6727.2	-9.82	0.69	2.90
688.0	-312751	55413	2523020	-2806.1	255.8	6733.0	-9.81	0.69	2.91
690.0	-318383	55926	2536492	-2825.7	257.2	6738.8	-9.81	0.69	2.91
692.0	-324054	56442	2549975	-2845.3	258.6	6744.7	-9.81	0.69	2.92
694.0	-329764	56960	2563471	-2864.9	260.0	6750.5	-9.81	0.69	2.92
696.0	-335514	57482	2576977	-2884.5	261.4	6756.3	-9.81	0.69	2.92
698.0	-341302	58006	2590496	-2904.2	262.8	6762.1	-9.81	0.70	2.91
700.0	-347130	58533	2604026	-2923.8	264.1	6768.0	-9.82	0.62	2.91
S-IVB 1ST GUIDANCE CUTOFF									
700.560	-348769	58681	2607816	-2929.3	264.5	6769.6	-9.82	0.64	2.91
702.0	-352995	59062	2617564	-2940.8	265.3	6766.2	-7.62	0.49	-3.29
704.0	-358892	59594	2631087	-2956.0	266.3	6759.6	-7.61	0.49	-3.31
706.0	-364819	60127	2644601	-2971.2	267.3	6753.0	-7.61	0.49	-3.32
708.0	-370776	60663	2658101	-2986.4	268.2	6746.3	-7.60	0.48	-3.34
710.0	-376764	61200	2671587	-3001.6	269.2	6739.6	-7.59	0.48	-3.35
PARKING ORBIT INSERTION									
710.560	-378446	61351	2675361	-3005.9	269.5	6737.7	-7.59	0.48	-3.35

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	6373.382	17.393	-4.479	-0.0	101.9	395.7	-0.02	-0.01	0.00
-16.0	6373.382	17.490	-4.099	-0.0	101.9	395.7	-0.02	-0.01	0.00
-15.0	6373.382	17.592	-3.704	-0.1	101.9	395.7	-0.02	-0.01	0.00
-14.0	6373.382	17.694	-3.308	-0.1	101.9	395.7	-0.02	-0.01	0.00
-13.0	6373.382	17.796	-2.912	-0.1	101.9	395.7	-0.02	-0.01	0.00
-12.0	6373.381	17.898	-2.516	-0.1	101.8	395.7	-0.02	-0.01	0.00
-11.0	6373.381	18.000	-2.121	-0.2	101.8	395.7	-0.02	-0.01	0.00
-10.0	6373.381	18.102	-1.725	-0.2	101.8	395.8	-0.02	-0.01	0.00
-9.0	6373.381	18.203	-1.329	-0.2	101.8	395.8	-0.02	-0.01	0.00
-8.0	6373.381	18.305	-0.933	-0.2	101.8	395.8	-0.02	-0.01	0.00
-7.0	6373.380	18.407	-0.538	-0.3	101.8	395.8	-0.02	-0.01	0.00
-6.0	6373.380	18.509	-0.142	-0.3	101.8	395.8	-0.02	-0.01	0.00
-5.0	6373.380	18.610	0.254	-0.3	101.7	395.8	-0.02	-0.01	0.00
-4.0	6373.380	18.712	0.650	-0.3	101.7	395.8	-0.02	-0.01	0.00
-3.0	6373.379	18.814	1.045	-0.4	101.7	395.8	-0.02	-0.01	0.00
-2.0	6373.379	18.916	1.441	-0.4	101.7	395.8	-0.02	-0.01	0.00
-1.0	6373.378	19.017	1.837	-0.4	101.7	395.8	-0.02	-0.01	0.00
0.0	6373.378	19.119	2.233	-0.4	101.7	395.8	-0.02	-0.01	0.00
ALL HOLDDOWN ARMS RELEASED									
0.200	6373.378	19.139	2.312	-0.4	101.7	395.8	0.52	0.00	-0.01
LIFTOFF - START OF TIME BASE 1									
0.600	6373.378	19.180	2.470	-0.1	101.7	395.8	0.71	-0.02	-0.01
1.0	6373.378	19.221	2.629	0.2	101.7	395.8	1.12	-0.03	0.01
2.0	6373.379	19.322	3.024	2.2	101.6	395.8	2.27	-0.03	0.04
3.0	6373.382	19.424	3.420	4.5	101.6	395.9	2.32	-0.07	0.05
4.0	6373.388	19.526	3.816	6.8	101.5	395.9	2.35	-0.07	0.06
5.0	6373.396	19.627	4.212	9.2	101.6	396.0	2.40	0.35	0.07
6.0	6373.406	19.729	4.608	11.6	102.0	396.1	2.43	0.45	0.08
7.0	6373.419	19.831	5.004	14.1	102.4	396.2	2.47	0.45	0.09
8.0	6373.435	19.934	5.400	16.6	102.9	396.2	2.52	0.38	0.09
9.0	6373.452	20.037	5.797	19.1	103.0	396.3	2.56	0.07	0.10
10.0	6373.473	20.140	6.193	21.7	103.1	396.4	2.59	0.07	0.12
11.0	6373.496	20.243	6.590	24.3	103.2	396.6	2.64	0.09	0.14
12.0	6373.521	20.346	6.986	26.9	103.3	396.7	2.67	0.11	0.12
13.0	6373.550	20.449	7.383	29.6	103.4	396.8	2.71	0.12	0.10
14.0	6373.581	20.553	7.780	32.4	103.5	396.9	2.79	0.13	0.16

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
15.0	6373.614	20.656	8.177	35.2	103.6	397.1	2.85	0.10	0.19
16.0	6373.651	20.760	8.574	38.1	103.7	397.3	2.93	0.01	0.23
17.0	6373.691	20.864	8.972	41.0	103.6	397.6	2.99	-0.04	0.27
18.0	6373.733	20.967	9.369	44.0	103.6	397.9	3.05	-0.06	0.32
19.0	6373.779	21.071	9.767	47.1	103.5	398.2	3.12	-0.06	0.37
20.0	6373.827	21.174	10.166	50.3	103.5	398.6	3.18	-0.06	0.43
21.0	6373.879	21.278	10.565	53.5	103.4	399.1	3.25	-0.05	0.50
22.0	6373.934	21.381	10.964	56.7	103.3	399.6	3.31	-0.05	0.57
23.0	6373.993	21.484	11.364	60.1	103.3	400.2	3.38	-0.05	0.64
24.0	6374.054	21.588	11.764	63.5	103.2	400.9	3.45	-0.06	0.71
25.0	6374.120	21.691	12.166	67.0	103.2	401.6	3.52	-0.07	0.78
26.0	6374.188	21.794	12.568	70.5	103.1	402.5	3.59	-0.07	0.87
27.0	6374.261	21.897	12.971	74.1	103.0	403.4	3.66	-0.08	0.95
28.0	6374.337	22.000	13.374	77.8	102.9	404.4	3.73	-0.08	1.04
29.0	6374.416	22.103	13.779	81.6	102.9	405.5	3.80	-0.08	1.13
30.0	6374.500	22.206	14.185	85.4	102.8	406.6	3.87	-0.08	1.23
31.0	6374.587	22.309	14.593	89.3	102.7	407.9	3.94	-0.08	1.32
32.0	6374.678	22.411	15.001	93.3	102.6	409.3	4.02	-0.07	1.42
33.0	6374.774	22.514	15.411	97.3	102.6	410.8	4.09	-0.07	1.53
34.0	6374.873	22.616	15.823	101.5	102.5	412.3	4.16	-0.05	1.64
35.0	6374.977	22.719	16.236	105.6	102.4	414.0	4.23	-0.04	1.75
36.0	6375.084	22.821	16.651	109.9	102.4	415.9	4.30	-0.04	1.87
37.0	6375.197	22.924	17.068	114.2	102.4	417.8	4.38	-0.03	1.99
38.0	6375.313	23.026	17.487	118.7	102.3	419.8	4.45	-0.03	2.11
39.0	6375.434	23.128	17.908	123.1	102.3	422.0	4.52	-0.03	2.23
40.0	6375.559	23.230	18.331	127.7	102.3	424.3	4.59	-0.03	2.35
41.0	6375.689	23.333	18.756	132.3	102.2	426.7	4.67	-0.03	2.48
42.0	6375.824	23.435	19.184	137.0	102.2	429.3	4.75	-0.02	2.61
43.0	6375.963	23.537	19.615	141.8	102.2	432.0	4.83	-0.02	2.76
44.0	6376.108	23.639	20.048	146.7	102.2	434.8	4.90	-0.01	2.91
45.0	6376.257	23.741	20.484	151.6	102.1	437.8	4.98	-0.01	3.08
46.0	6376.411	23.844	20.924	156.6	102.1	441.0	5.06	0.00	3.25
47.0	6376.570	23.946	21.366	161.7	102.1	444.3	5.13	0.01	3.43
48.0	6376.734	24.048	21.812	166.9	102.2	447.8	5.20	0.01	3.61
49.0	6376.904	24.150	22.262	172.1	102.2	451.5	5.26	0.02	3.79
50.0	6377.079	24.252	22.715	177.4	102.2	455.4	5.32	0.03	3.98
51.0	6377.259	24.354	23.173	182.7	102.2	459.5	5.37	0.02	4.18
52.0	6377.444	24.457	23.635	188.1	102.2	463.8	5.44	0.02	4.37
53.0	6377.635	24.559	24.101	193.6	102.3	468.2	5.50	0.02	4.57
54.0	6377.831	24.661	24.571	199.1	102.3	472.9	5.57	0.01	4.75
55.0	6378.033	24.763	25.046	204.7	102.3	477.7	5.65	0.01	4.94
56.0	6378.241	24.866	25.527	210.4	102.3	482.8	5.72	-0.00	5.12
57.0	6378.454	24.968	26.012	216.2	102.3	488.0	5.79	-0.00	5.32

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
58.0	6378.673	25.070	26.503	222.0	102.3	493.4	5.86	-0.01	5.52
59.0	6378.898	25.172	26.999	227.9	102.3	499.1	5.92	-0.01	5.73
60.0	6379.129	25.275	27.501	233.8	102.2	504.9	5.98	-0.01	5.94
61.0	6379.366	25.377	28.009	239.8	102.2	510.9	6.03	-0.01	6.15
62.0	6379.609	25.479	28.523	245.9	102.2	517.2	6.08	0.01	6.35
63.0	6379.857	25.581	29.043	252.0	102.2	523.6	6.13	0.02	6.55
64.0	6380.112	25.683	29.570	258.1	102.3	530.3	6.17	0.05	6.74
65.0	6380.374	25.786	30.104	264.3	102.3	537.1	6.20	0.08	6.94
66.0	6380.641	25.888	30.644	270.5	102.4	544.1	6.22	0.10	7.13
67.0	6380.915	25.991	31.192	276.7	102.5	551.4	6.25	0.12	7.33
MACH 1									
68.000	6381.195	26.093	31.747	283.0	102.7	558.8	6.27	0.13	7.53
69.0	6381.481	26.196	32.310	289.3	102.8	566.4	6.30	0.14	7.73
70.0	6381.773	26.299	32.880	295.6	103.0	574.3	6.34	0.16	7.94
71.0	6382.072	26.402	33.458	301.9	103.1	582.3	6.39	0.18	8.15
72.0	6382.377	26.505	34.045	308.4	103.3	590.6	6.45	0.24	8.34
73.0	6382.689	26.608	34.639	314.9	103.6	599.0	6.52	0.33	8.54
74.0	6383.007	26.712	35.243	321.4	104.0	607.6	6.61	0.43	8.74
75.0	6383.331	26.817	35.855	328.1	104.5	616.5	6.70	0.69	8.95
76.0	6383.663	26.922	36.476	334.8	105.2	625.5	6.78	0.69	9.17
77.0	6384.001	27.027	37.106	341.6	105.8	634.8	6.85	0.55	9.42
78.0	6384.346	27.133	37.745	348.5	106.2	644.4	6.91	0.25	9.71
79.0	6384.698	27.239	38.395	355.4	106.4	654.3	6.93	0.05	10.04
80.0	6385.057	27.346	39.054	362.3	106.3	664.5	6.94	-0.14	10.40
MAXIMUM DYNAMIC PRESSURE									
81.000	6385.423	27.452	39.724	369.2	106.2	675.1	6.92	-0.22	10.79
82.0	6385.795	27.559	40.405	376.1	105.9	686.1	6.89	-0.28	11.19
83.0	6386.175	27.665	41.096	383.0	105.6	697.5	6.86	-0.31	11.59
84.0	6386.561	27.771	41.800	389.9	105.3	709.3	6.84	-0.32	11.97
85.0	6386.955	27.876	42.515	396.7	105.0	721.4	6.82	-0.32	12.33
86.0	6387.355	27.981	43.243	403.5	104.7	733.9	6.82	-0.30	12.67
87.0	6387.762	28.086	43.983	410.3	104.4	746.7	6.82	-0.27	12.99
88.0	6388.175	28.190	44.736	417.1	104.1	759.9	6.82	-0.23	13.29
89.0	6388.596	28.294	45.503	424.0	103.9	773.3	6.84	-0.11	13.60
90.0	6389.023	28.399	46.283	430.8	103.9	787.1	6.87	-0.03	13.90
91.0	6389.458	28.503	47.077	437.7	103.9	801.1	6.90	0.01	14.20
92.0	6389.899	28.607	47.885	444.6	103.9	815.5	6.92	0.02	14.52
93.0	6390.347	28.711	48.708	451.5	103.9	830.2	6.94	0.01	14.84
94.0	6390.802	28.815	49.546	458.5	103.9	845.2	6.95	0.00	15.16

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
95.0	6391.264	28.919	50.399	465.4	103.9	860.5	6.93	-0.01	15.48
96.0	6391.733	29.023	51.267	472.3	103.9	876.2	6.90	-0.02	15.83
97.0	6392.208	29.127	52.151	479.2	103.8	892.2	6.87	-0.03	16.19
98.0	6392.691	29.231	53.051	486.0	103.8	908.5	6.83	-0.05	16.55
99.0	6393.180	29.335	53.968	492.9	103.7	925.3	6.80	-0.07	16.93
100.0	6393.677	29.439	54.902	499.6	103.7	942.4	6.76	-0.08	17.30
101.0	6394.180	29.542	55.853	506.4	103.6	959.9	6.73	-0.10	17.67
102.0	6394.689	29.646	56.822	513.1	103.5	977.7	6.71	-0.11	18.02
103.0	6395.206	29.749	57.809	519.8	103.3	995.9	6.68	-0.12	18.36
104.0	6395.729	29.853	58.814	526.5	103.2	1014.4	6.66	-0.14	18.69
105.0	6396.259	29.956	59.838	533.1	103.1	1033.3	6.65	-0.16	19.03
106.0	6396.795	30.059	60.881	539.7	102.9	1052.5	6.63	-0.20	19.37
107.0	6397.338	30.162	61.943	546.4	102.7	1072.1	6.61	-0.23	19.72
108.0	6397.888	30.265	63.025	552.9	102.4	1091.9	6.58	-0.26	20.08
109.0	6398.444	30.367	64.127	559.5	102.1	1112.2	6.53	-0.28	20.44
110.0	6399.007	30.469	65.249	566.0	101.9	1132.8	6.49	-0.28	20.79
111.0	6399.576	30.571	66.393	572.4	101.6	1153.8	6.45	-0.28	21.15
112.0	6400.152	30.673	67.557	578.9	101.3	1175.1	6.42	-0.27	21.50
113.0	6400.734	30.774	68.743	585.3	101.0	1196.8	6.40	-0.23	21.83
114.0	6401.322	30.875	69.951	591.7	100.8	1218.8	6.41	-0.18	22.16
115.0	6401.917	30.976	71.181	598.1	100.7	1241.1	6.45	-0.14	22.47
116.0	6402.518	31.077	72.433	604.6	100.5	1263.7	6.53	-0.09	22.75
117.0	6403.126	31.178	73.708	611.2	100.5	1286.6	6.64	-0.04	23.03
118.0	6403.741	31.279	75.006	617.9	100.5	1309.7	6.76	0.01	23.31
119.0	6404.362	31.379	76.328	624.7	100.5	1333.2	6.87	0.03	23.59
120.0	6404.990	31.480	77.673	631.6	100.5	1357.0	6.96	0.04	23.91
121.0	6405.625	31.581	79.042	638.6	100.6	1381.1	7.02	0.05	24.25
122.0	6406.268	31.681	80.435	645.6	100.6	1405.5	7.04	0.06	24.63
123.0	6406.917	31.782	81.853	652.6	100.7	1430.3	7.02	0.06	25.03
124.0	6407.573	31.883	83.296	659.6	100.7	1455.6	6.99	0.06	25.44
125.0	6408.236	31.984	84.764	666.6	100.8	1481.2	6.95	0.05	25.85
126.0	6408.906	32.085	86.258	673.5	100.8	1507.2	6.92	0.04	26.25
127.0	6409.583	32.186	87.779	680.4	100.9	1533.7	6.91	0.02	26.65
128.0	6410.267	32.287	89.326	687.3	100.9	1560.6	6.92	0.00	27.09
129.0	6410.958	32.388	90.900	694.3	100.9	1587.9	6.92	-0.02	27.51
130.0	6411.655	32.489	92.502	701.2	100.8	1615.6	6.93	-0.05	27.94
131.0	6412.360	32.590	94.131	708.1	100.8	1643.7	6.96	-0.08	28.37
132.0	6413.072	32.691	95.789	715.1	100.7	1672.3	6.98	-0.09	28.79
133.0	6413.790	32.791	97.476	722.1	100.6	1701.3	7.01	-0.11	29.22
134.0	6414.516	32.892	99.192	729.1	100.5	1730.8	7.03	-0.12	29.65
135.0	6415.249	32.992	100.937	736.1	100.3	1760.6	7.06	-0.12	30.08
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.140	6415.352	33.007	101.184	737.1	100.4	1764.8	7.06	-0.12	30.14

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
136.0	6415.987	33.093	102.710	741.0	100.3	1787.1	3.71	-0.10	24.49
137.0	6416.729	33.193	104.507	744.7	100.2	1811.6	3.71	-0.10	24.49
138.0	6417.476	33.293	106.331	748.4	100.1	1836.1	3.71	-0.10	24.49
139.0	6418.226	33.393	108.179	752.1	100.1	1860.7	3.71	-0.06	24.74
140.0	6418.980	33.494	110.053	755.8	100.0	1885.6	3.71	0.00	25.01
141.0	6419.738	33.594	111.951	759.5	100.0	1910.8	3.72	0.01	25.35
142.0	6420.499	33.694	113.874	763.2	100.0	1936.3	3.73	0.01	25.70
143.0	6421.264	33.794	115.823	767.0	100.1	1962.4	3.74	0.03	26.04
144.0	6422.033	33.894	117.799	770.7	100.1	1988.6	3.75	0.03	26.41
145.0	6422.806	33.994	119.801	774.5	100.1	2015.2	3.77	0.02	26.76
146.0	6423.582	34.094	121.829	778.2	100.1	2042.2	3.77	0.00	27.13
147.0	6424.363	34.194	123.885	782.0	100.1	2069.5	3.79	-0.01	27.50
148.0	6425.147	34.294	125.968	785.9	100.1	2097.1	3.80	-0.02	27.86
149.0	6425.935	34.394	128.080	789.7	100.1	2125.2	3.82	-0.03	28.22
150.0	6426.726	34.494	130.219	793.6	100.0	2153.6	3.85	-0.04	28.59
151.0	6427.522	34.594	132.387	797.5	100.0	2182.4	3.89	-0.05	28.99
152.0	6428.321	34.694	134.584	801.4	99.9	2211.5	3.92	-0.05	29.39
153.0	6429.124	34.794	136.810	805.3	99.9	2241.1	3.95	-0.06	29.78
154.0	6429.932	34.894	139.066	809.2	99.8	2271.0	3.98	-0.06	30.18
155.0	6430.743	34.994	141.352	813.2	99.8	2301.4	4.00	-0.06	30.54
156.0	6431.558	35.093	143.669	817.2	99.7	2332.1	4.02	-0.05	30.98
157.0	6432.377	35.193	146.017	821.2	99.6	2363.3	4.04	-0.05	31.41
158.0	6433.201	35.293	148.396	825.3	99.6	2394.9	4.06	-0.05	31.84
159.0	6434.028	35.392	150.807	829.4	99.5	2426.9	4.08	-0.05	32.27
160.0	6434.859	35.492	153.250	833.4	99.5	2459.4	4.10	-0.05	32.71
161.0	6435.695	35.591	155.726	837.6	99.4	2492.4	4.12	-0.05	33.16
162.0	6436.534	35.691	158.235	841.7	99.4	2525.8	4.14	-0.07	33.61
163.0	6437.378	35.790	160.778	845.8	99.3	2559.6	4.16	-0.08	34.06
164.0	6438.226	35.889	163.355	850.0	99.2	2593.9	4.18	-0.07	34.51
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
164.100	6438.311	35.899	163.615	850.4	99.2	2597.3	4.19	-0.09	34.55
S-IC/S-II SEPARATION COMMAND									
164.800	6438.905	35.969	165.436	848.4	99.2	2608.4	-8.30	-0.03	4.37
166.0	6439.919	36.088	168.572	837.1	99.1	2609.5	-9.53	-0.04	0.20
168.0	6441.570	36.286	173.782	818.8	99.1	2611.0	-8.33	-0.06	3.99
170.0	6443.195	36.484	179.016	803.5	98.9	2620.3	-7.46	-0.07	4.92
172.0	6444.787	36.682	184.267	788.9	98.8	2631.4	-6.92	-0.04	6.67
174.0	6446.350	36.879	189.543	775.4	98.7	2644.9	-6.68	-0.05	6.81
176.0	6447.888	37.076	194.847	761.9	98.6	2658.6	-6.65	-0.06	6.89

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
178.0	6449.398	37.273	200.178	748.6	98.5	2672.5	-6.60	-0.05	7.00
180.0	6450.882	37.470	205.537	735.4	98.4	2686.5	-6.60	-0.05	7.02
182.0	6452.340	37.667	210.924	722.2	98.3	2700.6	-6.58	-0.05	7.06
184.0	6453.771	37.863	216.339	709.1	98.2	2714.8	-6.58	-0.05	7.10
186.0	6455.176	38.059	221.783	695.9	98.1	2729.0	-6.56	-0.05	7.12
188.0	6456.555	38.255	227.255	682.8	97.9	2743.3	-6.54	-0.05	7.15
190.0	6457.907	38.451	232.756	669.7	97.8	2757.6	-6.51	-0.05	7.16
192.0	6459.234	38.647	238.285	656.7	97.7	2771.9	-6.50	-0.05	7.19
194.0	6460.534	38.842	243.844	643.7	97.6	2786.4	-6.48	-0.05	7.23
196.0	6461.809	39.037	249.431	630.8	97.5	2800.9	-6.46	-0.05	7.27
198.0	6463.057	39.232	255.047	617.9	97.4	2815.4	-6.44	-0.05	7.29
200.0	6464.280	39.427	260.693	605.0	97.3	2830.0	-6.41	-0.05	7.33
202.0	6465.478	39.622	266.367	592.2	97.2	2844.8	-6.39	-0.04	7.38
204.0	6466.649	39.816	272.072	579.4	97.1	2859.6	-6.37	-0.05	7.42
206.0	6467.795	40.010	277.806	566.7	97.0	2874.4	-6.31	-0.06	7.43
208.0	6468.916	40.204	283.569	554.2	96.9	2889.3	-6.19	-0.08	7.39
210.0	6470.012	40.398	289.363	542.0	96.7	2904.0	-5.98	-0.11	7.33
212.0	6471.084	40.591	295.185	530.3	96.4	2918.6	-5.73	-0.12	7.25
214.0	6472.134	40.783	301.037	519.0	96.2	2933.0	-5.52	-0.12	7.19
216.0	6473.161	40.976	306.917	508.1	95.9	2947.3	-5.39	-0.12	7.16
218.0	6474.166	41.167	312.826	497.4	95.7	2961.7	-5.35	-0.12	7.17
220.0	6475.150	41.358	318.764	486.7	95.5	2976.0	-5.35	-0.12	7.20
222.0	6476.113	41.549	324.730	476.0	95.2	2990.5	-5.35	-0.12	7.24
224.0	6477.054	41.739	330.726	465.3	95.0	3005.0	-5.36	-0.12	7.28
226.0	6477.974	41.929	336.750	454.5	94.7	3019.6	-5.36	-0.13	7.32
228.0	6478.873	42.118	342.804	443.8	94.5	3034.3	-5.37	-0.13	7.37
230.0	6479.749	42.307	348.887	433.1	94.2	3049.1	-5.38	-0.12	7.41
232.0	6480.605	42.495	355.000	422.3	94.0	3063.9	-5.39	-0.11	7.44
234.0	6481.439	42.683	361.143	411.5	93.8	3078.9	-5.39	-0.11	7.48
236.0	6482.251	42.870	367.316	400.7	93.5	3093.9	-5.40	-0.11	7.52
238.0	6483.041	43.057	373.519	389.9	93.3	3109.0	-5.41	-0.12	7.57
240.0	6483.810	43.243	379.752	379.0	93.1	3124.1	-5.41	-0.11	7.61
242.0	6484.557	43.429	386.015	368.2	92.8	3139.4	-5.41	-0.11	7.64
244.0	6485.283	43.614	392.309	357.3	92.6	3154.7	-5.42	-0.11	7.68
246.0	6485.987	43.799	398.634	346.5	92.4	3170.1	-5.43	-0.12	7.73
248.0	6486.669	43.984	404.990	335.6	92.1	3185.6	-5.43	-0.11	7.77
250.0	6487.329	44.168	411.377	324.7	91.9	3201.2	-5.44	-0.11	7.80
252.0	6487.968	44.352	417.795	313.9	91.7	3216.9	-5.44	-0.12	7.84
254.0	6488.585	44.535	424.244	303.0	91.4	3232.6	-5.44	-0.12	7.89
256.0	6489.180	44.717	430.725	292.1	91.2	3248.4	-5.45	-0.11	7.93
258.0	6489.753	44.899	437.238	281.1	91.0	3264.3	-5.46	-0.11	7.97
260.0	6490.304	45.081	443.783	270.2	90.7	3280.3	-5.47	-0.12	8.02
262.0	6490.834	45.262	450.359	259.2	90.5	3296.4	-5.48	-0.12	8.06

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
264.0	6491.341	45.443	456.968	248.3	90.3	3312.6	-5.48	-0.11	8.10
266.0	6491.827	45.624	463.610	237.3	90.0	3328.8	-5.48	-0.11	8.15
268.0	6492.290	45.803	470.284	226.3	89.8	3345.2	-5.47	-0.11	8.20
270.0	6492.732	45.983	476.990	215.4	89.6	3361.6	-5.49	-0.12	8.25
272.0	6493.152	46.162	483.730	204.4	89.3	3378.2	-5.51	-0.12	8.29
274.0	6493.550	46.340	490.503	193.3	89.1	3394.8	-5.54	-0.11	8.33
276.0	6493.925	46.518	497.309	182.2	88.8	3411.5	-5.55	-0.12	8.37
278.0	6494.278	46.695	504.149	171.1	88.6	3428.3	-5.55	-0.13	8.42
280.0	6494.610	46.872	511.023	160.0	88.3	3445.2	-5.55	-0.12	8.47
282.0	6494.918	47.049	517.930	148.9	88.1	3462.2	-5.55	-0.11	8.52
284.0	6495.205	47.225	524.871	137.7	87.9	3479.3	-5.58	-0.10	8.57
286.0	6495.469	47.400	531.847	126.5	87.7	3496.5	-5.63	-0.10	8.61
288.0	6495.711	47.576	538.857	115.3	87.5	3513.7	-5.64	-0.10	8.66
290.0	6495.930	47.750	545.902	104.0	87.2	3531.1	-5.62	-0.10	8.71
292.0	6496.127	47.924	552.982	92.8	87.0	3548.6	-5.59	-0.11	8.76
294.0	6496.301	48.098	560.097	81.5	86.8	3566.2	-5.61	-0.11	8.80
296.0	6496.453	48.272	567.247	70.3	86.6	3583.8	-5.63	-0.11	8.86
298.0	6496.583	48.445	574.432	59.0	86.3	3601.6	-5.65	-0.11	8.91
300.0	6496.689	48.617	581.653	47.7	86.1	3619.5	-5.66	-0.11	8.96
302.0	6496.773	48.789	588.910	36.3	85.9	3637.4	-5.68	-0.11	9.01
304.0	6496.835	48.960	596.203	24.9	85.6	3655.5	-5.69	-0.12	9.06
306.0	6496.873	49.131	603.532	13.5	85.4	3673.7	-5.71	-0.11	9.12
308.0	6496.889	49.302	610.898	2.1	85.2	3692.0	-5.72	-0.10	9.17
310.0	6496.881	49.472	618.300	-9.4	85.0	3710.4	-5.73	-0.10	9.23
312.0	6496.851	49.642	625.739	-20.9	84.7	3728.9	-5.75	-0.11	9.29
314.0	6496.798	49.811	633.216	-32.4	84.5	3747.6	-5.76	-0.13	9.35
316.0	6496.722	49.980	640.729	-43.9	84.2	3766.3	-5.78	-0.13	9.41
318.0	6496.622	50.148	648.281	-55.5	84.0	3785.2	-5.79	-0.12	9.47
320.0	6496.499	50.316	655.870	-67.1	83.7	3804.2	-5.81	-0.11	9.52
322.0	6496.353	50.483	663.498	-78.8	83.5	3823.3	-5.84	-0.12	9.58
324.0	6496.184	50.650	671.164	-90.5	83.3	3842.5	-5.86	-0.12	9.64
326.0	6495.991	50.816	678.868	-102.3	83.0	3861.9	-5.88	-0.11	9.70
328.0	6495.775	50.982	686.611	-114.1	82.8	3881.3	-5.89	-0.11	9.76
330.0	6495.535	51.147	694.393	-125.9	82.6	3900.9	-5.90	-0.11	9.82
332.0	6495.272	51.312	702.215	-137.7	82.3	3920.6	-5.93	-0.11	9.88
334.0	6494.984	51.476	710.076	-149.6	82.1	3940.4	-5.96	-0.12	9.94
336.0	6494.673	51.640	717.977	-161.5	81.9	3960.4	-5.97	-0.12	10.00
338.0	6494.338	51.804	725.918	-173.5	81.6	3980.4	-5.98	-0.11	10.06
340.0	6493.979	51.967	733.899	-185.5	81.4	4000.6	-6.01	-0.11	10.13
342.0	6493.596	52.130	741.920	-197.6	81.2	4021.0	-6.05	-0.12	10.20
344.0	6493.189	52.292	749.983	-209.7	80.9	4041.5	-6.07	-0.11	10.27
346.0	6492.757	52.453	758.086	-221.9	80.7	4062.1	-6.08	-0.10	10.33
348.0	6492.301	52.615	766.231	-234.1	80.5	4082.8	-6.10	-0.09	10.39

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
350.0	6491.821	52.775	774.417	-246.3	80.3	4103.6	-6.12	-0.10	10.45
352.0	6491.316	52.936	782.645	-258.6	80.1	4124.6	-6.16	-0.11	10.52
354.0	6490.786	53.096	790.916	-271.0	79.9	4145.7	-6.19	-0.11	10.59
356.0	6490.232	53.255	799.228	-283.4	79.7	4166.9	-6.21	-0.11	10.66
358.0	6489.653	53.415	807.584	-295.8	79.4	4188.3	-6.23	-0.11	10.73
360.0	6489.049	53.573	815.982	-308.3	79.2	4209.9	-6.25	-0.10	10.80
362.0	6488.420	53.731	824.423	-320.8	79.0	4231.6	-6.27	-0.10	10.87
364.0	6487.765	53.889	832.908	-333.4	78.8	4253.4	-6.30	-0.10	10.94
366.0	6487.086	54.047	841.437	-346.1	78.6	4275.3	-6.34	-0.10	11.02
368.0	6486.381	54.204	850.010	-358.8	78.4	4297.5	-6.38	-0.10	11.12
370.0	6485.651	54.360	858.627	-371.6	78.2	4319.8	-6.41	-0.10	11.19
372.0	6484.894	54.516	867.289	-384.5	78.0	4342.2	-6.43	-0.10	11.24
374.0	6484.113	54.672	875.996	-397.4	77.8	4364.8	-6.45	-0.10	11.29
376.0	6483.305	54.827	884.748	-410.3	77.5	4387.4	-6.48	-0.10	11.37
378.0	6482.471	54.982	893.546	-423.3	77.3	4410.3	-6.51	-0.10	11.47
380.0	6481.612	55.137	902.389	-436.4	77.1	4433.3	-6.54	-0.10	11.55
382.0	6480.726	55.291	911.279	-449.5	76.9	4456.5	-6.57	-0.11	11.63
384.0	6479.814	55.444	920.215	-462.7	76.7	4479.8	-6.61	-0.10	11.71
386.0	6478.875	55.598	929.198	-476.0	76.5	4503.3	-6.65	-0.10	11.80
388.0	6477.910	55.750	938.228	-489.3	76.3	4527.0	-6.69	-0.10	11.87
390.0	6476.918	55.903	947.306	-502.7	76.1	4550.8	-6.71	-0.10	11.95
392.0	6475.899	56.055	956.432	-516.2	75.9	4574.8	-6.74	-0.10	12.03
394.0	6474.853	56.206	965.605	-529.7	75.7	4599.0	-6.79	-0.10	12.12
396.0	6473.780	56.358	974.828	-543.4	75.5	4623.3	-6.85	-0.10	12.22
398.0	6472.679	56.509	984.099	-557.2	75.3	4647.8	-6.89	-0.10	12.30
400.0	6471.551	56.659	993.419	-571.0	75.1	4672.5	-6.91	-0.10	12.38
402.0	6470.395	56.809	1002.789	-584.8	74.9	4697.4	-6.94	-0.10	12.47
404.0	6469.212	56.959	1012.209	-598.8	74.7	4722.4	-6.98	-0.10	12.57
406.0	6468.000	57.108	1021.679	-612.8	74.5	4747.6	-7.02	-0.09	12.66
408.0	6466.760	57.257	1031.199	-626.9	74.3	4773.0	-7.07	-0.09	12.74
410.0	6465.492	57.405	1040.771	-641.1	74.1	4798.6	-7.11	-0.09	12.83
412.0	6464.196	57.553	1050.394	-655.4	73.9	4824.4	-7.16	-0.09	12.93
414.0	6462.871	57.701	1060.069	-669.8	73.7	4850.4	-7.20	-0.09	13.03
416.0	6461.517	57.848	1069.795	-684.2	73.5	4876.5	-7.25	-0.09	13.12
418.0	6460.134	57.995	1079.575	-698.8	73.4	4902.8	-7.30	-0.09	13.22
420.0	6458.722	58.141	1089.407	-713.4	73.2	4929.4	-7.34	-0.09	13.31
422.0	6457.280	58.288	1099.292	-728.2	73.0	4956.1	-7.39	-0.09	13.40
424.0	6455.809	58.433	1109.231	-743.0	72.8	4983.0	-7.44	-0.09	13.50
426.0	6454.308	58.579	1119.225	-758.0	72.6	5010.2	-7.49	-0.09	13.66
428.0	6452.777	58.724	1129.272	-773.0	72.4	5037.7	-7.54	-0.08	13.82
430.0	6451.216	58.868	1139.375	-788.2	72.3	5065.4	-7.59	-0.08	13.91
432.0	6449.624	59.013	1149.534	-803.4	72.1	5093.3	-7.64	-0.08	13.97
434.0	6448.002	59.157	1159.749	-818.8	71.9	5121.3	-7.69	-0.09	14.05

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
436.0	6446.349	59.300	1170.019	-834.2	71.7	5149.5	-7.75	-0.09	14.19
438.0	6444.665	59.444	1180.347	-849.8	71.6	5178.0	-7.80	-0.08	14.31
440.0	6442.950	59.587	1190.732	-865.5	71.4	5206.8	-7.86	-0.08	14.40
442.0	6441.203	59.729	1201.174	-881.3	71.2	5235.7	-7.91	-0.07	14.51
444.0	6439.424	59.872	1211.675	-897.2	71.1	5264.8	-7.97	-0.07	14.63
446.0	6437.614	60.014	1222.234	-913.1	70.9	5294.2	-8.01	-0.08	14.76
448.0	6435.772	60.155	1232.852	-929.2	70.7	5323.9	-8.07	-0.08	14.88
450.0	6433.897	60.297	1243.529	-945.5	70.6	5353.7	-8.14	-0.08	15.00
452.0	6431.990	60.437	1254.267	-961.8	70.4	5383.9	-8.21	-0.08	15.14
454.0	6430.050	60.578	1265.065	-978.3	70.2	5414.3	-8.24	-0.07	15.26
456.0	6428.077	60.718	1275.924	-994.8	70.1	5445.0	-8.29	-0.08	15.41
458.0	6426.070	60.858	1286.845	-1011.6	69.9	5475.9	-8.38	-0.08	15.53
460.0	6424.031	60.998	1297.828	-1028.4	69.7	5507.1	-8.47	-0.10	15.65
462.0	6421.956	61.137	1308.873	-1045.5	69.5	5538.5	-8.56	-0.08	15.76
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
463.090	6420.811	61.213	1314.919	-1054.9	69.4	5555.7	-8.61	-0.13	15.83
464.0	6419.848	61.276	1319.980	-1062.7	69.3	5567.8	-8.63	-0.08	12.23
466.0	6417.705	61.415	1331.139	-1080.1	69.1	5592.4	-8.75	-0.13	12.32
468.0	6415.527	61.553	1342.348	-1097.7	68.8	5617.1	-8.79	-0.18	12.42
470.0	6413.314	61.690	1353.607	-1115.3	68.4	5642.1	-8.78	-0.19	12.53
472.0	6411.066	61.826	1364.917	-1132.8	68.1	5667.2	-8.71	-0.13	12.63
474.0	6408.783	61.962	1376.275	-1150.0	67.9	5691.3	-8.43	-0.12	10.94
476.0	6406.466	62.098	1387.679	-1166.6	67.6	5712.6	-8.21	-0.15	10.62
478.0	6404.117	62.233	1399.125	-1183.0	67.3	5733.8	-8.16	-0.12	10.64
480.0	6401.734	62.367	1410.614	-1199.4	67.0	5755.1	-8.25	-0.12	10.67
482.0	6399.319	62.501	1422.146	-1216.0	66.8	5776.5	-8.33	-0.12	10.71
484.0	6396.870	62.634	1433.720	-1232.7	66.5	5798.0	-8.38	-0.12	10.76
486.0	6394.388	62.767	1445.337	-1249.6	66.3	5819.5	-8.40	-0.11	10.81
488.0	6391.872	62.899	1456.998	-1266.4	66.1	5841.2	-8.40	-0.10	10.87
490.0	6389.322	63.031	1468.702	-1283.2	65.9	5863.0	-8.40	-0.08	10.92
492.0	6386.739	63.163	1480.450	-1300.1	65.8	5884.9	-8.42	-0.07	10.98
494.0	6384.122	63.294	1492.242	-1317.0	65.6	5906.9	-8.50	-0.06	11.04
496.0	6381.471	63.425	1504.078	-1334.1	65.5	5929.1	-8.60	-0.05	11.11
498.0	6378.785	63.556	1515.958	-1351.4	65.4	5951.4	-8.71	-0.06	11.18
500.0	6376.065	63.687	1527.883	-1369.0	65.3	5973.8	-8.80	-0.06	11.25
502.0	6373.309	63.817	1539.854	-1386.7	65.1	5996.4	-8.88	-0.06	11.31
504.0	6370.518	63.947	1551.869	-1404.5	65.0	6019.1	-8.97	-0.05	11.38
506.0	6367.691	64.077	1563.930	-1422.6	64.9	6041.9	-9.05	-0.05	11.46
508.0	6364.828	64.207	1576.037	-1440.8	64.8	6064.9	-9.13	-0.04	11.53
510.0	6361.928	64.337	1588.190	-1459.1	64.7	6088.0	-9.20	-0.04	11.59
512.0	6358.991	64.466	1600.389	-1477.6	64.6	6111.3	-9.26	-0.04	11.66

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
514.0	6356.017	64.595	1612.635	-1496.2	64.5	6134.7	-9.32	-0.04	11.73
516.0	6353.006	64.724	1624.928	-1515.0	64.4	6158.2	-9.38	-0.04	11.81
518.0	6349.957	64.853	1637.268	-1533.8	64.3	6181.9	-9.44	-0.04	11.88
520.0	6346.871	64.981	1649.656	-1552.8	64.3	6205.7	-9.51	-0.03	11.95
522.0	6343.746	65.110	1662.091	-1571.9	64.2	6229.7	-9.57	-0.03	12.04
524.0	6340.583	65.238	1674.575	-1591.1	64.1	6253.9	-9.64	-0.03	12.12
526.0	6337.382	65.366	1687.107	-1610.5	64.0	6278.2	-9.71	-0.03	12.19
528.0	6334.141	65.494	1699.688	-1630.0	64.0	6302.7	-9.77	-0.03	12.26
530.0	6330.862	65.622	1712.318	-1649.6	63.9	6327.3	-9.83	-0.02	12.34
532.0	6327.543	65.750	1724.997	-1669.4	63.9	6352.1	-9.91	-0.02	12.42
534.0	6324.184	65.877	1737.726	-1689.3	63.8	6377.0	-9.99	-0.02	12.51
536.0	6320.785	66.005	1750.505	-1709.4	63.8	6402.1	-10.07	-0.02	12.59
538.0	6317.346	66.132	1763.335	-1729.6	63.7	6427.4	-10.14	-0.02	12.67
540.0	6313.867	66.260	1776.215	-1750.0	63.7	6452.8	-10.21	-0.03	12.74
542.0	6310.346	66.387	1789.146	-1770.5	63.6	6478.4	-10.27	-0.03	12.82
544.0	6306.785	66.514	1802.128	-1791.1	63.5	6504.1	-10.35	-0.03	12.91
546.0	6303.182	66.641	1815.163	-1811.9	63.5	6530.0	-10.43	-0.03	13.00
548.0	6299.537	66.768	1828.249	-1832.9	63.4	6556.1	-10.51	-0.03	13.08
550.0	6295.850	66.895	1841.387	-1854.0	63.3	6582.4	-10.59	-0.02	13.16
552.0	6292.121	67.022	1854.578	-1875.3	63.3	6608.8	-10.66	-0.02	13.27
554.0	6288.349	67.148	1867.822	-1896.7	63.3	6635.4	-10.75	-0.00	13.32
556.0	6284.534	67.275	1881.120	-1918.3	63.2	6662.1	-10.84	-0.02	13.39
558.0	6280.676	67.401	1894.471	-1940.1	63.2	6688.9	-10.93	0.01	13.46
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
559.050	6278.633	67.467	1901.502	-1951.6	63.2	6703.1	-10.97	-0.14	13.50
S-II/S-IVB SEPARATION COMMAND									
560.000	6276.775	67.527	1907.869	-1960.4	63.1	6704.1	-8.77	-0.10	-2.76
562.0	6272.836	67.653	1921.274	-1978.0	62.9	6698.7	-8.81	-0.05	-2.67
564.0	6268.862	67.779	1934.664	-1995.8	62.7	6693.5	-8.99	-0.10	-2.28
566.0	6264.852	67.904	1948.052	-2014.4	62.5	6694.4	-9.57	-0.14	2.16
568.0	6260.804	68.029	1961.445	-2033.5	62.3	6699.2	-9.48	-0.05	2.47
570.0	6256.718	68.154	1974.849	-2052.5	62.2	6704.2	-9.54	-0.06	2.49
572.0	6252.594	68.278	1988.262	-2071.7	62.0	6709.2	-9.65	-0.10	2.51
574.0	6248.431	68.402	2001.685	-2091.1	61.8	6714.2	-9.75	-0.13	2.53
576.0	6244.229	68.525	2015.119	-2110.7	61.5	6719.3	-9.77	-0.12	2.55
578.0	6239.988	68.648	2028.562	-2130.3	61.3	6724.4	-9.77	-0.10	2.57
580.0	6235.708	68.770	2042.016	-2149.9	61.1	6729.4	-9.80	-0.09	2.56
582.0	6231.388	68.892	2055.480	-2169.6	60.9	6734.6	-9.85	-0.08	2.55
584.0	6227.029	69.014	2068.954	-2189.3	60.7	6739.7	-9.89	-0.07	2.54

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
586.0	6222.631	69.135	2082.438	-2209.2	60.6	6744.7	-9.92	-0.05	2.52
588.0	6218.192	69.256	2095.933	-2229.1	60.5	6749.8	-9.94	-0.05	2.51
590.0	6213.714	69.377	2109.437	-2249.0	60.4	6754.8	-9.97	-0.05	2.50
592.0	6209.196	69.498	2122.952	-2269.0	60.3	6759.8	-10.00	-0.04	2.49
594.0	6204.638	69.618	2136.477	-2289.1	60.2	6764.8	-10.03	-0.03	2.49
596.0	6200.040	69.739	2150.011	-2309.2	60.1	6769.8	-10.06	-0.03	2.48
598.0	6195.402	69.859	2163.556	-2329.3	60.1	6774.7	-10.08	-0.02	2.47
600.0	6190.723	69.979	2177.110	-2349.5	60.0	6779.7	-10.09	-0.02	2.46
602.0	6186.004	70.099	2190.674	-2369.7	60.0	6784.6	-10.10	-0.03	2.45
604.0	6181.244	70.219	2204.248	-2390.0	59.9	6789.5	-10.12	-0.03	2.44
606.0	6176.444	70.339	2217.832	-2410.2	59.8	6794.4	-10.14	-0.04	2.42
608.0	6171.603	70.458	2231.426	-2430.6	59.7	6799.2	-10.18	-0.03	2.40
610.0	6166.721	70.578	2245.029	-2451.0	59.7	6804.0	-10.21	-0.02	2.39
612.0	6161.799	70.697	2258.642	-2471.5	59.6	6808.8	-10.24	-0.01	2.39
614.0	6156.836	70.816	2272.264	-2492.0	59.6	6813.6	-10.24	-0.02	2.39
616.0	6151.831	70.935	2285.896	-2512.4	59.5	6818.4	-10.23	-0.02	2.39
618.0	6146.786	71.054	2299.537	-2533.0	59.5	6823.2	-10.25	-0.02	2.38
620.0	6141.699	71.173	2313.188	-2553.5	59.4	6827.9	-10.29	-0.02	2.37
622.0	6136.572	71.292	2326.849	-2574.1	59.4	6832.6	-10.32	-0.03	2.35
624.0	6131.403	71.411	2340.519	-2594.8	59.3	6837.3	-10.33	-0.03	2.35
626.0	6126.192	71.529	2354.198	-2615.5	59.3	6842.0	-10.32	-0.03	2.35
628.0	6120.941	71.648	2367.887	-2636.2	59.2	6846.8	-10.32	-0.03	2.35
630.0	6115.648	71.766	2381.585	-2656.8	59.1	6851.4	-10.34	-0.03	2.34
632.0	6110.313	71.884	2395.293	-2677.6	59.1	6856.1	-10.37	-0.03	2.32
634.0	6104.937	72.002	2409.010	-2698.4	59.0	6860.7	-10.42	-0.03	2.30
636.0	6099.520	72.120	2422.736	-2719.3	58.9	6865.3	-10.44	-0.03	2.29
638.0	6094.060	72.238	2436.471	-2740.2	58.8	6869.9	-10.44	-0.03	2.29
640.0	6088.559	72.355	2450.215	-2761.1	58.7	6874.5	-10.44	-0.03	2.29
642.0	6083.016	72.473	2463.969	-2782.0	58.7	6879.1	-10.47	-0.03	2.28
644.0	6077.431	72.590	2477.732	-2803.0	58.6	6883.6	-10.49	-0.03	2.26
646.0	6071.804	72.707	2491.503	-2824.0	58.5	6888.1	-10.50	-0.03	2.25
648.0	6066.135	72.824	2505.284	-2845.1	58.5	6892.6	-10.51	-0.03	2.24
650.0	6060.424	72.941	2519.074	-2866.1	58.4	6897.1	-10.53	-0.03	2.23
652.0	6054.670	73.058	2532.873	-2887.2	58.3	6901.6	-10.55	-0.04	2.22
654.0	6048.875	73.174	2546.680	-2908.4	58.2	6906.0	-10.56	-0.05	2.22
656.0	6043.037	73.291	2560.497	-2929.5	58.1	6910.4	-10.57	-0.06	2.21
658.0	6037.157	73.407	2574.322	-2950.7	58.0	6914.9	-10.59	-0.06	2.21
660.0	6031.234	73.523	2588.156	-2971.9	57.9	6919.3	-10.60	-0.05	2.21
662.0	6025.269	73.638	2601.999	-2993.2	57.8	6923.7	-10.62	-0.05	2.21
664.0	6019.261	73.754	2615.851	-3014.5	57.6	6928.2	-10.63	-0.05	2.19
666.0	6013.211	73.869	2629.712	-3035.7	57.5	6932.5	-10.64	-0.05	2.18
668.0	6007.118	73.984	2643.581	-3057.1	57.4	6936.9	-10.68	-0.05	2.15
670.0	6000.982	74.099	2657.459	-3078.6	57.3	6941.2	-10.75	-0.06	2.12

TABLE B-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
672.0	5994.804	74.213	2671.346	-3100.2	57.2	6945.4	-10.82	-0.06	2.09
674.0	5988.582	74.327	2685.241	-3121.8	57.0	6949.6	-10.83	-0.06	2.09
676.0	5982.316	74.441	2699.144	-3143.5	56.9	6953.8	-10.81	-0.05	2.10
678.0	5976.008	74.555	2713.056	-3165.1	56.8	6958.0	-10.80	-0.06	2.10
680.0	5969.656	74.668	2726.976	-3186.8	56.7	6962.2	-10.80	-0.07	2.09
682.0	5963.261	74.782	2740.904	-3208.4	56.5	6966.3	-10.80	-0.07	2.09
684.0	5956.822	74.894	2754.841	-3230.0	56.4	6970.5	-10.78	-0.06	2.09
686.0	5950.341	75.007	2768.787	-3251.6	56.2	6974.7	-10.77	-0.06	2.09
688.0	5943.816	75.119	2782.740	-3273.1	56.1	6978.9	-10.76	-0.06	2.10
690.0	5937.248	75.231	2796.702	-3294.7	56.0	6983.1	-10.76	-0.06	2.10
692.0	5930.637	75.343	2810.673	-3316.2	55.8	6987.3	-10.77	-0.06	2.10
694.0	5923.983	75.455	2824.652	-3337.8	55.7	6991.5	-10.77	-0.06	2.10
696.0	5917.286	75.566	2838.639	-3359.4	55.6	6995.7	-10.77	-0.06	2.09
698.0	5910.546	75.677	2852.634	-3381.0	55.4	6999.9	-10.77	-0.06	2.08
700.0	5903.762	75.788	2866.638	-3402.5	55.3	7004.0	-10.77	-0.14	2.07
S-IVB IST GUIDANCE CUTOFF									
700.560	5901.856	75.819	2870.561	-3408.6	55.2	7005.2	-10.78	-0.12	2.07
702.0	5896.939	75.898	2880.647	-3421.1	55.2	7000.7	-8.31	-0.08	-4.03
704.0	5890.079	76.009	2894.638	-3437.7	55.0	6992.7	-8.30	-0.09	-4.05
706.0	5883.188	76.118	2908.616	-3454.4	54.8	6984.6	-8.29	-0.09	-4.06
708.0	5876.263	76.228	2922.578	-3470.9	54.6	6976.4	-8.28	-0.09	-4.08
710.0	5869.304	76.337	2936.522	-3487.5	54.4	6968.2	-8.27	-0.09	-4.10
PARKING ORBIT INSERTION									
710.560	5867.350	76.367	2940.425	-3492.2	54.4	6965.9	-8.27	-0.09	-4.10

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
GUIDANCE REFERENCE RELEASE											
-16.960	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-16.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-15.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-14.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-13.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-12.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-11.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-10.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-9.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-8.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-7.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-6.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-5.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-4.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-3.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-2.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-1.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
0.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
ALL HOLDDOWN ARMS RELEASED											
0.200	6373.407	-80.6041	28.4470	0.0	90.00	0.1	90.00	0.01	408.6	0	112
LIFTOFF - START OF TIME BASE 1											
0.600	6373.407	-80.6041	28.4470	219.08	88.71	0.3	90.00	0.05	408.6	0	112
1.0	6373.407	-80.6041	28.4470	266.05	89.35	0.7	90.00	0.10	408.6	0	112
2.0	6373.409	-80.6041	28.4470	32.68	89.29	2.7	90.00	0.38	408.7	0	114
3.0	6373.413	-80.6041	28.4470	30.46	88.91	5.0	89.99	0.71	408.7	0	117
4.0	6373.419	-80.6041	28.4470	26.44	88.59	7.4	89.98	1.04	408.8	0	124
5.0	6373.428	-80.6041	28.4470	53.82	88.87	9.8	89.98	1.37	408.9	0	132
6.0	6373.439	-80.6041	28.4470	130.40	87.99	12.2	90.04	1.71	409.2	0	143
7.0	6373.452	-80.6041	28.4470	143.87	86.60	14.7	90.10	2.06	409.4	1	157
8.0	6373.468	-80.6041	28.4470	147.55	85.65	17.3	90.15	2.41	409.7	1	173
9.0	6373.487	-80.6041	28.4469	146.07	85.73	19.8	90.17	2.77	410.0	3	191
10.0	6373.508	-80.6041	28.4469	143.44	85.95	22.4	90.18	3.13	410.2	4	212
11.0	6373.531	-80.6041	28.4469	140.61	86.09	25.1	90.18	3.49	410.5	6	236
12.0	6373.558	-80.6041	28.4469	138.40	86.18	27.8	90.19	3.87	410.8	8	262
13.0	6373.587	-80.6041	28.4469	137.78	86.24	30.5	90.21	4.24	411.1	10	291
14.0	6373.619	-80.6041	28.4469	136.48	86.27	33.2	90.22	4.62	411.5	12	323

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
15.0	6373.653	-80.6040	28.4469	134.45	86.27	36.1	90.23	5.02	411.9	14	358
16.0	6373.691	-80.6040	28.4469	131.34	86.32	39.0	90.23	5.42	412.4	16	395
17.0	6373.731	-80.6040	28.4468	126.84	86.41	42.0	90.22	5.83	412.9	19	436
18.0	6373.774	-80.6040	28.4468	121.58	86.46	45.0	90.20	6.24	413.5	21	479
19.0	6373.821	-80.6039	28.4468	116.19	86.44	48.2	90.18	6.66	414.1	24	525
20.0	6373.871	-80.6039	28.4468	111.00	86.36	51.3	90.16	7.09	414.9	27	575
21.0	6373.923	-80.6039	28.4468	106.19	86.23	54.6	90.14	7.53	415.7	30	628
22.0	6373.980	-80.6038	28.4468	101.75	86.03	57.9	90.11	7.97	416.6	34	684
23.0	6374.039	-80.6038	28.4468	97.87	85.77	61.3	90.09	8.42	417.7	38	744
24.0	6374.102	-80.6038	28.4468	94.52	85.46	64.8	90.06	8.87	418.8	42	806
25.0	6374.168	-80.6037	28.4468	91.62	85.13	68.3	90.02	9.33	420.0	47	873
26.0	6374.238	-80.6036	28.4468	89.11	84.76	72.0	89.99	9.79	421.4	53	943
27.0	6374.311	-80.6036	28.4468	86.93	84.37	75.7	89.95	10.26	422.9	59	1016
28.0	6374.389	-80.6035	28.4468	85.07	83.96	79.5	89.90	10.73	424.5	66	1093
29.0	6374.470	-80.6034	28.4468	83.50	83.52	83.3	89.85	11.20	426.2	75	1174
30.0	6374.554	-80.6033	28.4468	82.19	83.06	87.3	89.80	11.68	428.0	84	1259
31.0	6374.643	-80.6032	28.4468	81.09	82.59	91.4	89.75	12.16	430.0	94	1347
32.0	6374.736	-80.6031	28.4468	80.20	82.10	95.5	89.70	12.65	432.1	106	1440
33.0	6374.832	-80.6029	28.4469	79.46	81.61	99.8	89.64	13.13	434.4	119	1537
34.0	6374.933	-80.6028	28.4469	78.87	81.09	104.1	89.58	13.62	436.8	134	1637
35.0	6375.038	-80.6026	28.4469	78.38	80.57	108.5	89.52	14.10	439.4	150	1742
36.0	6375.147	-80.6024	28.4469	77.99	80.04	113.1	89.45	14.59	442.2	169	1852
37.0	6375.261	-80.6022	28.4470	77.67	79.50	117.7	89.39	15.07	445.1	189	1965
38.0	6375.379	-80.6020	28.4470	77.41	78.95	122.5	89.32	15.56	448.1	211	2083
39.0	6375.501	-80.6017	28.4471	77.18	78.39	127.3	89.25	16.04	451.4	235	2206
40.0	6375.628	-80.6015	28.4471	76.97	77.84	132.3	89.17	16.52	454.7	261	2333
41.0	6375.760	-80.6012	28.4472	76.80	77.28	137.3	89.10	16.99	458.3	290	2464
42.0	6375.896	-80.6009	28.4472	76.66	76.71	142.5	89.02	17.47	462.0	321	2601
43.0	6376.037	-80.6005	28.4473	76.54	76.14	147.8	88.93	17.94	466.0	355	2742
44.0	6376.183	-80.6002	28.4474	76.44	75.56	153.3	88.85	18.40	470.1	391	2888
45.0	6376.334	-80.5998	28.4475	76.36	74.98	158.8	88.76	18.86	474.4	431	3039
46.0	6376.490	-80.5993	28.4476	76.30	74.38	164.5	88.67	19.32	479.0	473	3195
47.0	6376.651	-80.5989	28.4477	76.25	73.78	170.4	88.58	19.77	483.7	519	3356
48.0	6376.817	-80.5984	28.4478	76.21	73.17	176.3	88.48	20.21	488.7	568	3522
49.0	6376.988	-80.5979	28.4479	76.19	72.55	182.5	88.38	20.64	493.9	621	3693
50.0	6377.165	-80.5973	28.4480	76.17	71.92	188.7	88.28	21.06	499.3	677	3870
51.0	6377.347	-80.5967	28.4481	76.15	71.28	195.1	88.17	21.47	504.9	738	4052
52.0	6377.535	-80.5961	28.4483	76.13	70.64	201.6	88.06	21.87	510.8	802	4240
53.0	6377.728	-80.5954	28.4484	76.12	70.00	208.3	87.95	22.25	516.9	871	4433
54.0	6377.926	-80.5947	28.4486	76.10	69.36	215.2	87.84	22.63	523.2	944	4631
55.0	6378.130	-80.5939	28.4488	76.07	68.72	222.2	87.72	23.00	529.7	1023	4836
56.0	6378.340	-80.5931	28.4489	76.05	68.08	229.3	87.60	23.36	536.5	1106	5046
57.0	6378.556	-80.5922	28.4491	76.02	67.44	236.7	87.47	23.71	543.4	1194	5261

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
58.0	6378.777	-80.5913	28.4493	75.99	66.81	244.2	87.35	24.05	550.6	1287	5483
59.0	6379.005	-80.5903	28.4495	75.97	66.17	251.8	87.22	24.38	558.1	1386	5710
60.0	6379.238	-80.5892	28.4498	75.94	65.55	259.7	87.09	24.70	565.7	1490	5944
61.0	6379.478	-80.5881	28.4500	75.92	64.92	267.7	86.96	25.01	573.6	1600	6183
62.0	6379.723	-80.5870	28.4503	75.91	64.30	275.9	86.82	25.30	581.7	1717	6429
63.0	6379.975	-80.5858	28.4505	75.90	63.68	284.2	86.69	25.58	590.0	1839	6681
64.0	6380.233	-80.5845	28.4508	75.90	63.06	292.7	86.56	25.85	598.6	1969	6939
65.0	6380.497	-80.5831	28.4511	75.92	62.45	301.4	86.43	26.11	607.3	2104	7203
66.0	6380.767	-80.5817	28.4514	75.94	61.85	310.2	86.31	26.35	616.2	2247	7473
67.0	6381.044	-80.5802	28.4518	75.97	61.25	319.2	86.18	26.58	625.4	2397	7750
MACH 1											
68.000	6381.327	-80.5787	28.4521	76.00	60.66	328.3	86.06	26.80	634.7	2554	8033
69.0	6381.616	-80.5771	28.4525	76.03	60.07	337.6	85.94	27.01	644.3	2718	8323
70.0	6381.912	-80.5753	28.4528	76.06	59.49	347.0	85.82	27.20	654.0	2890	8618
71.0	6382.214	-80.5736	28.4532	76.10	58.91	356.6	85.70	27.39	664.0	3070	8921
72.0	6382.523	-80.5717	28.4536	76.15	58.35	366.4	85.58	27.56	674.2	3258	9230
73.0	6382.838	-80.5697	28.4541	76.21	57.79	376.5	85.47	27.73	684.6	3454	9545
74.0	6383.160	-80.5677	28.4545	76.29	57.25	386.7	85.37	27.89	695.2	3659	9867
75.0	6383.489	-80.5656	28.4549	76.41	56.71	397.1	85.29	28.04	706.1	3872	10196
76.0	6383.824	-80.5634	28.4554	76.56	56.19	407.8	85.21	28.19	717.2	4094	10531
77.0	6384.166	-80.5611	28.4559	76.68	55.67	418.7	85.13	28.33	728.6	4325	10874
78.0	6384.515	-80.5587	28.4564	76.73	55.15	429.8	85.03	28.46	740.3	4565	11223
79.0	6384.872	-80.5562	28.4569	76.73	54.63	441.2	84.91	28.58	752.1	4815	11579
80.0	6385.235	-80.5536	28.4574	76.68	54.10	452.8	84.77	28.68	764.3	5075	11943
MAXIMUM DYNAMIC PRESSURE											
81.000	6385.605	-80.5509	28.4580	76.61	53.56	464.7	84.61	28.77	776.8	5346	12313
82.0	6385.983	-80.5481	28.4586	76.53	53.02	476.9	84.45	28.84	789.6	5626	12691
83.0	6386.367	-80.5452	28.4592	76.44	52.46	489.3	84.29	28.90	802.7	5918	13076
84.0	6386.759	-80.5422	28.4598	76.36	51.89	502.0	84.13	28.94	816.2	6222	13467
85.0	6387.157	-80.5391	28.4605	76.28	51.32	514.9	83.96	28.97	829.9	6537	13866
86.0	6387.562	-80.5358	28.4612	76.21	50.74	528.1	83.80	28.98	844.0	6864	14271
87.0	6387.975	-80.5325	28.4619	76.14	50.17	541.6	83.65	28.98	858.4	7204	14684
88.0	6388.394	-80.5290	28.4627	76.09	49.60	555.3	83.50	28.97	873.1	7556	15104
89.0	6388.821	-80.5253	28.4635	76.06	49.04	569.3	83.35	28.96	888.0	7922	15530
90.0	6389.254	-80.5216	28.4643	76.04	48.48	583.6	83.22	28.93	903.3	8301	15964
91.0	6389.695	-80.5177	28.4651	76.03	47.93	598.2	83.09	28.90	918.8	8694	16405
92.0	6390.142	-80.5136	28.4660	76.03	47.39	613.0	82.97	28.86	934.6	9101	16853
93.0	6390.597	-80.5095	28.4669	76.02	46.86	628.1	82.85	28.82	950.7	9522	17308
94.0	6391.059	-80.5051	28.4679	76.02	46.33	643.5	82.72	28.77	967.1	9957	17770

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
95.0	6391.528	-80.5007	28.4689	76.01	45.80	659.2	82.60	28.71	983.8	10408	18239
96.0	6392.004	-80.4960	28.4699	76.01	45.28	675.2	82.49	28.65	1000.8	10874	18716
97.0	6392.487	-80.4913	28.4709	76.00	44.77	691.4	82.37	28.57	1018.0	11355	19200
98.0	6392.978	-80.4863	28.4720	75.99	44.25	708.0	82.25	28.49	1035.6	11853	19690
99.0	6393.476	-80.4812	28.4731	75.99	43.74	724.8	82.13	28.40	1053.5	12367	20188
100.0	6393.980	-80.4760	28.4743	75.98	43.23	742.0	82.02	28.31	1071.7	12897	20693
101.0	6394.492	-80.4705	28.4755	75.97	42.72	759.4	81.90	28.20	1090.2	13445	21205
102.0	6395.011	-80.4649	28.4767	75.96	42.22	777.2	81.79	28.09	1109.0	14009	21725
103.0	6395.536	-80.4591	28.4780	75.94	41.72	795.3	81.68	27.98	1128.1	14592	22251
104.0	6396.069	-80.4532	28.4793	75.93	41.23	813.7	81.57	27.86	1147.5	15193	22784
105.0	6396.609	-80.4470	28.4806	75.92	40.74	832.4	81.46	27.73	1167.3	15812	23324
106.0	6397.156	-80.4407	28.4820	75.91	40.26	851.4	81.35	27.61	1187.3	16449	23871
107.0	6397.709	-80.4342	28.4835	75.89	39.79	870.7	81.25	27.48	1207.6	17106	24425
108.0	6398.270	-80.4275	28.4849	75.88	39.32	890.3	81.14	27.34	1228.2	17782	24986
109.0	6398.837	-80.4206	28.4865	75.86	38.86	910.2	81.03	27.20	1249.2	18478	25554
110.0	6399.412	-80.4135	28.4880	75.84	38.40	930.5	80.93	27.06	1270.4	19194	26129
111.0	6399.993	-80.4062	28.4896	75.83	37.95	951.1	80.83	26.92	1292.0	19931	26711
112.0	6400.582	-80.3987	28.4913	75.81	37.50	971.9	80.73	26.77	1313.9	20688	27300
113.0	6401.177	-80.3909	28.4930	75.80	37.06	993.2	80.63	26.62	1336.1	21466	27896
114.0	6401.779	-80.3830	28.4948	75.80	36.63	1014.7	80.54	26.46	1358.6	22266	28498
115.0	6402.388	-80.3749	28.4966	75.79	36.21	1036.6	80.46	26.31	1381.4	23088	29108
116.0	6403.004	-80.3665	28.4985	75.80	35.80	1058.8	80.38	26.17	1404.5	23931	29724
117.0	6403.627	-80.3579	28.5004	75.80	35.40	1081.3	80.30	26.02	1427.9	24797	30348
118.0	6404.257	-80.3491	28.5023	75.81	35.02	1104.2	80.23	25.88	1451.7	25686	30979
119.0	6404.894	-80.3401	28.5043	75.82	34.65	1127.5	80.16	25.75	1475.7	26597	31616
120.0	6405.539	-80.3308	28.5064	75.83	34.29	1151.1	80.09	25.61	1500.1	27532	32262
121.0	6406.191	-80.3213	28.5085	75.84	33.94	1175.0	80.03	25.48	1524.9	28490	32915
122.0	6406.851	-80.3115	28.5107	75.86	33.60	1199.4	79.96	25.35	1550.0	29472	33575
123.0	6407.518	-80.3016	28.5129	75.87	33.26	1224.1	79.90	25.22	1575.4	30477	34244
124.0	6408.193	-80.2913	28.5151	75.88	32.93	1249.1	79.84	25.09	1601.2	31508	34919
125.0	6408.876	-80.2809	28.5174	75.89	32.60	1274.6	79.78	24.95	1627.4	32563	35603
126.0	6409.567	-80.2701	28.5198	75.90	32.27	1300.4	79.72	24.82	1654.0	33644	36294
127.0	6410.265	-80.2592	28.5222	75.91	31.94	1326.6	79.67	24.68	1680.9	34750	36993
128.0	6410.970	-80.2479	28.5247	75.92	31.62	1353.2	79.61	24.54	1708.2	35882	37699
129.0	6411.684	-80.2364	28.5272	75.93	31.31	1380.2	79.55	24.40	1735.9	37041	38414
130.0	6412.405	-80.2247	28.5298	75.94	31.00	1407.6	79.50	24.26	1764.1	38227	39135
131.0	6413.134	-80.2126	28.5325	75.95	30.69	1435.5	79.44	24.12	1792.6	39440	39865
132.0	6413.870	-80.2003	28.5352	75.95	30.39	1463.8	79.39	23.99	1821.6	40680	40603
133.0	6414.615	-80.1877	28.5379	75.96	30.09	1492.5	79.34	23.85	1851.0	41949	41348
134.0	6415.367	-80.1748	28.5408	75.96	29.80	1521.7	79.28	23.71	1880.7	43246	42101
135.0	6416.127	-80.1617	28.5437	75.97	29.52	1551.2	79.23	23.57	1911.0	44572	42862
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)											
135.140	6416.234	-80.1598	28.5441	75.98	29.48	1555.4	79.23	23.55	1915.2	44760	42970

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
136.0	6416.894	-80.1482	28.5466	75.98	29.23	1576.8	79.19	23.42	1937.2	45924	43630
137.0	6417.665	-80.1346	28.5496	75.99	28.95	1600.2	79.15	23.26	1961.2	47301	44402
138.0	6418.443	-80.1206	28.5526	75.99	28.68	1623.6	79.12	23.11	1985.3	48704	45181
139.0	6419.224	-80.1065	28.5557	76.00	28.42	1647.1	79.08	22.96	2009.4	50130	45963
140.0	6420.011	-80.0921	28.5589	76.01	28.16	1670.9	79.05	22.81	2033.9	51580	46751
141.0	6420.802	-80.0774	28.5621	76.02	27.90	1695.0	79.02	22.66	2058.6	53055	47542
142.0	6421.597	-80.0625	28.5654	76.04	27.65	1719.5	78.99	22.52	2083.7	54554	48339
143.0	6422.398	-80.0474	28.5687	76.05	27.40	1744.6	78.96	22.37	2109.3	56078	49140
144.0	6423.203	-80.0320	28.5720	76.06	27.15	1769.8	78.94	22.22	2135.1	57628	49947
145.0	6424.013	-80.0163	28.5754	76.07	26.91	1795.3	78.91	22.08	2161.2	59203	50758
146.0	6424.828	-80.0004	28.5789	76.09	26.67	1821.2	78.88	21.94	2187.7	60805	51574
147.0	6425.648	-79.9843	28.5824	76.10	26.43	1847.5	78.85	21.80	2214.5	62433	52395
148.0	6426.473	-79.9678	28.5860	76.11	26.20	1874.2	78.83	21.66	2241.8	64087	53221
149.0	6427.303	-79.9511	28.5896	76.12	25.97	1901.3	78.80	21.52	2269.4	65768	54052
150.0	6428.138	-79.9341	28.5933	76.13	25.74	1928.7	78.78	21.38	2297.3	67477	54888
151.0	6428.978	-79.9169	28.5970	76.14	25.51	1956.5	78.75	21.25	2325.7	69213	55730
152.0	6429.823	-79.8993	28.6008	76.15	25.29	1984.7	78.72	21.11	2354.4	70978	56576
153.0	6430.674	-79.8815	28.6047	76.17	25.08	2013.3	78.70	20.98	2383.5	72771	57428
154.0	6431.530	-79.8634	28.6086	76.18	24.86	2042.3	78.68	20.85	2412.9	74593	58285
155.0	6432.391	-79.8450	28.6126	76.19	24.65	2071.7	78.65	20.72	2442.8	76443	59148
156.0	6433.258	-79.8263	28.6166	76.20	24.44	2101.6	78.63	20.59	2473.2	78324	60016
157.0	6434.131	-79.8073	28.6207	76.21	24.24	2131.9	78.61	20.46	2504.0	80234	60890
158.0	6435.009	-79.7880	28.6249	76.22	24.04	2162.5	78.59	20.33	2535.0	82175	61769
159.0	6435.892	-79.7684	28.6291	76.23	23.84	2193.7	78.57	20.21	2566.7	84147	62654
160.0	6436.782	-79.7484	28.6334	76.25	23.64	2225.3	78.55	20.08	2598.7	86150	63545
161.0	6437.677	-79.7282	28.6377	76.26	23.44	2257.4	78.53	19.96	2631.2	88184	64442
162.0	6438.578	-79.7076	28.6421	76.27	23.25	2289.9	78.51	19.84	2664.2	90251	65344
163.0	6439.485	-79.6867	28.6466	76.28	23.06	2322.9	78.49	19.72	2697.6	92350	66253
164.0	6440.398	-79.6655	28.6511	76.30	22.88	2356.3	78.47	19.60	2731.4	94481	67167
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)											
164.100	6440.490	-79.6634	28.6516	76.30	22.86	2359.7	78.47	19.58	2734.8	94697	67259
S-IC/S-II SEPARATION COMMAND											
164.800	6441.131	-79.6484	28.6548	76.31	22.74	2369.2	78.47	19.49	2744.7	96206	67901
166.0	6442.226	-79.6225	28.6603	76.32	22.50	2366.2	78.48	19.28	2742.2	98806	68998
168.0	6444.016	-79.5795	28.6695	76.35	22.13	2361.2	78.51	18.96	2738.2	103121	70791
170.0	6445.784	-79.5363	28.6787	76.38	21.76	2364.5	78.52	18.64	2742.5	107459	72562
172.0	6447.525	-79.4930	28.6879	76.41	21.39	2370.0	78.54	18.33	2748.9	111810	74305
174.0	6449.242	-79.4494	28.6971	76.43	21.03	2378.2	78.55	18.02	2757.9	116185	76025
176.0	6450.938	-79.4055	28.7064	76.46	20.67	2386.8	78.56	17.72	2767.4	120585	77724

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-FL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
178.0	6452.612	-79.3614	28.7157	76.49	20.31	2395.6	78.58	17.43	2777.1	125010	79401
180.0	6454.265	-79.3171	28.7250	76.52	19.97	2404.8	78.59	17.14	2787.1	129461	81057
182.0	6455.896	-79.2724	28.7344	76.55	19.62	2414.2	78.60	16.85	2797.2	133938	82691
184.0	6457.507	-79.2275	28.7438	76.58	19.28	2423.7	78.62	16.56	2807.6	138441	84305
186.0	6459.097	-79.1824	28.7533	76.61	18.94	2433.4	78.63	16.28	2818.0	142970	85898
188.0	6460.666	-79.1369	28.7627	76.63	18.60	2443.3	78.65	15.99	2828.7	147525	87470
190.0	6462.215	-79.0912	28.7723	76.66	18.27	2453.4	78.66	15.72	2839.4	152107	89022
192.0	6463.743	-79.0452	28.7818	76.69	17.94	2463.6	78.68	15.44	2850.3	156716	90553
194.0	6465.251	-78.9989	28.7914	76.72	17.62	2474.0	78.69	15.17	2861.4	161351	92064
196.0	6466.739	-78.9524	28.8010	76.75	17.30	2484.6	78.71	14.91	2872.7	166013	93555
198.0	6468.207	-78.9055	28.8106	76.78	16.99	2495.3	78.72	14.64	2884.1	170702	95026
200.0	6469.655	-78.8584	28.8203	76.81	16.67	2506.3	78.74	14.38	2895.6	175419	96477
202.0	6471.083	-78.8110	28.8301	76.84	16.37	2517.4	78.75	14.12	2907.4	180163	97909
204.0	6472.493	-78.7633	28.8398	76.87	16.06	2528.7	78.77	13.87	2919.3	184934	99321
206.0	6473.882	-78.7154	28.8496	76.90	15.76	2540.2	78.79	13.62	2931.4	189734	100714
208.0	6475.253	-78.6671	28.8594	76.93	15.47	2551.8	78.80	13.37	2943.5	194561	102088
210.0	6476.606	-78.6186	28.8693	76.96	15.19	2563.5	78.82	13.14	2955.7	199416	103443
212.0	6477.941	-78.5697	28.8792	76.99	14.93	2575.2	78.83	12.91	2967.9	204298	104781
214.0	6479.259	-78.5206	28.8891	77.02	14.67	2587.0	78.85	12.70	2980.1	209208	106103
216.0	6480.562	-78.4712	28.8991	77.04	14.43	2598.8	78.86	12.50	2992.4	214145	107409
218.0	6481.850	-78.4215	28.9091	77.07	14.20	2610.7	78.88	12.31	3004.7	219108	108701
220.0	6483.124	-78.3716	28.9191	77.10	13.97	2622.7	78.89	12.11	3017.1	224099	109977
222.0	6484.383	-78.3213	28.9291	77.13	13.74	2634.8	78.91	11.92	3029.6	229116	111239
224.0	6485.627	-78.2708	28.9392	77.16	13.51	2647.1	78.93	11.73	3042.3	234161	112487
226.0	6486.857	-78.2200	28.9494	77.18	13.29	2659.5	78.94	11.54	3055.1	239233	113720
228.0	6488.072	-78.1689	28.9595	77.21	13.07	2672.1	78.96	11.36	3068.0	244332	114938
230.0	6489.273	-78.1175	28.9697	77.24	12.85	2684.8	78.98	11.17	3081.1	249460	116143
232.0	6490.460	-78.0658	28.9799	77.27	12.63	2697.6	78.99	10.99	3094.3	254615	117333
234.0	6491.632	-78.0139	28.9902	77.30	12.41	2710.6	79.01	10.81	3107.6	259799	118508
236.0	6492.791	-77.9616	29.0005	77.33	12.20	2723.7	79.03	10.63	3121.1	265011	119670
238.0	6493.935	-77.9091	29.0108	77.36	11.99	2737.0	79.05	10.45	3134.7	270251	120818
240.0	6495.065	-77.8562	29.0212	77.39	11.78	2750.4	79.06	10.28	3148.4	275521	121951
242.0	6496.182	-77.8030	29.0315	77.42	11.58	2763.9	79.08	10.10	3162.3	280819	123071
244.0	6497.284	-77.7496	29.0420	77.45	11.37	2777.6	79.10	9.93	3176.2	286146	124177
246.0	6498.373	-77.6958	29.0524	77.48	11.17	2791.4	79.12	9.76	3190.3	291503	125269
248.0	6499.448	-77.6417	29.0629	77.51	10.98	2805.3	79.14	9.59	3204.6	296889	126347
250.0	6500.509	-77.5873	29.0734	77.55	10.78	2819.4	79.16	9.43	3218.9	302305	127412
252.0	6501.557	-77.5326	29.0839	77.58	10.59	2833.6	79.18	9.26	3233.4	307751	128463
254.0	6502.592	-77.4776	29.0945	77.61	10.39	2848.0	79.20	9.10	3248.0	313226	129501
256.0	6503.613	-77.4222	29.1051	77.64	10.21	2862.4	79.22	8.94	3262.8	318732	130525
258.0	6504.620	-77.3666	29.1158	77.67	10.02	2877.1	79.24	8.78	3277.7	324269	131536
260.0	6505.615	-77.3106	29.1264	77.70	9.84	2891.8	79.26	8.63	3292.7	329836	132534
262.0	6506.596	-77.2543	29.1371	77.74	9.65	2906.7	79.28	8.47	3307.8	335434	133519

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
264.0	6507.565	-77.1977	29.1479	77.77	9.47	2921.7	79.30	8.32	3323.1	341063	134491
266.0	6508.520	-77.1407	29.1586	77.80	9.30	2936.9	79.32	8.17	3338.5	346723	135449
268.0	6509.462	-77.0835	29.1694	77.84	9.12	2952.2	79.34	8.02	3354.0	352415	136395
270.0	6510.392	-77.0259	29.1803	77.87	8.95	2967.7	79.36	7.88	3369.7	358139	137328
272.0	6511.309	-76.9679	29.1911	77.90	8.78	2983.3	79.39	7.73	3385.5	363894	138249
274.0	6512.214	-76.9096	29.2020	77.94	8.61	2999.0	79.41	7.59	3401.4	369681	139157
276.0	6513.106	-76.8510	29.2129	77.97	8.45	3014.9	79.43	7.44	3417.5	375501	140052
278.0	6513.985	-76.7920	29.2239	78.00	8.28	3030.9	79.45	7.30	3433.7	381354	140935
280.0	6514.852	-76.7327	29.2349	78.04	8.12	3047.0	79.47	7.17	3450.0	387239	141806
282.0	6515.706	-76.6731	29.2459	78.07	7.96	3063.3	79.50	7.03	3466.5	393157	142664
284.0	6516.549	-76.6131	29.2569	78.11	7.80	3079.7	79.52	6.90	3483.1	399108	143510
286.0	6517.379	-76.5527	29.2680	78.14	7.65	3096.3	79.55	6.76	3499.9	405093	144343
288.0	6518.197	-76.4920	29.2791	78.18	7.49	3113.0	79.57	6.63	3516.7	411111	145165
290.0	6519.003	-76.4309	29.2902	78.21	7.34	3129.8	79.59	6.50	3533.7	417164	145974
292.0	6519.797	-76.3695	29.3014	78.25	7.19	3146.8	79.62	6.37	3550.9	423250	146772
294.0	6520.579	-76.3077	29.3126	78.28	7.05	3163.9	79.64	6.25	3568.1	429370	147558
296.0	6521.350	-76.2456	29.3238	78.32	6.90	3181.2	79.67	6.12	3585.6	435526	148332
298.0	6522.109	-76.1831	29.3351	78.36	6.76	3198.6	79.69	6.00	3603.1	441716	149095
300.0	6522.856	-76.1202	29.3463	78.39	6.62	3216.1	79.72	5.88	3620.8	447940	149846
302.0	6523.592	-76.0569	29.3577	78.43	6.48	3233.8	79.74	5.76	3638.6	454201	150585
304.0	6524.317	-75.9933	29.3690	78.46	6.35	3251.6	79.77	5.64	3656.6	460496	151314
306.0	6525.031	-75.9293	29.3804	78.50	6.21	3269.6	79.80	5.53	3674.7	466828	152031
308.0	6525.733	-75.8649	29.3917	78.54	6.08	3287.7	79.82	5.41	3693.0	473195	152737
310.0	6526.424	-75.8002	29.4032	78.58	5.95	3306.0	79.85	5.30	3711.4	479598	153431
312.0	6527.104	-75.7350	29.4146	78.61	5.82	3324.5	79.88	5.19	3729.9	486038	154115
314.0	6527.773	-75.6695	29.4261	78.65	5.70	3343.1	79.90	5.08	3748.7	492515	154788
316.0	6528.432	-75.6035	29.4376	78.69	5.57	3361.8	79.93	4.97	3767.5	499029	155450
318.0	6529.080	-75.5372	29.4491	78.73	5.45	3380.7	79.96	4.87	3786.5	505580	156102
320.0	6529.717	-75.4705	29.4607	78.77	5.33	3399.8	79.99	4.76	3805.7	512169	156743
322.0	6530.344	-75.4034	29.4723	78.80	5.21	3419.0	80.01	4.66	3825.0	518796	157373
324.0	6530.960	-75.3358	29.4839	78.84	5.10	3438.4	80.04	4.56	3844.5	525460	157993
326.0	6531.566	-75.2679	29.4955	78.88	4.98	3457.9	80.07	4.46	3864.1	532163	158603
328.0	6532.161	-75.1996	29.5072	78.92	4.87	3477.6	80.10	4.36	3883.9	538905	159202
330.0	6532.746	-75.1308	29.5189	78.96	4.76	3497.4	80.13	4.26	3903.8	545685	159791
332.0	6533.322	-75.0617	29.5306	79.00	4.65	3517.4	80.16	4.17	3923.9	552505	160370
334.0	6533.887	-74.9921	29.5424	79.04	4.54	3537.5	80.19	4.07	3944.1	559364	160939
336.0	6534.442	-74.9221	29.5541	79.08	4.44	3557.8	80.22	3.98	3964.5	566263	161498
338.0	6534.988	-74.8516	29.5659	79.12	4.33	3578.3	80.25	3.89	3985.1	573202	162048
340.0	6535.524	-74.7808	29.5777	79.16	4.23	3598.9	80.28	3.80	4005.8	580182	162587
342.0	6536.050	-74.7095	29.5896	79.20	4.13	3619.7	80.31	3.71	4026.7	587202	163117
344.0	6536.567	-74.6378	29.6014	79.25	4.03	3640.7	80.34	3.63	4047.7	594263	163638
346.0	6537.074	-74.5656	29.6133	79.29	3.94	3661.8	80.37	3.54	4068.9	601365	164149
348.0	6537.572	-74.4930	29.6252	79.33	3.84	3683.1	80.41	3.46	4090.3	608509	164651

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
350.0	6538.061	-74.4200	29.6372	79.37	3.75	3704.6	80.44	3.38	4111.8	615694	165144
352.0	6538.541	-74.3465	29.6491	79.42	3.66	3726.2	80.47	3.30	4133.5	622922	165627
354.0	6539.012	-74.2726	29.6611	79.46	3.57	3748.0	80.51	3.22	4155.3	630192	166102
356.0	6539.473	-74.1982	29.6731	79.50	3.48	3769.9	80.54	3.14	4177.3	637504	166568
358.0	6539.926	-74.1233	29.6852	79.54	3.39	3792.1	80.57	3.06	4199.5	644860	167024
360.0	6540.371	-74.0480	29.6972	79.59	3.31	3814.4	80.61	2.99	4221.9	652259	167473
362.0	6540.806	-73.9722	29.7093	79.63	3.22	3836.9	80.64	2.91	4244.4	659702	167912
364.0	6541.234	-73.8960	29.7214	79.68	3.14	3859.5	80.67	2.84	4267.2	667189	168343
366.0	6541.653	-73.8193	29.7335	79.72	3.06	3882.4	80.71	2.77	4290.1	674721	168766
368.0	6542.063	-73.7421	29.7456	79.77	2.98	3905.4	80.74	2.70	4313.2	682296	169181
370.0	6542.466	-73.6644	29.7577	79.81	2.91	3928.7	80.78	2.63	4336.5	689918	169587
372.0	6542.860	-73.5863	29.7699	79.86	2.83	3952.1	80.82	2.57	4359.9	697584	169985
374.0	6543.246	-73.5076	29.7821	79.90	2.76	3975.6	80.85	2.50	4383.5	705296	170376
376.0	6543.625	-73.4285	29.7943	79.95	2.69	3999.3	80.89	2.44	4407.2	713055	170758
378.0	6543.996	-73.3489	29.8065	79.99	2.61	4023.2	80.92	2.37	4431.2	720859	171133
380.0	6544.359	-73.2687	29.8188	80.04	2.55	4047.4	80.96	2.31	4455.4	728710	171500
382.0	6544.715	-73.1881	29.8310	80.09	2.48	4071.7	81.00	2.25	4479.7	736609	171860
384.0	6545.063	-73.1070	29.8433	80.13	2.41	4096.2	81.04	2.19	4504.3	744554	172213
386.0	6545.405	-73.0253	29.8556	80.18	2.35	4120.9	81.07	2.14	4529.0	752548	172558
388.0	6545.739	-72.9432	29.8679	80.23	2.28	4145.8	81.11	2.08	4554.0	760590	172896
390.0	6546.066	-72.8605	29.8802	80.28	2.22	4170.9	81.15	2.02	4579.1	768681	173227
392.0	6546.386	-72.7773	29.8925	80.32	2.16	4196.2	81.19	1.97	4604.4	776820	173551
394.0	6546.699	-72.6936	29.9049	80.37	2.10	4221.7	81.23	1.92	4630.0	785009	173868
396.0	6547.006	-72.6093	29.9172	80.42	2.05	4247.4	81.27	1.87	4655.7	793247	174179
398.0	6547.306	-72.5245	29.9296	80.47	1.99	4273.4	81.31	1.82	4681.7	801536	174483
400.0	6547.600	-72.4392	29.9420	80.52	1.94	4299.5	81.35	1.77	4707.9	809875	174781
402.0	6547.887	-72.3533	29.9544	80.57	1.88	4325.8	81.39	1.72	4734.2	818265	175072
404.0	6548.168	-72.2669	29.9668	80.62	1.83	4352.4	81.43	1.67	4760.8	826707	175357
406.0	6548.444	-72.1799	29.9792	80.67	1.78	4379.1	81.47	1.63	4787.6	835200	175637
408.0	6548.713	-72.0924	29.9916	80.72	1.73	4406.1	81.51	1.59	4814.6	843745	175910
410.0	6548.976	-72.0043	30.0040	80.77	1.68	4433.3	81.56	1.54	4841.8	852343	176177
412.0	6549.234	-71.9156	30.0165	80.82	1.64	4460.7	81.60	1.50	4869.3	860994	176439
414.0	6549.487	-71.8264	30.0289	80.87	1.59	4488.4	81.64	1.46	4896.9	869698	176696
416.0	6549.734	-71.7366	30.0414	80.92	1.55	4516.2	81.68	1.42	4924.8	878456	176947
418.0	6549.975	-71.6462	30.0538	80.98	1.51	4544.3	81.73	1.38	4952.9	887268	177192
420.0	6550.212	-71.5552	30.0663	81.03	1.47	4572.7	81.77	1.35	4981.3	896135	177433
422.0	6550.443	-71.4637	30.0788	81.08	1.43	4601.2	81.82	1.31	5009.8	905058	177669
424.0	6550.670	-71.3715	30.0912	81.14	1.39	4630.0	81.86	1.28	5038.6	914035	177899
426.0	6550.892	-71.2787	30.1037	81.19	1.35	4659.0	81.90	1.24	5067.7	923069	178125
428.0	6551.109	-71.1854	30.1162	81.24	1.32	4688.4	81.95	1.21	5097.1	932160	178347
430.0	6551.322	-71.0914	30.1287	81.30	1.28	4718.1	82.00	1.18	5126.8	941308	178564
432.0	6551.531	-70.9968	30.1412	81.35	1.25	4748.0	82.04	1.15	5156.8	950513	178777
434.0	6551.736	-70.9015	30.1537	81.41	1.22	4778.1	82.09	1.12	5186.8	959777	178985

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
436.0	6551.937	-70.8057	30.1661	81.46	1.19	4808.4	82.14	1.09	5217.2	969099	179190
438.0	6552.134	-70.7092	30.1786	81.52	1.16	4839.0	82.18	1.07	5247.8	978480	179391
440.0	6552.327	-70.6121	30.1911	81.57	1.13	4869.9	82.23	1.04	5278.7	987921	179589
442.0	6552.517	-70.5143	30.2036	81.63	1.10	4901.0	82.28	1.02	5309.8	997422	179783
444.0	6552.704	-70.4159	30.2161	81.69	1.07	4932.4	82.33	0.99	5341.2	1006984	179974
446.0	6552.887	-70.3168	30.2285	81.74	1.05	4964.0	82.38	0.97	5372.8	1016606	180161
448.0	6553.068	-70.2170	30.2410	81.80	1.03	4995.9	82.42	0.95	5404.8	1026290	180346
450.0	6553.246	-70.1166	30.2534	81.86	1.01	5028.2	82.47	0.93	5437.0	1036037	180528
452.0	6553.421	-70.0156	30.2659	81.92	0.99	5060.7	82.52	0.91	5469.6	1045846	180707
454.0	6553.594	-69.9138	30.2783	81.97	0.97	5093.5	82.57	0.90	5502.4	1055718	180884
456.0	6553.765	-69.8113	30.2907	82.03	0.95	5126.6	82.63	0.88	5535.5	1065654	181059
458.0	6553.934	-69.7082	30.3032	82.09	0.93	5160.1	82.68	0.86	5569.0	1075655	181232
460.0	6554.101	-69.6044	30.3156	82.15	0.92	5193.8	82.73	0.85	5602.7	1085721	181404
462.0	6554.267	-69.4998	30.3280	82.21	0.90	5227.8	82.78	0.84	5636.7	1095852	181573
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)											
463.090	6554.356	-69.4425	30.3347	82.24	0.89	5246.4	82.81	0.83	5655.4	1101402	181664
464.0	6554.430	-69.3946	30.3403	82.27	0.88	5259.8	82.83	0.82	5668.8	1106048	181740
466.0	6554.589	-69.2887	30.3527	82.33	0.85	5287.2	82.89	0.79	5696.2	1116300	181904
468.0	6554.744	-69.1823	30.3650	82.39	0.83	5314.8	82.94	0.77	5723.8	1126606	182063
470.0	6554.895	-69.0753	30.3773	82.45	0.80	5342.7	82.99	0.74	5751.7	1136966	182218
472.0	6555.043	-68.9677	30.3895	82.51	0.78	5370.7	83.04	0.72	5779.8	1147381	182369
474.0	6555.186	-68.8595	30.4017	82.57	0.76	5397.7	83.10	0.70	5806.7	1157848	182517
476.0	6555.327	-68.7507	30.4139	82.63	0.74	5421.8	83.15	0.69	5830.9	1168365	182662
478.0	6555.466	-68.6415	30.4260	82.70	0.72	5445.9	83.21	0.67	5855.0	1178928	182804
480.0	6555.603	-68.5318	30.4381	82.76	0.71	5470.1	83.26	0.66	5879.2	1189539	182945
482.0	6555.737	-68.4215	30.4501	82.82	0.70	5494.4	83.32	0.65	5903.5	1200196	183083
484.0	6555.869	-68.3107	30.4621	82.88	0.68	5518.8	83.38	0.64	5927.9	1210901	183220
486.0	6556.000	-68.1994	30.4740	82.95	0.67	5543.4	83.43	0.62	5952.5	1221653	183354
488.0	6556.129	-68.0876	30.4859	83.01	0.66	5568.1	83.49	0.61	5977.3	1232453	183487
490.0	6556.256	-67.9752	30.4977	83.07	0.65	5593.0	83.55	0.61	6002.1	1243300	183618
492.0	6556.383	-67.8623	30.5095	83.14	0.64	5618.0	83.61	0.60	6027.1	1254196	183748
494.0	6556.509	-67.7489	30.5212	83.21	0.64	5643.2	83.67	0.59	6052.3	1265141	183878
496.0	6556.633	-67.6350	30.5328	83.27	0.63	5668.5	83.73	0.59	6077.7	1276134	184007
498.0	6556.758	-67.5205	30.5444	83.34	0.62	5694.1	83.79	0.58	6103.2	1287177	184135
500.0	6556.881	-67.4055	30.5559	83.40	0.62	5719.8	83.85	0.57	6129.0	1298269	184262
502.0	6557.003	-67.2899	30.5674	83.47	0.61	5745.8	83.91	0.57	6155.0	1309412	184388
504.0	6557.125	-67.1737	30.5788	83.54	0.60	5771.9	83.97	0.56	6181.1	1320605	184513
506.0	6557.246	-67.0570	30.5901	83.61	0.59	5798.3	84.03	0.56	6207.5	1331848	184638
508.0	6557.366	-66.9398	30.6013	83.67	0.59	5824.8	84.09	0.55	6234.0	1343143	184761
510.0	6557.485	-66.8220	30.6125	83.74	0.58	5851.6	84.15	0.54	6260.8	1354490	184884
512.0	6557.604	-66.7036	30.6236	83.81	0.58	5878.5	84.21	0.54	6287.7	1365888	185007

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
514.0	6557.722	-66.5846	30.6347	83.88	0.57	5905.6	84.28	0.54	6314.8	1377339	185129
516.0	6557.840	-66.4651	30.6456	83.95	0.57	5932.9	84.34	0.53	6342.2	1388842	185250
518.0	6557.958	-66.3450	30.6565	84.02	0.57	5960.4	84.40	0.53	6369.7	1400398	185372
520.0	6558.075	-66.2243	30.6673	84.09	0.56	5988.1	84.47	0.53	6397.4	1412008	185493
522.0	6558.193	-66.1030	30.6781	84.16	0.56	6016.0	84.53	0.53	6425.3	1423672	185614
524.0	6558.312	-65.9811	30.6887	84.23	0.56	6044.2	84.59	0.53	6453.5	1435390	185736
526.0	6558.430	-65.8586	30.6993	84.30	0.56	6072.5	84.66	0.53	6481.8	1447162	185858
528.0	6558.550	-65.7356	30.7098	84.37	0.56	6101.0	84.72	0.53	6510.4	1458990	185981
530.0	6558.670	-65.6119	30.7202	84.44	0.56	6129.8	84.79	0.53	6539.1	1470873	186104
532.0	6558.791	-65.4876	30.7306	84.51	0.57	6158.7	84.86	0.53	6568.1	1482812	186229
534.0	6558.913	-65.3627	30.7408	84.59	0.57	6187.9	84.92	0.53	6597.3	1494807	186354
536.0	6559.036	-65.2371	30.7510	84.66	0.57	6217.3	84.99	0.54	6626.7	1506859	186481
538.0	6559.161	-65.1110	30.7610	84.73	0.58	6247.0	85.06	0.54	6656.3	1518967	186609
540.0	6559.287	-64.9842	30.7710	84.80	0.58	6276.8	85.12	0.54	6686.2	1531134	186738
542.0	6559.415	-64.8568	30.7809	84.88	0.59	6306.9	85.19	0.55	6716.3	1543358	186869
544.0	6559.545	-64.7288	30.7907	84.95	0.59	6337.2	85.26	0.56	6746.5	1555641	187003
546.0	6559.677	-64.6001	30.8004	85.03	0.60	6367.7	85.33	0.56	6777.1	1567982	187138
548.0	6559.811	-64.4707	30.8100	85.10	0.61	6398.4	85.40	0.57	6807.8	1580383	187275
550.0	6559.948	-64.3408	30.8194	85.18	0.61	6429.4	85.47	0.58	6838.8	1592844	187415
552.0	6560.087	-64.2101	30.8288	85.25	0.62	6460.5	85.54	0.59	6870.0	1605364	187557
554.0	6560.229	-64.0788	30.8381	85.33	0.63	6492.0	85.61	0.60	6901.4	1617945	187702
556.0	6560.374	-63.9469	30.8473	85.40	0.64	6523.6	85.68	0.61	6933.1	1630587	187851
558.0	6560.522	-63.8143	30.8564	85.48	0.65	6555.4	85.75	0.62	6964.9	1643290	188002
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)											
559.050	6560.601	-63.7444	30.8611	85.52	0.66	6572.2	85.78	0.62	6981.7	1649984	188082
S-II/S-IVB SEPARATION COMMAND											
560.000	6560.673	-63.6810	30.8654	85.56	0.65	6575.7	85.82	0.61	6985.2	1656048	188155
562.0	6560.819	-63.5476	30.8742	85.63	0.62	6575.4	85.89	0.58	6984.9	1668823	188304
564.0	6560.957	-63.4142	30.8828	85.71	0.59	6575.5	85.96	0.55	6985.0	1681593	188445
566.0	6561.089	-63.2807	30.8914	85.79	0.56	6581.7	86.04	0.53	6991.2	1694371	188580
568.0	6561.217	-63.1470	30.8997	85.87	0.55	6591.8	86.11	0.52	7001.3	1707165	188710
570.0	6561.341	-63.0131	30.9080	85.94	0.53	6602.1	86.18	0.50	7011.6	1719979	188837
572.0	6561.461	-62.8789	30.9160	86.02	0.52	6612.5	86.25	0.49	7022.0	1732812	188961
574.0	6561.578	-62.7445	30.9240	86.10	0.50	6623.0	86.32	0.47	7032.6	1745665	189080
576.0	6561.691	-62.6099	30.9318	86.17	0.48	6633.7	86.40	0.45	7043.3	1758539	189196
578.0	6561.800	-62.4750	30.9394	86.25	0.46	6644.5	86.47	0.44	7054.0	1771433	189307
580.0	6561.906	-62.3399	30.9470	86.33	0.45	6655.2	86.54	0.42	7064.8	1784348	189415
582.0	6562.007	-62.2045	30.9543	86.41	0.43	6666.1	86.62	0.40	7075.7	1797284	189519
584.0	6562.105	-62.0690	30.9615	86.49	0.41	6677.0	86.69	0.39	7086.6	1810241	189619

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
586.0	6562.199	-61.9331	30.9686	86.56	0.40	6688.0	86.76	0.37	7097.6	1823219	189716
588.0	6562.290	-61.7970	30.9755	86.64	0.38	6699.0	86.84	0.36	7108.6	1836218	189809
590.0	6562.377	-61.6607	30.9823	86.72	0.36	6710.0	86.91	0.34	7119.6	1849238	189898
592.0	6562.460	-61.5242	30.9889	86.80	0.35	6721.1	86.99	0.33	7130.7	1862280	189983
594.0	6562.539	-61.3874	30.9954	86.88	0.33	6732.2	87.06	0.31	7141.8	1875343	190064
596.0	6562.614	-61.2503	31.0017	86.96	0.31	6743.4	87.14	0.30	7153.0	1888427	190142
598.0	6562.687	-61.1130	31.0079	87.04	0.30	6754.6	87.21	0.28	7164.2	1901533	190216
600.0	6562.755	-60.9755	31.0139	87.12	0.28	6765.8	87.29	0.27	7175.5	1914661	190287
602.0	6562.820	-60.8377	31.0198	87.20	0.27	6777.1	87.36	0.25	7186.8	1927811	190354
604.0	6562.882	-60.6996	31.0255	87.28	0.25	6788.4	87.44	0.24	7198.1	1940982	190417
606.0	6562.940	-60.5613	31.0310	87.36	0.24	6799.8	87.51	0.23	7209.4	1954176	190477
608.0	6562.995	-60.4228	31.0364	87.44	0.23	6811.1	87.59	0.21	7220.8	1967391	190534
610.0	6563.047	-60.2840	31.0416	87.52	0.21	6822.6	87.66	0.20	7232.2	1980628	190588
612.0	6563.096	-60.1450	31.0467	87.61	0.20	6834.0	87.74	0.19	7243.7	1993888	190638
614.0	6563.141	-60.0057	31.0516	87.69	0.18	6845.5	87.82	0.17	7255.2	2007169	190685
616.0	6563.184	-59.8662	31.0563	87.77	0.17	6857.1	87.89	0.16	7266.8	2020473	190729
618.0	6563.223	-59.7264	31.0609	87.85	0.16	6868.7	87.97	0.15	7278.4	2033799	190770
620.0	6563.260	-59.5864	31.0653	87.93	0.15	6880.3	88.05	0.14	7290.0	2047148	190808
622.0	6563.294	-59.4461	31.0696	88.01	0.13	6892.0	88.13	0.13	7301.7	2060520	190843
624.0	6563.325	-59.3056	31.0737	88.10	0.12	6903.7	88.20	0.12	7313.4	2073914	190876
626.0	6563.353	-59.1648	31.0776	88.18	0.11	6915.4	88.28	0.11	7325.2	2087330	190905
628.0	6563.379	-59.0238	31.0813	88.26	0.10	6927.2	88.36	0.10	7337.0	2100770	190932
630.0	6563.402	-58.8825	31.0849	88.34	0.09	6939.1	88.43	0.09	7348.8	2114232	190957
632.0	6563.423	-58.7410	31.0884	88.42	0.08	6950.9	88.51	0.08	7360.7	2127717	190979
634.0	6563.442	-58.5992	31.0916	88.51	0.07	6962.8	88.59	0.07	7372.5	2141226	190999
636.0	6563.459	-58.4572	31.0947	88.59	0.06	6974.8	88.67	0.06	7384.5	2154757	191017
638.0	6563.473	-58.3149	31.0976	88.67	0.05	6986.7	88.75	0.05	7396.5	2168312	191032
640.0	6563.485	-58.1724	31.1003	88.75	0.05	6998.7	88.82	0.04	7408.5	2181890	191046
642.0	6563.496	-58.0296	31.1029	88.84	0.04	7010.8	88.90	0.04	7420.5	2195491	191057
644.0	6563.504	-57.8865	31.1053	88.92	0.03	7022.9	88.98	0.03	7432.6	2209116	191066
646.0	6563.511	-57.7432	31.1075	89.00	0.02	7035.0	89.06	0.02	7444.8	2222764	191074
648.0	6563.516	-57.5996	31.1096	89.09	0.02	7047.2	89.14	0.02	7457.0	2236435	191079
650.0	6563.519	-57.4558	31.1114	89.17	0.01	7059.4	89.22	0.01	7469.1	2250131	191083
652.0	6563.521	-57.3118	31.1131	89.25	0.00	7071.6	89.30	0.00	7481.4	2263850	191086
654.0	6563.522	-57.1674	31.1147	89.34	-0.00	7083.9	89.37	-0.00	7493.7	2277593	191087
656.0	6563.521	-57.0229	31.1160	89.42	-0.01	7096.2	89.45	-0.01	7506.0	2291360	191086
658.0	6563.519	-56.8780	31.1172	89.51	-0.01	7108.6	89.53	-0.01	7518.4	2305150	191085
660.0	6563.516	-56.7329	31.1181	89.59	-0.01	7121.0	89.61	-0.01	7530.8	2318965	191082
662.0	6563.512	-56.5876	31.1189	89.67	-0.02	7133.5	89.69	-0.02	7543.3	2332804	191078
664.0	6563.507	-56.4420	31.1196	89.76	-0.02	7146.0	89.77	-0.02	7555.8	2346667	191073
666.0	6563.501	-56.2961	31.1200	89.84	-0.02	7158.6	89.85	-0.02	7568.3	2360555	191068
668.0	6563.495	-56.1500	31.1203	89.93	-0.03	7171.1	89.93	-0.03	7580.9	2374467	191061
670.0	6563.488	-56.0036	31.1203	90.01	-0.03	7183.7	90.01	-0.03	7593.4	2388403	191054

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
672.0	6563.480	-55.8570	31.1202	90.09	-0.03	7196.3	90.09	-0.03	7606.1	2402364	191047
674.0	6563.471	-55.7101	31.1199	90.18	-0.04	7209.0	90.17	-0.03	7618.8	2416349	191038
676.0	6563.462	-55.5630	31.1194	90.26	-0.04	7221.7	90.25	-0.04	7631.5	2430360	191028
678.0	6563.452	-55.4156	31.1187	90.35	-0.04	7234.5	90.33	-0.04	7644.2	2444395	191018
680.0	6563.442	-55.2679	31.1179	90.43	-0.04	7247.3	90.41	-0.04	7657.0	2458454	191007
682.0	6563.431	-55.1200	31.1168	90.52	-0.04	7260.1	90.49	-0.04	7669.9	2472539	190997
684.0	6563.421	-54.9718	31.1156	90.60	-0.04	7273.0	90.57	-0.04	7682.7	2486648	190986
686.0	6563.411	-54.8233	31.1141	90.69	-0.04	7285.9	90.65	-0.04	7695.6	2500783	190975
688.0	6563.401	-54.6746	31.1125	90.78	-0.04	7298.8	90.73	-0.03	7708.6	2514943	190965
690.0	6563.392	-54.5257	31.1107	90.86	-0.03	7311.8	90.82	-0.03	7721.5	2529128	190956
692.0	6563.385	-54.3765	31.1087	90.95	-0.03	7324.8	90.90	-0.03	7734.5	2543338	190947
694.0	6563.378	-54.2270	31.1065	91.03	-0.02	7337.9	90.98	-0.02	7747.6	2557573	190940
696.0	6563.372	-54.0773	31.1041	91.12	-0.02	7351.0	91.06	-0.02	7760.7	2571834	190934
698.0	6563.368	-53.9273	31.1015	91.20	-0.01	7364.1	91.14	-0.01	7773.8	2586121	190929
700.0	6563.366	-53.7770	31.0987	91.29	-0.01	7377.2	91.22	-0.01	7787.0	2600432	190925
S-IVB 1ST GUIDANCE CUTOFF											
700.560	6563.365	-53.7349	31.0978	91.31	-0.00	7380.9	91.25	-0.00	7790.6	2604444	190925
702.0	6563.366	-53.6266	31.0957	91.38	-0.00	7382.4	91.30	-0.00	7792.1	2614765	190925
704.0	6563.364	-53.4761	31.0925	91.46	-0.00	7382.5	91.39	-0.00	7792.2	2629098	190921
706.0	6563.364	-53.3256	31.0891	91.55	-0.00	7382.6	91.47	-0.00	7792.3	2643434	190920
708.0	6563.363	-53.1752	31.0855	91.64	-0.00	7382.6	91.55	-0.00	7792.4	2657769	190918
710.0	6563.362	-53.0247	31.0817	91.72	-0.00	7382.7	91.63	-0.00	7792.4	2672104	190916
PARKING ORBIT INSERTION											
710.560	6563.362	-52.9826	31.0806	91.75	-0.00	7382.7	91.66	-0.00	7792.5	2676119	190916

TABLE B-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
PARKING ORBIT INSERTION								
710.560	6563.362	-52.9826	31.0806	31.2460	91.66	-0.00	7792.5	190.916
750.0	6563.420	-50.0199	30.9653	31.1304	93.27	-0.00	7792.6	190.935
800.0	6563.398	-46.2782	30.7110	30.8753	95.30	-0.00	7793.0	190.830
850.0	6563.367	-42.5620	30.3374	30.5006	97.30	-0.01	7793.1	190.677
900.0	6563.330	-38.8802	29.8475	30.0090	99.26	-0.01	7793.3	190.480
950.0	6563.285	-35.2406	29.2443	29.4039	101.16	-0.01	7793.5	190.242
1000.0	6563.233	-31.6501	28.5322	28.6892	103.00	-0.01	7793.8	189.964
1050.0	6563.174	-28.1142	27.7155	27.8696	104.77	-0.01	7794.0	189.652
1100.0	6563.109	-24.6372	26.7994	26.9500	106.46	-0.01	7794.3	189.307
1150.0	6563.036	-21.2221	25.7891	25.9358	108.07	-0.01	7794.6	188.934
1200.0	6562.956	-17.8707	24.6904	24.8325	109.59	-0.01	7795.0	188.537
1250.0	6562.870	-14.5838	23.5089	23.6459	111.03	-0.01	7795.3	188.120
1300.0	6562.776	-11.3608	22.2506	22.3819	112.36	-0.01	7795.7	187.689
1350.0	6562.676	-8.2006	20.9213	21.0463	113.61	-0.02	7796.0	187.248
1400.0	6562.569	-5.1008	19.5269	19.6450	114.75	-0.02	7796.4	186.803
1450.0	6562.455	-2.0587	18.0731	18.1836	115.80	-0.02	7796.8	186.357
1500.0	6562.335	0.9291	16.5655	16.6680	116.76	-0.02	7797.1	185.916
1550.0	6562.209	3.8667	15.0098	15.1036	117.62	-0.02	7797.5	185.484
1600.0	6562.077	6.7583	13.4112	13.4958	118.38	-0.02	7797.9	185.067
1650.0	6561.939	9.6086	11.7751	11.8500	119.05	-0.02	7798.2	184.668
1700.0	6561.796	12.4225	10.1065	10.1713	119.63	-0.02	7798.6	184.292
1750.0	6561.648	15.2051	8.4105	8.4648	120.11	-0.02	7798.9	183.942
1800.0	6561.496	17.9616	6.6919	6.7353	120.50	-0.02	7799.3	183.622
1850.0	6561.340	20.6974	4.9555	4.9878	120.80	-0.02	7799.6	183.335
1900.0	6561.181	23.4178	3.2061	3.2270	121.01	-0.02	7799.9	183.083
1950.0	6561.020	26.1284	1.4481	1.4576	121.13	-0.02	7800.1	182.868
2000.0	6560.857	28.8346	-0.3137	-0.3158	121.16	-0.02	7800.4	182.692
2050.0	6560.693	31.5419	-2.0748	-2.0884	121.10	-0.02	7800.6	182.556
2100.0	6560.530	34.2559	-3.8306	-3.8556	120.94	-0.02	7800.8	182.460
2150.0	6560.367	36.9821	-5.5764	-5.6127	120.70	-0.02	7801.0	182.404
2200.0	6560.207	39.7259	-7.3077	-7.3550	120.37	-0.02	7801.1	182.389
2250.0	6560.050	42.4926	-9.0196	-9.0777	119.95	-0.02	7801.3	182.412
2300.0	6559.897	45.2877	-10.7074	-10.7759	119.43	-0.02	7801.4	182.473
2350.0	6559.750	48.1163	-12.3660	-12.4445	118.82	-0.02	7801.4	182.569
2400.0	6559.609	50.9834	-13.9906	-14.0786	118.12	-0.02	7801.5	182.699
2450.0	6559.476	53.8939	-15.5757	-15.6727	117.32	-0.02	7801.5	182.859
2500.0	6559.352	56.8524	-17.1162	-17.2217	116.42	-0.02	7801.5	183.047
2550.0	6559.238	59.8629	-18.6065	-18.7199	115.43	-0.02	7801.5	183.259
2600.0	6559.136	62.9294	-20.0410	-20.1617	114.35	-0.01	7801.5	183.492
2650.0	6559.046	66.0551	-21.4140	-21.5414	113.16	-0.01	7801.5	183.743

TABLE B-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
2700.0	6558.969	69.2425	-22.7196	-22.8531	111.88	-0.01	7801.4	184.007
2750.0	6558.908	72.4936	-23.9520	-24.0910	110.51	-0.01	7801.3	184.280
2800.0	6558.861	75.8093	-25.1052	-25.2491	109.04	-0.01	7801.2	184.560
2850.0	6558.831	79.1897	-26.1733	-26.3216	107.48	-0.00	7801.1	184.842
2900.0	6558.818	82.6336	-27.1506	-27.3027	105.84	-0.00	7801.0	185.123
2950.0	6558.824	86.1387	-28.0315	-28.1869	104.11	0.00	7800.9	185.399
3000.0	6558.847	89.7015	-28.8107	-28.9689	102.31	0.00	7800.7	185.666
3050.0	6558.890	93.3173	-29.4833	-29.6438	100.45	0.01	7800.6	185.923
3100.0	6558.952	96.9798	-30.0449	-30.2072	98.52	0.01	7800.5	186.167
3150.0	6559.034	100.6818	-30.4917	-30.6554	96.54	0.01	7800.3	186.394
3200.0	6559.136	104.4150	-30.8205	-30.9852	94.53	0.02	7800.2	186.603
3250.0	6559.257	108.1701	-31.0290	-31.1943	92.49	0.02	7800.0	186.794
3300.0	6559.398	111.9375	-31.1156	-31.2812	90.43	0.02	7799.8	186.963
3350.0	6559.559	115.7067	-31.0798	-31.2453	88.37	0.02	7799.7	187.112
3400.0	6559.738	119.4677	-30.9218	-31.0869	86.32	0.03	7799.5	187.239
3450.0	6559.936	123.2104	-30.6429	-30.8070	84.29	0.03	7799.4	187.345
3500.0	6560.151	126.9254	-30.2449	-30.4079	82.30	0.03	7799.2	187.430
3550.0	6560.383	130.6038	-29.7309	-29.8922	80.35	0.04	7799.1	187.496
3600.0	6560.631	134.2381	-29.1043	-29.2635	78.46	0.04	7798.9	187.543
3650.0	6560.894	137.8216	-28.3694	-28.5260	76.63	0.04	7798.8	187.574
3700.0	6561.170	141.3490	-27.5309	-27.6844	74.87	0.04	7798.6	187.591
3750.0	6561.459	144.8163	-26.5939	-26.7438	73.19	0.04	7798.4	187.596
3800.0	6561.759	148.2207	-25.5640	-25.7098	71.60	0.04	7798.3	187.591
3850.0	6562.069	151.5606	-24.4467	-24.5878	70.10	0.05	7798.1	187.581
3900.0	6562.387	154.8356	-23.2481	-23.3839	68.68	0.05	7798.0	187.567
3950.0	6562.712	158.0463	-21.9739	-22.1039	67.37	0.05	7797.8	187.553
4000.0	6563.042	161.1942	-20.6301	-20.7536	66.14	0.05	7797.6	187.542
4050.0	6563.375	164.2817	-19.2225	-19.3390	65.02	0.05	7797.4	187.537
4100.0	6563.710	167.3117	-17.7570	-17.8659	63.99	0.05	7797.2	187.542
4150.0	6564.046	170.2879	-16.2392	-16.3398	63.05	0.05	7797.0	187.560
4200.0	6564.380	173.2142	-14.6745	-14.7664	62.21	0.05	7796.8	187.593
4250.0	6564.712	176.0952	-13.0684	-13.1510	61.47	0.05	7796.6	187.645
4300.0	6565.040	178.9354	-11.4261	-11.4989	60.82	0.05	7796.4	187.717
4350.0	6565.362	-178.2600	-9.7527	-9.8153	60.27	0.05	7796.2	187.813
4400.0	6565.677	-175.4861	-8.0532	-8.1052	59.80	0.05	7795.9	187.933
4450.0	6565.984	-172.7376	-6.3324	-6.3735	59.43	0.04	7795.7	188.080
4500.0	6566.282	-170.0090	-4.5951	-4.6250	59.15	0.04	7795.4	188.254
4550.0	6566.569	-167.2951	-2.8459	-2.8645	58.96	0.04	7795.2	188.456
4600.0	6566.845	-164.5902	-1.0894	-1.0966	58.86	0.04	7794.9	188.686
4650.0	6567.108	-161.8890	0.6697	0.6741	58.85	0.04	7794.6	188.945
4700.0	6567.358	-159.1859	2.4270	2.4429	58.93	0.04	7794.3	189.231
4750.0	6567.594	-156.4755	4.1779	4.2051	59.10	0.03	7794.0	189.542
4800.0	6567.816	-153.7522	5.9177	5.9562	59.35	0.03	7793.7	189.879

TABLE B-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
4850.0	6568.024	-151.0107	7.6419	7.6913	59.70	0.03	7793.4	190.238
4900.0	6568.216	-148.2456	9.3458	9.4059	60.14	0.03	7793.1	190.617
4950.0	6568.393	-145.4516	11.0245	11.0948	60.68	0.02	7792.8	191.013
5000.0	6568.554	-142.6236	12.6731	12.7533	61.30	0.02	7792.5	191.422
5050.0	6568.701	-139.7566	14.2867	14.3763	62.02	0.02	7792.2	191.843
5100.0	6568.832	-136.8459	15.8600	15.9584	62.84	0.02	7791.9	192.270
5150.0	6568.948	-133.8869	17.3877	17.4945	63.74	0.02	7791.6	192.700
5200.0	6569.049	-130.8756	18.8645	18.9790	64.75	0.01	7791.3	193.129
5250.0	6569.136	-127.8083	20.2847	20.4064	65.85	0.01	7791.1	193.551
5300.0	6569.209	-124.6819	21.6426	21.7709	67.05	0.01	7790.8	193.964
5350.0	6569.269	-121.4938	22.9326	23.0669	68.34	0.01	7790.6	194.363
5400.0	6569.316	-118.2423	24.1487	24.2883	69.73	0.01	7790.4	194.743
5450.0	6569.350	-114.9266	25.2851	25.4295	71.20	0.00	7790.2	195.101
5500.0	6569.373	-111.5468	26.3359	26.4847	72.77	0.00	7790.0	195.432
5550.0	6569.384	-108.1041	27.2957	27.4481	74.42	0.00	7789.9	195.733
5600.0	6569.385	-104.6011	28.1587	28.3143	76.15	-0.00	7789.8	196.000
5650.0	6569.377	-101.0413	28.9199	29.0782	77.96	-0.00	7789.7	196.230
5700.0	6569.359	-97.4297	29.5745	29.7350	79.83	-0.00	7789.6	196.421
5750.0	6569.332	-93.7726	30.1181	30.2804	81.76	-0.00	7789.6	196.570
5800.0	6569.297	-90.0771	30.5471	30.7108	83.74	-0.01	7789.6	196.675
5850.0	6569.255	-86.3517	30.8585	31.0231	85.75	-0.01	7789.6	196.735
5900.0	6569.206	-82.6055	31.0500	31.2152	87.79	-0.01	7789.6	196.749
5950.0	6569.150	-78.8484	31.1202	31.2856	89.84	-0.01	7789.7	196.717
6000.0	6569.088	-75.0905	31.0687	31.2339	91.90	-0.01	7789.8	196.637
6050.0	6569.020	-71.3417	30.8957	31.0604	93.94	-0.01	7790.0	196.513
6100.0	6568.947	-67.6121	30.6026	30.7664	95.96	-0.01	7790.1	196.343
6150.0	6568.868	-63.9109	30.1913	30.3539	97.94	-0.01	7790.3	196.130
6200.0	6568.785	-60.2466	29.6649	29.8257	99.88	-0.01	7790.6	195.876
6250.0	6568.697	-56.6268	29.0269	29.1856	101.76	-0.01	7790.8	195.584
6300.0	6568.604	-53.0577	28.2815	28.4375	103.58	-0.01	7791.1	195.257
6350.0	6568.506	-49.5446	27.4334	27.5863	105.32	-0.01	7791.4	194.897
6400.0	6568.404	-46.0914	26.4877	26.6370	106.98	-0.02	7791.7	194.509
6450.0	6568.298	-42.7006	25.4498	25.5950	108.56	-0.02	7792.0	194.097
6500.0	6568.187	-39.3737	24.3256	24.4660	110.06	-0.02	7792.3	193.665
6550.0	6568.072	-36.1110	23.1206	23.2558	111.46	-0.02	7792.7	193.217
6600.0	6567.953	-32.9119	21.8408	21.9700	112.76	-0.02	7793.0	192.759
6650.0	6567.829	-29.7747	20.4920	20.6147	113.98	-0.02	7793.4	192.295
6700.0	6567.701	-26.6971	19.0800	19.1957	115.09	-0.02	7793.8	191.830
6750.0	6567.569	-23.6760	17.6105	17.7185	116.11	-0.02	7794.1	191.369
6800.0	6567.432	-20.7078	16.0891	16.1889	117.04	-0.02	7794.5	190.916
6850.0	6567.291	-17.7884	14.5213	14.6123	117.86	-0.02	7794.8	190.476
6900.0	6567.146	-14.9135	12.9125	12.9941	118.60	-0.02	7795.2	190.053
6950.0	6566.998	-12.0784	11.2677	11.3396	119.24	-0.02	7795.5	189.652

TABLE B-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
7000.0	6566.846	-9.2780	9.5922	9.6537	119.78	-0.02	7795.9	189.276
7050.0	6566.690	-6.5073	7.8907	7.9417	120.24	-0.02	7796.2	188.929
7100.0	6566.532	-3.7611	6.1681	6.2082	120.60	-0.02	7796.5	188.614
7150.0	6566.371	-1.0339	4.4293	4.4582	120.87	-0.02	7796.8	188.333
7200.0	6566.209	1.6797	2.6788	2.6963	121.05	-0.02	7797.0	188.090
7250.0	6566.045	4.3850	0.9212	0.9272	121.15	-0.02	7797.3	187.884
7300.0	6565.880	7.0876	-0.8389	-0.8444	121.15	-0.02	7797.5	187.718
7350.0	6565.715	9.7930	-2.5969	-2.6139	121.06	-0.02	7797.7	187.593
7400.0	6565.551	12.5067	-4.3482	-4.3766	120.88	-0.02	7797.9	187.509
7450.0	6565.389	15.2341	-6.0882	-6.1278	120.61	-0.02	7798.0	187.465
7500.0	6565.229	17.9806	-7.8123	-7.8628	120.26	-0.02	7798.2	187.460
7550.0	6565.073	20.7516	-9.5157	-9.5769	119.81	-0.02	7798.3	187.494
7600.0	6564.921	23.5524	-11.1936	-11.2650	119.26	-0.02	7798.3	187.565
7650.0	6564.775	26.3882	-12.8410	-12.9222	118.63	-0.02	7798.4	187.670
7700.0	6564.636	29.2638	-14.4528	-14.5434	117.90	-0.02	7798.4	187.808
7750.0	6564.504	32.1840	-16.0238	-16.1233	117.07	-0.02	7798.4	187.975
7800.0	6564.381	35.1532	-17.5487	-17.6564	116.15	-0.02	7798.4	188.167
7850.0	6564.267	38.1756	-19.0219	-19.1374	115.13	-0.02	7798.4	188.383
7900.0	6564.165	41.2548	-20.4379	-20.5605	114.02	-0.01	7798.4	188.618
7950.0	6564.074	44.3938	-21.7908	-21.9199	112.81	-0.01	7798.3	188.867
8000.0	6563.996	47.5950	-23.0749	-23.2099	111.51	-0.01	7798.2	189.129
8050.0	6563.932	50.8601	-24.2842	-24.4246	110.11	-0.01	7798.1	189.398
8100.0	6563.882	54.1898	-25.4129	-25.5580	108.62	-0.01	7798.0	189.670
8150.0	6563.847	57.5838	-26.4551	-26.6044	107.04	-0.00	7797.9	189.942
8200.0	6563.828	61.0407	-27.4051	-27.5580	105.37	-0.00	7797.7	190.210
8250.0	6563.825	64.5578	-28.2574	-28.4135	103.63	0.00	7797.6	190.470
8300.0	6563.839	68.1313	-29.0069	-29.1656	101.81	0.00	7797.5	190.720
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6								
8334.200	6563.856	70.6055	-29.4578	-29.6181	100.53	0.00	7797.4	190.881

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6									
8334.200	-12316177	1090904	2561379	-3120.6	-1948.1	-6407.0	7.50	-1.93	-3.06
8340.0	-12334152	1079573	2524168	-3077.0	-1959.3	-6424.6	7.52	-1.92	-3.01
8350.0	-12364545	1059885	2459773	-3001.6	-1978.3	-6454.3	7.56	-1.89	-2.93
8360.0	-12394183	1040007	2395085	-2925.8	-1997.2	-6483.2	7.60	-1.87	-2.85
8370.0	-12423060	1019942	2330113	-2849.6	-2015.8	-6511.2	7.64	-1.85	-2.76
8380.0	-12451174	999692	2264864	-2773.1	-2034.1	-6538.4	7.67	-1.82	-2.68
8390.0	-12478521	979261	2199347	-2696.2	-2052.2	-6564.8	7.70	-1.80	-2.60
8400.0	-12505097	958649	2133571	-2619.0	-2070.1	-6590.4	7.74	-1.77	-2.51
8410.0	-12530900	937860	2067543	-2541.5	-2087.7	-6615.1	7.77	-1.75	-2.43
8420.0	-12555926	916896	2001272	-2463.6	-2105.1	-6638.9	7.80	-1.72	-2.34
8430.0	-12580171	895760	1934767	-2385.4	-2122.2	-6662.0	7.83	-1.70	-2.26
8440.0	-12603633	874454	1868036	-2307.0	-2139.0	-6684.1	7.86	-1.67	-2.17
8450.0	-12626309	852980	1801087	-2228.2	-2155.6	-6705.4	7.89	-1.65	-2.09
8460.0	-12648196	831342	1733930	-2149.1	-2171.9	-6725.9	7.92	-1.62	-2.00
8470.0	-12669291	809542	1666572	-2069.8	-2188.0	-6745.5	7.94	-1.59	-1.92
8480.0	-12689592	787583	1599023	-1990.3	-2203.8	-6764.2	7.97	-1.57	-1.83
8490.0	-12709095	765467	1531290	-1910.4	-2219.3	-6782.1	7.99	-1.54	-1.74
8500.0	-12727799	743197	1463383	-1830.4	-2234.6	-6799.1	8.02	-1.51	-1.66
8510.0	-12745702	720776	1395311	-1750.1	-2249.6	-6815.3	8.04	-1.48	-1.57
8520.0	-12762800	698206	1327081	-1669.5	-2264.3	-6830.6	8.06	-1.46	-1.48
8530.0	-12779092	675491	1258703	-1588.8	-2278.7	-6845.0	8.08	-1.43	-1.40
8540.0	-12794575	652633	1190185	-1507.9	-2292.8	-6858.5	8.10	-1.40	-1.31
8550.0	-12809249	629635	1121535	-1426.8	-2306.7	-6871.2	8.12	-1.37	-1.22
8560.0	-12823110	606500	1052764	-1345.5	-2320.2	-6883.0	8.14	-1.34	-1.14
8570.0	-12836157	583232	983879	-1264.0	-2333.5	-6893.9	8.16	-1.31	-1.05
8580.0	-12848389	559831	914889	-1182.4	-2346.5	-6903.9	8.17	-1.28	-0.96
8590.0	-12859804	536303	845803	-1100.6	-2359.2	-6913.1	8.18	-1.25	-0.87
8600.0	-12870400	512649	776630	-1018.7	-2371.5	-6921.4	8.20	-1.22	-0.79
8610.0	-12880177	488873	707378	-936.6	-2383.6	-6928.8	8.21	-1.19	-0.70
8620.0	-12889132	464978	638057	-854.5	-2395.4	-6935.3	8.22	-1.16	-0.61
8630.0	-12897265	440967	568675	-772.2	-2406.8	-6941.0	8.23	-1.13	-0.52
8640.0	-12904575	416842	499240	-689.8	-2418.0	-6945.8	8.24	-1.10	-0.43
8650.0	-12911061	392608	429762	-607.4	-2428.9	-6949.7	8.25	-1.07	-0.35
8660.0	-12916722	368266	360250	-524.8	-2439.4	-6952.7	8.26	-1.04	-0.26
8670.0	-12921558	343821	290712	-442.2	-2449.6	-6954.8	8.26	-1.01	-0.17
8680.0	-12925567	319275	221157	-359.6	-2459.5	-6956.1	8.27	-0.97	-0.08
8690.0	-12928749	294632	151594	-276.9	-2469.1	-6956.4	8.27	-0.94	0.01
8700.0	-12931104	269894	82031	-194.1	-2478.4	-6955.9	8.27	-0.91	0.09
8710.0	-12932632	245065	12478	-111.4	-2487.3	-6954.5	8.28	-0.88	0.18
8720.0	-12933332	220149	-57057	-28.6	-2495.9	-6952.3	8.28	-0.85	0.27

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
8730.0	-12933204	195147	-126564	54.2	-2504.2	-6949.1	8.28	-0.81	0.36
8740.0	-12932249	170065	-196036	136.9	-2512.2	-6945.1	8.28	-0.78	0.45
8750.0	-12930466	144905	-265463	219.7	-2519.8	-6940.2	8.27	-0.75	0.53
8760.0	-12927855	119670	-334837	302.4	-2527.1	-6934.4	8.27	-0.71	0.62
8770.0	-12924417	94363	-404149	385.1	-2534.1	-6927.8	8.27	-0.68	0.71
8780.0	-12920153	68989	-473389	467.7	-2540.7	-6920.2	8.26	-0.65	0.80
8790.0	-12915063	43549	-542551	550.3	-2547.0	-6911.8	8.25	-0.61	0.88
8800.0	-12909147	18049	-611623	632.8	-2553.0	-6902.6	8.25	-0.58	0.97
8810.0	-12902406	-7510	-680599	715.3	-2558.6	-6892.4	8.24	-0.55	1.06
8820.0	-12894842	-33123	-749469	797.6	-2563.9	-6881.4	8.23	-0.51	1.14
8830.0	-12886455	-58787	-818225	879.8	-2568.8	-6869.6	8.22	-0.48	1.23
8840.0	-12877246	-84498	-886858	962.0	-2573.4	-6856.9	8.20	-0.44	1.32
8850.0	-12867216	-110254	-955360	1044.0	-2577.7	-6843.3	8.20	-0.42	1.39
8860.0	-12856367	-136051	-1023722	1125.9	-2581.6	-6828.9	8.18	-0.37	1.49
8870.0	-12844699	-161885	-1091935	1207.6	-2585.2	-6813.6	8.17	-0.34	1.58
8880.0	-12832215	-187753	-1159991	1289.2	-2588.4	-6797.5	8.15	-0.31	1.65
8890.0	-12818916	-213652	-1227882	1370.6	-2591.3	-6780.5	8.13	-0.27	1.74
8900.0	-12804803	-239577	-1295598	1451.9	-2593.8	-6762.6	8.11	-0.23	1.83
8910.0	-12789879	-265526	-1363132	1533.0	-2596.0	-6744.0	8.10	-0.26	1.90
S-IVB RE-IGNITION (STDV OPEN)									
8912.400	-12786176	-271757	-1379312	1552.4	-2596.5	-6739.4	8.09	-0.28	1.92
8914.0	-12783682	-275912	-1390094	1565.9	-2597.8	-6739.0	8.72	-1.33	-1.41
8916.0	-12780532	-281112	-1403578	1584.0	-2601.8	-6744.5	9.15	-2.08	-3.32
8918.0	-12777345	-286320	-1417074	1602.5	-2605.9	-6751.1	9.19	-2.12	-3.31
8920.0	-12774123	-291536	-1430582	1620.8	-2610.2	-6757.7	9.23	-2.14	-3.29
8922.0	-12770862	-296761	-1444104	1639.3	-2614.5	-6764.2	9.30	-2.15	-3.28
8924.0	-12767565	-301994	-1457639	1657.9	-2618.8	-6770.8	9.37	-2.15	-3.26
8926.0	-12764230	-307236	-1471187	1676.8	-2623.0	-6777.3	9.58	-2.15	-3.25
8928.0	-12760858	-312486	-1484748	1696.2	-2627.3	-6783.7	9.80	-2.14	-3.23
8930.0	-12757446	-317745	-1498322	1715.9	-2631.6	-6790.2	9.90	-2.14	-3.22
8932.0	-12753994	-323012	-1511909	1735.7	-2635.8	-6796.6	9.91	-2.14	-3.20
8934.0	-12750503	-328288	-1525508	1755.5	-2640.1	-6803.0	9.89	-2.12	-3.20
8936.0	-12746972	-333573	-1539121	1775.3	-2644.3	-6809.4	9.91	-2.10	-3.20
8938.0	-12743401	-338865	-1552746	1795.2	-2648.5	-6815.7	9.94	-2.09	-3.19
8940.0	-12739791	-344167	-1566383	1815.1	-2652.7	-6822.1	9.96	-2.09	-3.19
8942.0	-12736141	-349476	-1580034	1835.0	-2656.9	-6828.5	9.97	-2.09	-3.19
8944.0	-12732451	-354794	-1593697	1855.0	-2661.1	-6834.9	9.97	-2.09	-3.19
8946.0	-12728721	-360121	-1607374	1874.9	-2665.2	-6841.3	9.97	-2.08	-3.19
8948.0	-12724951	-365455	-1621062	1894.8	-2669.4	-6847.6	9.98	-2.06	-3.19
8950.0	-12721142	-370798	-1634764	1914.8	-2673.5	-6854.0	10.00	-2.05	-3.19
8952.0	-12717292	-376149	-1648478	1934.8	-2677.6	-6860.4	10.02	-2.05	-3.19

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
8954.0	-12713402	-381509	-1662206	1954.9	-2681.7	-6866.8	10.02	-2.04	-3.19
8956.0	-12709473	-386876	-1675945	1974.9	-2685.8	-6873.1	10.03	-2.04	-3.18
8958.0	-12705503	-392252	-1689698	1995.0	-2689.9	-6879.5	10.03	-2.04	-3.17
8960.0	-12701493	-397635	-1703463	2015.1	-2693.9	-6885.8	10.03	-2.04	-3.17
8962.0	-12697442	-403027	-1717241	2035.1	-2698.0	-6892.2	10.04	-2.04	-3.18
8964.0	-12693352	-408427	-1731032	2055.2	-2702.1	-6898.5	10.05	-2.03	-3.18
8966.0	-12689222	-413836	-1744835	2075.3	-2706.1	-6904.9	10.06	-2.02	-3.18
8968.0	-12685051	-419252	-1758651	2095.4	-2710.2	-6911.2	10.06	-2.01	-3.18
8970.0	-12680840	-424676	-1772480	2115.6	-2714.2	-6917.6	10.07	-2.01	-3.17
8972.0	-12676588	-430109	-1786322	2135.7	-2718.2	-6923.9	10.07	-2.01	-3.17
8974.0	-12672297	-435549	-1800176	2155.9	-2722.2	-6930.3	10.08	-2.02	-3.17
8976.0	-12667965	-440998	-1814043	2176.0	-2726.2	-6936.6	10.09	-2.02	-3.17
8978.0	-12663593	-446454	-1827923	2196.2	-2730.3	-6943.0	10.10	-2.02	-3.16
8980.0	-12659180	-451919	-1841815	2216.4	-2734.3	-6949.3	10.10	-2.01	-3.16
8982.0	-12654727	-457391	-1855720	2236.6	-2738.3	-6955.6	10.11	-2.00	-3.17
8984.0	-12650234	-462872	-1869637	2256.8	-2742.3	-6962.0	10.11	-1.99	-3.17
8986.0	-12645700	-468361	-1883568	2277.0	-2746.3	-6968.3	10.11	-1.99	-3.16
8988.0	-12641126	-473857	-1897511	2297.3	-2750.3	-6974.6	10.11	-1.99	-3.16
8990.0	-12636511	-479362	-1911466	2317.5	-2754.2	-6980.9	10.12	-1.99	-3.17
8992.0	-12631856	-484874	-1925434	2337.7	-2758.2	-6987.3	10.13	-1.98	-3.17
8994.0	-12627160	-490394	-1939415	2358.0	-2762.2	-6993.6	10.13	-1.99	-3.16
8996.0	-12622424	-495923	-1953409	2378.3	-2766.2	-6999.9	10.13	-1.98	-3.16
8998.0	-12617647	-501459	-1967415	2398.5	-2770.1	-7006.3	10.13	-1.98	-3.16
9000.0	-12612830	-507003	-1981434	2418.8	-2774.1	-7012.6	10.14	-1.98	-3.16
9002.0	-12607972	-512555	-1995465	2439.1	-2778.0	-7018.9	10.15	-1.98	-3.16
9004.0	-12603073	-518115	-2009509	2459.4	-2782.0	-7025.2	10.16	-1.98	-3.16
9006.0	-12598134	-523683	-2023566	2479.7	-2786.0	-7031.6	10.16	-1.98	-3.17
9008.0	-12593154	-529259	-2037636	2500.0	-2789.9	-7037.9	10.16	-1.97	-3.17
9010.0	-12588134	-534843	-2051718	2520.4	-2793.9	-7044.2	10.17	-1.97	-3.17
9012.0	-12583073	-540435	-2065813	2540.7	-2797.8	-7050.6	10.17	-1.97	-3.17
9014.0	-12577971	-546034	-2079920	2561.0	-2801.7	-7056.9	10.17	-1.98	-3.17
9016.0	-12572829	-551642	-2094040	2581.4	-2805.7	-7063.2	10.18	-1.98	-3.17
9018.0	-12567646	-557257	-2108173	2601.7	-2809.7	-7069.6	10.18	-1.97	-3.16
9020.0	-12562422	-562880	-2122318	2622.1	-2813.6	-7075.9	10.18	-1.97	-3.16
9022.0	-12557157	-568511	-2136477	2642.4	-2817.5	-7082.2	10.19	-1.97	-3.17
9024.0	-12551852	-574150	-2150647	2662.8	-2821.5	-7088.6	10.19	-1.96	-3.17
9026.0	-12546506	-579797	-2164831	2683.2	-2825.4	-7094.9	10.20	-1.97	-3.17
9028.0	-12541119	-585452	-2179027	2703.6	-2829.3	-7101.3	10.19	-1.97	-3.18
9030.0	-12535692	-591115	-2193236	2724.0	-2833.3	-7107.6	10.20	-1.97	-3.18
9032.0	-12530223	-596785	-2207458	2744.4	-2837.2	-7114.0	10.20	-1.97	-3.18
9034.0	-12524714	-602464	-2221692	2764.8	-2841.1	-7120.4	10.21	-1.97	-3.18
9036.0	-12519164	-608150	-2235939	2785.2	-2845.1	-7126.7	10.21	-1.97	-3.18
9038.0	-12513573	-613844	-2250199	2805.7	-2849.0	-7133.1	10.22	-1.97	-3.18

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
9040.0	-12507941	-619546	-2264471	2826.1	-2853.0	-7139.4	10.22	-1.97	-3.18
9042.0	-12502269	-625256	-2278756	2846.5	-2856.9	-7145.8	10.22	-1.97	-3.19
9044.0	-12496555	-630974	-2293054	2867.0	-2860.8	-7152.1	10.21	-1.95	-3.17
9046.0	-12490801	-636699	-2307365	2887.4	-2864.7	-7158.5	10.22	-1.95	-3.17
9048.0	-12485006	-642432	-2321688	2907.9	-2868.7	-7165.0	10.29	-2.01	-3.33
9050.0	-12479169	-648174	-2336025	2928.6	-2872.8	-7171.9	10.40	-2.12	-3.62
9052.0	-12473291	-653924	-2350376	2949.5	-2877.2	-7179.4	10.50	-2.24	-3.91
9054.0	-12467371	-659683	-2364743	2970.6	-2881.7	-7187.4	10.57	-2.30	-4.07
9056.0	-12461409	-665451	-2379126	2991.8	-2886.3	-7195.6	10.63	-2.32	-4.13
9058.0	-12455404	-671228	-2393526	3013.1	-2891.0	-7203.9	10.68	-2.32	-4.16
9060.0	-12449356	-677014	-2407942	3034.5	-2895.6	-7212.2	10.67	-2.31	-4.15
9062.0	-12443266	-682810	-2422374	3055.8	-2900.2	-7220.5	10.65	-2.30	-4.14
9064.0	-12437133	-688615	-2436824	3077.1	-2904.8	-7228.8	10.66	-2.31	-4.15
9066.0	-12430957	-694429	-2451290	3098.4	-2909.4	-7237.1	10.68	-2.31	-4.16
9068.0	-12424739	-700253	-2465772	3119.8	-2914.0	-7245.4	10.69	-2.30	-4.18
9070.0	-12418478	-706086	-2480272	3141.2	-2918.6	-7253.8	10.70	-2.30	-4.19
9072.0	-12412174	-711927	-2494788	3162.6	-2923.2	-7262.2	10.71	-2.30	-4.20
9074.0	-12405828	-717778	-2509320	3184.1	-2927.8	-7270.6	10.73	-2.31	-4.20
9076.0	-12399438	-723639	-2523870	3205.5	-2932.5	-7279.0	10.74	-2.31	-4.21
9078.0	-12393005	-729508	-2538436	3227.0	-2937.1	-7287.5	10.74	-2.31	-4.23
9080.0	-12386530	-735387	-2553020	3248.5	-2941.7	-7295.9	10.76	-2.31	-4.24
9082.0	-12380011	-741275	-2567620	3270.1	-2946.3	-7304.4	10.78	-2.33	-4.24
9084.0	-12373450	-747172	-2582237	3291.6	-2951.0	-7312.9	10.78	-2.37	-4.24
9086.0	-12366845	-753079	-2596872	3313.2	-2955.8	-7321.4	10.75	-2.43	-4.25
9088.0	-12360197	-758996	-2611523	3334.6	-2960.7	-7329.9	10.71	-2.45	-4.27
9090.0	-12353506	-764922	-2626191	3356.1	-2965.6	-7338.4	10.72	-2.45	-4.29
9092.0	-12346773	-770858	-2640876	3377.5	-2970.5	-7347.0	10.76	-2.44	-4.30
9094.0	-12339996	-776804	-2655579	3399.1	-2975.4	-7355.6	10.78	-2.43	-4.31
9096.0	-12333176	-782760	-2670299	3420.6	-2980.2	-7364.2	10.79	-2.43	-4.32
9098.0	-12326314	-788725	-2685036	3442.2	-2985.1	-7372.9	10.80	-2.44	-4.34
9100.0	-12319408	-794700	-2699791	3463.8	-2990.0	-7381.6	10.82	-2.44	-4.36
9102.0	-12312458	-800685	-2714563	3485.5	-2994.9	-7390.3	10.84	-2.44	-4.37
9104.0	-12305466	-806680	-2729352	3507.2	-2999.8	-7399.1	10.86	-2.44	-4.38
9106.0	-12298429	-812684	-2744159	3528.9	-3004.7	-7407.8	10.87	-2.45	-4.39
9108.0	-12291350	-818698	-2758983	3550.7	-3009.5	-7416.6	10.89	-2.45	-4.41
9110.0	-12284227	-824722	-2773825	3572.5	-3014.4	-7425.5	10.90	-2.44	-4.42
9112.0	-12277060	-830756	-2788685	3594.3	-3019.3	-7434.3	10.91	-2.45	-4.44
9114.0	-12269850	-836800	-2803563	3616.1	-3024.2	-7443.2	10.92	-2.46	-4.45
9116.0	-12262596	-842853	-2818458	3638.0	-3029.1	-7452.1	10.94	-2.46	-4.47
9118.0	-12255298	-848916	-2833371	3659.9	-3034.1	-7461.1	10.96	-2.46	-4.48
9120.0	-12247956	-854989	-2848302	3681.8	-3039.0	-7470.1	10.98	-2.46	-4.49
9122.0	-12240570	-861072	-2863251	3703.8	-3043.9	-7479.1	10.99	-2.45	-4.51
9124.0	-12233141	-867165	-2878219	3725.8	-3048.8	-7488.1	11.01	-2.46	-4.53

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
9126.0	-12225667	-873267	-2893204	3747.8	-3053.7	-7497.2	11.03	-2.46	-4.55
9128.0	-12218150	-879380	-2908207	3769.9	-3058.6	-7506.3	11.04	-2.46	-4.57
9130.0	-12210588	-885502	-2923229	3792.0	-3063.6	-7515.5	11.06	-2.46	-4.58
9132.0	-12202981	-891634	-2938269	3814.2	-3068.5	-7524.6	11.09	-2.46	-4.60
9134.0	-12195331	-897776	-2953328	3836.3	-3073.4	-7533.8	11.11	-2.46	-4.61
9136.0	-12187636	-903928	-2968405	3858.6	-3078.3	-7543.1	11.12	-2.46	-4.63
9138.0	-12179897	-910089	-2983500	3880.8	-3083.3	-7552.4	11.14	-2.47	-4.65
9140.0	-12172113	-916261	-2998614	3903.1	-3088.2	-7561.7	11.17	-2.47	-4.67
9142.0	-12164284	-922442	-3013747	3925.5	-3093.2	-7571.1	11.19	-2.47	-4.69
9144.0	-12156411	-928633	-3028898	3947.9	-3098.1	-7580.5	11.20	-2.47	-4.71
9146.0	-12148493	-934834	-3044069	3970.3	-3103.1	-7589.9	11.22	-2.48	-4.73
9148.0	-12140529	-941045	-3059258	3992.8	-3108.0	-7599.4	11.25	-2.48	-4.75
9150.0	-12132521	-947266	-3074466	4015.3	-3113.0	-7608.9	11.27	-2.49	-4.77
9152.0	-12124468	-953497	-3089694	4037.9	-3118.0	-7618.5	11.29	-2.49	-4.79
9154.0	-12116370	-959738	-3104940	4060.5	-3123.0	-7628.0	11.31	-2.50	-4.81
9156.0	-12108226	-965989	-3120206	4083.1	-3128.0	-7637.7	11.34	-2.50	-4.82
9158.0	-12100037	-972250	-3135491	4105.8	-3133.0	-7647.4	11.36	-2.49	-4.85
9160.0	-12091803	-978521	-3150795	4128.6	-3137.9	-7657.1	11.38	-2.50	-4.88
9162.0	-12083523	-984802	-3166119	4151.3	-3142.9	-7666.9	11.40	-2.50	-4.91
9164.0	-12075198	-991093	-3181463	4174.2	-3148.0	-7676.7	11.43	-2.51	-4.92
9166.0	-12066826	-997394	-3196826	4197.1	-3153.0	-7686.6	11.45	-2.51	-4.94
9168.0	-12058409	-1003705	-3212209	4220.0	-3158.0	-7696.5	11.48	-2.51	-4.96
9170.0	-12049946	-1010026	-3227612	4243.0	-3163.0	-7706.4	11.50	-2.51	-4.98
9172.0	-12041437	-1016357	-3243035	4266.0	-3168.1	-7716.4	11.53	-2.51	-5.01
9174.0	-12032882	-1022698	-3258477	4289.1	-3173.1	-7726.4	11.56	-2.51	-5.02
9176.0	-12024281	-1029049	-3273940	4312.2	-3178.1	-7736.5	11.59	-2.52	-5.05
9178.0	-12015634	-1035411	-3289423	4335.4	-3183.2	-7746.6	11.62	-2.53	-5.08
9180.0	-12006939	-1041782	-3304927	4358.7	-3188.2	-7756.8	11.65	-2.53	-5.11
9182.0	-11998199	-1048163	-3320451	4382.0	-3193.3	-7767.0	11.67	-2.53	-5.12
9184.0	-11989411	-1054555	-3335995	4405.4	-3198.3	-7777.3	11.69	-2.53	-5.14
9186.0	-11980577	-1060957	-3351560	4428.8	-3203.4	-7787.6	11.72	-2.54	-5.17
9188.0	-11971696	-1067369	-3367145	4452.2	-3208.5	-7798.0	11.74	-2.55	-5.19
9190.0	-11962768	-1073791	-3382752	4475.8	-3213.6	-7808.3	11.78	-2.54	-5.21
9192.0	-11953793	-1080223	-3398379	4499.4	-3218.7	-7818.8	11.81	-2.55	-5.23
9194.0	-11944771	-1086665	-3414027	4523.0	-3223.8	-7829.3	11.85	-2.55	-5.27
9196.0	-11935701	-1093118	-3429696	4546.8	-3228.9	-7839.9	11.89	-2.55	-5.30
9198.0	-11926584	-1099581	-3445386	4570.6	-3234.0	-7850.5	11.93	-2.55	-5.32
9200.0	-11917418	-1106054	-3461098	4594.5	-3239.1	-7861.1	11.96	-2.56	-5.35
9202.0	-11908206	-1112537	-3476831	4618.4	-3244.2	-7871.9	11.98	-2.57	-5.38
9204.0	-11898945	-1119031	-3492586	4642.4	-3249.4	-7882.7	12.02	-2.58	-5.41
9206.0	-11889636	-1125535	-3508362	4666.5	-3254.5	-7893.5	12.06	-2.58	-5.42
9208.0	-11880279	-1132049	-3524160	4690.7	-3259.7	-7904.4	12.12	-2.58	-5.44
9210.0	-11870873	-1138574	-3539979	4715.0	-3264.9	-7915.3	12.17	-2.59	-5.47

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
9212.0	-11861419	-1145108	-3555821	4739.3	-3270.1	-7926.3	12.20	-2.60	-5.51
9214.0	-11851916	-1151654	-3571684	4763.8	-3275.2	-7937.3	12.24	-2.60	-5.55
9216.0	-11842364	-1158209	-3587570	4788.3	-3280.5	-7948.4	12.28	-2.60	-5.59
9218.0	-11832763	-1164776	-3603478	4812.9	-3285.7	-7959.7	12.34	-2.62	-5.62
9220.0	-11823112	-1171352	-3619409	4837.6	-3290.9	-7970.9	12.39	-2.63	-5.65
9222.0	-11813412	-1177939	-3635362	4862.5	-3296.2	-7982.3	12.44	-2.64	-5.68
9224.0	-11803662	-1184537	-3651338	4887.4	-3301.5	-7993.7	12.50	-2.64	-5.71
9226.0	-11793862	-1191145	-3667336	4912.4	-3306.7	-8005.1	12.55	-2.64	-5.74
9228.0	-11784012	-1197764	-3683358	4937.6	-3312.0	-8016.6	12.60	-2.66	-5.77
9230.0	-11774112	-1204393	-3699403	4962.8	-3317.4	-8028.2	12.65	-2.67	-5.80
9232.0	-11764161	-1211033	-3715471	4988.2	-3322.7	-8039.8	12.71	-2.68	-5.83
9234.0	-11754159	-1217684	-3731562	5013.7	-3328.1	-8051.5	12.76	-2.70	-5.87
9236.0	-11744106	-1224346	-3747677	5039.3	-3333.5	-8063.2	12.87	-2.70	-5.86
9238.0	-11734002	-1231018	-3763815	5065.2	-3338.9	-8074.9	13.06	-2.68	-5.82
9240.0	-11723845	-1237701	-3779977	5091.6	-3344.2	-8086.5	13.25	-2.66	-5.79
9242.0	-11713635	-1244395	-3796161	5118.1	-3349.5	-8098.1	13.35	-2.66	-5.80
9244.0	-11703372	-1251099	-3812369	5144.9	-3354.9	-8109.8	13.36	-2.69	-5.86
9246.0	-11693056	-1257815	-3828601	5171.6	-3360.3	-8121.6	13.36	-2.71	-5.92
9248.0	-11682686	-1264541	-3844856	5198.3	-3365.7	-8133.5	13.39	-2.72	-5.97
9250.0	-11672262	-1271277	-3861135	5225.1	-3371.2	-8145.5	13.41	-2.74	-6.03
9252.0	-11661785	-1278025	-3877438	5252.0	-3376.7	-8157.6	13.44	-2.76	-6.10
9254.0	-11651254	-1284784	-3893765	5278.9	-3382.2	-8169.8	13.47	-2.78	-6.16
9256.0	-11640670	-1291554	-3910117	5305.8	-3387.8	-8182.2	13.49	-2.80	-6.21
9258.0	-11630031	-1298335	-3926494	5332.8	-3393.4	-8194.7	13.49	-2.82	-6.27
9260.0	-11619338	-1305128	-3942896	5359.8	-3399.1	-8207.3	13.50	-2.84	-6.34
9262.0	-11608592	-1311932	-3959323	5386.8	-3404.8	-8220.0	13.51	-2.85	-6.40
S-IVB 2ND GUIDANCE CUTOFF									
9263.240	-11601901	-1316156	-3969521	5403.5	-3408.3	-8228.0	13.51	-2.87	-6.43
9264.0	-11597793	-1318746	-3975773	5410.0	-3408.6	-8227.3	5.80	0.95	4.82
9266.0	-11586962	-1325561	-3992219	5421.5	-3406.7	-8217.6	5.78	0.96	4.83
9268.0	-11576107	-1332373	-4008645	5433.1	-3404.8	-8207.9	5.75	0.97	4.85
9270.0	-11565229	-1339180	-4025051	5444.5	-3402.8	-8198.2	5.73	0.98	4.87
9272.0	-11554329	-1345984	-4041438	5456.0	-3400.8	-8188.5	5.71	0.99	4.89
TRANSLUNAR INJECTION (TLI)									
9273.240	-11547558	-1350201	-4051589	5463.1	-3399.6	-8182.5	5.70	0.99	4.89
9300.0	-11399361	-1440809	-4268778	5611.6	-3371.9	-8049.1	5.40	1.08	5.06
9350.0	-11112269	-1607987	-4664797	5867.3	-3314.0	-7789.6	4.82	1.23	5.30
9400.0	-10813132	-1772102	-5047581	6093.2	-3249.6	-7520.5	4.22	1.34	5.45
9450.0	-10503442	-1932865	-5416760	6289.5	-3180.3	-7246.2	3.63	1.43	5.51

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
9500.0	-10184674	-2090069	-5772175	6456.5	-3107.5	-6970.5	3.06	1.48	5.50
9550.0	-9858263	-2243577	-6113850	6595.5	-3032.6	-6697.1	2.51	1.51	5.43
9600.0	-9525564	-2393318	-6441974	6708.3	-2957.0	-6428.9	2.01	1.51	5.30
9650.0	-9187838	-2539279	-6756862	6797.0	-2881.6	-6168.1	1.55	1.50	5.13
9700.0	-8846232	-2681493	-7058934	6863.8	-2807.2	-5916.5	1.13	1.47	4.93
9750.0	-8501783	-2820031	-7348685	6911.1	-2734.6	-5675.4	0.77	1.43	4.71
9800.0	-8155407	-2954992	-7626662	6941.2	-2664.3	-5445.6	0.44	1.38	4.48
9850.0	-7807914	-3086500	-7893442	6956.2	-2596.5	-5227.6	0.16	1.33	4.24
9900.0	-7460006	-3214692	-8149621	6958.1	-2531.6	-5021.5	-0.08	1.27	4.00
9950.0	-7112289	-3339714	-8395794	6948.8	-2469.8	-4827.4	-0.29	1.21	3.77
10000.0	-6765283	-3461719	-8632552	6929.9	-2411.0	-4644.9	-0.46	1.15	3.54
10050.0	-6419430	-3580861	-8860469	6903.0	-2355.2	-4473.7	-0.61	1.08	3.31
10100.0	-6075100	-3697295	-9080099	6869.2	-2302.6	-4313.3	-0.74	1.02	3.10
10150.0	-5732609	-3811169	-9291972	6829.6	-2252.9	-4163.3	-0.84	0.96	2.90
10200.0	-5392215	-3922631	-9496591	6785.4	-2206.1	-4023.1	-0.92	0.91	2.71
10250.0	-5054129	-4031824	-9694439	6737.4	-2162.1	-3892.3	-0.99	0.85	2.53
10300.0	-4718526	-4138883	-9885964	6686.3	-2120.7	-3770.2	-1.05	0.80	2.36
10350.0	-4385545	-4243938	-10071593	6632.6	-2081.9	-3656.3	-1.09	0.75	2.20
10400.0	-4055298	-4347112	-10251721	6577.0	-2045.5	-3550.1	-1.13	0.71	2.05
10450.0	-3727871	-4448522	-10426721	6519.8	-2011.3	-3451.1	-1.16	0.66	1.91
10500.0	-3403331	-4548277	-10596940	6461.7	-1979.3	-3358.8	-1.17	0.62	1.78
10550.0	-3081721	-4646484	-10762704	6402.6	-1949.3	-3272.8	-1.19	0.58	1.66
10600.0	-2763075	-4743239	-10924316	6343.1	-1921.2	-3192.6	-1.19	0.54	1.55
10650.0	-2447413	-4838636	-11082057	6283.3	-1894.9	-3117.9	-1.20	0.51	1.44
10700.0	-2134743	-4932760	-11236191	6223.4	-1870.3	-3048.3	-1.20	0.48	1.34
10750.0	-1825067	-5025693	-11386963	6163.7	-1847.3	-2983.4	-1.19	0.45	1.25
10800.0	-1518375	-5117513	-11534604	6104.1	-1825.8	-2922.9	-1.19	0.42	1.17
10850.0	-1214655	-5208292	-11679326	6044.8	-1805.6	-2866.6	-1.18	0.39	1.09
10900.0	-913888	-5298098	-11821331	5985.9	-1786.8	-2814.2	-1.17	0.36	1.01
CSM SEPARATION									
10949.400	-619609	-5385933	-11959145	5928.3	-1769.5	-2765.9	-1.16	0.34	0.94

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6									
8334.200	-6534.713	-42.256	-616.400	732.3	-127.1	-7761.9	9.22	0.05	0.87
8340.0	-6530.312	-42.993	-661.404	785.7	-126.8	-7756.6	9.21	0.05	0.93
8350.0	-6521.994	-44.258	-738.922	877.8	-126.3	-7746.7	9.20	0.05	1.04
8360.0	-6512.757	-45.519	-816.335	969.7	-125.8	-7735.7	9.19	0.05	1.15
8370.0	-6502.602	-46.774	-893.633	1061.4	-125.3	-7723.6	9.17	0.05	1.26
8380.0	-6491.529	-48.025	-970.804	1153.0	-124.7	-7710.5	9.15	0.06	1.37
8390.0	-6479.541	-49.269	-1047.839	1244.5	-124.2	-7696.2	9.14	0.06	1.48
8400.0	-6466.640	-50.508	-1124.726	1335.8	-123.6	-7680.9	9.12	0.06	1.59
8410.0	-6452.827	-51.741	-1201.454	1426.8	-123.0	-7664.5	9.10	0.06	1.69
8420.0	-6438.104	-52.968	-1278.012	1517.7	-122.4	-7647.0	9.08	0.06	1.80
8430.0	-6422.473	-54.188	-1354.391	1608.4	-121.7	-7628.5	9.06	0.06	1.91
8440.0	-6405.937	-55.403	-1430.578	1698.8	-121.1	-7608.8	9.03	0.07	2.02
8450.0	-6388.498	-56.610	-1506.564	1789.0	-120.4	-7588.1	9.01	0.07	2.12
8460.0	-6370.158	-57.811	-1582.337	1878.9	-119.8	-7566.3	8.98	0.07	2.23
8470.0	-6350.920	-59.005	-1657.887	1968.6	-119.1	-7543.5	8.95	0.07	2.34
8480.0	-6330.786	-60.192	-1733.203	2058.0	-118.3	-7519.6	8.93	0.07	2.44
8490.0	-6309.760	-61.372	-1808.275	2147.1	-117.6	-7494.6	8.90	0.07	2.55
8500.0	-6287.845	-62.544	-1883.092	2235.9	-116.9	-7468.6	8.87	0.08	2.65
8510.0	-6265.043	-63.709	-1957.644	2324.4	-116.1	-7441.5	8.83	0.08	2.76
8520.0	-6241.357	-64.866	-2031.919	2412.6	-115.3	-7413.4	8.80	0.08	2.86
8530.0	-6216.792	-66.015	-2105.908	2500.4	-114.5	-7384.2	8.76	0.08	2.97
8540.0	-6191.351	-67.156	-2179.600	2587.9	-113.7	-7354.0	8.73	0.08	3.07
8550.0	-6165.036	-68.289	-2252.985	2675.0	-112.9	-7322.8	8.69	0.08	3.18
8560.0	-6137.853	-69.414	-2326.053	2761.7	-112.0	-7290.5	8.65	0.09	3.28
8570.0	-6109.804	-70.530	-2398.792	2848.0	-111.2	-7257.2	8.61	0.09	3.38
8580.0	-6080.894	-71.637	-2471.193	2933.9	-110.3	-7222.9	8.57	0.09	3.48
8590.0	-6051.126	-72.736	-2543.247	3019.5	-109.4	-7187.6	8.53	0.09	3.58
8600.0	-6020.506	-73.825	-2614.941	3104.5	-108.5	-7151.2	8.49	0.09	3.69
8610.0	-5989.037	-74.906	-2686.267	3189.2	-107.6	-7113.8	8.44	0.09	3.79
8620.0	-5956.723	-75.977	-2757.215	3273.4	-106.6	-7075.5	8.40	0.09	3.89
8630.0	-5923.570	-77.039	-2827.773	3357.1	-105.7	-7036.1	8.35	0.10	3.99
8640.0	-5889.582	-78.091	-2897.934	3440.4	-104.7	-6995.8	8.30	0.10	4.08
8650.0	-5854.764	-79.133	-2967.686	3523.2	-103.7	-6954.4	8.25	0.10	4.18
8660.0	-5819.120	-80.166	-3037.019	3605.5	-102.7	-6912.1	8.20	0.10	4.28
8670.0	-5782.656	-81.188	-3105.925	3687.2	-101.7	-6868.9	8.15	0.10	4.38
8680.0	-5745.377	-82.200	-3174.393	3768.5	-100.7	-6824.6	8.10	0.10	4.47
8690.0	-5707.288	-83.202	-3242.414	3849.2	-99.7	-6779.4	8.04	0.10	4.57
8700.0	-5668.394	-84.194	-3309.978	3929.4	-98.6	-6733.2	7.99	0.11	4.66
8710.0	-5628.702	-85.174	-3377.075	4009.0	-97.5	-6686.1	7.93	0.11	4.76
8720.0	-5588.216	-86.144	-3443.697	4088.1	-96.5	-6638.0	7.88	0.11	4.85

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
8730.0	-5546.942	-87.104	-3509.833	4166.6	-95.4	-6589.1	7.82	0.11	4.95
8740.0	-5504.886	-88.052	-3575.475	4244.5	-94.3	-6539.1	7.76	0.11	5.04
8750.0	-5462.055	-88.989	-3640.613	4321.8	-93.1	-6488.3	7.70	0.11	5.13
8760.0	-5418.453	-89.915	-3705.238	4398.5	-92.0	-6436.5	7.64	0.11	5.22
8770.0	-5374.088	-90.829	-3769.341	4474.5	-90.9	-6383.9	7.57	0.12	5.31
8780.0	-5328.965	-91.732	-3832.913	4550.0	-89.7	-6330.3	7.51	0.12	5.40
8790.0	-5283.091	-92.623	-3895.944	4624.8	-88.5	-6275.9	7.45	0.12	5.49
8800.0	-5236.472	-93.502	-3958.427	4698.9	-87.3	-6220.6	7.38	0.12	5.58
8810.0	-5189.115	-94.369	-4020.352	4772.4	-86.1	-6164.3	7.31	0.12	5.66
8820.0	-5141.026	-95.224	-4081.711	4845.2	-84.9	-6107.3	7.25	0.12	5.75
8830.0	-5092.213	-96.067	-4142.496	4917.3	-83.6	-6049.4	7.18	0.12	5.84
8840.0	-5042.682	-96.898	-4202.696	4988.8	-82.4	-5990.6	7.11	0.12	5.92
8850.0	-4992.440	-97.715	-4262.305	5059.5	-81.2	-5931.0	7.04	0.12	6.00
8860.0	-4941.494	-98.521	-4321.314	5129.6	-79.9	-5870.6	6.96	0.13	6.09
8870.0	-4889.851	-99.313	-4379.714	5198.9	-78.6	-5809.3	6.89	0.13	6.17
8880.0	-4837.518	-100.093	-4437.498	5267.5	-77.3	-5747.2	6.83	0.13	6.24
8890.0	-4784.503	-100.860	-4494.657	5335.3	-76.0	-5684.4	6.74	0.13	6.33
8900.0	-4730.814	-101.613	-4551.183	5402.4	-74.7	-5620.7	6.66	0.13	6.41
8910.0	-4676.457	-102.354	-4607.068	5468.8	-73.4	-5556.2	6.61	0.08	6.46
S-IVB RE-IGNITION (STDV OPEN)									
8912.400	-4663.313	-102.530	-4620.384	5484.6	-73.1	-5540.6	6.60	0.06	6.47
8914.0	-4654.528	-102.646	-4629.242	5497.1	-73.0	-5532.4	8.99	0.19	3.87
8916.0	-4643.513	-102.792	-4640.301	5517.3	-72.9	-5526.7	10.47	0.13	2.37
8918.0	-4632.457	-102.938	-4651.350	5538.4	-72.7	-5521.9	10.50	0.09	2.40
8920.0	-4621.361	-103.083	-4662.389	5559.3	-72.5	-5517.1	10.53	0.07	2.43
8922.0	-4610.220	-103.228	-4673.418	5580.4	-72.4	-5512.2	10.58	0.06	2.48
8924.0	-4599.038	-103.372	-4684.437	5601.6	-72.3	-5507.2	10.63	0.05	2.53
8926.0	-4587.814	-103.517	-4695.447	5623.0	-72.1	-5502.0	10.80	0.06	2.67
8928.0	-4576.547	-103.661	-4706.446	5644.7	-71.9	-5496.5	10.97	0.07	2.80
8930.0	-4565.235	-103.805	-4717.433	5666.8	-71.8	-5490.8	11.05	0.08	2.87
8932.0	-4553.879	-103.948	-4728.409	5688.9	-71.6	-5485.1	11.05	0.07	2.89
8934.0	-4542.480	-104.091	-4739.373	5711.0	-71.5	-5479.3	11.03	0.09	2.90
8936.0	-4531.036	-104.234	-4750.326	5733.0	-71.3	-5473.5	11.04	0.11	2.91
8938.0	-4519.547	-104.376	-4761.267	5755.1	-71.1	-5467.6	11.06	0.12	2.94
8940.0	-4508.015	-104.518	-4772.196	5777.3	-70.8	-5461.7	11.08	0.12	2.96
8942.0	-4496.438	-104.660	-4783.114	5799.4	-70.6	-5455.8	11.08	0.12	2.96
8944.0	-4484.817	-104.801	-4794.019	5821.6	-70.3	-5449.8	11.08	0.12	2.97
8946.0	-4473.152	-104.941	-4804.913	5843.8	-70.1	-5443.9	11.07	0.13	2.98
8948.0	-4461.442	-105.081	-4815.795	5865.9	-69.8	-5437.9	11.08	0.15	3.00
8950.0	-4449.688	-105.220	-4826.665	5888.1	-69.5	-5431.9	11.09	0.16	3.01
8952.0	-4437.890	-105.359	-4837.522	5910.3	-69.2	-5425.9	11.11	0.17	3.02

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
8954.0	-4426.047	-105.497	-4848.368	5932.5	-68.8	-5419.8	11.11	0.17	3.03
8956.0	-4414.160	-105.634	-4859.202	5954.7	-68.5	-5413.7	11.10	0.17	3.05
8958.0	-4402.228	-105.771	-4870.023	5976.9	-68.1	-5407.6	11.10	0.17	3.06
8960.0	-4390.252	-105.907	-4880.832	5999.2	-67.8	-5401.5	11.11	0.17	3.06
8962.0	-4378.231	-106.042	-4891.629	6021.4	-67.5	-5395.4	11.11	0.17	3.07
8964.0	-4366.166	-106.177	-4902.414	6043.6	-67.1	-5389.2	11.12	0.19	3.08
8966.0	-4354.057	-106.310	-4913.186	6065.9	-66.7	-5383.1	11.12	0.20	3.09
8968.0	-4341.903	-106.443	-4923.946	6088.1	-66.3	-5376.9	11.12	0.21	3.10
8970.0	-4329.704	-106.576	-4934.694	6110.4	-65.9	-5370.7	11.12	0.21	3.11
8972.0	-4317.461	-106.707	-4945.429	6132.6	-65.5	-5364.5	11.12	0.21	3.11
8974.0	-4305.174	-106.838	-4956.152	6154.9	-65.1	-5358.2	11.13	0.20	3.12
8976.0	-4292.842	-106.967	-4966.862	6177.2	-64.7	-5352.0	11.14	0.20	3.13
8978.0	-4280.465	-107.096	-4977.559	6199.4	-64.3	-5345.7	11.14	0.20	3.15
8980.0	-4268.044	-107.224	-4988.245	6221.7	-63.9	-5339.4	11.14	0.20	3.16
8982.0	-4255.578	-107.352	-4998.917	6244.0	-63.5	-5333.1	11.14	0.21	3.16
8984.0	-4243.068	-107.478	-5009.577	6266.3	-63.0	-5326.8	11.14	0.22	3.17
8986.0	-4230.513	-107.604	-5020.224	6288.6	-62.6	-5320.4	11.14	0.23	3.18
8988.0	-4217.914	-107.729	-5030.858	6310.9	-62.1	-5314.0	11.14	0.23	3.18
8990.0	-4205.270	-107.852	-5041.480	6333.2	-61.7	-5307.7	11.15	0.23	3.19
8992.0	-4192.581	-107.975	-5052.089	6355.5	-61.2	-5301.3	11.16	0.23	3.20
8994.0	-4179.848	-108.097	-5062.685	6377.8	-60.7	-5294.9	11.16	0.23	3.21
8996.0	-4167.070	-108.218	-5073.269	6400.1	-60.3	-5288.5	11.15	0.23	3.21
8998.0	-4154.247	-108.338	-5083.839	6422.4	-59.8	-5282.0	11.15	0.24	3.22
9000.0	-4141.380	-108.457	-5094.397	6444.7	-59.3	-5275.6	11.15	0.24	3.22
9002.0	-4128.468	-108.575	-5104.942	6467.0	-58.8	-5269.1	11.16	0.24	3.24
9004.0	-4115.512	-108.693	-5115.473	6489.4	-58.4	-5262.7	11.17	0.24	3.24
9006.0	-4102.511	-108.809	-5125.992	6511.7	-57.9	-5256.2	11.17	0.24	3.24
9008.0	-4089.465	-108.924	-5136.498	6534.1	-57.4	-5249.7	11.17	0.25	3.25
9010.0	-4076.374	-109.038	-5146.991	6556.4	-56.9	-5243.2	11.17	0.25	3.26
9012.0	-4063.239	-109.152	-5157.471	6578.8	-56.4	-5236.7	11.17	0.25	3.26
9014.0	-4050.059	-109.264	-5167.938	6601.1	-55.9	-5230.1	11.18	0.25	3.26
9016.0	-4036.835	-109.375	-5178.391	6623.5	-55.4	-5223.6	11.18	0.24	3.27
9018.0	-4023.565	-109.485	-5188.832	6645.9	-54.9	-5217.1	11.18	0.25	3.28
9020.0	-4010.251	-109.595	-5199.260	6668.2	-54.4	-5210.5	11.18	0.26	3.29
9022.0	-3996.892	-109.703	-5209.674	6690.6	-53.9	-5203.9	11.18	0.26	3.29
9024.0	-3983.489	-109.810	-5220.075	6713.0	-53.3	-5197.3	11.19	0.26	3.30
9026.0	-3970.040	-109.916	-5230.463	6735.4	-52.8	-5190.7	11.19	0.26	3.30
9028.0	-3956.547	-110.021	-5240.838	6757.8	-52.3	-5184.1	11.19	0.26	3.30
9030.0	-3943.009	-110.125	-5251.200	6780.1	-51.7	-5177.5	11.19	0.26	3.30
9032.0	-3929.427	-110.228	-5261.548	6802.5	-51.2	-5170.9	11.20	0.27	3.31
9034.0	-3915.799	-110.330	-5271.883	6825.0	-50.7	-5164.3	11.20	0.26	3.32
9036.0	-3902.127	-110.431	-5282.205	6847.4	-50.2	-5157.6	11.21	0.26	3.33
9038.0	-3888.410	-110.531	-5292.514	6869.8	-49.6	-5151.0	11.21	0.26	3.33

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
9040.0	-3874.648	-110.629	-5302.809	6892.2	-49.1	-5144.3	11.21	0.27	3.34
9042.0	-3860.841	-110.727	-5313.091	6914.6	-48.6	-5137.6	11.21	0.27	3.34
9044.0	-3846.989	-110.824	-5323.360	6937.0	-48.0	-5130.9	11.19	0.28	3.36
9046.0	-3833.093	-110.919	-5333.615	6959.4	-47.4	-5124.2	11.19	0.28	3.36
9048.0	-3819.151	-111.013	-5343.856	6982.0	-46.9	-5117.6	11.35	0.29	3.27
9050.0	-3805.165	-111.107	-5354.085	7004.9	-46.3	-5111.2	11.61	0.28	3.07
9052.0	-3791.131	-111.199	-5364.301	7028.4	-45.7	-5105.3	11.86	0.27	2.87
9054.0	-3777.051	-111.290	-5374.506	7052.3	-45.2	-5099.7	12.02	0.27	2.76
9056.0	-3762.922	-111.379	-5384.700	7076.4	-44.6	-5094.2	12.10	0.28	2.75
9058.0	-3748.745	-111.468	-5394.883	7100.7	-44.1	-5088.7	12.15	0.29	2.76
9060.0	-3734.519	-111.556	-5405.055	7125.0	-43.5	-5083.1	12.14	0.30	2.76
9062.0	-3720.245	-111.642	-5415.216	7149.2	-42.9	-5077.6	12.11	0.30	2.77
9064.0	-3705.922	-111.727	-5425.365	7173.5	-42.3	-5072.1	12.13	0.30	2.77
9066.0	-3691.551	-111.811	-5435.504	7197.7	-41.7	-5066.5	12.15	0.31	2.77
9068.0	-3677.131	-111.894	-5445.632	7222.1	-41.0	-5061.0	12.16	0.32	2.77
9070.0	-3662.663	-111.975	-5455.748	7246.4	-40.4	-5055.5	12.18	0.32	2.77
9072.0	-3648.146	-112.055	-5465.853	7270.8	-39.7	-5049.9	12.19	0.33	2.78
9074.0	-3633.580	-112.134	-5475.948	7295.2	-39.1	-5044.3	12.20	0.32	2.79
9076.0	-3618.965	-112.212	-5486.031	7319.6	-38.4	-5038.8	12.22	0.32	2.79
9078.0	-3604.301	-112.288	-5496.103	7344.0	-37.8	-5033.2	12.23	0.33	2.78
9080.0	-3589.589	-112.363	-5506.164	7368.5	-37.1	-5027.6	12.24	0.34	2.78
9082.0	-3574.827	-112.436	-5516.213	7393.1	-36.5	-5022.1	12.27	0.32	2.80
9084.0	-3560.017	-112.509	-5526.252	7417.6	-35.9	-5016.5	12.28	0.28	2.79
9086.0	-3545.157	-112.580	-5536.279	7442.1	-35.3	-5010.9	12.26	0.23	2.75
9088.0	-3530.248	-112.650	-5546.296	7466.7	-34.9	-5005.5	12.25	0.21	2.72
9090.0	-3515.290	-112.719	-5556.301	7491.2	-34.5	-5000.0	12.27	0.22	2.71
9092.0	-3500.283	-112.788	-5566.296	7515.8	-34.0	-4994.6	12.30	0.24	2.73
9094.0	-3485.227	-112.855	-5576.279	7540.4	-33.5	-4989.1	12.32	0.25	2.74
9096.0	-3470.122	-112.922	-5586.252	7565.0	-33.0	-4983.6	12.33	0.25	2.74
9098.0	-3454.967	-112.987	-5596.214	7589.7	-32.5	-4978.2	12.35	0.26	2.73
9100.0	-3439.763	-113.052	-5606.165	7614.5	-32.0	-4972.7	12.38	0.26	2.74
9102.0	-3424.509	-113.115	-5616.105	7639.2	-31.4	-4967.2	12.40	0.27	2.74
9104.0	-3409.206	-113.178	-5626.034	7664.1	-30.9	-4961.7	12.42	0.27	2.75
9106.0	-3393.853	-113.239	-5635.952	7688.9	-30.4	-4956.2	12.43	0.27	2.75
9108.0	-3378.450	-113.299	-5645.859	7713.8	-29.8	-4950.8	12.46	0.28	2.75
9110.0	-3362.998	-113.358	-5655.755	7738.7	-29.2	-4945.3	12.47	0.29	2.75
9112.0	-3347.495	-113.416	-5665.640	7763.7	-28.6	-4939.8	12.49	0.29	2.74
9114.0	-3331.943	-113.473	-5675.514	7788.7	-28.1	-4934.3	12.51	0.29	2.74
9116.0	-3316.340	-113.528	-5685.377	7813.8	-27.5	-4928.8	12.53	0.29	2.74
9118.0	-3300.688	-113.582	-5695.229	7838.8	-26.9	-4923.3	12.55	0.30	2.75
9120.0	-3284.985	-113.636	-5705.070	7864.0	-26.3	-4917.8	12.57	0.31	2.76
9122.0	-3269.232	-113.688	-5714.900	7889.1	-25.6	-4912.3	12.59	0.32	2.76
9124.0	-3253.428	-113.738	-5724.719	7914.4	-25.0	-4906.8	12.62	0.33	2.75

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
9126.0	-3237.575	-113.787	-5734.527	7939.6	-24.3	-4901.3	12.64	0.33	2.75
9128.0	-3221.670	-113.835	-5744.325	7964.9	-23.7	-4895.8	12.66	0.33	2.75
9130.0	-3205.715	-113.882	-5754.111	7990.3	-23.0	-4890.3	12.69	0.34	2.75
9132.0	-3189.709	-113.927	-5763.886	8015.7	-22.3	-4884.8	12.71	0.34	2.76
9134.0	-3173.652	-113.971	-5773.650	8041.1	-21.6	-4879.3	12.73	0.35	2.76
9136.0	-3157.544	-114.014	-5783.403	8066.6	-20.9	-4873.8	12.76	0.36	2.76
9138.0	-3141.385	-114.055	-5793.145	8092.2	-20.2	-4868.3	12.78	0.37	2.76
9140.0	-3125.176	-114.094	-5802.876	8117.8	-19.4	-4862.7	12.81	0.37	2.76
9142.0	-3108.914	-114.133	-5812.596	8143.4	-18.7	-4857.2	12.84	0.38	2.76
9144.0	-3092.602	-114.169	-5822.305	8169.1	-17.9	-4851.7	12.86	0.38	2.75
9146.0	-3076.238	-114.204	-5832.003	8194.9	-17.1	-4846.2	12.89	0.39	2.76
9148.0	-3059.822	-114.238	-5841.690	8220.7	-16.4	-4840.7	12.92	0.39	2.76
9150.0	-3043.355	-114.270	-5851.366	8246.6	-15.6	-4835.2	12.95	0.40	2.76
9152.0	-3026.836	-114.300	-5861.031	8272.5	-14.8	-4829.7	12.98	0.40	2.76
9154.0	-3010.265	-114.329	-5870.684	8298.5	-14.0	-4824.2	13.00	0.40	2.76
9156.0	-2993.641	-114.356	-5880.327	8324.6	-13.2	-4818.6	13.03	0.41	2.76
9158.0	-2976.966	-114.381	-5889.959	8350.7	-12.3	-4813.1	13.06	0.42	2.76
9160.0	-2960.239	-114.405	-5899.580	8376.8	-11.5	-4807.6	13.09	0.43	2.75
9162.0	-2943.459	-114.427	-5909.190	8403.1	-10.6	-4802.1	13.13	0.44	2.74
9164.0	-2926.626	-114.447	-5918.788	8429.4	-9.7	-4796.6	13.16	0.44	2.75
9166.0	-2909.741	-114.466	-5928.376	8455.7	-8.8	-4791.1	13.18	0.44	2.76
9168.0	-2892.804	-114.483	-5937.953	8482.1	-7.9	-4785.6	13.21	0.45	2.76
9170.0	-2875.813	-114.498	-5947.519	8508.6	-7.0	-4780.1	13.24	0.46	2.75
9172.0	-2858.769	-114.511	-5957.073	8535.1	-6.0	-4774.6	13.28	0.47	2.76
9174.0	-2841.673	-114.522	-5966.617	8561.7	-5.1	-4769.1	13.31	0.48	2.76
9176.0	-2824.522	-114.531	-5976.150	8588.4	-4.1	-4763.6	13.35	0.49	2.76
9178.0	-2807.319	-114.538	-5985.671	8615.1	-3.1	-4758.1	13.40	0.49	2.76
9180.0	-2790.062	-114.543	-5995.182	8642.0	-2.1	-4752.5	13.43	0.50	2.76
9182.0	-2772.751	-114.547	-6004.681	8668.9	-1.1	-4747.0	13.46	0.51	2.76
9184.0	-2755.386	-114.548	-6014.170	8695.8	-0.1	-4741.5	13.48	0.51	2.76
9186.0	-2737.968	-114.547	-6023.647	8722.8	0.9	-4736.0	13.52	0.52	2.76
9188.0	-2720.495	-114.544	-6033.114	8749.9	2.0	-4730.4	13.55	0.52	2.76
9190.0	-2702.968	-114.539	-6042.569	8777.0	3.0	-4724.9	13.59	0.53	2.77
9192.0	-2685.387	-114.532	-6052.013	8804.3	4.1	-4719.4	13.63	0.54	2.77
9194.0	-2667.751	-114.523	-6061.447	8831.6	5.2	-4713.8	13.68	0.55	2.77
9196.0	-2650.061	-114.512	-6070.869	8859.0	6.3	-4708.3	13.73	0.56	2.78
9198.0	-2632.315	-114.498	-6080.280	8886.5	7.4	-4702.7	13.77	0.57	2.78
9200.0	-2614.515	-114.482	-6089.680	8914.1	8.6	-4697.2	13.81	0.57	2.78
9202.0	-2596.659	-114.463	-6099.068	8941.8	9.7	-4691.6	13.85	0.58	2.77
9204.0	-2578.748	-114.443	-6108.446	8969.5	10.9	-4686.1	13.89	0.58	2.77
9206.0	-2560.781	-114.420	-6117.813	8997.3	12.1	-4680.5	13.94	0.59	2.79
9208.0	-2542.758	-114.394	-6127.168	9025.3	13.3	-4674.9	13.99	0.60	2.81
9210.0	-2524.680	-114.367	-6136.512	9053.3	14.5	-4669.3	14.05	0.60	2.82

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
9212.0	-2506.545	-114.337	-6145.845	9081.5	15.7	-4663.7	14.10	0.61	2.81
9214.0	-2488.354	-114.304	-6155.167	9109.7	16.9	-4658.1	14.15	0.63	2.80
9216.0	-2470.106	-114.269	-6164.478	9138.1	18.2	-4652.5	14.20	0.64	2.80
9218.0	-2451.801	-114.231	-6173.777	9166.5	19.5	-4646.9	14.27	0.64	2.80
9220.0	-2433.440	-114.191	-6183.065	9195.1	20.8	-4641.3	14.33	0.64	2.81
9222.0	-2415.021	-114.148	-6192.342	9223.9	22.1	-4635.6	14.39	0.65	2.82
9224.0	-2396.544	-114.103	-6201.608	9252.7	23.4	-4630.0	14.45	0.66	2.83
9226.0	-2378.010	-114.054	-6210.862	9281.7	24.7	-4624.3	14.51	0.67	2.84
9228.0	-2359.417	-114.004	-6220.105	9310.8	26.1	-4618.6	14.56	0.67	2.85
9230.0	-2340.767	-113.950	-6229.336	9340.0	27.4	-4612.9	14.63	0.67	2.86
9232.0	-2322.057	-113.894	-6238.557	9369.3	28.7	-4607.2	14.70	0.67	2.87
9234.0	-2303.289	-113.835	-6247.765	9398.7	30.1	-4601.5	14.75	0.68	2.86
9236.0	-2284.462	-113.774	-6256.962	9428.3	31.5	-4595.7	14.84	0.68	2.93
9238.0	-2265.576	-113.709	-6266.148	9458.2	32.8	-4589.6	14.98	0.70	3.09
9240.0	-2246.629	-113.642	-6275.321	9488.3	34.3	-4583.3	15.11	0.71	3.23
9242.0	-2227.623	-113.572	-6284.481	9518.6	35.7	-4576.8	15.20	0.72	3.28
9244.0	-2208.555	-113.499	-6293.628	9549.1	37.1	-4570.3	15.24	0.72	3.23
9246.0	-2189.426	-113.424	-6302.762	9579.6	38.6	-4563.9	15.28	0.72	3.19
9248.0	-2170.236	-113.345	-6311.884	9610.2	40.0	-4557.6	15.33	0.72	3.16
9250.0	-2150.985	-113.264	-6320.993	9640.9	41.5	-4551.3	15.38	0.73	3.13
9252.0	-2131.673	-113.179	-6330.089	9671.8	42.9	-4545.0	15.44	0.74	3.10
9254.0	-2112.298	-113.092	-6339.173	9702.7	44.4	-4538.9	15.50	0.74	3.06
9256.0	-2092.862	-113.002	-6348.245	9733.8	45.9	-4532.8	15.55	0.74	3.03
9258.0	-2073.363	-112.908	-6357.304	9764.9	47.4	-4526.8	15.59	0.75	2.99
9260.0	-2053.802	-112.812	-6366.352	9796.1	48.9	-4520.8	15.63	0.75	2.94
9262.0	-2034.179	-112.713	-6375.388	9827.4	50.4	-4515.0	15.67	0.76	2.90
S-IVB 2ND GUIDANCE CUTOFF									
9263.240	-2021.980	-112.650	-6380.984	9846.8	51.3	-4511.4	15.69	0.76	2.87
9264.0	-2014.496	-112.611	-6384.411	9852.3	51.6	-4506.5	2.69	0.14	8.47
9266.0	-1994.786	-112.507	-6393.407	9857.7	51.9	-4489.5	2.66	0.14	8.47
9268.0	-1975.064	-112.403	-6402.370	9862.9	52.2	-4472.6	2.63	0.14	8.48
9270.0	-1955.334	-112.298	-6411.298	9868.2	52.4	-4455.6	2.60	0.14	8.48
9272.0	-1935.592	-112.193	-6420.192	9873.4	52.8	-4438.7	2.56	0.14	8.49
TRANSLUNAR INJECTION (TLI)									
9273.240	-1923.345	-112.127	-6425.690	9876.5	53.0	-4428.2	2.55	0.14	8.49
9300.0	-1658.183	-110.660	-6541.149	9939.5	56.7	-4201.0	2.16	0.14	8.49
9350.0	-1158.805	-107.657	-6740.610	10029.7	63.3	-3778.2	1.45	0.13	8.40
9400.0	-655.796	-104.333	-6919.085	10085.1	69.6	-3362.3	0.78	0.12	8.22
9450.0	-150.822	-100.709	-7077.026	10108.8	75.3	-2957.5	0.17	0.11	7.96

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
9500.0	354.598	-96.812	-7215.082	10103.5	80.5	-2567.4	-0.38	0.10	7.64
9550.0	859.098	-92.665	-7334.057	10072.6	85.3	-2194.7	-0.85	0.09	7.27
9600.0	1361.489	-88.293	-7434.870	10019.7	89.5	-1841.2	-1.26	0.08	6.87
9650.0	1860.753	-83.721	-7518.512	9948.1	93.3	-1508.0	-1.60	0.07	6.46
9700.0	2356.038	-78.972	-7586.016	9861.0	96.6	-1195.6	-1.88	0.06	6.04
9750.0	2846.647	-74.066	-7638.422	9761.5	99.5	-904.1	-2.10	0.05	5.63
9800.0	3332.027	-69.024	-7676.760	9652.2	102.1	-632.8	-2.27	0.05	5.23
9850.0	3811.747	-63.863	-7702.032	9535.5	104.3	-381.2	-2.40	0.04	4.84
9900.0	4285.485	-58.601	-7715.196	9413.3	106.2	-148.4	-2.49	0.03	4.48
9950.0	4753.013	-53.253	-7717.163	9287.3	107.7	66.8	-2.55	0.03	4.14
10000.0	5214.180	-47.831	-7708.788	9159.1	109.1	265.5	-2.58	0.02	3.82
10050.0	5668.901	-42.347	-7690.872	9029.7	110.2	448.7	-2.60	0.02	3.52
10100.0	6117.144	-36.813	-7664.159	8900.1	111.1	617.6	-2.59	0.02	3.24
10150.0	6558.920	-31.237	-7629.337	8771.0	111.9	773.2	-2.57	0.01	2.99
10200.0	6994.272	-25.628	-7587.042	8643.3	112.5	916.7	-2.54	0.01	2.75
10250.0	7423.280	-19.993	-7537.859	8517.3	112.9	1048.9	-2.50	0.01	2.54
10300.0	7846.039	-14.338	-7482.326	8393.4	113.2	1170.8	-2.46	0.00	2.34
10350.0	8262.660	-8.670	-7420.938	8271.9	113.5	1283.2	-2.41	0.00	2.16
10400.0	8673.270	-2.993	-7354.148	8152.9	113.6	1387.0	-2.35	0.00	1.99
10450.0	9077.998	2.688	-7282.371	8036.7	113.6	1482.8	-2.30	-0.00	1.84
10500.0	9476.984	8.370	-7205.987	7923.3	113.6	1571.4	-2.24	-0.00	1.70
10550.0	9870.374	14.049	-7125.345	7812.8	113.5	1653.2	-2.18	-0.00	1.57
10600.0	10258.311	19.723	-7040.765	7705.2	113.4	1729.0	-2.12	-0.00	1.46
10650.0	10640.939	25.388	-6952.539	7600.4	113.2	1799.1	-2.07	-0.00	1.35
10700.0	11018.402	31.043	-6860.936	7498.6	113.0	1864.1	-2.01	-0.01	1.25
10750.0	11390.844	36.685	-6766.205	7399.5	112.7	1924.4	-1.95	-0.01	1.16
10800.0	11758.403	42.313	-6668.571	7303.3	112.4	1980.3	-1.90	-0.01	1.08
10850.0	12121.217	47.926	-6568.246	7209.7	112.1	2032.1	-1.84	-0.01	1.00
10900.0	12479.422	53.522	-6465.420	7118.9	111.8	2080.3	-1.79	-0.01	0.93
CSM SEPARATION									
10949.400	12828.927	59.034	-6361.548	7031.6	111.4	2124.5	-1.74	-0.01	0.86

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6										
8334.200	6563.856	70.6055	-29.4578	101.12	0.01	7388.0	100.53	0.00	7797.4	190881
8340.0	6563.861	71.0273	-29.5292	100.89	0.01	7388.0	100.31	0.01	7797.3	190909
8350.0	6563.869	71.7560	-29.6488	100.48	0.01	7387.9	99.93	0.01	7797.3	190955
8360.0	6563.877	72.4866	-29.7639	100.08	0.01	7387.8	99.54	0.01	7797.3	191000
8370.0	6563.886	73.2189	-29.8744	99.67	0.01	7387.8	99.16	0.01	7797.2	191045
8380.0	6563.895	73.9528	-29.9805	99.26	0.01	7387.7	98.77	0.01	7797.2	191088
8390.0	6563.905	74.6884	-30.0819	98.85	0.01	7387.7	98.38	0.01	7797.2	191131
8400.0	6563.916	75.4256	-30.1788	98.43	0.01	7387.6	97.99	0.01	7797.2	191174
8410.0	6563.927	76.1642	-30.2711	98.02	0.01	7387.6	97.59	0.01	7797.2	191215
8420.0	6563.940	76.9043	-30.3587	97.60	0.01	7387.6	97.20	0.01	7797.1	191256
8430.0	6563.953	77.6457	-30.4416	97.18	0.01	7387.5	96.80	0.01	7797.1	191296
8440.0	6563.966	78.3884	-30.5198	96.76	0.01	7387.5	96.40	0.01	7797.1	191335
8450.0	6563.981	79.1324	-30.5933	96.33	0.01	7387.4	96.00	0.01	7797.1	191374
8460.0	6563.996	79.8775	-30.6621	95.91	0.01	7387.4	95.60	0.01	7797.1	191412
8470.0	6564.012	80.6237	-30.7261	95.48	0.01	7387.4	95.20	0.01	7797.0	191449
8480.0	6564.029	81.3708	-30.7854	95.06	0.01	7387.3	94.79	0.01	7797.0	191485
8490.0	6564.046	82.1190	-30.8398	94.63	0.01	7387.3	94.39	0.01	7797.0	191520
8500.0	6564.064	82.8679	-30.8895	94.20	0.01	7387.3	93.98	0.01	7797.0	191555
8510.0	6564.083	83.6177	-30.9343	93.77	0.01	7387.2	93.57	0.01	7797.0	191588
8520.0	6564.103	84.3681	-30.9743	93.34	0.02	7387.2	93.16	0.01	7796.9	191621
8530.0	6564.123	85.1192	-31.0094	92.91	0.02	7387.2	92.75	0.02	7796.9	191653
8540.0	6564.144	85.8708	-31.0397	92.47	0.02	7387.1	92.34	0.02	7796.9	191684
8550.0	6564.166	86.6229	-31.0651	92.04	0.02	7387.1	91.93	0.02	7796.9	191715
8560.0	6564.189	87.3753	-31.0856	91.61	0.02	7387.1	91.52	0.02	7796.9	191744
8570.0	6564.212	88.1281	-31.1013	91.17	0.02	7387.1	91.11	0.02	7796.8	191773
8580.0	6564.236	88.8810	-31.1120	90.74	0.02	7387.0	90.70	0.02	7796.8	191800
8590.0	6564.261	89.6341	-31.1179	90.30	0.02	7387.0	90.29	0.02	7796.8	191827
8600.0	6564.287	90.3873	-31.1189	89.87	0.02	7387.0	89.88	0.02	7796.8	191853
8610.0	6564.313	91.1404	-31.1150	89.44	0.02	7387.0	89.47	0.02	7796.8	191878
8620.0	6564.340	91.8934	-31.1062	89.00	0.02	7386.9	89.05	0.02	7796.7	191902
8630.0	6564.368	92.6462	-31.0925	88.57	0.02	7386.9	88.64	0.02	7796.7	191925
8640.0	6564.396	93.3987	-31.0739	88.13	0.02	7386.9	88.23	0.02	7796.7	191947
8650.0	6564.425	94.1509	-31.0505	87.70	0.02	7386.9	87.82	0.02	7796.7	191969
8660.0	6564.455	94.9026	-31.0222	87.27	0.02	7386.9	87.41	0.02	7796.6	191989
8670.0	6564.486	95.6539	-30.9890	86.83	0.02	7386.8	87.00	0.02	7796.6	192009
8680.0	6564.517	96.4045	-30.9510	86.40	0.02	7386.8	86.59	0.02	7796.6	192028
8690.0	6564.549	97.1544	-30.9081	85.97	0.03	7386.8	86.18	0.02	7796.6	192046
8700.0	6564.582	97.9036	-30.8604	85.54	0.03	7386.8	85.78	0.02	7796.5	192063
8710.0	6564.615	98.6520	-30.8079	85.11	0.03	7386.8	85.37	0.02	7796.5	192079
8720.0	6564.650	99.3994	-30.7506	84.69	0.03	7386.8	84.97	0.03	7796.5	192094

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
8730.0	6564.684	100.1459	-30.6885	84.26	0.03	7386.8	84.56	0.03	7796.5	192109
8740.0	6564.720	100.8913	-30.6217	83.84	0.03	7386.8	84.16	0.03	7796.5	192122
8750.0	6564.756	101.6355	-30.5501	83.41	0.03	7386.8	83.76	0.03	7796.4	192135
8760.0	6564.793	102.3786	-30.4737	82.99	0.03	7386.7	83.36	0.03	7796.4	192147
8770.0	6564.830	103.1204	-30.3927	82.57	0.03	7386.7	82.96	0.03	7796.4	192158
8780.0	6564.868	103.8608	-30.3070	82.15	0.03	7386.7	82.57	0.03	7796.4	192168
8790.0	6564.907	104.5999	-30.2167	81.74	0.03	7386.7	82.17	0.03	7796.3	192177
8800.0	6564.947	105.3374	-30.1217	81.32	0.03	7386.7	81.78	0.03	7796.3	192186
8810.0	6564.987	106.0734	-30.0221	80.91	0.03	7386.7	81.39	0.03	7796.3	192194
8820.0	6565.027	106.8078	-29.9180	80.50	0.03	7386.7	81.00	0.03	7796.3	192201
8830.0	6565.069	107.5406	-29.8093	80.09	0.03	7386.8	80.61	0.03	7796.3	192207
8840.0	6565.111	108.2716	-29.6960	79.68	0.03	7386.8	80.23	0.03	7796.3	192213
8850.0	6565.154	109.0008	-29.5783	79.28	0.03	7386.8	79.85	0.03	7796.3	192218
8860.0	6565.198	109.7282	-29.4562	78.88	0.03	7386.9	79.47	0.03	7796.3	192222
8870.0	6565.242	110.4537	-29.3296	78.48	0.03	7387.0	79.09	0.03	7796.4	192226
8880.0	6565.287	111.1773	-29.1987	78.08	0.03	7387.0	78.72	0.03	7796.4	192229
8890.0	6565.332	111.8989	-29.0634	77.69	0.04	7387.0	78.34	0.03	7796.4	192231
8900.0	6565.378	112.6184	-28.9237	77.30	0.04	7387.1	77.97	0.03	7796.4	192233
8910.0	6565.425	113.3359	-28.7798	76.91	0.04	7387.1	77.61	0.03	7796.4	192234
S-IVB RE-IGNITION (STDV OPEN)										
8912.400	6565.435	113.5078	-28.7446	76.81	0.04	7387.2	77.52	0.03	7796.5	192234
8914.0	6565.443	113.6223	-28.7211	76.75	0.04	7390.2	77.46	0.04	7799.5	192234
8916.0	6565.453	113.7655	-28.6914	76.68	0.04	7400.4	77.39	0.04	7809.7	192235
8918.0	6565.463	113.9089	-28.6615	76.60	0.04	7411.9	77.31	0.04	7821.1	192235
8920.0	6565.476	114.0524	-28.6314	76.52	0.05	7423.3	77.24	0.04	7832.6	192238
8922.0	6565.487	114.1960	-28.6011	76.45	0.05	7434.9	77.17	0.05	7844.1	192240
8924.0	6565.500	114.3397	-28.5706	76.37	0.05	7446.5	77.09	0.05	7855.7	192244
8926.0	6565.514	114.4836	-28.5399	76.29	0.05	7458.1	77.02	0.05	7867.3	192247
8928.0	6565.528	114.6276	-28.5089	76.22	0.05	7469.9	76.95	0.05	7879.1	192252
8930.0	6565.541	114.7718	-28.4778	76.14	0.05	7481.7	76.87	0.04	7890.9	192255
8932.0	6565.552	114.9161	-28.4464	76.07	0.04	7493.6	76.80	0.04	7902.8	192256
8934.0	6565.563	115.0606	-28.4148	75.99	0.04	7505.5	76.73	0.04	7914.7	192257
8936.0	6565.573	115.2051	-28.3830	75.91	0.04	7517.4	76.66	0.03	7926.6	192257
8938.0	6565.582	115.3499	-28.3509	75.84	0.03	7529.4	76.58	0.03	7938.6	192256
8940.0	6565.591	115.4947	-28.3187	75.76	0.03	7541.4	76.51	0.03	7950.6	192255
8942.0	6565.599	115.6397	-28.2862	75.69	0.03	7553.5	76.44	0.03	7962.7	192253
8944.0	6565.607	115.7848	-28.2535	75.61	0.03	7565.6	76.37	0.03	7974.8	192251
8946.0	6565.614	115.9301	-28.2206	75.54	0.03	7577.7	76.29	0.03	7986.9	192248
8948.0	6565.622	116.0755	-28.1874	75.46	0.03	7589.9	76.22	0.03	7999.0	192245
8950.0	6565.629	116.2211	-28.1541	75.39	0.03	7602.1	76.15	0.03	8011.2	192242
8952.0	6565.637	116.3668	-28.1205	75.31	0.03	7614.3	76.08	0.03	8023.5	192240

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
8954.0	6565.645	116.5126	-28.0867	75.24	0.03	7626.6	76.01	0.03	8035.8	192237
8956.0	6565.654	116.6585	-28.0526	75.16	0.03	7638.9	75.93	0.03	8048.1	192235
8958.0	6565.663	116.8047	-28.0184	75.09	0.03	7651.3	75.86	0.03	8060.5	192233
8960.0	6565.672	116.9509	-27.9839	75.02	0.04	7663.7	75.79	0.04	8072.8	192232
8962.0	6565.683	117.0973	-27.9492	74.94	0.04	7676.1	75.72	0.04	8085.3	192232
8964.0	6565.694	117.2438	-27.9143	74.87	0.05	7688.6	75.65	0.04	8097.8	192233
8966.0	6565.707	117.3905	-27.8792	74.79	0.05	7701.1	75.58	0.05	8110.3	192235
8968.0	6565.721	117.5373	-27.8438	74.72	0.05	7713.7	75.51	0.05	8122.8	192238
8970.0	6565.737	117.6842	-27.8082	74.64	0.06	7726.3	75.43	0.06	8135.4	192243
8972.0	6565.754	117.8313	-27.7724	74.57	0.07	7738.9	75.36	0.06	8148.1	192249
8974.0	6565.773	117.9785	-27.7363	74.50	0.07	7751.6	75.29	0.07	8160.7	192257
8976.0	6565.794	118.1259	-27.7001	74.42	0.08	7764.3	75.22	0.08	8173.4	192266
8978.0	6565.817	118.2734	-27.6636	74.35	0.09	7777.1	75.15	0.08	8186.2	192278
8980.0	6565.842	118.4210	-27.6268	74.28	0.10	7789.8	75.08	0.09	8199.0	192292
8982.0	6565.870	118.5688	-27.5899	74.20	0.11	7802.7	75.01	0.10	8211.8	192308
8984.0	6565.900	118.7167	-27.5527	74.13	0.12	7815.5	74.94	0.11	8224.7	192327
8986.0	6565.932	118.8647	-27.5153	74.06	0.13	7828.4	74.87	0.12	8237.5	192348
8988.0	6565.968	119.0129	-27.4776	73.98	0.14	7841.3	74.80	0.13	8250.5	192372
8990.0	6566.007	119.1613	-27.4397	73.91	0.15	7854.3	74.73	0.14	8263.4	192399
8992.0	6566.049	119.3097	-27.4016	73.84	0.16	7867.3	74.65	0.15	8276.4	192430
8994.0	6566.094	119.4583	-27.3633	73.76	0.17	7880.4	74.58	0.16	8289.5	192463
8996.0	6566.143	119.6071	-27.3247	73.69	0.18	7893.5	74.51	0.18	8302.6	192501
8998.0	6566.196	119.7560	-27.2859	73.62	0.20	7906.6	74.44	0.19	8315.7	192541
9000.0	6566.252	119.9050	-27.2469	73.54	0.21	7919.7	74.37	0.20	8328.9	192586
9002.0	6566.313	120.0542	-27.2076	73.47	0.23	7932.9	74.30	0.22	8342.1	192635
9004.0	6566.378	120.2035	-27.1681	73.40	0.24	7946.2	74.23	0.23	8355.3	192688
9006.0	6566.447	120.3529	-27.1284	73.32	0.26	7959.5	74.16	0.25	8368.6	192745
9008.0	6566.521	120.5025	-27.0884	73.25	0.27	7972.8	74.09	0.26	8381.9	192807
9010.0	6566.600	120.6522	-27.0482	73.18	0.29	7986.2	74.02	0.28	8395.3	192873
9012.0	6566.684	120.8020	-27.0077	73.11	0.31	7999.6	73.95	0.29	8408.7	192945
9014.0	6566.772	120.9520	-26.9670	73.03	0.33	8013.0	73.88	0.31	8422.2	193021
9016.0	6566.866	121.1022	-26.9261	72.96	0.35	8026.5	73.81	0.33	8435.6	193103
9018.0	6566.966	121.2524	-26.8850	72.89	0.36	8040.0	73.74	0.35	8449.2	193190
9020.0	6567.071	121.4028	-26.8436	72.82	0.38	8053.6	73.67	0.37	8462.7	193283
9022.0	6567.183	121.5534	-26.8019	72.75	0.41	8067.2	73.60	0.39	8476.3	193381
9024.0	6567.300	121.7040	-26.7601	72.67	0.43	8080.8	73.53	0.41	8489.9	193486
9026.0	6567.423	121.8548	-26.7180	72.60	0.45	8094.5	73.46	0.43	8503.6	193597
9028.0	6567.553	122.0058	-26.6756	72.53	0.47	8108.2	73.39	0.45	8517.3	193714
9030.0	6567.690	122.1569	-26.6330	72.46	0.49	8121.9	73.32	0.47	8531.1	193838
9032.0	6567.833	122.3081	-26.5902	72.39	0.52	8135.7	73.25	0.49	8544.9	193968
9034.0	6567.984	122.4594	-26.5471	72.31	0.54	8149.6	73.19	0.52	8558.8	194106
9036.0	6568.141	122.6109	-26.5038	72.24	0.57	8163.5	73.12	0.54	8572.6	194251
9038.0	6568.306	122.7626	-26.4602	72.17	0.59	8177.4	73.05	0.56	8586.5	194403

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
9040.0	6568.479	122.9143	-26.4164	72.10	0.62	8191.3	72.98	0.59	8600.5	194562
9042.0	6568.660	123.0662	-26.3724	72.03	0.64	8205.3	72.91	0.61	8614.5	194730
9044.0	6568.848	123.2183	-26.3281	71.96	0.67	8219.3	72.84	0.64	8628.5	194905
9046.0	6569.045	123.3704	-26.2836	71.88	0.70	8233.3	72.77	0.67	8642.5	195088
9048.0	6569.250	123.5227	-26.2388	71.81	0.73	8247.5	72.70	0.69	8656.8	195280
9050.0	6569.463	123.6752	-26.1938	71.74	0.76	8262.3	72.63	0.72	8671.6	195480
9052.0	6569.686	123.8278	-26.1485	71.67	0.79	8277.8	72.56	0.75	8687.0	195690
9054.0	6569.918	123.9805	-26.1030	71.60	0.82	8293.8	72.49	0.78	8703.1	195908
9056.0	6570.159	124.1334	-26.0572	71.53	0.85	8310.2	72.43	0.81	8719.4	196135
9058.0	6570.409	124.2865	-26.0112	71.46	0.88	8326.6	72.36	0.84	8735.9	196372
9060.0	6570.670	124.4398	-25.9648	71.39	0.91	8343.2	72.29	0.87	8752.4	196619
9062.0	6570.940	124.5933	-25.9183	71.32	0.94	8359.7	72.22	0.90	8769.0	196875
9064.0	6571.220	124.7469	-25.8715	71.25	0.98	8376.3	72.15	0.93	8785.6	197142
9066.0	6571.511	124.9007	-25.8244	71.18	1.01	8392.9	72.08	0.96	8802.2	197419
9068.0	6571.812	125.0546	-25.7770	71.11	1.05	8409.6	72.02	1.00	8818.9	197707
9070.0	6572.125	125.2087	-25.7294	71.04	1.08	8426.4	71.95	1.03	8835.7	198005
9072.0	6572.448	125.3630	-25.6816	70.97	1.12	8443.2	71.88	1.07	8852.5	198315
9074.0	6572.783	125.5175	-25.6335	70.90	1.15	8460.0	71.81	1.10	8869.4	198635
9076.0	6573.130	125.6721	-25.5851	70.83	1.19	8477.0	71.74	1.14	8886.4	198968
9078.0	6573.488	125.8270	-25.5364	70.76	1.23	8493.9	71.68	1.17	8903.3	199312
9080.0	6573.858	125.9819	-25.4875	70.69	1.27	8511.0	71.61	1.21	8920.4	199668
9082.0	6574.241	126.1371	-25.4383	70.62	1.31	8528.1	71.54	1.25	8937.5	200036
9084.0	6574.636	126.2924	-25.3889	70.55	1.35	8545.3	71.47	1.28	8954.7	200417
9086.0	6575.044	126.4479	-25.3392	70.48	1.39	8562.5	71.40	1.32	8972.0	200810
9088.0	6575.465	126.6036	-25.2892	70.41	1.43	8579.8	71.34	1.36	8989.3	201217
9090.0	6575.899	126.7594	-25.2389	70.34	1.47	8597.1	71.27	1.40	9006.6	201637
9092.0	6576.348	126.9154	-25.1884	70.27	1.52	8614.5	71.20	1.45	9024.1	202071
9094.0	6576.811	127.0716	-25.1376	70.20	1.56	8632.0	71.13	1.49	9041.6	202519
9096.0	6577.287	127.2279	-25.0865	70.13	1.60	8649.5	71.06	1.53	9059.1	202981
9098.0	6577.779	127.3844	-25.0352	70.06	1.65	8667.2	70.99	1.57	9076.7	203458
9100.0	6578.285	127.5411	-24.9836	69.99	1.69	8684.8	70.93	1.62	9094.4	203949
9102.0	6578.806	127.6979	-24.9317	69.92	1.74	8702.6	70.86	1.66	9112.2	204455
9104.0	6579.343	127.8550	-24.8795	69.85	1.79	8720.4	70.79	1.71	9130.0	204977
9106.0	6579.895	128.0121	-24.8271	69.78	1.84	8738.3	70.72	1.75	9147.9	205514
9108.0	6580.462	128.1695	-24.7744	69.71	1.88	8756.2	70.65	1.80	9165.9	206067
9110.0	6581.046	128.3270	-24.7214	69.64	1.93	8774.2	70.59	1.85	9183.9	206635
9112.0	6581.646	128.4847	-24.6681	69.57	1.98	8792.3	70.52	1.89	9202.0	207220
9114.0	6582.262	128.6425	-24.6146	69.50	2.03	8810.4	70.45	1.94	9220.2	207821
9116.0	6582.895	128.8005	-24.5608	69.43	2.08	8828.6	70.39	1.99	9238.4	208439
9118.0	6583.546	128.9587	-24.5067	69.37	2.13	8846.9	70.32	2.04	9256.7	209074
9120.0	6584.213	129.1171	-24.4523	69.30	2.19	8865.3	70.25	2.09	9275.1	209726
9122.0	6584.898	129.2756	-24.3977	69.23	2.24	8883.7	70.18	2.14	9293.5	210396
9124.0	6585.601	129.4343	-24.3428	69.16	2.29	8902.2	70.12	2.19	9312.1	211083

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
9126.0	6586.322	129.5931	-24.2875	69.09	2.35	8920.7	70.05	2.24	9330.6	211789
9128.0	6587.062	129.7521	-24.2321	69.02	2.40	8939.4	69.99	2.29	9349.3	212513
9130.0	6587.820	129.9113	-24.1763	68.96	2.45	8958.1	69.92	2.35	9368.0	213255
9132.0	6588.596	130.0707	-24.1203	68.89	2.51	8976.8	69.85	2.40	9386.9	214016
9134.0	6589.392	130.2302	-24.0639	68.82	2.57	8995.7	69.79	2.45	9405.7	214796
9136.0	6590.207	130.3898	-24.0073	68.75	2.62	9014.6	69.72	2.51	9424.7	215596
9138.0	6591.042	130.5497	-23.9505	68.69	2.68	9033.6	69.66	2.56	9443.7	216415
9140.0	6591.897	130.7097	-23.8933	68.62	2.74	9052.7	69.59	2.62	9462.8	217254
9142.0	6592.772	130.8699	-23.8359	68.55	2.80	9071.8	69.53	2.68	9482.0	218113
9144.0	6593.668	131.0302	-23.7781	68.49	2.86	9091.1	69.46	2.73	9501.3	218993
9146.0	6594.584	131.1907	-23.7201	68.42	2.92	9110.4	69.40	2.79	9520.6	219893
9148.0	6595.521	131.3514	-23.6618	68.35	2.98	9129.8	69.33	2.85	9540.1	220814
9150.0	6596.480	131.5122	-23.6032	68.29	3.04	9149.2	69.27	2.91	9559.6	221756
9152.0	6597.460	131.6732	-23.5444	68.22	3.10	9168.8	69.20	2.96	9579.2	222720
9154.0	6598.462	131.8344	-23.4852	68.16	3.16	9188.4	69.14	3.02	9598.9	223706
9156.0	6599.486	131.9957	-23.4258	68.09	3.22	9208.2	69.07	3.08	9618.6	224714
9158.0	6600.532	132.1572	-23.3661	68.02	3.29	9228.0	69.01	3.15	9638.5	225744
9160.0	6601.602	132.3189	-23.3061	67.96	3.35	9247.8	68.94	3.21	9658.4	226797
9162.0	6602.694	132.4807	-23.2458	67.89	3.41	9267.8	68.88	3.27	9678.4	227873
9164.0	6603.809	132.6426	-23.1853	67.83	3.48	9287.9	68.82	3.33	9698.5	228972
9166.0	6604.948	132.8048	-23.1244	67.76	3.54	9308.0	68.75	3.39	9718.7	230094
9168.0	6606.111	132.9671	-23.0633	67.70	3.61	9328.3	68.69	3.46	9739.0	231240
9170.0	6607.298	133.1296	-23.0019	67.63	3.68	9348.6	68.63	3.52	9759.4	232411
9172.0	6608.509	133.2922	-22.9401	67.57	3.74	9369.0	68.56	3.59	9779.8	233606
9174.0	6609.746	133.4550	-22.8781	67.51	3.81	9389.5	68.50	3.65	9800.3	234825
9176.0	6611.007	133.6180	-22.8159	67.44	3.88	9410.0	68.44	3.72	9821.0	236070
9178.0	6612.293	133.7811	-22.7533	67.38	3.95	9430.7	68.38	3.78	9841.7	237339
9180.0	6613.605	133.9444	-22.6904	67.31	4.02	9451.5	68.31	3.85	9862.6	238634
9182.0	6614.943	134.1078	-22.6273	67.25	4.09	9472.4	68.25	3.92	9883.5	239955
9184.0	6616.307	134.2714	-22.5638	67.19	4.16	9493.3	68.19	3.99	9904.5	241303
9186.0	6617.697	134.4352	-22.5001	67.13	4.23	9514.3	68.13	4.06	9925.6	242676
9188.0	6619.115	134.5991	-22.4361	67.06	4.30	9535.5	68.07	4.12	9946.7	244076
9190.0	6620.559	134.7632	-22.3718	67.00	4.37	9556.7	68.01	4.19	9968.0	245504
9192.0	6622.031	134.9275	-22.3072	66.94	4.45	9578.0	67.94	4.26	9989.4	246958
9194.0	6623.530	135.0919	-22.2424	66.88	4.52	9599.4	67.88	4.33	10010.8	248441
9196.0	6625.057	135.2565	-22.1772	66.81	4.59	9620.9	67.82	4.41	10032.4	249951
9198.0	6626.613	135.4212	-22.1117	66.75	4.67	9642.6	67.76	4.48	10054.1	251489
9200.0	6628.197	135.5861	-22.0460	66.69	4.74	9664.3	67.70	4.55	10075.9	253056
9202.0	6629.809	135.7512	-21.9800	66.63	4.82	9686.1	67.64	4.62	10097.8	254652
9204.0	6631.452	135.9164	-21.9136	66.57	4.89	9708.1	67.58	4.70	10119.8	256277
9206.0	6633.123	136.0818	-21.8470	66.51	4.97	9730.1	67.52	4.77	10142.0	257931
9208.0	6634.824	136.2473	-21.7801	66.45	5.05	9752.3	67.46	4.84	10164.2	259615
9210.0	6636.556	136.4130	-21.7129	66.38	5.13	9774.5	67.40	4.92	10186.5	261329

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
9212.0	6638.317	136.5789	-21.6454	66.32	5.20	9796.9	67.34	4.99	10209.0	263073
9214.0	6640.109	136.7449	-21.5777	66.26	5.28	9819.5	67.28	5.07	10231.6	264848
9216.0	6641.932	136.9111	-21.5096	66.20	5.36	9842.1	67.22	5.14	10254.3	266653
9218.0	6643.787	137.0775	-21.4412	66.14	5.44	9864.9	67.17	5.22	10277.1	268490
9220.0	6645.673	137.2440	-21.3726	66.08	5.52	9887.8	67.11	5.30	10300.1	270359
9222.0	6647.590	137.4106	-21.3036	66.02	5.60	9910.8	67.05	5.37	10323.2	272259
9224.0	6649.540	137.5775	-21.2344	65.97	5.68	9934.0	66.99	5.45	10346.5	274191
9226.0	6651.522	137.7445	-21.1649	65.91	5.76	9957.3	66.93	5.53	10369.9	276156
9228.0	6653.537	137.9116	-21.0950	65.85	5.84	9980.8	66.87	5.61	10393.4	278153
9230.0	6655.585	138.0790	-21.0249	65.79	5.92	10004.3	66.82	5.69	10417.0	280183
9232.0	6657.666	138.2464	-20.9545	65.73	6.00	10028.0	66.76	5.77	10440.8	282246
9234.0	6659.780	138.4141	-20.8838	65.67	6.09	10051.9	66.70	5.85	10464.7	284343
9236.0	6661.929	138.5819	-20.8128	65.61	6.17	10075.8	66.64	5.92	10488.8	286474
9238.0	6664.111	138.7499	-20.7415	65.56	6.25	10100.0	66.59	6.00	10513.0	288638
9240.0	6666.327	138.9180	-20.6699	65.50	6.33	10124.2	66.53	6.08	10537.3	290836
9242.0	6668.576	139.0863	-20.5981	65.44	6.41	10148.6	66.47	6.16	10561.8	293068
9244.0	6670.858	139.2548	-20.5259	65.38	6.49	10173.2	66.42	6.24	10586.5	295333
9246.0	6673.175	139.4234	-20.4534	65.33	6.57	10197.9	66.36	6.31	10611.3	297632
9248.0	6675.526	139.5922	-20.3806	65.27	6.65	10222.7	66.30	6.39	10636.2	299965
9250.0	6677.912	139.7612	-20.3076	65.21	6.74	10247.7	66.25	6.47	10661.3	302333
9252.0	6680.334	139.9303	-20.2342	65.16	6.82	10272.9	66.19	6.55	10686.5	304737
9254.0	6682.792	140.0996	-20.1605	65.10	6.90	10298.2	66.14	6.64	10711.9	307177
9256.0	6685.286	140.2691	-20.0866	65.04	6.99	10323.7	66.08	6.72	10737.5	309653
9258.0	6687.817	140.4387	-20.0123	64.99	7.08	10349.3	66.02	6.80	10763.2	312166
9260.0	6690.386	140.6085	-19.9377	64.93	7.16	10375.0	65.97	6.89	10789.1	314717
9262.0	6692.993	140.7785	-19.8629	64.87	7.25	10400.9	65.91	6.97	10815.1	317306
S-IVB 2ND GUIDANCE CUTOFF										
9263.240	6694.629	140.8840	-19.8163	64.84	7.31	10417.0	65.88	7.03	10831.2	318931
9264.0	6695.638	140.9486	-19.7877	64.82	7.34	10419.9	65.86	7.06	10834.2	319934
9266.0	6698.319	141.1186	-19.7124	64.75	7.44	10417.7	65.80	7.15	10832.0	322597
9268.0	6701.034	141.2882	-19.6370	64.69	7.53	10415.4	65.74	7.24	10829.8	325293
9270.0	6703.781	141.4575	-19.5614	64.63	7.63	10413.1	65.68	7.33	10827.6	328023
9272.0	6706.562	141.6265	-19.4858	64.56	7.72	10410.8	65.62	7.42	10825.4	330786
TRANSLUNAR INJECTION (TLI)										
9273.240	6708.303	141.7312	-19.4388	64.52	7.78	10409.4	65.58	7.48	10823.9	332515
9300.0	6748.958	143.9595	-18.4160	63.71	9.03	10375.4	64.82	8.68	10791.0	372936
9350.0	6840.339	147.9683	-16.4689	62.35	11.33	10299.8	63.56	10.88	10717.9	463900
9400.0	6950.877	151.7725	-14.4991	61.17	13.56	10210.0	62.48	13.02	10631.0	574058
9450.0	7079.350	155.3727	-12.5321	60.18	15.73	10108.4	61.59	15.08	10532.9	702195

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
9500.0	7224.439	158.7732	-10.5896	59.35	17.82	9996.5	60.87	17.06	10424.9	846999
9550.0	7384.784	161.9811	-8.6893	58.67	19.83	9876.7	60.29	18.96	10309.3	1007108
9600.0	7559.017	165.0050	-6.8449	58.12	21.76	9750.6	59.86	20.78	10187.8	1181156
9650.0	7745.801	167.8548	-5.0665	57.68	23.61	9620.1	59.54	22.51	10062.1	1367803
9700.0	7943.852	170.5406	-3.3609	57.35	25.38	9486.7	59.32	24.16	9933.7	1565760
9750.0	8151.955	173.0727	-1.7324	57.11	27.06	9351.6	59.20	25.72	9803.8	1773809
9800.0	8368.980	175.4610	-0.1829	56.94	28.68	9215.9	59.16	27.21	9673.5	1990814
9850.0	8593.881	177.7152	1.2873	56.84	30.22	9080.7	59.18	28.61	9543.7	2215726
9900.0	8825.705	179.8445	2.6792	56.79	31.69	8946.5	59.26	29.95	9415.0	2447586
9950.0	9063.585	-178.1426	3.9949	56.79	33.10	8814.2	59.39	31.21	9288.2	2685523
10000.0	9306.738	-176.2380	5.2370	56.82	34.44	8684.0	59.56	32.41	9163.6	2928751
10050.0	9554.462	-174.4343	6.4087	56.89	35.72	8556.4	59.77	33.54	9041.5	3176564
10100.0	9806.128	-172.7245	7.5134	56.99	36.95	8431.6	60.00	34.62	8922.2	3428329
10150.0	10061.172	-171.1025	8.5548	57.10	38.13	8309.7	60.26	35.64	8805.8	3683482
10200.0	10319.094	-169.5622	9.5364	57.23	39.26	8191.1	60.53	36.61	8692.5	3941518
10250.0	10579.452	-168.0983	10.4617	57.38	40.35	8075.7	60.82	37.54	8582.4	4201994
10300.0	10841.851	-166.7058	11.3342	57.54	41.40	7963.5	61.13	38.41	8475.4	4464515
10350.0	11105.942	-165.3802	12.1574	57.70	42.40	7854.6	61.44	39.25	8371.6	4728729
10400.0	11371.416	-164.1172	12.9342	57.87	43.37	7748.8	61.76	40.05	8270.8	4994327
10450.0	11637.997	-162.9131	13.6678	58.04	44.31	7646.1	62.09	40.80	8173.1	5261031
10500.0	11905.442	-161.7641	14.3609	58.22	45.21	7546.7	62.42	41.53	8078.4	5528597
10550.0	12173.538	-160.6670	15.0163	58.39	46.09	7450.2	62.75	42.22	7986.6	5796814
10600.0	12442.094	-159.6188	15.6364	58.56	46.93	7356.6	63.08	42.89	7897.6	6065489
10650.0	12710.941	-158.6166	16.2235	58.74	47.76	7265.8	63.41	43.52	7811.3	6334452
10700.0	12979.931	-157.6578	16.7798	58.90	48.55	7177.8	63.74	44.13	7727.6	6603555
10750.0	13248.932	-156.7400	17.3073	59.07	49.33	7092.5	64.08	44.71	7646.5	6872667
10800.0	13517.828	-155.8610	17.8079	59.23	50.08	7009.7	64.40	45.27	7567.8	7141671
10850.0	13786.517	-155.0187	18.2832	59.39	50.82	6929.5	64.73	45.80	7491.5	7410465
10900.0	14054.910	-154.2111	18.7349	59.54	51.53	6851.6	65.05	46.32	7417.4	7678959
CSM SEPARATION										
10949.400	14319.712	-153.4456	19.1594	59.69	52.22	6776.8	65.37	46.81	7346.4	7943860

APPENDIX C

TIME HISTORY OF TRAJECTORY PARAMETERS - ENGLISH UNITS

The postflight trajectory, from guidance reference release to CSM separation, is tabulated in English Units in Table C-I through C-VII.

Table C-I gives the earth-fixed launch site position, velocity, and acceleration components for the ascent phase of flight.

Table C-II gives the launch vehicle navigation position, velocity, and acceleration components for the ascent phase of flight.

Table C-III gives the geographic polar coordinates for the ascent phase of flight.

Table C-IV gives the geographic polar coordinates for the parking orbit phase of flight.

Table C-V gives the earth-fixed launch site position, velocity, and acceleration components for the second burn phase of flight.

Table C-VI gives the launch vehicle navigation position, velocity, and acceleration components for the second burn phase of flight.

Table C-VII gives the geographic polar coordinates for the second burn phase of flight.

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
ALL HOLDDOWN ARMS RELEASED									
0.200	366	0	0	0.2	0.0	-0.0	1.77	0.05	-0.03
LIFTOFF - START OF TIME BASE 1									
0.600	367	0	0	1.1	0.0	-0.0	2.39	-0.01	-0.04
1.0	367	0	0	2.3	0.0	-0.0	3.75	-0.06	0.01
2.0	373	0	0	8.9	-0.1	0.1	7.51	-0.07	0.12
3.0	385	0	0	16.5	-0.2	0.2	7.68	-0.20	0.15
4.0	406	0	0	24.3	-0.4	0.4	7.79	-0.19	0.18
5.0	434	-1	1	32.1	-0.1	0.6	7.95	1.18	0.20
6.0	470	0	2	40.1	1.3	0.8	8.05	1.51	0.23
7.0	514	2	2	48.2	2.8	1.0	8.19	1.51	0.25
8.0	567	5	4	56.5	4.2	1.3	8.33	1.29	0.27
9.0	627	10	5	64.9	4.7	1.6	8.47	0.26	0.29
10.0	696	15	7	73.4	5.0	1.9	8.57	0.28	0.37
11.0	774	20	9	82.1	5.3	2.3	8.72	0.33	0.41
12.0	860	25	11	90.8	5.7	2.7	8.85	0.38	0.35
13.0	956	31	14	99.7	6.1	3.0	8.97	0.43	0.28
14.0	1060	38	17	108.8	6.5	3.4	9.22	0.45	0.49

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
15.0	1174	44	21	118.2	6.9	3.9	9.43	0.36	0.57
16.0	1296	51	25	127.7	7.1	4.5	9.68	0.08	0.70
17.0	1429	58	30	137.5	7.1	5.3	9.88	-0.12	0.86
18.0	1571	66	36	147.5	7.0	6.2	10.08	-0.15	1.00
19.0	1724	72	43	157.7	6.8	7.3	10.30	-0.17	1.16
20.0	1887	79	51	168.1	6.7	8.6	10.51	-0.15	1.35
21.0	2060	86	60	178.7	6.5	10.0	10.73	-0.14	1.57
22.0	2244	92	71	189.5	6.3	11.7	10.95	-0.12	1.81
23.0	2439	98	83	200.6	6.2	13.6	11.17	-0.13	2.03
24.0	2646	104	98	211.9	6.0	15.8	11.40	-0.16	2.26
25.0	2863	110	115	223.4	5.9	18.1	11.63	-0.19	2.51
26.0	3092	116	134	235.1	5.7	20.8	11.85	-0.21	2.78
27.0	3333	122	157	247.1	5.5	23.7	12.08	-0.22	3.06
28.0	3587	127	182	259.3	5.2	26.9	12.31	-0.23	3.35
29.0	3852	132	211	271.7	5.0	30.4	12.54	-0.23	3.64
30.0	4130	137	243	284.4	4.8	34.2	12.78	-0.23	3.94
31.0	4421	142	279	297.3	4.5	38.3	13.01	-0.23	4.25
32.0	4725	146	319	310.4	4.3	42.7	13.27	-0.22	4.58
33.0	5042	151	364	323.8	4.1	47.4	13.51	-0.19	4.93
34.0	5372	155	414	337.4	4.0	52.6	13.75	-0.15	5.29
35.0	5717	158	470	351.3	3.8	58.0	13.99	-0.11	5.66
36.0	6075	162	531	365.4	3.7	63.9	14.22	-0.09	6.04
37.0	6448	166	598	379.7	3.6	70.1	14.46	-0.07	6.42
38.0	6835	170	671	394.3	3.6	76.7	14.71	-0.07	6.82
39.0	7236	173	751	409.2	3.5	83.7	14.95	-0.07	7.21
40.0	7653	176	839	424.2	3.4	91.1	15.18	-0.08	7.60
41.0	8085	180	933	439.5	3.4	98.9	15.43	-0.06	8.01
42.0	8532	183	1036	455.1	3.3	107.2	15.69	-0.05	8.45
43.0	8995	186	1148	470.9	3.3	115.9	15.95	-0.03	8.93
44.0	9474	190	1268	487.0	3.3	125.0	16.21	-0.00	9.42
45.0	9969	193	1398	503.3	3.3	134.7	16.48	0.02	9.97
46.0	10481	196	1538	520.0	3.3	145.0	16.73	0.04	10.53
47.0	11009	200	1688	536.8	3.3	155.8	16.98	0.06	11.11
48.0	11554	203	1850	553.9	3.4	167.2	17.20	0.09	11.70
49.0	12117	206	2023	571.2	3.5	179.2	17.40	0.12	12.30
50.0	12697	210	2208	588.7	3.6	191.8	17.59	0.13	12.92
51.0	13294	214	2407	606.4	3.8	205.1	17.78	0.13	13.55
52.0	13910	218	2619	624.3	3.9	218.9	18.00	0.12	14.18
53.0	14543	222	2845	642.4	4.0	233.4	18.23	0.11	14.82
54.0	15194	226	3086	660.7	4.1	248.5	18.46	0.10	15.42
55.0	15864	230	3342	679.3	4.2	264.2	18.71	0.08	16.02
56.0	16553	234	3614	698.1	4.3	280.6	18.95	0.06	16.63
57.0	17261	238	3903	717.2	4.3	297.5	19.18	0.05	17.26

TABLE C-1. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
58.0	17988	243	4210	736.5	4.4	315.1	19.41	0.04	17.92
59.0	18734	247	4534	756.0	4.4	333.4	19.62	0.03	18.59
60.0	19500	251	4877	775.7	4.4	352.3	19.83	0.04	19.28
61.0	20285	256	5239	795.6	4.5	371.9	20.01	0.05	19.97
62.0	21091	260	5621	815.7	4.6	392.2	20.19	0.09	20.63
63.0	21917	264	6023	836.0	4.7	413.1	20.34	0.16	21.27
64.0	22763	269	6447	856.4	4.9	434.8	20.47	0.25	21.91
65.0	23630	274	6893	876.9	5.2	457.0	20.58	0.36	22.53
66.0	24517	279	7361	897.5	5.6	479.8	20.67	0.42	23.16
67.0	25425	285	7853	918.3	6.0	503.3	20.75	0.48	23.81
MACH 1									
68.000	26354	291	8368	939.0	6.5	527.4	20.83	0.52	24.48
69.0	27303	298	8908	959.9	7.1	552.3	20.94	0.56	25.14
70.0	28273	305	9473	981.0	7.6	577.7	21.08	0.62	25.80
71.0	29265	312	10064	1002.1	8.3	603.9	21.27	0.70	26.48
72.0	30278	321	10681	1023.5	9.1	630.7	21.48	0.88	27.12
73.0	31312	331	11325	1045.1	10.1	658.1	21.71	1.19	27.76
74.0	32368	342	11997	1067.0	11.5	686.1	22.00	1.51	28.42
75.0	33446	355	12698	1089.1	13.3	714.9	22.30	2.39	29.08
76.0	34546	370	13427	1111.6	15.8	744.3	22.57	2.39	29.80
77.0	35669	387	14187	1134.3	18.0	774.6	22.82	1.93	30.63
78.0	36815	406	14977	1157.2	19.4	805.7	23.02	0.94	31.57
79.0	37984	425	15798	1180.2	20.0	837.8	23.12	0.30	32.66
80.0	39176	445	16653	1203.3	20.0	871.1	23.15	-0.31	33.83
MAXIMUM DYNAMIC PRESSURE									
81.000	40390	466	17541	1226.4	19.6	905.6	23.09	-0.59	35.10
82.0	41628	486	18464	1249.5	18.9	941.3	23.01	-0.77	36.41
83.0	42889	506	19424	1272.5	18.1	978.3	22.94	-0.87	37.71
84.0	44173	524	20421	1295.4	17.2	1016.7	22.88	-0.89	38.96
85.0	45480	542	21458	1318.3	16.3	1056.2	22.84	-0.87	40.14
86.0	46810	558	22534	1341.1	15.5	1096.9	22.84	-0.79	41.26
87.0	48163	574	23652	1364.0	14.7	1138.6	22.86	-0.70	42.30
88.0	49538	590	24812	1386.9	14.1	1181.4	22.89	-0.55	43.29
89.0	50936	604	26015	1409.8	13.7	1225.2	22.97	-0.16	44.27
90.0	52358	619	27263	1432.8	13.7	1270.0	23.07	0.11	45.27
91.0	53802	634	28555	1456.0	13.9	1315.8	23.18	0.27	46.26
92.0	55270	648	29894	1479.2	14.2	1362.5	23.28	0.29	47.28
93.0	56761	663	31281	1502.5	14.5	1410.4	23.36	0.27	48.33
94.0	58275	678	32715	1525.8	14.7	1459.2	23.39	0.25	49.40

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
95.0	59812	694	34200	1549.2	15.0	1509.1	23.35	0.22	50.43
96.0	61373	709	35734	1572.5	15.2	1560.1	23.27	0.19	51.57
97.0	62957	725	37320	1595.8	15.3	1612.3	23.17	0.16	52.74
98.0	64565	741	38959	1618.9	15.5	1665.6	23.09	0.12	53.93
99.0	66195	757	40652	1641.9	15.6	1720.2	22.99	0.07	55.16
100.0	67848	773	42400	1664.9	15.6	1776.0	22.88	0.03	56.38
101.0	69525	788	44204	1687.7	15.6	1832.9	22.80	-0.00	57.58
102.0	71224	804	46066	1710.5	15.6	1891.0	22.74	-0.04	58.74
103.0	72946	820	47987	1733.2	15.6	1950.3	22.69	-0.07	59.84
104.0	74690	836	49967	1755.9	15.5	2010.7	22.65	-0.10	60.94
105.0	76457	852	52008	1778.5	15.3	2072.2	22.61	-0.17	62.03
106.0	78247	867	54112	1801.1	15.1	2134.8	22.58	-0.31	63.15
107.0	80060	883	56278	1823.6	14.8	2198.6	22.52	-0.40	64.29
108.0	81894	898	58509	1846.1	14.3	2263.4	22.43	-0.46	65.47
109.0	83752	912	60806	1868.5	13.8	2329.5	22.32	-0.51	66.65
110.0	85631	927	63169	1890.7	13.3	2396.7	22.19	-0.52	67.81
111.0	87533	940	65600	1912.8	12.8	2465.1	22.08	-0.51	68.97
112.0	89457	954	68099	1934.9	12.3	2534.7	22.00	-0.47	70.11
113.0	91403	966	70669	1956.8	11.9	2605.3	21.97	-0.32	71.21
114.0	93371	979	73310	1978.8	11.7	2677.1	22.02	-0.15	72.28
115.0	95361	991	76024	2001.0	11.6	2749.8	22.19	-0.01	73.28
116.0	97373	1004	78810	2023.4	11.7	2823.5	22.46	0.18	74.20
117.0	99407	1016	81671	2046.0	11.9	2898.2	22.83	0.35	75.12
118.0	101465	1029	84607	2069.1	12.4	2973.7	23.25	0.53	76.01
119.0	103546	1042	87619	2092.5	13.0	3050.2	23.65	0.61	76.95
120.0	105650	1056	90708	2116.3	13.6	3127.7	23.97	0.66	77.98
121.0	107778	1071	93875	2140.3	14.3	3206.3	24.19	0.70	79.10
122.0	109931	1086	97121	2164.5	15.0	3286.0	24.27	0.74	80.33
123.0	112107	1102	100447	2188.7	15.8	3367.0	24.24	0.75	81.62
124.0	114308	1118	103855	2213.0	16.5	3449.3	24.15	0.75	82.97
125.0	116533	1135	107346	2237.1	17.3	3532.9	24.06	0.74	84.32
126.0	118782	1153	110922	2261.1	18.0	3617.8	24.00	0.72	85.63
127.0	121056	1172	114582	2285.1	18.7	3704.1	23.99	0.69	86.94
128.0	123353	1192	118330	2309.1	19.4	3791.7	24.03	0.64	88.36
129.0	125674	1211	122166	2333.2	20.0	3880.8	24.07	0.58	89.76
130.0	128019	1232	126092	2357.3	20.5	3971.3	24.14	0.49	91.15
131.0	130389	1253	130110	2381.5	21.0	4063.1	24.25	0.43	92.55
132.0	132783	1275	134219	2405.8	21.4	4156.4	24.37	0.38	93.95
133.0	135201	1297	138421	2430.2	21.7	4251.0	24.48	0.35	95.35
134.0	137644	1319	142720	2454.7	22.1	4347.0	24.59	0.34	96.74
135.0	140111	1342	147114	2479.4	22.4	4444.5	24.70	0.33	98.14
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.140	140458	1345	147739	2482.8	22.8	4458.2	24.72	0.33	98.34

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
136.0	142597	1365	151598	2496.8	23.1	4530.9	13.56	0.34	79.91
137.0	145097	1388	156162	2510.3	23.5	4610.8	13.58	0.35	79.91
138.0	147616	1412	160814	2523.9	23.8	4690.7	13.60	0.36	79.91
139.0	150147	1436	165544	2537.5	24.2	4771.0	13.61	0.50	80.73
140.0	152692	1460	170357	2551.2	24.9	4852.2	13.64	0.73	81.59
141.0	155250	1485	175249	2564.8	25.6	4934.3	13.70	0.77	82.73
142.0	157822	1511	180225	2578.6	26.4	5017.6	13.77	0.79	83.85
143.0	160408	1538	185285	2592.4	27.2	5102.9	13.83	0.85	84.98
144.0	163007	1566	190430	2606.2	28.0	5188.4	13.90	0.86	86.19
145.0	165621	1594	195662	2620.1	28.9	5275.2	13.96	0.84	87.34
146.0	168249	1624	200981	2634.1	29.7	5363.1	14.02	0.81	88.54
147.0	170890	1654	206389	2648.2	30.5	5452.2	14.09	0.79	89.75
148.0	173546	1685	211886	2662.8	31.3	5542.5	14.17	0.77	90.94
149.0	176216	1716	217474	2677.0	32.1	5634.1	14.27	0.74	92.12
150.0	178900	1749	223154	2691.4	32.8	5726.8	14.40	0.73	93.34
151.0	181599	1782	228928	2705.9	33.5	5820.7	14.54	0.72	94.62
152.0	184312	1816	234796	2720.5	34.3	5915.9	14.69	0.72	95.92
153.0	187040	1851	240760	2735.2	35.0	6012.4	14.82	0.73	97.22
154.0	189782	1886	246822	2750.1	35.7	6110.1	14.93	0.74	98.52
155.0	192540	1922	252981	2765.0	36.5	6209.1	15.03	0.76	99.69
156.0	195312	1959	259240	2780.1	37.3	6309.6	15.12	0.79	101.13
157.0	198100	1997	265601	2795.3	38.1	6411.5	15.24	0.82	102.56
158.0	200903	2035	272063	2810.6	38.9	6514.4	15.34	0.85	103.96
159.0	203721	2074	278630	2826.0	39.7	6619.1	15.44	0.86	105.36
160.0	206555	2115	285303	2841.5	40.6	6725.2	15.55	0.88	106.80
161.0	209404	2156	292082	2857.1	41.5	6832.7	15.65	0.90	108.27
162.0	212269	2198	298969	2872.8	42.4	6941.7	15.75	0.85	109.74
163.0	215150	2240	305967	2888.6	43.2	7052.2	15.86	0.84	111.21
164.0	218047	2284	313075	2904.5	44.1	7164.2	15.96	0.89	112.68
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
164.100	218337	2288	313794	2906.1	44.2	7175.4	15.97	0.84	112.83
S-IC/S-II SEPARATION COMMAND									
164.800	220368	2320	318827	2900.6	44.6	7211.4	-26.10	0.53	14.29
166.0	223835	2374	327499	2864.7	45.2	7215.0	-30.29	0.42	0.63
168.0	229491	2465	341900	2806.7	46.0	7220.1	-26.20	0.44	13.04
170.0	235063	2558	356380	2758.8	46.9	7250.4	-23.30	0.41	16.08
172.0	240533	2652	370914	2713.3	47.7	7286.7	-21.46	0.53	21.81
174.0	245916	2749	385530	2671.5	48.8	7330.7	-20.66	0.53	22.26
176.0	251218	2847	400238	2629.9	49.8	7375.7	-20.56	0.49	22.54

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
178.0	256436	2948	415035	2588.7	50.9	7421.0	-20.40	0.54	22.89
180.0	261573	3051	429922	2548.0	52.0	7466.9	-20.37	0.55	22.97
182.0	266628	3156	444902	2507.3	53.0	7513.0	-20.30	0.54	23.12
184.0	271602	3263	459974	2466.8	54.1	7559.3	-20.27	0.55	23.23
186.0	276496	3372	475140	2426.3	55.3	7605.9	-20.22	0.57	23.33
188.0	281308	3484	490398	2385.9	56.4	7652.6	-20.12	0.58	23.41
190.0	286039	3598	505750	2345.8	57.6	7699.5	-20.04	0.57	23.48
192.0	290691	3714	521196	2305.7	58.7	7746.6	-19.98	0.57	23.58
194.0	295262	3833	536737	2265.9	59.9	7793.9	-19.92	0.59	23.71
196.0	299754	3954	552372	2226.1	61.1	7841.4	-19.83	0.62	23.83
198.0	304167	4077	568103	2186.5	62.3	7889.2	-19.75	0.62	23.93
200.0	308501	4203	583929	2147.1	63.6	7937.2	-19.66	0.63	24.05
202.0	312756	4331	599851	2107.9	64.8	7985.4	-19.59	0.64	24.22
204.0	316932	4462	615871	2068.8	66.1	8034.0	-19.50	0.64	24.37
206.0	321031	4596	631988	2030.0	67.4	8082.8	-19.30	0.60	24.40
208.0	325052	4732	648202	1991.8	68.5	8131.5	-18.89	0.53	24.29
210.0	328999	4870	664513	1954.7	69.5	8179.9	-18.19	0.46	24.06
212.0	332872	5009	680921	1919.1	70.4	8227.7	-17.37	0.42	23.80
214.0	336676	5151	697424	1885.1	71.2	8275.1	-16.66	0.41	23.59
216.0	340413	5294	714021	1852.2	72.0	8322.2	-16.24	0.41	23.51
218.0	344085	5439	730713	1819.9	72.8	8369.2	-16.10	0.43	23.55
220.0	347693	5585	747498	1787.7	73.7	8416.4	-16.08	0.44	23.65
222.0	351236	5734	764379	1755.6	74.6	8463.8	-16.07	0.45	23.78
224.0	354715	5884	781354	1723.4	75.5	8511.6	-16.09	0.45	23.93
226.0	358130	6036	798425	1691.3	76.4	8559.6	-16.09	0.44	24.08
228.0	361480	6189	815592	1659.1	77.3	8607.9	-16.10	0.45	24.22
230.0	364766	6345	832857	1626.9	78.2	8656.4	-16.12	0.49	24.36
232.0	367988	6502	850218	1594.6	79.2	8705.3	-16.14	0.53	24.48
234.0	371145	6662	867678	1562.3	80.3	8754.4	-16.16	0.54	24.62
236.0	374237	6823	885236	1530.0	81.4	8803.8	-16.18	0.53	24.76
238.0	377265	6987	902893	1497.6	82.4	8853.5	-16.19	0.52	24.91
240.0	380227	7153	920650	1465.2	83.5	8903.4	-16.18	0.54	25.05
242.0	383125	7321	938507	1432.9	84.6	8953.6	-16.17	0.55	25.18
244.0	385959	7491	956465	1400.5	85.7	9004.1	-16.17	0.55	25.31
246.0	388728	7664	974524	1368.2	86.8	9054.9	-16.19	0.55	25.46
248.0	391432	7838	992685	1335.8	87.9	9106.0	-16.21	0.58	25.60
250.0	394071	8015	1010948	1303.4	89.1	9157.3	-16.20	0.58	25.73
252.0	396645	8195	1029314	1271.0	90.2	9208.9	-16.20	0.58	25.87
254.0	399154	8376	1047784	1238.5	91.4	9260.8	-16.20	0.59	26.02
256.0	401599	8560	1066357	1206.1	92.6	9313.0	-16.21	0.61	26.17
258.0	403979	8747	1085036	1173.7	93.8	9365.4	-16.22	0.63	26.32
260.0	406294	8936	1103819	1141.2	95.1	9418.2	-16.25	0.61	26.47
262.0	408544	9127	1122709	1108.7	96.3	9471.3	-16.27	0.61	26.61

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
264.0	410729	9321	1141705	1076.2	97.5	9524.7	-16.27	0.63	26.75
266.0	412849	9517	1160808	1043.7	98.8	9578.3	-16.24	0.66	26.91
268.0	414904	9716	1180018	1011.2	100.2	9632.3	-16.20	0.66	27.08
270.0	416894	9918	1199337	978.8	101.5	9686.7	-16.24	0.64	27.25
272.0	418819	10122	1218765	946.2	102.8	9741.3	-16.32	0.66	27.38
274.0	420678	10329	1238302	913.5	104.1	9796.2	-16.39	0.68	27.53
276.0	422473	10538	1257950	880.7	105.5	9851.4	-16.41	0.68	27.69
278.0	424201	10751	1277708	847.9	106.8	9907.0	-16.40	0.66	27.86
280.0	425864	10966	1297578	815.1	108.1	9962.8	-16.38	0.68	28.02
282.0	427462	11183	1317560	782.4	109.5	10019.1	-16.37	0.72	28.19
284.0	428994	11404	1337655	749.6	111.0	10075.6	-16.44	0.76	28.35
286.0	430460	11627	1357863	716.5	112.6	10132.4	-16.60	0.78	28.51
288.0	431860	11854	1378185	683.3	114.1	10189.6	-16.64	0.79	28.67
290.0	433193	12084	1398621	650.1	115.7	10247.1	-16.54	0.79	28.84
292.0	434460	12317	1419173	617.1	117.3	10305.0	-16.45	0.78	29.00
294.0	435662	12553	1439841	584.2	118.8	10363.1	-16.48	0.78	29.16
296.0	436797	12792	1460626	551.2	120.4	10421.6	-16.55	0.79	29.34
298.0	437866	13034	1481528	518.0	122.0	10480.5	-16.60	0.80	29.51
300.0	438869	13280	1502548	484.8	123.6	10539.7	-16.63	0.80	29.69
302.0	439806	13529	1523687	451.5	125.2	10599.2	-16.66	0.81	29.86
304.0	440675	13781	1544945	418.2	126.8	10659.1	-16.70	0.82	30.04
306.0	441478	14036	1566324	384.7	128.5	10719.4	-16.72	0.83	30.22
308.0	442214	14294	1587823	351.3	130.2	10780.0	-16.74	0.88	30.41
310.0	442883	14557	1609444	317.8	131.9	10841.0	-16.77	0.90	30.61
312.0	443485	14822	1631187	284.2	133.7	10902.5	-16.80	0.87	30.83
314.0	444020	15091	1653054	250.5	135.4	10964.3	-16.84	0.83	31.03
316.0	444487	15364	1675045	216.8	137.1	11026.6	-16.88	0.84	31.23
318.0	444887	15640	1697161	183.0	138.8	11089.2	-16.91	0.88	31.42
320.0	445219	15919	1719402	149.2	140.6	11152.3	-16.96	0.91	31.60
322.0	445484	16202	1741770	115.2	142.4	11215.7	-17.03	0.91	31.80
324.0	445680	16489	1764265	81.0	144.2	11279.5	-17.10	0.92	32.02
326.0	445808	16779	1786888	46.8	146.1	11343.7	-17.13	0.95	32.22
328.0	445867	17073	1809640	12.5	148.0	11408.4	-17.14	0.98	32.41
330.0	445858	17371	1832522	-21.8	150.0	11473.4	-17.18	0.98	32.61
332.0	445780	17673	1855534	-56.2	152.0	11538.8	-17.25	0.97	32.83
334.0	445633	17979	1878678	-90.8	153.9	11604.7	-17.32	0.97	33.04
336.0	445417	18289	1901953	-125.4	155.9	11671.0	-17.34	0.99	33.24
338.0	445131	18603	1925362	-160.2	157.9	11737.7	-17.37	1.03	33.46
340.0	444776	18920	1948904	-195.0	159.9	11804.8	-17.45	1.03	33.69
342.0	444351	19242	1972581	-230.0	162.0	11872.4	-17.54	1.03	33.93
344.0	443856	19568	1996394	-265.1	164.1	11940.5	-17.61	1.06	34.15
346.0	443291	19899	2020344	-300.4	166.2	12009.0	-17.63	1.11	34.35
348.0	442655	20233	2044430	-335.6	168.5	12077.9	-17.66	1.14	34.55

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
350.0	441948	20573	2068655	-371.0	170.8	12147.2	-17.73	1.14	34.76
352.0	441170	20916	2093020	-406.6	173.0	12217.0	-17.82	1.12	35.01
354.0	440321	21265	2117524	-442.3	175.3	12287.3	-17.91	1.12	35.25
356.0	439401	21618	2142169	-478.2	177.5	12358.0	-17.96	1.13	35.49
358.0	438409	21975	2166956	-514.1	179.8	12429.2	-17.99	1.16	35.73
360.0	437344	22337	2191886	-550.2	182.1	12500.9	-18.04	1.19	35.97
362.0	436208	22703	2216960	-586.3	184.5	12573.1	-18.10	1.20	36.21
364.0	434999	23075	2242179	-622.6	186.9	12645.8	-18.18	1.21	36.45
366.0	433718	23451	2267544	-659.0	189.4	12719.0	-18.28	1.22	36.73
368.0	432363	23832	2293055	-695.7	191.8	12792.7	-18.40	1.23	37.04
370.0	430935	24218	2318715	-732.6	194.3	12867.1	-18.49	1.25	37.29
372.0	429432	24609	2344524	-769.6	196.8	12941.8	-18.52	1.26	37.45
374.0	427856	25006	2370482	-806.7	199.4	13016.9	-18.56	1.28	37.63
376.0	426205	25407	2396592	-843.9	202.0	13092.4	-18.65	1.31	37.91
378.0	424480	25813	2422852	-881.3	204.6	13168.5	-18.74	1.31	38.23
380.0	422680	26225	2449266	-918.8	207.2	13245.3	-18.81	1.31	38.51
382.0	420805	26642	2475834	-956.5	209.8	13322.6	-18.89	1.32	38.79
384.0	418854	27065	2502557	-994.4	212.5	13400.4	-19.00	1.35	39.07
386.0	416827	27492	2529436	-1032.5	215.2	13478.9	-19.11	1.38	39.35
388.0	414724	27926	2556473	-1070.8	218.0	13557.8	-19.21	1.40	39.61
390.0	412544	28364	2583668	-1109.3	220.8	13637.3	-19.26	1.41	39.87
392.0	410286	28809	2611022	-1147.9	223.7	13717.3	-19.33	1.43	40.16
394.0	407952	29259	2638538	-1186.7	226.5	13798.0	-19.48	1.44	40.47
396.0	405539	29715	2666215	-1225.9	229.4	13879.3	-19.65	1.46	40.80
398.0	403048	30177	2694055	-1265.3	232.4	13961.1	-19.77	1.47	41.07
400.0	400478	30645	2722059	-1304.8	235.3	14043.5	-19.81	1.48	41.34
402.0	397829	31118	2750229	-1344.5	238.3	14126.5	-19.86	1.50	41.64
404.0	395100	31598	2778566	-1384.4	241.3	14210.1	-19.98	1.51	41.98
406.0	392291	32083	2807070	-1424.4	244.4	14294.4	-20.11	1.54	42.30
408.0	389402	32575	2835744	-1464.8	247.5	14379.3	-20.23	1.57	42.59
410.0	386432	33073	2864588	-1505.4	250.6	14464.8	-20.35	1.59	42.89
412.0	383380	33578	2893603	-1546.2	253.8	14550.9	-20.47	1.60	43.21
414.0	380247	34089	2922792	-1587.3	257.0	14637.6	-20.60	1.62	43.54
416.0	377031	34606	2952154	-1628.6	260.3	14725.0	-20.73	1.63	43.87
418.0	373733	35130	2981692	-1670.2	263.6	14813.1	-20.86	1.65	44.19
420.0	370350	35660	3011407	-1712.0	266.9	14901.8	-20.99	1.67	44.52
422.0	366884	36197	3041300	-1754.1	270.2	14991.1	-21.12	1.69	44.83
424.0	363334	36741	3071372	-1796.5	273.6	15081.0	-21.25	1.72	45.15
426.0	359698	37292	3101625	-1839.1	277.1	15172.0	-21.38	1.74	45.70
428.0	355977	37849	3132060	-1882.0	280.6	15263.9	-21.51	1.77	46.22
430.0	352170	38414	3162681	-1925.2	284.2	15356.6	-21.66	1.79	46.55
432.0	348276	38986	3193487	-1968.6	287.8	15449.9	-21.80	1.81	46.74
434.0	344295	39565	3224481	-2012.4	291.4	15543.7	-21.95	1.81	47.03

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
436.0	340227	40152	3255663	-2056.4	295.0	15638.2	-22.09	1.82	47.50
438.0	336070	40746	3287034	-2100.7	298.7	15733.6	-22.23	1.86	47.91
440.0	331823	41347	3318597	-2145.4	302.5	15829.7	-22.39	1.90	48.21
442.0	327488	41956	3350354	-2190.3	306.3	15926.5	-22.55	1.93	48.57
444.0	323062	42572	3382304	-2235.6	310.2	16024.1	-22.70	1.95	48.98
446.0	318546	43196	3414450	-2281.1	314.1	16122.5	-22.82	1.95	49.42
448.0	313938	43828	3446795	-2326.9	318.0	16221.8	-22.97	1.95	49.84
450.0	309238	44468	3479338	-2373.0	321.9	16321.8	-23.17	1.98	50.26
452.0	304445	45116	3512082	-2419.5	325.9	16422.8	-23.37	2.02	50.71
454.0	299560	45772	3545030	-2466.3	330.0	16524.7	-23.44	2.06	51.14
456.0	294580	46436	3578182	-2513.3	334.1	16627.4	-23.57	2.07	51.63
458.0	289506	47109	3611540	-2560.9	338.3	16731.1	-23.85	2.08	52.04
460.0	284337	47789	3645106	-2608.8	342.4	16835.6	-24.11	2.04	52.44
462.0	279070	48478	3678882	-2657.3	346.6	16940.9	-24.38	2.14	52.85
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
463.090	276158	48857	3697378	-2684.0	348.8	16998.5	-24.52	1.97	53.07
464.0	273706	49176	3712863	-2706.5	350.6	17039.4	-24.92	1.94	41.27
466.0	268241	49880	3747021	-2756.8	354.3	17122.2	-25.30	1.81	41.60
468.0	262676	50593	3781349	-2807.5	357.7	17205.8	-25.40	1.65	41.95
470.0	257010	51311	3815844	-2858.3	361.1	17290.0	-25.34	1.64	42.30
472.0	251243	52037	3850509	-2908.8	364.7	17374.9	-25.09	1.84	42.65
474.0	245375	52770	3885339	-2958.1	368.3	17456.2	-24.33	1.79	37.07
476.0	239411	53510	3920324	-3006.1	371.7	17528.4	-23.62	1.69	36.01
478.0	233353	54257	3955452	-3053.0	375.2	17600.5	-23.44	1.80	36.08
480.0	227200	55011	3990725	-3100.1	378.8	17672.7	-23.72	1.79	36.19
482.0	220951	55772	4026142	-3147.8	382.4	17745.2	-23.97	1.81	36.33
484.0	214607	56541	4061705	-3195.9	386.0	17818.0	-24.12	1.84	36.51
486.0	208167	57316	4097414	-3244.4	389.8	17891.1	-24.16	1.89	36.69
488.0	201630	58100	4133270	-3292.6	393.6	17964.7	-24.14	1.93	36.90
490.0	194996	58891	4169273	-3340.9	397.5	18038.7	-24.11	1.99	37.09
492.0	188266	59690	4205425	-3389.2	401.6	18113.0	-24.17	2.05	37.28
494.0	181439	60497	4241726	-3437.8	405.7	18187.8	-24.40	2.11	37.51
496.0	174515	61313	4278177	-3486.9	410.0	18263.1	-24.72	2.13	37.76
498.0	167492	62137	4314779	-3536.6	414.2	18338.9	-25.04	2.14	38.01
500.0	160368	62970	4351533	-3587.0	418.5	18415.1	-25.33	2.15	38.24
502.0	153143	63811	4388439	-3637.9	422.8	18491.8	-25.58	2.18	38.47
504.0	145816	64661	4425500	-3689.3	427.2	18569.0	-25.83	2.21	38.72
506.0	138386	65520	4462716	-3741.2	431.7	18646.7	-26.09	2.23	38.98
508.0	130851	66388	4500087	-3793.6	436.2	18724.9	-26.33	2.27	39.23
510.0	123211	67265	4537616	-3846.5	440.7	18803.6	-26.52	2.29	39.45
512.0	115465	68151	4575302	-3899.7	445.3	18882.7	-26.70	2.31	39.69

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
514.0	107612	69046	4613147	-3953.3	450.0	18962.4	-26.88	2.32	39.95
516.0	99652	69951	4651152	-4007.2	454.6	19042.5	-27.06	2.34	40.21
518.0	91583	70865	4689317	-4061.5	459.4	19123.2	-27.23	2.38	40.46
520.0	83405	71788	4727645	-4116.2	464.1	19204.4	-27.41	2.40	40.73
522.0	75118	72721	4766135	-4171.2	468.9	19286.1	-27.61	2.42	41.02
524.0	66720	73664	4804790	-4226.6	473.8	19368.5	-27.82	2.44	41.31
526.0	58211	74616	4843610	-4282.4	478.7	19451.3	-28.02	2.47	41.57
528.0	49590	75579	4882596	-4338.6	483.7	19534.7	-28.19	2.50	41.81
530.0	40856	76551	4921749	-4395.2	488.7	19618.6	-28.37	2.53	42.07
532.0	32009	77534	4961070	-4452.2	493.8	19703.0	-28.59	2.56	42.38
534.0	23047	78526	5000561	-4509.6	499.0	19788.1	-28.84	2.59	42.69
536.0	13970	79529	5040223	-4567.5	504.2	19873.8	-29.07	2.61	42.98
538.0	4777	80543	5080057	-4625.9	509.4	19960.0	-29.27	2.61	43.24
540.0	-4533	81567	5120064	-4684.6	514.6	20046.8	-29.47	2.61	43.50
542.0	-13962	82601	5160244	-4743.7	519.8	20134.0	-29.66	2.63	43.79
544.0	-23509	83646	5200600	-4803.3	525.1	20221.9	-29.87	2.65	44.09
546.0	-33175	84702	5241132	-4863.3	530.5	20310.4	-30.12	2.67	44.39
548.0	-42962	85768	5281842	-4923.7	535.8	20399.5	-30.37	2.69	44.68
550.0	-52870	86845	5322731	-4984.7	541.2	20489.1	-30.59	2.72	44.97
552.0	-62901	87933	5363799	-5046.1	546.7	20579.3	-30.81	2.76	45.34
554.0	-73055	89032	5405048	-5107.9	552.3	20670.2	-31.07	2.83	45.53
556.0	-83333	90142	5446480	-5170.3	557.9	20761.5	-31.34	2.78	45.80
558.0	-93736	91264	5488095	-5233.3	563.6	20853.3	-31.60	2.93	46.05
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
559.050	-99249	91857	5510016	-5266.5	566.6	20901.7	-31.74	2.44	46.18
S-II/S-IVB SEPARATION COMMAND									
560.000	-104263	92396	5529871	-5292.8	568.3	20906.7	-26.43	1.44	-7.36
562.0	-114903	93536	5571677	-5345.8	571.2	20892.3	-26.54	1.59	-7.06
564.0	-125647	94681	5613441	-5399.3	574.2	20878.8	-27.11	1.46	-5.75
566.0	-136502	95833	5655205	-5454.9	577.4	20885.1	-28.46	1.67	8.89
568.0	-147468	96991	5696995	-5511.5	581.1	20904.5	-28.12	1.97	9.91
570.0	-158548	98158	5738825	-5567.8	585.1	20924.3	-28.31	1.95	9.99
572.0	-169741	99332	5780693	-5624.8	588.8	20944.4	-28.68	1.82	10.08
574.0	-181048	100513	5822601	-5682.5	592.4	20964.6	-28.99	1.73	10.16
576.0	-192472	101701	5864550	-5740.5	595.9	20985.0	-29.05	1.77	10.23
578.0	-204011	102897	5906539	-5798.6	599.5	21005.5	-29.05	1.84	10.31
580.0	-215667	104099	5948570	-5857.0	603.2	21025.8	-29.14	1.88	10.31
582.0	-227439	105309	5990642	-5915.5	607.0	21046.4	-29.32	1.92	10.29
584.0	-239329	106527	6032756	-5974.2	610.9	21066.9	-29.45	1.98	10.27

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
586.0	-251336	107753	6074910	-6033.2	614.9	21087.4	-29.53	2.02	10.22
588.0	-263462	108987	6117105	-6092.4	619.0	21107.8	-29.61	2.04	10.20
590.0	-275706	110229	6159341	-6151.7	623.1	21128.2	-29.70	2.06	10.18
592.0	-288069	111479	6201618	-6211.2	627.2	21148.6	-29.80	2.08	10.17
594.0	-300551	112738	6243936	-6270.9	631.4	21168.9	-29.88	2.11	10.16
596.0	-313152	114005	6286294	-6330.7	635.7	21189.2	-29.96	2.13	10.16
598.0	-325874	115281	6328693	-6390.7	639.9	21209.5	-30.03	2.15	10.14
600.0	-338715	116565	6371132	-6450.8	644.2	21229.8	-30.07	2.16	10.13
602.0	-351677	117858	6413612	-6511.0	648.6	21250.0	-30.11	2.15	10.11
604.0	-364759	119159	6456132	-6571.2	652.8	21270.2	-30.15	2.14	10.09
606.0	-377962	120469	6498693	-6631.6	657.1	21290.4	-30.23	2.13	10.04
608.0	-391286	121788	6541293	-6692.2	661.4	21310.4	-30.35	2.15	9.99
610.0	-404731	123115	6583934	-6753.0	665.7	21330.3	-30.47	2.19	9.97
612.0	-418298	124451	6626615	-6814.0	670.1	21350.3	-30.54	2.21	9.98
614.0	-431987	125795	6669335	-6875.1	674.6	21370.3	-30.54	2.22	10.00
616.0	-445798	127149	6712096	-6936.1	679.0	21390.3	-30.52	2.22	10.01
618.0	-459731	128511	6754896	-6997.2	683.5	21410.3	-30.58	2.22	9.99
620.0	-473787	129883	6797737	-7058.5	687.9	21430.2	-30.69	2.21	9.95
622.0	-487965	131263	6840617	-7120.0	692.3	21450.1	-30.80	2.20	9.92
624.0	-502267	132652	6883537	-7181.6	696.7	21469.9	-30.83	2.20	9.91
626.0	-516692	134050	6926497	-7243.3	701.1	21489.8	-30.81	2.21	9.93
628.0	-531240	135457	6969496	-7304.9	705.6	21509.6	-30.80	2.22	9.94
630.0	-545911	136872	7012535	-7366.5	710.0	21529.5	-30.85	2.22	9.92
632.0	-560706	138297	7055614	-7428.3	714.4	21549.3	-30.97	2.22	9.87
634.0	-575625	139730	7098733	-7490.4	718.9	21569.0	-31.11	2.21	9.82
636.0	-590668	141172	7141890	-7552.7	723.3	21588.6	-31.17	2.21	9.80
638.0	-605836	142623	7185087	-7615.0	727.7	21608.2	-31.17	2.22	9.82
640.0	-621128	144083	7228323	-7677.4	732.2	21627.9	-31.18	2.23	9.83
642.0	-636545	145552	7271598	-7739.8	736.7	21647.5	-31.25	2.24	9.82
644.0	-652087	147030	7314913	-7802.4	741.1	21667.1	-31.33	2.25	9.79
646.0	-667755	148516	7358267	-7865.1	745.7	21686.7	-31.37	2.26	9.76
648.0	-683548	150012	7401660	-7927.9	750.2	21706.1	-31.40	2.27	9.73
650.0	-699466	151517	7445091	-7990.7	754.7	21725.6	-31.45	2.26	9.71
652.0	-715511	153031	7488562	-8053.7	759.2	21745.0	-31.52	2.24	9.70
654.0	-731681	154554	7532071	-8116.8	763.7	21764.4	-31.57	2.21	9.70
656.0	-747978	156086	7575620	-8179.9	768.1	21783.8	-31.60	2.19	9.70
658.0	-764401	157626	7619207	-8243.2	772.4	21803.2	-31.64	2.19	9.71
660.0	-780950	159175	7662833	-8306.5	776.8	21822.7	-31.68	2.21	9.73
662.0	-797627	160734	7706497	-8369.9	781.3	21842.1	-31.74	2.23	9.73
664.0	-814430	162301	7750201	-8433.4	785.8	21861.5	-31.77	2.24	9.70
666.0	-831360	163877	7793943	-8497.0	790.2	21880.9	-31.80	2.24	9.66
668.0	-848418	165461	7837725	-8560.7	794.7	21900.2	-31.93	2.23	9.59
670.0	-865603	167055	7881544	-8624.8	799.1	21919.2	-32.17	2.22	9.51

TABLE C-I. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
672.0	-882918	168658	7925401	-8689.4	803.6	21938.2	-32.38	2.22	9.44
674.0	-900361	170270	7969297	-8754.1	808.0	21957.1	-32.41	2.23	9.43
676.0	-917934	171890	8013230	-8818.9	812.5	21976.0	-32.34	2.25	9.48
678.0	-935637	173520	8057201	-8883.6	817.0	21995.0	-32.31	2.24	9.50
680.0	-953468	175158	8101210	-8948.2	821.5	22013.9	-32.33	2.22	9.49
682.0	-971429	176806	8145256	-9012.8	825.9	22032.9	-32.32	2.22	9.48
684.0	-989520	178462	8189341	-9077.4	830.4	22051.9	-32.26	2.25	9.49
686.0	-1007739	180127	8233464	-9141.9	834.9	22070.9	-32.20	2.26	9.52
688.0	-1026087	181801	8277625	-9206.3	839.4	22089.9	-32.17	2.26	9.55
690.0	-1044564	183485	8321824	-9270.6	843.9	22109.0	-32.17	2.26	9.55
692.0	-1063170	185177	8366061	-9335.0	848.4	22128.2	-32.18	2.26	9.57
694.0	-1081904	186878	8410336	-9399.3	852.9	22147.3	-32.19	2.26	9.59
696.0	-1100767	188589	8454650	-9463.7	857.5	22166.4	-32.20	2.27	9.57
698.0	-1119758	190308	8499002	-9528.1	862.0	22185.5	-32.20	2.29	9.56
700.0	-1138878	192037	8543392	-9592.5	866.6	22204.6	-32.20	2.03	9.54
S-IVB 1ST GUIDANCE CUTOFF									
700.560	-1144255	192522	8555828	-9610.5	867.8	22209.9	-32.21	2.08	9.54
702.0	-1158119	193774	8587808	-9648.2	870.4	22198.9	-25.01	1.61	-10.80
704.0	-1177467	195518	8632176	-9698.1	873.6	22177.2	-24.98	1.60	-10.85
706.0	-1196912	197269	8676513	-9748.1	876.8	22155.4	-24.96	1.59	-10.89
708.0	-1216457	199025	8720803	-9798.0	880.0	22133.6	-24.93	1.59	-10.94
710.0	-1236103	200789	8765048	-9847.8	883.2	22111.6	-24.91	1.59	-10.99
PARKING ORBIT INSERTION									
710.560	-1241622	201284	8777431	-9861.8	884.1	22105.4	-24.90	1.58	-11.00

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	3441.351	9.391	-2.419	-0.0	334.4	1298.3	-0.07	-0.04	0.01
-16.0	3441.351	9.444	-2.213	-0.1	334.3	1298.3	-0.07	-0.04	0.01
-15.0	3441.351	9.499	-2.000	-0.2	334.3	1298.3	-0.07	-0.04	0.01
-14.0	3441.351	9.554	-1.786	-0.3	334.2	1298.4	-0.07	-0.04	0.01
-13.0	3441.351	9.609	-1.572	-0.3	334.2	1298.4	-0.07	-0.04	0.01
-12.0	3441.351	9.664	-1.359	-0.4	334.1	1298.4	-0.07	-0.04	0.01
-11.0	3441.351	9.719	-1.145	-0.5	334.1	1298.4	-0.07	-0.04	0.01
-10.0	3441.350	9.774	-0.931	-0.6	334.1	1298.4	-0.07	-0.04	0.01
-9.0	3441.350	9.829	-0.718	-0.7	334.0	1298.4	-0.07	-0.04	0.01
-8.0	3441.350	9.884	-0.504	-0.8	334.0	1298.4	-0.07	-0.04	0.01
-7.0	3441.350	9.939	-0.290	-0.9	333.9	1298.4	-0.07	-0.04	0.01
-6.0	3441.350	9.994	-0.077	-0.9	333.9	1298.4	-0.07	-0.04	0.01
-5.0	3441.350	10.049	0.137	-1.0	333.8	1298.5	-0.07	-0.04	0.01
-4.0	3441.350	10.104	0.351	-1.1	333.8	1298.5	-0.07	-0.04	0.01
-3.0	3441.349	10.159	0.565	-1.2	333.7	1298.5	-0.07	-0.04	0.01
-2.0	3441.349	10.214	0.778	-1.3	333.7	1298.5	-0.07	-0.04	0.01
-1.0	3441.349	10.269	0.992	-1.4	333.6	1298.5	-0.07	-0.04	0.01
0.0	3441.349	10.323	1.206	-1.5	333.6	1298.5	-0.07	-0.04	0.01
ALL HOLDDOWN ARMS RELEASED									
0.200	3441.349	10.334	1.248	-1.3	333.6	1298.5	1.70	0.01	-0.02
LIFTOFF - START OF TIME BASE 1									
0.600	3441.349	10.356	1.334	-0.4	333.6	1298.5	2.32	-0.05	-0.03
1.0	3441.349	10.378	1.419	0.7	333.6	1298.5	3.68	-0.10	0.02
2.0	3441.349	10.433	1.633	7.3	333.5	1298.6	7.44	-0.11	0.14
3.0	3441.351	10.488	1.847	14.8	333.3	1298.8	7.61	-0.24	0.17
4.0	3441.354	10.543	2.061	22.5	333.0	1299.0	7.72	-0.22	0.20
5.0	3441.359	10.598	2.274	30.2	333.2	1299.2	7.88	1.15	0.23
6.0	3441.364	10.653	2.488	38.1	334.6	1299.4	7.98	1.47	0.25
7.0	3441.371	10.708	2.702	46.2	336.1	1299.7	8.11	1.48	0.28
8.0	3441.379	10.763	2.916	54.4	337.5	1300.0	8.26	1.26	0.30
9.0	3441.389	10.819	3.130	62.7	338.0	1300.3	8.39	0.22	0.32
10.0	3441.400	10.875	3.344	71.1	338.2	1300.7	8.50	0.24	0.40
11.0	3441.412	10.930	3.558	79.6	338.4	1301.1	8.65	0.29	0.45
12.0	3441.426	10.986	3.772	88.4	338.8	1301.6	8.77	0.35	0.38
13.0	3441.441	11.042	3.987	97.2	339.1	1301.9	8.89	0.40	0.31
14.0	3441.458	11.098	4.201	106.2	339.5	1302.3	9.15	0.42	0.53

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
15.0	3441.476	11.153	4.415	115.4	339.9	1302.9	9.36	0.33	0.61
16.0	3441.496	11.209	4.630	124.9	340.1	1303.6	9.60	0.05	0.74
17.0	3441.518	11.265	4.844	134.5	340.0	1304.4	9.81	-0.15	0.90
18.0	3441.541	11.321	5.059	144.4	339.8	1305.4	10.00	-0.18	1.05
19.0	3441.565	11.377	5.274	154.6	339.6	1306.5	10.22	-0.20	1.21
20.0	3441.591	11.433	5.489	164.9	339.5	1307.8	10.44	-0.18	1.40
21.0	3441.619	11.489	5.704	175.4	339.3	1309.3	10.65	-0.17	1.63
22.0	3441.649	11.545	5.920	186.1	339.1	1311.0	10.87	-0.15	1.86
23.0	3441.681	11.601	6.136	197.1	338.9	1313.0	11.10	-0.16	2.09
24.0	3441.714	11.656	6.352	208.3	338.7	1315.2	11.32	-0.19	2.32
25.0	3441.749	11.712	6.569	219.7	338.5	1317.7	11.54	-0.22	2.57
26.0	3441.786	11.768	6.786	231.4	338.3	1320.4	11.77	-0.24	2.84
27.0	3441.825	11.823	7.004	243.2	338.0	1323.4	12.00	-0.25	3.13
28.0	3441.866	11.879	7.222	255.3	337.8	1326.7	12.23	-0.26	3.42
29.0	3441.909	11.935	7.440	267.6	337.5	1330.2	12.46	-0.26	3.72
30.0	3441.955	11.990	7.660	280.2	337.2	1334.1	12.69	-0.26	4.02
31.0	3442.002	12.046	7.879	293.0	336.9	1338.3	12.93	-0.26	4.33
32.0	3442.051	12.101	8.100	306.1	336.7	1342.8	13.17	-0.25	4.67
33.0	3442.102	12.156	8.321	319.3	336.5	1347.6	13.42	-0.22	5.02
34.0	3442.156	12.212	8.544	332.8	336.3	1352.8	13.66	-0.18	5.38
35.0	3442.212	12.267	8.767	346.6	336.1	1358.4	13.89	-0.14	5.76
36.0	3442.270	12.322	8.991	360.6	335.9	1364.4	14.12	-0.12	6.13
37.0	3442.331	12.378	9.216	374.8	335.8	1370.7	14.36	-0.11	6.52
38.0	3442.394	12.433	9.442	389.3	335.7	1377.4	14.60	-0.10	6.92
39.0	3442.459	12.488	9.669	404.0	335.6	1384.5	14.84	-0.10	7.32
40.0	3442.527	12.543	9.898	418.9	335.5	1392.1	15.07	-0.11	7.72
41.0	3442.597	12.599	10.128	434.1	335.4	1400.0	15.32	-0.10	8.13
42.0	3442.670	12.654	10.359	449.6	335.3	1408.3	15.57	-0.08	8.58
43.0	3442.745	12.709	10.591	465.2	335.2	1417.2	15.83	-0.06	9.05
44.0	3442.823	12.764	10.825	481.2	335.2	1426.5	16.09	-0.04	9.55
45.0	3442.903	12.819	11.061	497.4	335.1	1436.3	16.35	-0.02	10.10
46.0	3442.986	12.874	11.298	513.9	335.1	1446.7	16.60	0.00	10.67
47.0	3443.072	12.930	11.537	530.6	335.1	1457.7	16.85	0.02	11.25
48.0	3443.161	12.985	11.778	547.5	335.1	1469.2	17.06	0.04	11.84
49.0	3443.253	13.040	12.021	564.6	335.2	1481.3	17.25	0.07	12.45
50.0	3443.347	13.095	12.265	582.0	335.3	1494.1	17.44	0.08	13.07
51.0	3443.444	13.150	12.512	599.5	335.3	1507.5	17.63	0.08	13.70
52.0	3443.544	13.206	12.762	617.2	335.4	1521.6	17.84	0.07	14.34
53.0	3443.647	13.261	13.013	635.2	335.5	1536.2	18.06	0.06	14.99
54.0	3443.753	13.316	13.267	653.3	335.5	1551.5	18.29	0.04	15.59
55.0	3443.862	13.371	13.524	671.7	335.6	1567.4	18.53	0.02	16.19
56.0	3443.974	13.426	13.783	690.4	335.6	1583.9	18.77	-0.00	16.81
57.0	3444.090	13.482	14.045	709.2	335.5	1601.0	19.00	-0.01	17.44

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
58.0	3444.208	13.537	14.310	728.3	335.5	1618.8	19.21	-0.02	18.11
59.0	3444.329	13.592	14.578	747.6	335.5	1637.3	19.42	-0.03	18.79
60.0	3444.454	13.647	14.849	767.1	335.4	1656.4	19.62	-0.03	19.48
61.0	3444.582	13.702	15.123	786.8	335.4	1676.2	19.79	-0.02	20.17
62.0	3444.713	13.758	15.401	806.7	335.4	1696.7	19.96	0.02	20.83
63.0	3444.847	13.813	15.682	826.7	335.5	1717.9	20.11	0.08	21.48
64.0	3444.985	13.868	15.967	846.9	335.6	1739.7	20.23	0.18	22.13
65.0	3445.126	13.923	16.255	867.1	335.8	1762.1	20.34	0.28	22.75
66.0	3445.271	13.978	16.547	887.5	336.1	1785.2	20.42	0.34	23.38
67.0	3445.418	14.034	16.842	907.9	336.4	1808.9	20.49	0.39	24.04
MACH 1									
68.000	3445.569	14.089	17.142	928.4	336.8	1833.3	20.56	0.43	24.71
69.0	3445.724	14.145	17.446	949.0	337.3	1858.4	20.66	0.46	25.38
70.0	3445.882	14.200	17.754	969.8	337.8	1884.1	20.80	0.52	26.04
71.0	3446.043	14.256	18.066	990.6	338.3	1910.5	20.98	0.60	26.72
72.0	3446.208	14.311	18.383	1011.7	339.0	1937.5	21.18	0.78	27.38
73.0	3446.376	14.367	18.704	1033.0	339.9	1965.2	21.40	1.08	28.02
74.0	3446.548	14.423	19.030	1054.5	341.2	1993.5	21.68	1.40	28.69
75.0	3446.723	14.480	19.360	1076.3	342.9	2022.5	21.97	2.28	29.35
76.0	3446.902	14.537	19.695	1098.4	345.2	2052.3	22.23	2.27	30.08
77.0	3447.085	14.594	20.036	1120.8	347.3	2082.8	22.47	1.80	30.91
78.0	3447.271	14.651	20.381	1143.3	348.5	2114.2	22.66	0.81	31.86
79.0	3447.461	14.708	20.732	1166.0	349.1	2146.6	22.75	0.17	32.95
80.0	3447.655	14.766	21.088	1188.7	348.9	2180.2	22.76	-0.45	34.13
MAXIMUM DYNAMIC PRESSURE									
81.000	3447.852	14.823	21.449	1211.4	348.3	2215.0	22.70	-0.73	35.40
82.0	3448.054	14.881	21.817	1234.0	347.5	2251.0	22.60	-0.92	36.71
83.0	3448.259	14.938	22.190	1256.6	346.5	2288.4	22.51	-1.03	38.01
84.0	3448.467	14.995	22.570	1279.1	345.4	2327.0	22.44	-1.06	39.26
85.0	3448.680	15.052	22.956	1301.5	344.4	2366.8	22.38	-1.04	40.45
86.0	3448.896	15.109	23.349	1323.8	343.3	2407.8	22.37	-0.97	41.57
87.0	3449.115	15.165	23.749	1346.2	342.4	2449.9	22.37	-0.89	42.62
88.0	3449.339	15.221	24.156	1368.5	341.6	2493.0	22.39	-0.75	43.61
89.0	3449.566	15.278	24.570	1391.0	341.0	2537.1	22.45	-0.37	44.60
90.0	3449.797	15.334	24.991	1413.5	340.8	2582.3	22.54	-0.11	45.60
91.0	3450.031	15.390	25.420	1436.1	340.7	2628.4	22.63	0.05	46.60
92.0	3450.269	15.446	25.856	1458.7	340.8	2675.5	22.71	0.06	47.63
93.0	3450.511	15.503	26.300	1481.4	340.8	2723.7	22.78	0.04	48.68
94.0	3450.757	15.559	26.753	1504.2	340.8	2772.9	22.79	0.01	49.75

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
95.0	3451.006	15.615	27.213	1526.9	340.8	2823.1	22.74	-0.03	50.79
96.0	3451.259	15.671	27.682	1549.6	340.8	2874.5	22.64	-0.07	51.93
97.0	3451.516	15.727	28.159	1572.2	340.7	2927.1	22.53	-0.11	53.10
98.0	3451.777	15.783	28.645	1594.6	340.5	2980.8	22.42	-0.16	54.30
99.0	3452.041	15.840	29.141	1617.0	340.3	3035.7	22.30	-0.22	55.54
100.0	3452.309	15.896	29.645	1639.2	340.1	3091.9	22.18	-0.27	56.75
101.0	3452.581	15.952	30.158	1661.3	339.8	3149.2	22.08	-0.31	57.96
102.0	3452.856	16.007	30.681	1683.4	339.4	3207.7	22.00	-0.36	59.12
103.0	3453.135	16.063	31.214	1705.3	339.1	3267.4	21.93	-0.39	60.23
104.0	3453.417	16.119	31.757	1727.2	338.6	3328.2	21.87	-0.44	61.33
105.0	3453.703	16.175	32.310	1749.0	338.1	3390.1	21.81	-0.52	62.43
106.0	3453.993	16.231	32.873	1770.8	337.5	3453.1	21.76	-0.67	63.55
107.0	3454.286	16.286	33.446	1792.5	336.8	3517.2	21.68	-0.77	64.69
108.0	3454.583	16.342	34.031	1814.1	336.0	3582.5	21.57	-0.84	65.87
109.0	3454.883	16.397	34.626	1835.6	335.1	3648.9	21.43	-0.91	67.06
110.0	3455.187	16.452	35.232	1856.9	334.2	3716.6	21.29	-0.92	68.22
111.0	3455.495	16.507	35.849	1878.1	333.3	3785.4	21.15	-0.92	69.38
112.0	3455.805	16.562	36.478	1899.2	332.3	3855.4	21.05	-0.90	70.53
113.0	3456.120	16.617	37.118	1920.2	331.5	3926.5	21.00	-0.76	71.63
114.0	3456.437	16.671	37.770	1941.2	330.8	3998.6	21.02	-0.60	72.71
115.0	3456.759	16.726	38.434	1962.3	330.3	4071.8	21.17	-0.47	73.71
116.0	3457.083	16.780	39.111	1983.6	329.9	4146.0	21.43	-0.29	74.64
117.0	3457.412	16.835	39.799	2005.2	329.7	4221.1	21.78	-0.13	75.57
118.0	3457.743	16.889	40.500	2027.2	329.6	4297.1	22.17	0.04	76.46
119.0	3458.079	16.943	41.214	2049.6	329.7	4374.0	22.54	0.11	77.41
120.0	3458.418	16.998	41.940	2072.2	329.8	4452.0	22.85	0.15	78.45
121.0	3458.761	17.052	42.679	2095.1	330.0	4531.1	23.04	0.18	79.58
122.0	3459.108	17.107	43.431	2118.1	330.2	4611.3	23.09	0.20	80.81
123.0	3459.458	17.161	44.197	2141.1	330.4	4692.7	23.04	0.20	82.11
124.0	3459.812	17.215	44.976	2164.1	330.5	4775.5	22.92	0.18	83.46
125.0	3460.171	17.270	45.769	2187.0	330.7	4859.6	22.80	0.16	84.81
126.0	3460.532	17.324	46.576	2209.7	330.8	4945.0	22.71	0.12	86.13
127.0	3460.898	17.379	47.397	2232.4	330.9	5031.8	22.68	0.08	87.43
128.0	3461.267	17.434	48.232	2255.1	331.0	5119.9	22.69	0.02	88.86
129.0	3461.640	17.488	49.082	2277.7	330.9	5209.5	22.70	-0.06	90.26
130.0	3462.017	17.543	49.947	2300.5	330.8	5300.5	22.74	-0.17	91.67
131.0	3462.397	17.597	50.827	2323.2	330.6	5392.8	22.82	-0.25	93.07
132.0	3462.782	17.651	51.722	2346.1	330.3	5486.6	22.91	-0.31	94.47
133.0	3463.170	17.706	52.633	2369.0	330.0	5581.8	22.99	-0.35	95.87
134.0	3463.562	17.760	53.559	2392.0	329.6	5678.4	23.07	-0.38	97.27
135.0	3463.957	17.815	54.502	2415.1	329.2	5776.3	23.15	-0.41	98.68
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.140	3464.013	17.822	54.635	2418.3	329.5	5790.2	23.16	-0.41	98.87

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
136.0	3464.356	17.869	55.459	2431.0	329.2	5863.2	12.17	-0.34	80.35
137.0	3464.756	17.923	56.429	2443.2	328.9	5943.6	12.17	-0.34	80.35
138.0	3465.160	17.977	57.414	2455.3	328.5	6023.9	12.17	-0.33	80.35
139.0	3465.565	18.031	58.412	2467.5	328.3	6104.7	12.17	-0.20	81.18
140.0	3465.972	18.085	59.424	2479.6	328.2	6186.3	12.17	0.01	82.04
141.0	3466.381	18.139	60.448	2491.8	328.2	6268.9	12.20	0.04	83.18
142.0	3466.792	18.193	61.487	2504.0	328.2	6352.7	12.24	0.05	84.31
143.0	3467.205	18.247	62.540	2516.3	328.3	6438.4	12.28	0.09	85.43
144.0	3467.620	18.301	63.606	2528.5	328.4	6524.4	12.32	0.08	86.65
145.0	3468.038	18.355	64.687	2540.9	328.4	6611.6	12.35	0.05	87.81
146.0	3468.457	18.409	65.783	2553.2	328.4	6700.0	12.38	0.01	89.01
147.0	3468.878	18.463	66.893	2565.6	328.4	6789.6	12.42	-0.03	90.22
148.0	3469.302	18.517	68.018	2578.5	328.4	6880.4	12.48	-0.07	91.41
149.0	3469.727	18.571	69.157	2591.0	328.3	6972.4	12.55	-0.10	92.60
150.0	3470.155	18.625	70.313	2603.6	328.2	7065.6	12.64	-0.14	93.81
151.0	3470.584	18.679	71.483	2616.3	328.0	7160.0	12.75	-0.16	95.11
152.0	3471.016	18.733	72.669	2629.1	327.8	7255.7	12.87	-0.17	96.41
153.0	3471.449	18.787	73.872	2642.0	327.7	7352.6	12.97	-0.18	97.71
154.0	3471.885	18.841	75.090	2655.0	327.5	7450.8	13.05	-0.19	99.02
155.0	3472.323	18.895	76.324	2668.0	327.3	7550.4	13.12	-0.19	100.19
156.0	3472.764	18.949	77.575	2681.2	327.1	7651.3	13.18	-0.17	101.63
157.0	3473.206	19.003	78.843	2694.4	326.9	7753.8	13.26	-0.16	103.07
158.0	3473.650	19.057	80.127	2707.7	326.7	7857.2	13.33	-0.16	104.47
159.0	3474.097	19.110	81.429	2721.0	326.6	7962.4	13.40	-0.16	105.87
160.0	3474.546	19.164	82.748	2734.4	326.4	8069.0	13.46	-0.16	107.32
161.0	3474.997	19.218	84.085	2747.9	326.2	8177.1	13.53	-0.16	108.79
162.0	3475.451	19.271	85.440	2761.4	326.0	8286.6	13.60	-0.23	110.26
163.0	3475.906	19.325	86.813	2775.1	325.8	8397.6	13.66	-0.26	111.74
164.0	3476.364	19.379	88.204	2788.7	325.5	8510.1	13.73	-0.23	113.21
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
164.100	3476.410	19.384	88.345	2790.1	325.5	8521.4	13.73	-0.28	113.36
S-IC/S-II SEPARATION COMMAND									
164.800	3476.731	19.422	89.328	2783.5	325.4	8557.6	-27.23	-0.09	14.35
166.0	3477.278	19.486	91.021	2746.4	325.3	8561.2	-31.26	-0.13	0.64
168.0	3478.170	19.593	93.835	2686.4	325.0	8566.4	-27.32	-0.18	13.08
170.0	3479.047	19.700	96.661	2636.2	324.6	8596.8	-24.46	-0.23	16.15
172.0	3479.906	19.806	99.496	2588.3	324.1	8633.2	-22.70	-0.14	21.89
174.0	3480.751	19.913	102.345	2543.9	323.8	8677.4	-21.91	-0.16	22.35
176.0	3481.581	20.020	105.209	2499.8	323.4	8722.5	-21.82	-0.20	22.62

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
178.0	3482.396	20.126	108.087	2456.1	323.1	8768.0	-21.67	-0.16	22.95
180.0	3483.198	20.232	110.981	2412.8	322.7	8814.0	-21.65	-0.16	23.03
182.0	3483.985	20.338	113.890	2369.5	322.4	8860.3	-21.59	-0.17	23.17
184.0	3484.758	20.445	116.814	2326.3	322.0	8906.7	-21.57	-0.17	23.28
186.0	3485.516	20.550	119.753	2283.2	321.7	8953.4	-21.53	-0.16	23.37
188.0	3486.261	20.656	122.708	2240.2	321.4	9000.2	-21.44	-0.16	23.45
190.0	3486.991	20.762	125.678	2197.3	321.0	9047.2	-21.37	-0.18	23.50
192.0	3487.707	20.868	128.664	2154.6	320.6	9094.3	-21.32	-0.18	23.60
194.0	3488.409	20.973	131.665	2112.0	320.3	9141.6	-21.27	-0.16	23.72
196.0	3489.098	21.078	134.682	2069.5	320.0	9189.2	-21.19	-0.15	23.84
198.0	3489.772	21.184	137.714	2027.1	319.6	9236.9	-21.12	-0.15	23.93
200.0	3490.432	21.289	140.763	1985.0	319.3	9284.9	-21.04	-0.15	24.04
202.0	3491.079	21.394	143.827	1942.9	319.0	9333.2	-20.98	-0.15	24.21
204.0	3491.711	21.499	146.907	1901.0	318.7	9381.8	-20.90	-0.16	24.35
206.0	3492.330	21.604	150.003	1859.3	318.3	9430.5	-20.71	-0.20	24.37
208.0	3492.935	21.708	153.115	1818.2	317.8	9479.2	-20.31	-0.28	24.26
210.0	3493.527	21.813	156.243	1778.3	317.2	9527.5	-19.62	-0.35	24.03
212.0	3494.106	21.917	159.387	1739.8	316.4	9575.3	-18.80	-0.39	23.78
214.0	3494.673	22.021	162.547	1702.9	315.6	9622.7	-18.10	-0.40	23.58
216.0	3495.227	22.125	165.722	1667.1	314.8	9669.7	-17.69	-0.40	23.49
218.0	3495.770	22.228	168.913	1631.9	314.0	9716.7	-17.55	-0.40	23.52
220.0	3496.302	22.332	172.119	1596.7	313.2	9763.9	-17.54	-0.39	23.62
222.0	3496.821	22.435	175.340	1561.6	312.4	9811.3	-17.55	-0.39	23.75
224.0	3497.330	22.537	178.578	1526.5	311.6	9858.9	-17.57	-0.40	23.89
226.0	3497.826	22.640	181.831	1491.3	310.7	9906.8	-17.58	-0.42	24.03
228.0	3498.311	22.742	185.099	1456.1	309.9	9955.0	-17.61	-0.42	24.17
230.0	3498.785	22.844	188.384	1420.8	309.1	10003.5	-17.64	-0.38	24.30
232.0	3499.247	22.945	191.685	1385.4	308.3	10052.2	-17.67	-0.35	24.42
234.0	3499.697	23.047	195.002	1350.0	307.6	10101.2	-17.70	-0.34	24.55
236.0	3500.135	23.148	198.335	1314.6	306.9	10150.5	-17.73	-0.37	24.68
238.0	3500.562	23.249	201.684	1279.1	306.1	10200.0	-17.75	-0.38	24.83
240.0	3500.977	23.349	205.050	1243.5	305.3	10249.8	-17.76	-0.37	24.96
242.0	3501.381	23.450	208.432	1208.0	304.6	10299.8	-17.76	-0.36	25.08
244.0	3501.773	23.550	211.830	1172.4	303.8	10350.1	-17.77	-0.38	25.20
246.0	3502.153	23.650	215.245	1136.8	303.1	10400.7	-17.80	-0.38	25.35
248.0	3502.521	23.749	218.677	1101.1	302.3	10451.5	-17.83	-0.37	25.48
250.0	3502.878	23.849	222.126	1065.4	301.5	10502.6	-17.84	-0.37	25.61
252.0	3503.222	23.948	225.591	1029.7	300.8	10554.0	-17.85	-0.38	25.73
254.0	3503.555	24.047	229.074	994.0	300.0	10605.6	-17.86	-0.38	25.88
256.0	3503.877	24.145	232.573	958.2	299.2	10657.5	-17.88	-0.36	26.03
258.0	3504.186	24.244	236.090	922.4	298.5	10709.7	-17.90	-0.36	26.16
260.0	3504.484	24.342	239.623	886.5	297.7	10762.2	-17.94	-0.38	26.31
262.0	3504.770	24.440	243.175	850.6	296.9	10815.0	-17.97	-0.39	26.44

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
264.0	3505.044	24.537	246.743	814.6	296.2	10868.0	-17.99	-0.38	26.58
266.0	3505.306	24.635	250.329	778.6	295.4	10921.3	-17.97	-0.36	26.74
268.0	3505.556	24.732	253.933	742.6	294.6	10975.0	-17.94	-0.37	26.90
270.0	3505.795	24.829	257.554	706.6	293.9	11029.0	-18.00	-0.39	27.06
272.0	3506.022	24.925	261.193	670.5	293.1	11083.2	-18.09	-0.39	27.19
274.0	3506.236	25.022	264.850	634.2	292.3	11137.7	-18.17	-0.38	27.32
276.0	3506.439	25.118	268.526	597.8	291.5	11192.5	-18.20	-0.39	27.48
278.0	3506.630	25.214	272.219	561.3	290.7	11247.7	-18.21	-0.41	27.64
280.0	3506.809	25.309	275.930	524.9	289.9	11303.1	-18.20	-0.41	27.80
282.0	3506.975	25.404	279.660	488.5	289.1	11358.9	-18.20	-0.37	27.96
284.0	3507.130	25.499	283.408	451.9	288.3	11415.0	-18.29	-0.34	28.11
286.0	3507.273	25.594	287.174	415.1	287.6	11471.3	-18.46	-0.33	28.26
288.0	3507.403	25.689	290.960	378.1	286.9	11528.0	-18.51	-0.34	28.41
290.0	3507.522	25.783	294.764	341.2	286.2	11585.0	-18.43	-0.34	28.58
292.0	3507.628	25.877	298.586	304.3	285.5	11642.3	-18.35	-0.36	28.73
294.0	3507.722	25.971	302.428	267.5	284.8	11700.0	-18.39	-0.37	28.88
296.0	3507.804	26.065	306.289	230.6	284.0	11757.9	-18.48	-0.37	29.05
298.0	3507.874	26.158	310.168	193.6	283.2	11816.2	-18.54	-0.37	29.23
300.0	3507.932	26.251	314.067	156.4	282.5	11874.9	-18.58	-0.37	29.39
302.0	3507.977	26.344	317.986	119.2	281.7	11933.8	-18.63	-0.38	29.56
304.0	3508.010	26.437	321.924	81.8	280.9	11993.1	-18.68	-0.38	29.73
306.0	3508.031	26.529	325.881	44.4	280.2	12052.8	-18.72	-0.38	29.91
308.0	3508.039	26.621	329.858	6.8	279.4	12112.8	-18.76	-0.34	30.09
310.0	3508.035	26.713	333.855	-30.8	278.7	12173.2	-18.80	-0.33	30.28
312.0	3508.019	26.804	337.872	-68.5	278.0	12234.0	-18.85	-0.37	30.49
314.0	3507.990	26.896	341.909	-106.3	277.2	12295.1	-18.90	-0.42	30.69
316.0	3507.949	26.987	345.966	-144.2	276.3	12356.7	-18.96	-0.42	30.88
318.0	3507.895	27.078	350.044	-182.2	275.5	12418.7	-19.01	-0.39	31.05
320.0	3507.829	27.168	354.142	-220.3	274.7	12481.0	-19.07	-0.37	31.23
322.0	3507.750	27.259	358.260	-258.5	273.9	12543.6	-19.15	-0.38	31.43
324.0	3507.659	27.349	362.399	-297.0	273.1	12606.7	-19.24	-0.38	31.63
326.0	3507.555	27.438	366.559	-335.5	272.4	12670.2	-19.29	-0.36	31.82
328.0	3507.438	27.528	370.740	-374.2	271.6	12734.0	-19.32	-0.35	32.01
330.0	3507.308	27.617	374.942	-412.9	270.9	12798.3	-19.37	-0.36	32.20
332.0	3507.166	27.706	379.166	-451.8	270.2	12862.9	-19.46	-0.38	32.41
334.0	3507.011	27.795	383.410	-490.8	269.4	12927.9	-19.54	-0.39	32.62
336.0	3506.843	27.884	387.676	-530.0	268.6	12993.4	-19.58	-0.38	32.81
338.0	3506.662	27.972	391.964	-569.2	267.8	13059.2	-19.63	-0.36	33.02
340.0	3506.468	28.060	396.274	-608.6	267.1	13125.5	-19.73	-0.37	33.24
342.0	3506.261	28.148	400.605	-648.3	266.3	13192.2	-19.83	-0.38	33.47
344.0	3506.041	28.235	404.958	-688.0	265.5	13259.4	-19.92	-0.36	33.69
346.0	3505.808	28.323	409.334	-728.0	264.8	13326.9	-19.95	-0.32	33.88
348.0	3505.562	28.410	413.732	-768.0	264.2	13394.9	-20.00	-0.30	34.07

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
350.0	3505.303	28.496	418.152	-808.1	263.6	13463.3	-20.09	-0.32	34.28
352.0	3505.030	28.583	422.595	-848.4	262.9	13532.1	-20.20	-0.35	34.51
354.0	3504.744	28.669	427.060	-889.0	262.1	13601.4	-20.30	-0.36	34.74
356.0	3504.445	28.756	431.549	-929.7	261.4	13671.1	-20.37	-0.36	34.98
358.0	3504.132	28.842	436.060	-970.5	260.6	13741.3	-20.43	-0.35	35.21
360.0	3503.806	28.927	440.595	-1011.5	259.9	13811.9	-20.49	-0.33	35.44
362.0	3503.466	29.013	445.153	-1052.6	259.3	13883.1	-20.57	-0.34	35.67
364.0	3503.113	29.098	449.734	-1093.9	258.6	13954.6	-20.67	-0.34	35.90
366.0	3502.746	29.183	454.340	-1135.4	257.9	14026.7	-20.79	-0.34	36.17
368.0	3502.365	29.268	458.968	-1177.2	257.2	14099.4	-20.93	-0.34	36.47
370.0	3501.971	29.352	463.621	-1219.2	256.5	14172.6	-21.04	-0.33	36.71
372.0	3501.563	29.436	468.299	-1261.4	255.8	14246.1	-21.09	-0.33	36.86
374.0	3501.141	29.521	473.000	-1303.7	255.1	14320.1	-21.15	-0.33	37.03
376.0	3500.705	29.604	477.726	-1346.1	254.4	14394.4	-21.26	-0.31	37.30
378.0	3500.255	29.688	482.476	-1388.8	253.8	14469.3	-21.37	-0.33	37.62
380.0	3499.790	29.771	487.251	-1431.6	253.1	14544.9	-21.46	-0.34	37.89
382.0	3499.312	29.855	492.051	-1474.7	252.4	14620.9	-21.56	-0.34	38.15
384.0	3498.819	29.938	496.876	-1518.0	251.7	14697.5	-21.69	-0.33	38.42
386.0	3498.313	30.020	501.727	-1561.6	251.0	14774.7	-21.83	-0.31	38.70
388.0	3497.791	30.103	506.603	-1605.4	250.3	14852.3	-21.94	-0.31	38.95
390.0	3497.256	30.185	511.504	-1649.4	249.7	14930.5	-22.02	-0.32	39.20
392.0	3496.706	30.267	516.432	-1693.6	249.0	15009.2	-22.11	-0.32	39.47
394.0	3496.141	30.349	521.385	-1738.0	248.4	15088.4	-22.28	-0.32	39.78
396.0	3495.561	30.431	526.365	-1782.8	247.7	15168.3	-22.48	-0.32	40.09
398.0	3494.967	30.512	531.371	-1827.9	247.1	15248.8	-22.62	-0.32	40.35
400.0	3494.358	30.593	536.403	-1873.3	246.4	15329.7	-22.68	-0.32	40.62
402.0	3493.734	30.674	541.463	-1918.8	245.7	15411.3	-22.75	-0.32	40.90
404.0	3493.095	30.755	546.549	-1964.5	245.1	15493.4	-22.89	-0.32	41.23
406.0	3492.441	30.836	551.662	-2010.5	244.4	15576.2	-23.04	-0.31	41.54
408.0	3491.771	30.916	556.803	-2056.8	243.8	15659.6	-23.19	-0.30	41.81
410.0	3491.087	30.996	561.971	-2103.3	243.2	15743.5	-23.34	-0.30	42.11
412.0	3490.387	31.076	567.167	-2150.2	242.5	15828.1	-23.48	-0.30	42.41
414.0	3489.671	31.156	572.391	-2197.4	241.9	15913.2	-23.63	-0.30	42.73
416.0	3488.940	31.235	577.643	-2244.8	241.3	15999.0	-23.78	-0.30	43.05
418.0	3488.193	31.315	582.924	-2292.6	240.7	16085.5	-23.94	-0.30	43.36
420.0	3487.431	31.394	588.233	-2340.7	240.0	16172.5	-24.10	-0.30	43.68
422.0	3486.652	31.473	593.570	-2389.1	239.4	16260.2	-24.25	-0.29	43.98
424.0	3485.858	31.551	598.937	-2437.8	238.8	16348.4	-24.41	-0.29	44.28
426.0	3485.047	31.630	604.333	-2486.8	238.2	16437.6	-24.57	-0.28	44.82
428.0	3484.221	31.708	609.758	-2536.2	237.7	16527.8	-24.73	-0.27	45.33
430.0	3483.378	31.786	615.213	-2585.9	237.1	16618.7	-24.90	-0.27	45.65
432.0	3482.518	31.864	620.699	-2635.9	236.5	16710.2	-25.07	-0.27	45.82
434.0	3481.642	31.942	626.214	-2686.3	235.9	16802.2	-25.24	-0.28	46.10

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
436.0	3480.750	32.020	631.760	-2737.0	235.4	16894.8	-25.41	-0.29	46.56
438.0	3479.841	32.097	637.336	-2788.0	234.8	16988.3	-25.59	-0.27	46.96
440.0	3478.914	32.174	642.944	-2839.5	234.2	17082.6	-25.77	-0.26	47.25
442.0	3477.971	32.251	648.582	-2891.3	233.7	17177.4	-25.96	-0.24	47.59
444.0	3477.011	32.328	654.252	-2943.4	233.2	17273.0	-26.14	-0.24	47.99
446.0	3476.034	32.405	659.953	-2995.9	232.6	17369.4	-26.29	-0.26	48.41
448.0	3475.039	32.481	665.687	-3048.7	232.1	17466.7	-26.47	-0.28	48.82
450.0	3474.026	32.558	671.452	-3101.9	231.5	17564.8	-26.70	-0.27	49.22
452.0	3472.997	32.634	677.250	-3155.6	230.9	17663.7	-26.93	-0.25	49.66
454.0	3471.949	32.710	683.080	-3209.6	230.4	17763.4	-27.03	-0.24	50.07
456.0	3470.884	32.785	688.944	-3263.9	229.9	17864.1	-27.20	-0.25	50.56
458.0	3469.800	32.861	694.841	-3318.8	229.4	17965.6	-27.51	-0.26	50.95
460.0	3468.699	32.936	700.771	-3374.1	228.7	18067.9	-27.80	-0.33	51.33
462.0	3467.579	33.011	706.735	-3430.1	228.2	18170.9	-28.09	-0.25	51.72
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
463.090	3466.961	33.052	710.000	-3460.8	227.8	18227.4	-28.26	-0.43	51.92
464.0	3466.441	33.086	712.732	-3486.5	227.5	18267.2	-28.31	-0.26	40.12
466.0	3465.283	33.161	718.757	-3543.7	226.7	18347.7	-28.71	-0.42	40.43
468.0	3464.107	33.236	724.810	-3601.3	225.6	18428.9	-28.84	-0.59	40.76
470.0	3462.912	33.310	730.890	-3659.1	224.5	18510.8	-28.80	-0.62	41.10
472.0	3461.699	33.383	736.996	-3716.5	223.5	18593.3	-28.58	-0.44	41.45
474.0	3460.466	33.457	743.129	-3772.9	222.6	18672.2	-27.66	-0.40	35.89
476.0	3459.215	33.530	749.287	-3827.5	221.6	18742.1	-26.93	-0.48	34.83
478.0	3457.946	33.603	755.467	-3881.1	220.7	18811.8	-26.77	-0.38	34.90
480.0	3456.660	33.675	761.671	-3935.0	219.9	18881.7	-27.07	-0.40	35.00
482.0	3455.356	33.748	767.897	-3989.5	219.1	18951.8	-27.34	-0.39	35.12
484.0	3454.034	33.820	774.147	-4044.4	218.3	19022.2	-27.50	-0.38	35.29
486.0	3452.693	33.891	780.420	-4099.7	217.6	19092.9	-27.56	-0.35	35.45
488.0	3451.335	33.963	786.716	-4154.8	216.9	19164.0	-27.57	-0.31	35.65
490.0	3449.958	34.034	793.036	-4210.0	216.2	19235.5	-27.56	-0.28	35.84
492.0	3448.563	34.105	799.379	-4265.3	215.7	19307.4	-27.64	-0.22	36.02
494.0	3447.150	34.176	805.746	-4320.9	215.3	19379.6	-27.89	-0.18	36.23
496.0	3445.719	34.247	812.137	-4377.0	214.9	19452.4	-28.22	-0.18	36.46
498.0	3444.269	34.318	818.552	-4433.9	214.5	19525.5	-28.57	-0.19	36.69
500.0	3442.800	34.388	824.991	-4491.4	214.1	19599.1	-28.87	-0.20	36.90
502.0	3441.312	34.459	831.454	-4549.4	213.7	19673.2	-29.15	-0.18	37.11
504.0	3439.805	34.529	837.942	-4608.1	213.3	19747.6	-29.43	-0.17	37.34
506.0	3438.278	34.599	844.455	-4667.3	212.9	19822.6	-29.70	-0.16	37.58
508.0	3436.732	34.669	850.992	-4727.0	212.6	19898.0	-29.96	-0.15	37.82
510.0	3435.166	34.739	857.554	-4787.2	212.3	19973.9	-30.18	-0.14	38.03
512.0	3433.580	34.809	864.141	-4847.9	212.0	20050.2	-30.38	-0.14	38.24

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
514.0	3431.975	34.879	870.753	-4908.9	211.7	20126.9	-30.58	-0.14	38.48
516.0	3430.349	34.948	877.391	-4970.3	211.4	20204.1	-30.78	-0.13	38.73
518.0	3428.703	35.018	884.054	-5032.1	211.1	20281.9	-30.98	-0.12	38.97
520.0	3427.036	35.087	890.743	-5094.4	210.8	20360.1	-31.19	-0.11	39.22
522.0	3425.349	35.156	897.457	-5157.0	210.6	20438.8	-31.40	-0.11	39.49
524.0	3423.641	35.226	904.198	-5220.2	210.3	20518.1	-31.64	-0.11	39.77
526.0	3421.912	35.295	910.965	-5283.7	210.1	20597.9	-31.86	-0.10	40.00
528.0	3420.163	35.364	917.758	-5347.7	209.8	20678.1	-32.06	-0.08	40.22
530.0	3418.392	35.433	924.578	-5412.1	209.7	20758.8	-32.27	-0.08	40.47
532.0	3416.600	35.502	931.424	-5477.0	209.5	20840.1	-32.51	-0.06	40.76
534.0	3414.786	35.571	938.297	-5542.3	209.3	20921.9	-32.78	-0.05	41.05
536.0	3412.951	35.640	945.197	-5608.2	209.2	21004.3	-33.04	-0.05	41.32
538.0	3411.094	35.709	952.124	-5674.6	209.0	21087.2	-33.27	-0.07	41.57
540.0	3409.215	35.777	959.079	-5741.4	208.9	21170.6	-33.49	-0.09	41.81
542.0	3407.314	35.846	966.061	-5808.7	208.6	21254.5	-33.70	-0.08	42.08
544.0	3405.391	35.915	973.071	-5876.4	208.4	21339.0	-33.94	-0.08	42.36
546.0	3403.446	35.983	980.109	-5944.6	208.2	21424.0	-34.21	-0.09	42.63
548.0	3401.478	36.052	987.175	-6013.4	208.0	21509.6	-34.49	-0.09	42.91
550.0	3399.487	36.120	994.269	-6082.7	207.8	21595.7	-34.74	-0.08	43.17
552.0	3397.474	36.189	1001.392	-6152.4	207.7	21682.3	-34.98	-0.06	43.52
554.0	3395.437	36.257	1008.543	-6222.7	207.5	21769.6	-35.27	-0.00	43.70
556.0	3393.377	36.325	1015.723	-6293.7	207.4	21857.2	-35.56	-0.08	43.94
558.0	3391.294	36.394	1022.932	-6365.1	207.3	21945.3	-35.86	0.05	44.17
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
559.050	3390.190	36.429	1026.729	-6402.9	207.3	21991.8	-36.01	-0.45	44.29
S-II/S-IVB SEPARATION COMMAND									
560.000	3389.187	36.462	1030.167	-6431.9	207.1	21995.1	-28.78	-0.32	-9.05
562.0	3387.060	36.530	1037.405	-6489.6	206.4	21977.3	-28.90	-0.18	-8.76
564.0	3384.915	36.598	1044.635	-6548.0	205.9	21960.4	-29.51	-0.34	-7.48
566.0	3382.750	36.665	1051.864	-6609.0	205.0	21963.2	-31.39	-0.45	7.09
568.0	3380.564	36.733	1059.096	-6671.6	204.4	21979.0	-31.09	-0.16	8.12
570.0	3378.357	36.800	1066.333	-6734.0	204.1	21995.3	-31.29	-0.20	8.18
572.0	3376.130	36.867	1073.576	-6797.0	203.5	22011.7	-31.66	-0.33	8.24
574.0	3373.883	36.934	1080.824	-6860.7	202.7	22028.3	-31.98	-0.43	8.30
576.0	3371.614	37.001	1088.077	-6924.9	201.9	22044.9	-32.05	-0.40	8.35
578.0	3369.324	37.067	1095.336	-6989.0	201.1	22061.7	-32.05	-0.34	8.42
580.0	3367.013	37.133	1102.600	-7053.5	200.4	22078.2	-32.15	-0.30	8.41
582.0	3364.680	37.199	1109.870	-7118.0	199.8	22095.0	-32.33	-0.26	8.37
584.0	3362.327	37.264	1117.146	-7182.9	199.3	22111.7	-32.46	-0.22	8.33

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
586.0	3359.952	37.330	1124.427	-7248.0	198.9	22128.4	-32.54	-0.18	8.28
588.0	3357.555	37.395	1131.713	-7313.2	198.5	22144.9	-32.62	-0.16	8.24
590.0	3355.137	37.461	1139.005	-7378.6	198.2	22161.4	-32.72	-0.15	8.21
592.0	3352.698	37.526	1146.302	-7444.2	197.8	22177.8	-32.82	-0.13	8.18
594.0	3350.237	37.591	1153.605	-7510.0	197.6	22194.2	-32.90	-0.11	8.16
596.0	3347.754	37.656	1160.913	-7576.0	197.3	22210.5	-32.99	-0.10	8.14
598.0	3345.249	37.721	1168.227	-7642.1	197.1	22226.7	-33.06	-0.08	8.11
600.0	3342.723	37.786	1175.545	-7708.3	196.9	22243.0	-33.10	-0.07	8.08
602.0	3340.175	37.850	1182.869	-7774.7	196.7	22259.1	-33.14	-0.08	8.05
604.0	3337.605	37.915	1190.199	-7841.1	196.5	22275.2	-33.19	-0.11	8.01
606.0	3335.013	37.980	1197.533	-7907.6	196.2	22291.2	-33.27	-0.12	7.95
608.0	3332.399	38.044	1204.873	-7974.3	196.0	22307.1	-33.39	-0.10	7.89
610.0	3329.763	38.109	1212.219	-8041.3	195.8	22322.8	-33.51	-0.07	7.85
612.0	3327.105	38.173	1219.569	-8108.5	195.6	22338.5	-33.58	-0.05	7.84
614.0	3324.425	38.238	1226.924	-8175.7	195.5	22354.3	-33.58	-0.05	7.85
616.0	3321.723	38.302	1234.285	-8242.9	195.3	22370.0	-33.57	-0.05	7.85
618.0	3318.999	38.366	1241.651	-8310.2	195.2	22385.7	-33.63	-0.06	7.82
620.0	3316.252	38.430	1249.022	-8377.7	195.0	22401.3	-33.74	-0.07	7.76
622.0	3313.484	38.495	1256.398	-8445.4	194.8	22416.8	-33.85	-0.08	7.71
624.0	3310.693	38.559	1263.779	-8513.2	194.6	22432.2	-33.89	-0.09	7.69
626.0	3307.879	38.623	1271.165	-8581.0	194.4	22447.7	-33.87	-0.09	7.70
628.0	3305.044	38.687	1278.557	-8648.8	194.2	22463.1	-33.86	-0.09	7.70
630.0	3302.186	38.751	1285.953	-8716.7	194.0	22478.5	-33.91	-0.09	7.67
632.0	3299.305	38.814	1293.355	-8784.7	193.8	22493.8	-34.04	-0.09	7.60
634.0	3296.402	38.878	1300.761	-8853.0	193.5	22509.0	-34.18	-0.10	7.53
636.0	3293.477	38.942	1308.173	-8921.5	193.3	22524.0	-34.24	-0.11	7.50
638.0	3290.529	39.005	1315.589	-8990.1	193.0	22539.0	-34.24	-0.11	7.50
640.0	3287.559	39.069	1323.011	-9058.7	192.7	22554.1	-34.26	-0.10	7.50
642.0	3284.566	39.132	1330.437	-9127.4	192.5	22569.1	-34.33	-0.10	7.47
644.0	3281.550	39.196	1337.868	-9196.2	192.3	22584.0	-34.41	-0.09	7.43
646.0	3278.512	39.259	1345.304	-9265.1	192.1	22598.8	-34.46	-0.09	7.39
648.0	3275.451	39.322	1352.745	-9334.2	191.8	22613.6	-34.49	-0.09	7.35
650.0	3272.367	39.385	1360.191	-9403.3	191.6	22628.3	-34.53	-0.09	7.31
652.0	3269.260	39.448	1367.642	-9472.5	191.4	22642.9	-34.61	-0.12	7.29
654.0	3266.131	39.511	1375.097	-9541.9	191.0	22657.5	-34.66	-0.16	7.27
656.0	3262.979	39.574	1382.558	-9611.3	190.6	22672.1	-34.69	-0.18	7.26
658.0	3259.804	39.637	1390.023	-9680.8	190.2	22686.6	-34.74	-0.19	7.25
660.0	3256.606	39.699	1397.493	-9750.4	189.8	22701.2	-34.78	-0.17	7.26
662.0	3253.385	39.761	1404.967	-9820.1	189.5	22715.7	-34.84	-0.15	7.24
664.0	3250.141	39.824	1412.447	-9889.9	189.1	22730.2	-34.87	-0.15	7.20
666.0	3246.874	39.886	1419.931	-9959.8	188.8	22744.5	-34.91	-0.16	7.15
668.0	3243.584	39.948	1427.420	-10029.9	188.4	22758.8	-35.04	-0.17	7.06
670.0	3240.271	40.010	1434.913	-10100.3	188.0	22772.8	-35.28	-0.19	6.95

TABLE C-II. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
672.0	3236.935	40.072	1442.411	-10171.1	187.6	22786.7	-35.48	-0.19	6.86
674.0	3233.575	40.133	1449.914	-10242.2	187.1	22800.4	-35.52	-0.18	6.85
676.0	3230.192	40.195	1457.421	-10313.3	186.7	22814.2	-35.45	-0.17	6.88
678.0	3226.786	40.256	1464.933	-10384.3	186.3	22828.0	-35.43	-0.19	6.89
680.0	3223.356	40.318	1472.449	-10455.2	185.9	22841.7	-35.45	-0.21	6.87
682.0	3219.903	40.379	1479.970	-10526.2	185.4	22855.5	-35.44	-0.22	6.84
684.0	3216.427	40.440	1487.495	-10597.1	185.0	22869.2	-35.38	-0.20	6.85
686.0	3212.927	40.501	1495.025	-10667.9	184.5	22882.9	-35.33	-0.19	6.87
688.0	3209.404	40.561	1502.559	-10738.7	184.1	22896.7	-35.30	-0.19	6.88
690.0	3205.858	40.622	1510.098	-10809.4	183.7	22910.5	-35.31	-0.19	6.88
692.0	3202.288	40.682	1517.642	-10880.1	183.2	22924.3	-35.32	-0.20	6.88
694.0	3198.695	40.742	1525.190	-10950.8	182.8	22938.1	-35.34	-0.21	6.88
696.0	3195.079	40.802	1532.742	-11021.6	182.3	22951.8	-35.34	-0.20	6.86
698.0	3191.439	40.862	1540.299	-11092.4	181.9	22965.5	-35.35	-0.19	6.83
700.0	3187.777	40.922	1547.861	-11163.2	181.5	22979.1	-35.35	-0.45	6.80
S-IVB 1ST GUIDANCE CUTOFF									
700.560	3186.747	40.939	1549.979	-11183.0	181.3	22982.9	-35.35	-0.40	6.79
702.0	3184.092	40.982	1555.425	-11224.1	181.0	22968.3	-27.25	-0.28	-13.22
704.0	3180.388	41.041	1562.979	-11278.7	180.4	22941.8	-27.22	-0.29	-13.28
706.0	3176.667	41.101	1570.527	-11333.2	179.8	22915.2	-27.19	-0.29	-13.33
708.0	3172.928	41.160	1578.066	-11387.6	179.1	22888.5	-27.16	-0.29	-13.39
710.0	3169.171	41.219	1585.595	-11442.0	178.5	22861.7	-27.13	-0.29	-13.45
PARKING ORBIT INSERTION									
710.560	3168.115	41.235	1587.702	-11457.2	178.3	22854.2	-27.12	-0.30	-13.46

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
GUIDANCE REFERENCE RELEASE											
-16.960	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-16.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-15.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-14.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-13.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-12.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-11.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-10.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-9.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-8.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-7.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-6.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-5.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-4.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-3.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-2.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-1.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
0.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
ALL HOLDDOWN ARMS RELEASED											
0.200	3441.364	-80.6041	28.4470	0.0	90.00	0.2	90.00	0.01	1340.7	0.0	366
LIFTOFF - START OF TIME BASE 1											
0.600	3441.365	-80.6041	28.4470	219.08	88.71	1.1	90.00	0.05	1340.7	0.000	367
1.0	3441.365	-80.6041	28.4470	266.05	89.35	2.3	90.00	0.10	1340.7	-0.000	367
2.0	3441.366	-80.6041	28.4470	32.68	89.29	8.9	90.00	0.38	1340.8	0.000	373
3.0	3441.368	-80.6041	28.4470	30.46	88.91	16.5	89.99	0.71	1340.9	0.000	385
4.0	3441.371	-80.6041	28.4470	26.44	88.59	24.3	89.98	1.04	1341.2	0.000	406
5.0	3441.376	-80.6041	28.4470	53.82	88.87	32.1	89.98	1.37	1341.6	0.000	434
6.0	3441.382	-80.6041	28.4470	130.40	87.99	40.1	90.04	1.71	1342.4	0.000	470
7.0	3441.389	-80.6041	28.4470	143.87	86.60	48.3	90.10	2.06	1343.3	0.000	514
8.0	3441.397	-80.6041	28.4470	147.55	85.65	56.7	90.15	2.41	1344.2	0.001	567
9.0	3441.407	-80.6041	28.4469	146.07	85.73	65.1	90.17	2.77	1345.0	0.001	627
10.0	3441.419	-80.6041	28.4469	143.44	85.95	73.6	90.18	3.13	1345.8	0.002	696
11.0	3441.432	-80.6041	28.4469	140.61	86.09	82.3	90.18	3.49	1346.8	0.003	774
12.0	3441.446	-80.6041	28.4469	138.40	86.18	91.1	90.19	3.87	1347.8	0.004	860
13.0	3441.462	-80.6041	28.4469	137.78	86.24	100.0	90.21	4.24	1348.8	0.005	956
14.0	3441.479	-80.6041	28.4469	136.48	86.27	109.1	90.22	4.62	1350.0	0.006	1060

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
15.0	3441.497	-80.6040	28.4469	134.45	86.27	118.4	90.23	5.02	1351.4	0.007	1174
16.0	3441.518	-80.6040	28.4469	131.34	86.32	128.0	90.23	5.42	1353.0	0.009	1296
17.0	3441.539	-80.6040	28.4468	126.84	86.41	137.8	90.22	5.83	1354.7	0.010	1429
18.0	3441.563	-80.6040	28.4468	121.58	86.46	147.8	90.20	6.24	1356.6	0.012	1571
19.0	3441.588	-80.6039	28.4468	116.19	86.44	158.0	90.18	6.66	1358.8	0.013	1724
20.0	3441.615	-80.6039	28.4468	111.00	86.36	168.4	90.16	7.09	1361.2	0.015	1887
21.0	3441.643	-80.6039	28.4468	106.19	86.23	179.1	90.14	7.53	1363.9	0.016	2060
22.0	3441.674	-80.6038	28.4468	101.75	86.03	190.0	90.11	7.97	1366.9	0.018	2244
23.0	3441.706	-80.6038	28.4468	97.87	85.77	201.1	90.09	8.42	1370.3	0.020	2439
24.0	3441.740	-80.6038	28.4468	94.52	85.46	212.5	90.06	8.87	1374.0	0.023	2646
25.0	3441.775	-80.6037	28.4468	91.62	85.13	224.2	90.02	9.33	1378.1	0.025	2863
26.0	3441.813	-80.6036	28.4468	89.11	84.76	236.1	89.99	9.79	1382.6	0.028	3092
27.0	3441.853	-80.6036	28.4468	86.93	84.37	248.3	89.95	10.26	1387.4	0.032	3333
28.0	3441.895	-80.6035	28.4468	85.07	83.96	260.7	89.90	10.73	1392.6	0.036	3587
29.0	3441.938	-80.6034	28.4468	83.50	83.52	273.4	89.85	11.20	1398.2	0.040	3852
30.0	3441.984	-80.6033	28.4468	82.19	83.06	286.4	89.80	11.68	1404.3	0.045	4130
31.0	3442.032	-80.6032	28.4468	81.09	82.59	299.8	89.75	12.16	1410.8	0.051	4421
32.0	3442.082	-80.6031	28.4468	80.20	82.10	313.4	89.70	12.65	1417.8	0.057	4725
33.0	3442.134	-80.6029	28.4469	79.46	81.61	327.3	89.64	13.13	1425.2	0.064	5042
34.0	3442.188	-80.6028	28.4469	78.87	81.09	341.5	89.58	13.62	1433.2	0.072	5372
35.0	3442.245	-80.6026	28.4469	78.38	80.57	356.1	89.52	14.10	1441.7	0.081	5717
36.0	3442.304	-80.6024	28.4469	77.99	80.04	371.0	89.45	14.59	1450.7	0.091	6075
37.0	3442.365	-80.6022	28.4470	77.67	79.50	386.2	89.39	15.07	1460.2	0.102	6448
38.0	3442.429	-80.6020	28.4470	77.41	78.95	401.7	89.32	15.56	1470.2	0.114	6835
39.0	3442.495	-80.6017	28.4471	77.18	78.39	417.6	89.25	16.04	1480.8	0.127	7236
40.0	3442.564	-80.6015	28.4471	76.97	77.84	433.9	89.17	16.52	1491.9	0.141	7653
41.0	3442.635	-80.6012	28.4472	76.80	77.28	450.5	89.10	16.99	1503.6	0.157	8085
42.0	3442.708	-80.6009	28.4472	76.66	76.71	467.5	89.02	17.47	1515.9	0.173	8532
43.0	3442.785	-80.6005	28.4473	76.54	76.14	485.0	88.93	17.94	1528.8	0.192	8995
44.0	3442.863	-80.6002	28.4474	76.44	75.56	502.8	88.85	18.40	1542.3	0.211	9474
45.0	3442.945	-80.5998	28.4475	76.36	74.98	521.1	88.76	18.86	1556.5	0.233	9969
46.0	3443.029	-80.5993	28.4476	76.30	74.38	539.8	88.67	19.32	1571.4	0.256	10481
47.0	3443.116	-80.5989	28.4477	76.25	73.78	559.0	88.58	19.77	1587.0	0.280	11009
48.0	3443.206	-80.5984	28.4478	76.21	73.17	578.6	88.48	20.21	1603.3	0.307	11555
49.0	3443.298	-80.5979	28.4479	76.19	72.55	598.6	88.38	20.64	1620.4	0.335	12117
50.0	3443.394	-80.5973	28.4480	76.17	71.92	619.1	88.28	21.06	1638.1	0.366	12697
51.0	3443.492	-80.5967	28.4481	76.15	71.28	640.1	88.17	21.47	1656.7	0.398	13295
52.0	3443.593	-80.5961	28.4483	76.13	70.64	661.6	88.06	21.87	1675.9	0.433	13910
53.0	3443.697	-80.5954	28.4484	76.12	70.00	683.5	87.95	22.25	1695.9	0.470	14543
54.0	3443.805	-80.5947	28.4486	76.10	69.36	705.9	87.84	22.63	1716.5	0.510	15195
55.0	3443.915	-80.5939	28.4488	76.07	68.72	728.9	87.72	23.00	1737.9	0.552	15865
56.0	3444.028	-80.5931	28.4489	76.05	68.08	752.4	87.60	23.36	1760.1	0.597	16554
57.0	3444.145	-80.5922	28.4491	76.02	67.44	776.5	87.47	23.71	1782.9	0.644	17261

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
58.0	3444.264	-80.5913	28.4493	75.99	66.81	801.1	87.35	24.05	1806.5	0.695	17988
59.0	3444.387	-80.5903	28.4495	75.97	66.17	826.3	87.22	24.38	1830.9	0.748	18734
60.0	3444.513	-80.5892	28.4498	75.94	65.55	852.0	87.09	24.70	1856.0	0.805	19500
61.0	3444.642	-80.5881	28.4500	75.92	64.92	878.3	86.96	25.01	1881.8	0.864	20286
62.0	3444.775	-80.5870	28.4503	75.91	64.30	905.1	86.82	25.30	1908.4	0.927	21092
63.0	3444.911	-80.5858	28.4505	75.90	63.68	932.5	86.69	25.58	1935.7	0.993	21918
64.0	3445.050	-80.5845	28.4508	75.90	63.06	960.5	86.56	25.85	1963.8	1.063	22764
65.0	3445.193	-80.5831	28.4511	75.92	62.45	988.9	86.43	26.11	1992.4	1.136	23631
66.0	3445.339	-80.5817	28.4514	75.94	61.85	1017.8	86.31	26.35	2021.8	1.213	24518
67.0	3445.488	-80.5802	28.4518	75.97	61.25	1047.2	86.18	26.58	2051.8	1.294	25426
MACH 1											
68.000	3445.641	-80.5787	28.4521	76.00	60.66	1077.0	86.06	26.80	2082.4	1.379	26355
69.0	3445.797	-80.5771	28.4525	76.03	60.07	1107.5	85.94	27.01	2113.7	1.468	27305
70.0	3445.957	-80.5753	28.4528	76.06	59.49	1138.5	85.82	27.20	2145.8	1.560	28276
71.0	3446.120	-80.5736	28.4532	76.10	58.91	1170.1	85.70	27.39	2178.5	1.658	29268
72.0	3446.287	-80.5717	28.4536	76.15	58.35	1202.3	85.58	27.56	2211.9	1.759	30281
73.0	3446.457	-80.5697	28.4541	76.21	57.79	1235.1	85.47	27.73	2246.0	1.865	31315
74.0	3446.631	-80.5677	28.4545	76.29	57.25	1268.6	85.37	27.89	2280.9	1.975	32372
75.0	3446.808	-80.5656	28.4549	76.41	56.71	1302.9	85.29	28.04	2316.6	2.091	33450
76.0	3446.989	-80.5634	28.4554	76.56	56.19	1337.9	85.21	28.19	2353.2	2.211	34551
77.0	3447.174	-80.5611	28.4559	76.68	55.67	1373.6	85.13	28.33	2390.6	2.335	35674
78.0	3447.362	-80.5587	28.4564	76.73	55.15	1410.2	85.03	28.46	2428.7	2.465	36821
79.0	3447.555	-80.5562	28.4569	76.73	54.63	1447.5	84.91	28.58	2467.7	2.600	37990
80.0	3447.751	-80.5536	28.4574	76.68	54.10	1485.6	84.77	28.68	2507.6	2.740	39182
MAXIMUM DYNAMIC PRESSURE											
81.000	3447.951	-80.5509	28.4580	76.61	53.56	1524.6	84.61	28.77	2548.5	2.886	40398
82.0	3448.155	-80.5481	28.4586	76.53	53.02	1564.5	84.45	28.84	2590.5	3.038	41637
83.0	3448.362	-80.5452	28.4592	76.44	52.46	1605.2	84.29	28.90	2633.6	3.196	42899
84.0	3448.574	-80.5422	28.4598	76.36	51.89	1646.8	84.13	28.94	2677.7	3.359	44184
85.0	3448.789	-80.5391	28.4605	76.28	51.32	1689.3	83.96	28.97	2722.9	3.530	45492
86.0	3449.008	-80.5358	28.4612	76.21	50.74	1732.6	83.80	28.98	2769.1	3.706	46822
87.0	3449.230	-80.5325	28.4619	76.14	50.17	1776.8	83.65	28.98	2816.3	3.890	48176
88.0	3449.457	-80.5290	28.4627	76.09	49.60	1821.9	83.50	28.97	2864.4	4.080	49553
89.0	3449.687	-80.5253	28.4635	76.06	49.04	1867.9	83.35	28.96	2913.5	4.277	50953
90.0	3449.921	-80.5216	28.4643	76.04	48.48	1914.7	83.22	28.93	2963.5	4.482	52376
91.0	3450.159	-80.5177	28.4651	76.03	47.93	1962.5	83.09	28.90	3014.4	4.694	53822
92.0	3450.401	-80.5136	28.4660	76.03	47.39	2011.2	82.97	28.86	3066.3	4.914	55291
93.0	3450.646	-80.5095	28.4669	76.02	46.86	2060.8	82.85	28.82	3119.2	5.141	56784
94.0	3450.896	-80.5051	28.4679	76.02	46.33	2111.3	82.72	28.77	3173.0	5.377	58300

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
95.0	3451.149	-80.5007	28.4689	76.01	45.80	2162.8	82.60	28.71	3227.6	5.620	59840
96.0	3451.406	-80.4960	28.4699	76.01	45.28	2215.2	82.49	28.65	3283.3	5.871	61404
97.0	3451.667	-80.4913	28.4709	76.00	44.77	2268.5	82.37	28.57	3340.0	6.131	62991
98.0	3451.932	-80.4863	28.4720	75.99	44.25	2322.8	82.25	28.49	3397.6	6.400	64601
99.0	3452.201	-80.4812	28.4731	75.99	43.74	2378.1	82.13	28.40	3456.3	6.677	66235
100.0	3452.473	-80.4760	28.4743	75.98	43.23	2434.3	82.02	28.31	3516.0	6.964	67892
101.0	3452.749	-80.4705	28.4755	75.97	42.72	2491.6	81.90	28.20	3576.7	7.259	69572
102.0	3453.029	-80.4649	28.4767	75.96	42.22	2549.9	81.79	28.09	3638.5	7.564	71275
103.0	3453.313	-80.4591	28.4780	75.94	41.72	2609.2	81.68	27.98	3701.2	7.879	73001
104.0	3453.601	-80.4532	28.4793	75.93	41.23	2669.5	81.57	27.86	3764.9	8.203	74750
105.0	3453.892	-80.4470	28.4806	75.92	40.74	2730.8	81.46	27.73	3829.6	8.538	76522
106.0	3454.188	-80.4407	28.4820	75.91	40.26	2793.1	81.35	27.61	3895.3	8.882	78317
107.0	3454.487	-80.4342	28.4835	75.89	39.79	2856.5	81.25	27.48	3962.0	9.237	80135
108.0	3454.789	-80.4275	28.4849	75.88	39.32	2920.9	81.14	27.34	4029.7	9.602	81976
109.0	3455.096	-80.4206	28.4865	75.86	38.86	2986.3	81.03	27.20	4098.3	9.977	83840
110.0	3455.406	-80.4135	28.4880	75.84	38.40	3052.8	80.93	27.06	4168.1	10.364	85727
111.0	3455.720	-80.4062	28.4896	75.83	37.95	3120.2	80.83	26.92	4238.8	10.762	87636
112.0	3456.038	-80.3987	28.4913	75.81	37.50	3188.8	80.73	26.77	4310.6	11.171	89568
113.0	3456.359	-80.3909	28.4930	75.80	37.06	3258.4	80.63	26.62	4383.4	11.591	91522
114.0	3456.684	-80.3830	28.4948	75.80	36.63	3329.1	80.54	26.46	4457.2	12.023	93499
115.0	3457.013	-80.3749	28.4966	75.79	36.21	3400.8	80.46	26.31	4532.1	12.466	95498
116.0	3457.345	-80.3665	28.4985	75.80	35.80	3473.7	80.38	26.17	4607.9	12.922	97521
117.0	3457.682	-80.3579	28.5004	75.80	35.40	3547.7	80.30	26.02	4684.8	13.390	99566
118.0	3458.022	-80.3491	28.5023	75.81	35.02	3622.8	80.23	25.88	4762.7	13.869	101636
119.0	3458.366	-80.3401	28.5043	75.82	34.65	3699.0	80.16	25.75	4841.6	14.361	103729
120.0	3458.714	-80.3308	28.5064	75.83	34.29	3776.5	80.09	25.61	4921.7	14.866	105846
121.0	3459.066	-80.3213	28.5085	75.84	33.94	3855.1	80.03	25.48	5002.9	15.383	107988
122.0	3459.423	-80.3115	28.5107	75.86	33.60	3934.9	79.96	25.35	5085.2	15.913	110155
123.0	3459.783	-80.3016	28.5129	75.87	33.26	4015.9	79.90	25.22	5168.7	16.456	112348
124.0	3460.148	-80.2913	28.5151	75.88	32.93	4098.2	79.84	25.09	5253.4	17.013	114565
125.0	3460.516	-80.2809	28.5174	75.89	32.60	4181.7	79.78	24.95	5339.3	17.583	116808
126.0	3460.889	-80.2701	28.5198	75.90	32.27	4266.4	79.72	24.82	5426.4	18.166	119075
127.0	3461.266	-80.2592	28.5222	75.91	31.94	4352.3	79.67	24.68	5514.7	18.763	121368
128.0	3461.647	-80.2479	28.5247	75.92	31.62	4439.6	79.61	24.54	5604.3	19.375	123686
129.0	3462.032	-80.2364	28.5272	75.93	31.31	4528.2	79.55	24.40	5695.3	20.000	126029
130.0	3462.422	-80.2247	28.5298	75.94	31.00	4618.2	79.50	24.26	5787.6	20.641	128397
131.0	3462.815	-80.2126	28.5325	75.95	30.69	4709.6	79.44	24.12	5881.3	21.296	130791
132.0	3463.213	-80.2003	28.5352	75.95	30.39	4802.5	79.39	23.99	5976.3	21.966	133211
133.0	3463.615	-80.1877	28.5379	75.96	30.09	4896.7	79.34	23.85	6072.7	22.650	135656
134.0	3464.021	-80.1748	28.5408	75.96	29.80	4992.3	79.28	23.71	6170.4	23.351	138127
135.0	3464.432	-80.1617	28.5437	75.97	29.52	5089.3	79.23	23.57	6269.6	24.067	140625
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)											
135.140	3464.489	-80.1598	28.5441	75.98	29.48	5103.0	79.23	23.55	6283.6	24.169	140976

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
136.0	3464.846	-80.1482	28.5466	75.98	29.23	5173.3	79.19	23.42	6355.7	24.797	143143
137.0	3465.262	-80.1346	28.5496	75.99	28.95	5249.9	79.15	23.26	6434.5	25.540	145676
138.0	3465.682	-80.1206	28.5526	75.99	28.68	5326.7	79.12	23.11	6513.4	26.298	148230
139.0	3466.104	-80.1065	28.5557	76.00	28.42	5403.9	79.08	22.96	6592.6	27.068	150798
140.0	3466.529	-80.0921	28.5589	76.01	28.16	5482.0	79.05	22.81	6672.8	27.851	153381
141.0	3466.955	-80.0774	28.5621	76.02	27.90	5561.2	79.02	22.66	6754.0	28.647	155979
142.0	3467.385	-80.0625	28.5654	76.04	27.65	5641.5	78.99	22.52	6836.2	29.457	158592
143.0	3467.817	-80.0474	28.5687	76.05	27.40	5723.7	78.96	22.37	6920.4	30.280	161222
144.0	3468.252	-80.0320	28.5720	76.06	27.15	5806.3	78.94	22.22	7004.9	31.117	163867
145.0	3468.690	-80.0163	28.5754	76.07	26.91	5890.1	78.91	22.08	7090.6	31.967	166529
146.0	3469.130	-80.0004	28.5789	76.09	26.67	5975.2	78.88	21.94	7177.5	32.832	169206
147.0	3469.572	-79.9843	28.5824	76.10	26.43	6061.4	78.85	21.80	7265.6	33.711	171900
148.0	3470.018	-79.9678	28.5860	76.11	26.20	6149.1	78.83	21.66	7355.0	34.604	174610
149.0	3470.466	-79.9511	28.5896	76.12	25.97	6237.8	78.80	21.52	7445.5	35.512	177337
150.0	3470.917	-79.9341	28.5933	76.13	25.74	6327.8	78.78	21.38	7537.2	36.435	180080
151.0	3471.370	-79.9169	28.5970	76.14	25.51	6419.0	78.75	21.25	7630.1	37.372	182840
152.0	3471.827	-79.8993	28.6008	76.15	25.29	6511.6	78.72	21.11	7724.3	38.325	185618
153.0	3472.286	-79.8815	28.6047	76.17	25.08	6605.4	78.70	20.98	7819.8	39.293	188413
154.0	3472.748	-79.8634	28.6086	76.18	24.86	6700.5	78.68	20.85	7916.5	40.277	191225
155.0	3473.213	-79.8450	28.6126	76.19	24.65	6797.0	78.65	20.72	8014.6	41.276	194055
156.0	3473.682	-79.8263	28.6166	76.20	24.44	6895.0	78.63	20.59	8114.1	42.292	196903
157.0	3474.153	-79.8073	28.6207	76.21	24.24	6994.5	78.61	20.46	8215.1	43.323	199770
158.0	3474.627	-79.7880	28.6249	76.22	24.04	7095.0	78.59	20.33	8317.1	44.371	202655
159.0	3475.104	-79.7684	28.6291	76.23	23.84	7197.3	78.57	20.21	8420.8	45.436	205559
160.0	3475.584	-79.7484	28.6334	76.25	23.64	7300.9	78.55	20.08	8526.0	46.517	208481
161.0	3476.067	-79.7282	28.6377	76.26	23.44	7406.1	78.53	19.96	8632.6	47.616	211422
162.0	3476.554	-79.7076	28.6421	76.27	23.25	7512.8	78.51	19.84	8740.7	48.731	214383
163.0	3477.044	-79.6867	28.6466	76.28	23.06	7621.0	78.49	19.72	8850.2	49.865	217364
164.0	3477.537	-79.6655	28.6511	76.30	22.88	7730.7	78.47	19.60	8961.3	51.016	220364
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)											
164.100	3477.586	-79.6634	28.6516	76.30	22.86	7741.7	78.47	19.58	8972.5	51.132	220665
S-IC/S-II SEPARATION COMMAND											
164.800	3477.932	-79.6484	28.6548	76.31	22.74	7773.0	78.47	19.49	9004.8	51.947	222771
166.0	3478.524	-79.6225	28.6603	76.32	22.50	7763.1	78.48	19.28	8996.8	53.351	226370
168.0	3479.490	-79.5795	28.6695	76.35	22.13	7746.6	78.51	18.96	8983.6	55.681	232253
170.0	3480.445	-79.5363	28.6787	76.38	21.76	7757.7	78.52	18.64	8997.7	58.023	238063
172.0	3481.385	-79.4930	28.6879	76.41	21.39	7775.6	78.54	18.33	9018.7	60.373	243782
174.0	3482.312	-79.4494	28.6971	76.43	21.03	7802.4	78.55	18.02	9048.4	62.735	249426
176.0	3483.228	-79.4055	28.7064	76.46	20.67	7830.7	78.56	17.72	9079.4	65.111	254999

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
178.0	3484.132	-79.3614	28.7157	76.49	20.31	7859.7	78.58	17.43	9111.2	67.500	260501
180.0	3485.024	-79.3171	28.7250	76.52	19.97	7889.8	78.59	17.14	9144.0	69.904	265934
182.0	3485.905	-79.2724	28.7344	76.55	19.62	7920.5	78.60	16.85	9177.3	72.321	271297
184.0	3486.775	-79.2275	28.7438	76.58	19.28	7951.8	78.62	16.56	9211.1	74.752	276592
186.0	3487.633	-79.1824	28.7533	76.61	18.94	7983.7	78.63	16.28	9245.5	77.198	281818
188.0	3488.481	-79.1369	28.7627	76.63	18.60	8016.2	78.65	15.99	9280.4	79.657	286976
190.0	3489.317	-79.0912	28.7723	76.66	18.27	8049.1	78.66	15.72	9315.7	82.131	292066
192.0	3490.142	-79.0452	28.7818	76.69	17.94	8082.7	78.68	15.44	9351.5	84.620	297090
194.0	3490.956	-78.9989	28.7914	76.72	17.62	8116.8	78.69	15.17	9387.9	87.123	302047
196.0	3491.760	-78.9524	28.8010	76.75	17.30	8151.5	78.71	14.91	9424.8	89.640	306939
198.0	3492.552	-78.9055	28.8106	76.78	16.99	8186.8	78.72	14.64	9462.2	92.172	311765
200.0	3493.334	-78.8584	28.8203	76.81	16.67	8222.7	78.74	14.38	9500.1	94.719	316526
202.0	3494.106	-78.8110	28.8301	76.84	16.37	8259.2	78.75	14.12	9538.6	97.280	321223
204.0	3494.866	-78.7633	28.8398	76.87	16.06	8296.4	78.77	13.87	9577.7	99.857	325856
206.0	3495.617	-78.7154	28.8496	76.90	15.76	8334.1	78.79	13.62	9617.3	102.448	330425
208.0	3496.357	-78.6671	28.8594	76.93	15.47	8372.2	78.80	13.37	9657.2	105.054	334933
210.0	3497.087	-78.6186	28.8693	76.96	15.19	8410.5	78.82	13.14	9697.2	107.676	339381
212.0	3497.808	-78.5697	28.8792	76.99	14.93	8448.9	78.83	12.91	9737.2	110.312	343771
214.0	3498.520	-78.5206	28.8891	77.02	14.67	8487.4	78.85	12.70	9777.3	112.963	348108
216.0	3499.224	-78.4712	28.8991	77.04	14.43	8526.1	78.86	12.50	9817.4	115.629	352393
218.0	3499.919	-78.4215	28.9091	77.07	14.20	8565.1	78.88	12.31	9857.8	118.309	356629
220.0	3500.607	-78.3716	28.9191	77.10	13.97	8604.5	78.89	12.11	9898.5	121.004	360818
222.0	3501.286	-78.3213	28.9291	77.13	13.74	8644.3	78.91	11.92	9939.7	123.713	364958
224.0	3501.958	-78.2708	28.9392	77.16	13.51	8684.6	78.93	11.73	9981.3	126.437	369050
226.0	3502.622	-78.2200	28.9494	77.18	13.29	8725.4	78.94	11.54	10023.3	129.175	373096
228.0	3503.279	-78.1689	28.9595	77.21	13.07	8766.6	78.96	11.36	10065.7	131.929	377094
230.0	3503.927	-78.1175	28.9697	77.24	12.85	8808.3	78.98	11.17	10108.6	134.697	381045
232.0	3504.568	-78.0658	28.9799	77.27	12.63	8850.5	78.99	10.99	10152.0	137.481	384949
234.0	3505.201	-78.0139	28.9902	77.30	12.41	8893.1	79.01	10.81	10195.7	140.280	388807
236.0	3505.827	-77.9616	29.0005	77.33	12.20	8936.1	79.03	10.63	10239.8	143.094	392618
238.0	3506.444	-77.9091	29.0108	77.36	11.99	8979.6	79.05	10.45	10284.4	145.924	396383
240.0	3507.055	-77.8562	29.0212	77.39	11.78	9023.6	79.06	10.28	10329.5	148.769	400102
242.0	3507.658	-77.8030	29.0315	77.42	11.58	9068.0	79.08	10.10	10374.9	151.630	403776
244.0	3508.253	-77.7496	29.0420	77.45	11.37	9112.8	79.10	9.93	10420.7	154.507	407404
246.0	3508.841	-77.6958	29.0524	77.48	11.17	9158.1	79.12	9.76	10467.0	157.399	410986
248.0	3509.421	-77.6417	29.0629	77.51	10.98	9203.8	79.14	9.59	10513.7	160.307	414524
250.0	3509.994	-77.5873	29.0734	77.55	10.78	9250.0	79.16	9.43	10560.8	163.232	418017
252.0	3510.560	-77.5326	29.0839	77.58	10.59	9296.6	79.18	9.26	10608.4	166.172	421466
254.0	3511.119	-77.4776	29.0945	77.61	10.39	9343.7	79.20	9.10	10656.3	169.129	424871
256.0	3511.670	-77.4222	29.1051	77.64	10.21	9391.2	79.22	8.94	10704.7	172.102	428232
258.0	3512.214	-77.3666	29.1158	77.67	10.02	9439.2	79.24	8.78	10753.5	175.091	431549
260.0	3512.751	-77.3106	29.1264	77.70	9.84	9487.6	79.26	8.63	10802.8	178.097	434823
262.0	3513.281	-77.2543	29.1371	77.74	9.65	9536.5	79.28	8.47	10852.4	181.120	438054

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
264.0	3513.804	-77.1977	29.1479	77.77	9.47	9585.8	79.30	8.32	10902.5	184.159	441242
266.0	3514.320	-77.1407	29.1586	77.80	9.30	9635.5	79.32	8.17	10953.0	187.216	444387
268.0	3514.828	-77.0835	29.1694	77.84	9.12	9685.8	79.34	8.02	11004.0	190.289	447491
270.0	3515.330	-77.0259	29.1803	77.87	8.95	9736.5	79.36	7.88	11055.5	193.379	450553
272.0	3515.826	-76.9679	29.1911	77.90	8.78	9787.7	79.39	7.73	11107.3	196.487	453573
274.0	3516.314	-76.9096	29.2020	77.94	8.61	9839.3	79.41	7.59	11159.6	199.612	456552
276.0	3516.796	-76.8510	29.2129	77.97	8.45	9891.3	79.43	7.44	11212.3	202.754	459489
278.0	3517.270	-76.7920	29.2239	78.00	8.28	9943.8	79.45	7.30	11265.4	205.915	462386
280.0	3517.739	-76.7327	29.2349	78.04	8.12	9996.7	79.47	7.17	11319.0	209.092	465241
282.0	3518.200	-76.6731	29.2459	78.07	7.96	10050.2	79.50	7.03	11373.1	212.288	468057
284.0	3518.655	-76.6131	29.2569	78.11	7.80	10104.0	79.52	6.90	11427.5	215.501	470832
286.0	3519.103	-76.5527	29.2680	78.14	7.65	10158.4	79.55	6.76	11482.5	218.733	473568
288.0	3519.545	-76.4920	29.2791	78.18	7.49	10213.2	79.57	6.63	11537.8	221.982	476263
290.0	3519.980	-76.4309	29.2902	78.21	7.34	10268.4	79.59	6.50	11593.6	225.250	478919
292.0	3520.409	-76.3695	29.3014	78.25	7.19	10324.1	79.62	6.37	11649.8	228.537	481535
294.0	3520.831	-76.3077	29.3126	78.28	7.05	10380.2	79.64	6.25	11706.5	231.842	484114
296.0	3521.247	-76.2456	29.3238	78.32	6.90	10436.9	79.67	6.12	11763.6	235.165	486654
298.0	3521.657	-76.1831	29.3351	78.36	6.76	10494.0	79.69	6.00	11821.2	238.507	489156
300.0	3522.061	-76.1202	29.3463	78.39	6.62	10551.5	79.72	5.88	11879.2	241.868	491620
302.0	3522.458	-76.0569	29.3577	78.43	6.48	10609.6	79.74	5.76	11937.7	245.249	494047
304.0	3522.849	-75.9933	29.3690	78.46	6.35	10668.1	79.77	5.64	11996.7	248.648	496436
306.0	3523.235	-75.9293	29.3804	78.50	6.21	10727.0	79.80	5.53	12056.1	252.067	498789
308.0	3523.614	-75.8649	29.3917	78.54	6.08	10786.5	79.82	5.41	12116.0	255.505	501104
310.0	3523.987	-75.8002	29.4032	78.58	5.95	10846.5	79.85	5.30	12176.4	258.962	503384
312.0	3524.354	-75.7350	29.4146	78.61	5.82	10907.0	79.88	5.19	12237.3	262.440	505628
314.0	3524.716	-75.6695	29.4261	78.65	5.70	10968.0	79.90	5.08	12298.7	265.937	507835
316.0	3525.071	-75.6035	29.4376	78.69	5.57	11029.6	79.93	4.97	12360.6	269.454	510008
318.0	3525.421	-75.5372	29.4491	78.73	5.45	11091.6	79.96	4.87	12423.0	272.992	512145
320.0	3525.765	-75.4705	29.4607	78.77	5.33	11154.1	79.99	4.76	12485.9	276.549	514248
322.0	3526.103	-75.4034	29.4723	78.80	5.21	11217.2	80.01	4.66	12549.3	280.127	516316
324.0	3526.436	-75.3358	29.4839	78.84	5.10	11280.7	80.04	4.56	12613.2	283.726	518350
326.0	3526.763	-75.2679	29.4955	78.88	4.98	11344.8	80.07	4.46	12677.5	287.345	520350
328.0	3527.085	-75.1996	29.5072	78.92	4.87	11409.3	80.10	4.36	12742.4	290.985	522316
330.0	3527.401	-75.1308	29.5189	78.96	4.76	11474.4	80.13	4.26	12807.8	294.647	524249
332.0	3527.711	-75.0617	29.5306	79.00	4.65	11540.0	80.16	4.17	12873.6	298.329	526148
334.0	3528.017	-74.9921	29.5424	79.04	4.54	11606.1	80.19	4.07	12940.0	302.033	528015
336.0	3528.317	-74.9221	29.5541	79.08	4.44	11672.7	80.22	3.98	13006.9	305.758	529850
338.0	3528.611	-74.8516	29.5659	79.12	4.33	11739.8	80.25	3.89	13074.4	309.505	531652
340.0	3528.901	-74.7808	29.5777	79.16	4.23	11807.5	80.28	3.80	13142.3	313.273	533423
342.0	3529.185	-74.7095	29.5896	79.20	4.13	11875.8	80.31	3.71	13210.8	317.064	535162
344.0	3529.464	-74.6378	29.6014	79.25	4.03	11944.6	80.34	3.63	13279.9	320.876	536870
346.0	3529.738	-74.5656	29.6133	79.29	3.94	12013.9	80.37	3.54	13349.4	324.711	538547
348.0	3530.007	-74.4930	29.6252	79.33	3.84	12083.8	80.41	3.46	13419.5	328.568	540194

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
350.0	3530.271	-74.4200	29.6372	79.37	3.75	12154.1	80.44	3.38	13490.1	332.448	541810
352.0	3530.530	-74.3465	29.6491	79.42	3.66	12225.0	80.47	3.30	13561.2	336.351	543397
354.0	3530.784	-74.2726	29.6611	79.46	3.57	12296.5	80.51	3.22	13632.9	340.276	544954
356.0	3531.033	-74.1982	29.6731	79.50	3.48	12368.5	80.54	3.14	13705.2	344.225	546482
358.0	3531.278	-74.1233	29.6852	79.54	3.39	12441.2	80.57	3.06	13778.0	348.197	547981
360.0	3531.518	-74.0480	29.6972	79.59	3.31	12514.4	80.61	2.99	13851.4	352.192	549451
362.0	3531.753	-73.9722	29.7093	79.63	3.22	12588.1	80.64	2.91	13925.3	356.211	550893
364.0	3531.984	-73.8960	29.7214	79.68	3.14	12662.5	80.67	2.84	13999.8	360.253	552308
366.0	3532.210	-73.8193	29.7335	79.72	3.06	12737.4	80.71	2.77	14075.0	364.320	553695
368.0	3532.432	-73.7421	29.7456	79.77	2.98	12813.1	80.74	2.70	14150.8	368.411	555055
370.0	3532.649	-73.6644	29.7577	79.81	2.91	12889.4	80.78	2.63	14227.2	372.526	556388
372.0	3532.862	-73.5863	29.7699	79.86	2.83	12966.1	80.82	2.57	14304.2	376.665	557695
374.0	3533.070	-73.5076	29.7821	79.90	2.76	13043.4	80.85	2.50	14381.5	380.830	558975
376.0	3533.275	-73.4285	29.7943	79.95	2.69	13121.1	80.89	2.44	14459.5	385.019	560230
378.0	3533.475	-73.3489	29.8065	79.99	2.61	13199.6	80.92	2.37	14538.0	389.233	561460
380.0	3533.671	-73.2687	29.8188	80.04	2.55	13278.7	80.96	2.31	14617.3	393.472	562665
382.0	3533.863	-73.1881	29.8310	80.09	2.48	13358.5	81.00	2.25	14697.3	397.737	563845
384.0	3534.052	-73.1070	29.8433	80.13	2.41	13439.0	81.04	2.19	14777.8	402.027	565002
386.0	3534.236	-73.0253	29.8556	80.18	2.35	13520.1	81.07	2.14	14859.1	406.343	566134
388.0	3534.416	-72.9432	29.8679	80.23	2.28	13601.8	81.11	2.08	14940.9	410.686	567243
390.0	3534.593	-72.8605	29.8802	80.28	2.22	13684.1	81.15	2.02	15023.4	415.054	568329
392.0	3534.766	-72.7773	29.8925	80.32	2.16	13767.1	81.19	1.97	15106.5	419.449	569393
394.0	3534.935	-72.6936	29.9049	80.37	2.10	13850.8	81.23	1.92	15190.2	423.871	570434
396.0	3535.101	-72.6093	29.9172	80.42	2.05	13935.2	81.27	1.87	15274.7	428.319	571454
398.0	3535.263	-72.5245	29.9296	80.47	1.99	14020.3	81.31	1.82	15359.9	432.795	572452
400.0	3535.421	-72.4392	29.9420	80.52	1.94	14106.0	81.35	1.77	15445.7	437.298	573428
402.0	3535.576	-72.3533	29.9544	80.57	1.88	14192.4	81.39	1.72	15532.2	441.828	574384
404.0	3535.728	-72.2669	29.9668	80.62	1.83	14279.4	81.43	1.67	15619.4	446.386	575320
406.0	3535.877	-72.1799	29.9792	80.67	1.78	14367.3	81.47	1.63	15707.3	450.972	576236
408.0	3536.022	-72.0924	29.9916	80.72	1.73	14455.8	81.51	1.59	15796.0	455.586	577132
410.0	3536.164	-72.0043	30.0040	80.77	1.68	14545.0	81.56	1.54	15885.3	460.228	578010
412.0	3536.304	-71.9156	30.0165	80.82	1.64	14635.0	81.60	1.50	15975.3	464.899	578869
414.0	3536.440	-71.8264	30.0289	80.87	1.59	14725.7	81.64	1.46	16066.0	469.599	579710
416.0	3536.573	-71.7366	30.0414	80.92	1.55	14817.1	81.68	1.42	16157.5	474.328	580534
418.0	3536.704	-71.6462	30.0538	80.98	1.51	14909.3	81.73	1.38	16249.8	479.087	581340
420.0	3536.831	-71.5552	30.0663	81.03	1.47	15002.2	81.77	1.35	16342.8	483.874	582129
422.0	3536.956	-71.4637	30.0788	81.08	1.43	15095.8	81.82	1.31	16436.5	488.692	582902
424.0	3537.079	-71.3715	30.0912	81.14	1.39	15190.1	81.86	1.28	16530.9	493.540	583659
426.0	3537.199	-71.2787	30.1037	81.19	1.35	15285.5	81.90	1.24	16626.4	498.418	584400
428.0	3537.316	-71.1854	30.1162	81.24	1.32	15382.0	81.95	1.21	16722.9	503.326	585127
430.0	3537.431	-71.0914	30.1287	81.30	1.28	15479.4	82.00	1.18	16820.4	508.265	585839
432.0	3537.544	-70.9968	30.1412	81.35	1.25	15577.5	82.04	1.15	16918.5	513.236	586538
434.0	3537.654	-70.9015	30.1537	81.41	1.22	15676.1	82.09	1.12	17017.2	518.238	587223

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
436.0	3537.763	-70.8057	30.1661	81.46	1.19	15775.6	82.14	1.09	17116.7	523.272	587895
438.0	3537.869	-70.7092	30.1786	81.52	1.16	15876.0	82.18	1.07	17217.2	528.337	588555
440.0	3537.974	-70.6121	30.1911	81.57	1.13	15977.3	82.23	1.04	17318.5	533.435	589202
442.0	3538.076	-70.5143	30.2036	81.63	1.10	16079.4	82.28	1.02	17420.6	538.565	589839
444.0	3538.177	-70.4159	30.2161	81.69	1.07	16182.3	82.33	0.99	17523.6	543.728	590465
446.0	3538.276	-70.3168	30.2285	81.74	1.05	16286.1	82.38	0.97	17627.5	548.923	591080
448.0	3538.374	-70.2170	30.2410	81.80	1.03	16390.9	82.42	0.95	17732.3	554.152	591686
450.0	3538.470	-70.1166	30.2534	81.86	1.01	16496.6	82.47	0.93	17838.1	559.415	592283
452.0	3538.564	-70.0156	30.2659	81.92	0.99	16603.3	82.52	0.91	17944.8	564.712	592872
454.0	3538.658	-69.9138	30.2783	81.97	0.97	16711.0	82.57	0.90	18052.5	570.042	593453
456.0	3538.750	-69.8113	30.2907	82.03	0.95	16819.6	82.63	0.88	18161.3	575.407	594027
458.0	3538.841	-69.7082	30.3032	82.09	0.93	16929.3	82.68	0.86	18271.0	580.807	594594
460.0	3538.932	-69.6044	30.3156	82.15	0.92	17040.0	82.73	0.85	18381.7	586.242	595156
462.0	3539.021	-69.4998	30.3280	82.21	0.90	17151.5	82.78	0.84	18493.2	591.713	595712
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)											
463.090	3539.069	-69.4425	30.3347	82.24	0.89	17212.7	82.81	0.83	18554.4	594.709	596012
464.0	3539.109	-69.3946	30.3403	82.27	0.88	17256.6	82.83	0.82	18598.4	597.218	596260
466.0	3539.195	-69.2887	30.3527	82.33	0.85	17346.4	82.89	0.79	18688.2	602.754	596796
468.0	3539.279	-69.1823	30.3650	82.39	0.83	17437.0	82.94	0.77	18778.9	608.319	597319
470.0	3539.360	-69.0753	30.3773	82.45	0.80	17528.4	82.99	0.74	18870.3	613.913	597827
472.0	3539.440	-68.9677	30.3895	82.51	0.78	17620.5	83.04	0.72	18962.4	619.536	598323
474.0	3539.517	-68.8595	30.4017	82.57	0.76	17708.9	83.10	0.70	19050.9	625.188	598808
476.0	3539.594	-68.7507	30.4139	82.63	0.74	17788.2	83.15	0.69	19130.2	630.867	599284
478.0	3539.668	-68.6415	30.4260	82.70	0.72	17867.2	83.21	0.67	19209.3	636.570	599752
480.0	3539.742	-68.5318	30.4381	82.76	0.71	17946.5	83.26	0.66	19288.6	642.300	600213
482.0	3539.815	-68.4215	30.4501	82.82	0.70	18026.3	83.32	0.65	19368.4	648.054	600667
484.0	3539.886	-68.3107	30.4621	82.88	0.68	18106.4	83.38	0.64	19448.6	653.834	601114
486.0	3539.957	-68.1994	30.4740	82.95	0.67	18187.1	83.43	0.62	19529.3	659.640	601555
488.0	3540.026	-68.0876	30.4859	83.01	0.66	18268.2	83.49	0.61	19610.4	665.471	601991
490.0	3540.095	-67.9752	30.4977	83.07	0.65	18349.8	83.55	0.61	19692.0	671.329	602422
492.0	3540.164	-67.8623	30.5095	83.14	0.64	18431.8	83.61	0.60	19774.1	677.212	602849
494.0	3540.231	-67.7489	30.5212	83.21	0.64	18514.3	83.67	0.59	19856.7	683.121	603274
496.0	3540.299	-67.6350	30.5328	83.27	0.63	18597.5	83.73	0.59	19939.9	689.057	603697
498.0	3540.366	-67.5205	30.5444	83.34	0.62	18681.4	83.79	0.58	20023.8	695.020	604116
500.0	3540.432	-67.4055	30.5559	83.40	0.62	18765.9	83.85	0.57	20108.3	701.009	604533
502.0	3540.499	-67.2899	30.5674	83.47	0.61	18851.0	83.91	0.57	20193.5	707.026	604947
504.0	3540.564	-67.1737	30.5788	83.54	0.60	18936.8	83.97	0.56	20279.3	713.070	605359
506.0	3540.629	-67.0570	30.5901	83.61	0.59	19023.2	84.03	0.56	20365.7	719.141	605767
508.0	3540.694	-66.9398	30.6013	83.67	0.59	19110.3	84.09	0.55	20452.9	725.239	606173
510.0	3540.759	-66.8220	30.6125	83.74	0.58	19198.0	84.15	0.54	20540.6	731.366	606576
512.0	3540.823	-66.7036	30.6236	83.81	0.58	19286.4	84.21	0.54	20629.0	737.521	606978

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
514.0	3540.887	-66.5846	30.6347	83.88	0.57	19375.3	84.28	0.54	20718.0	743.703	607378
516.0	3540.950	-66.4651	30.6456	83.95	0.57	19464.9	84.34	0.53	20807.6	749.915	607776
518.0	3541.014	-66.3450	30.6565	84.02	0.57	19555.1	84.40	0.53	20897.9	756.155	608174
520.0	3541.077	-66.2243	30.6673	84.09	0.56	19646.0	84.47	0.53	20988.8	762.423	608572
522.0	3541.141	-66.1030	30.6781	84.16	0.56	19737.6	84.53	0.53	21080.4	768.721	608971
524.0	3541.205	-65.9811	30.6887	84.23	0.56	19829.9	84.59	0.53	21172.8	775.048	609370
526.0	3541.269	-65.8586	30.6993	84.30	0.56	19922.9	84.66	0.53	21265.8	781.405	609771
528.0	3541.333	-65.7356	30.7098	84.37	0.56	20016.6	84.72	0.53	21359.4	787.792	610173
530.0	3541.398	-65.6119	30.7202	84.44	0.56	20110.8	84.79	0.53	21453.8	794.208	610578
532.0	3541.464	-65.4876	30.7306	84.51	0.57	20205.8	84.86	0.53	21548.8	800.654	610986
534.0	3541.529	-65.3627	30.7408	84.59	0.57	20301.6	84.92	0.53	21644.6	807.131	611398
536.0	3541.596	-65.2371	30.7510	84.66	0.57	20398.1	84.99	0.54	21741.1	813.639	611813
538.0	3541.663	-65.1110	30.7610	84.73	0.58	20495.4	85.06	0.54	21838.4	820.177	612233
540.0	3541.732	-64.9842	30.7710	84.80	0.58	20593.3	85.12	0.54	21936.3	826.746	612658
542.0	3541.801	-64.8568	30.7809	84.88	0.59	20691.9	85.19	0.55	22035.0	833.347	613089
544.0	3541.871	-64.7288	30.7907	84.95	0.59	20791.2	85.26	0.56	22134.3	839.979	613525
546.0	3541.942	-64.6001	30.8004	85.03	0.60	20891.3	85.33	0.56	22234.4	846.643	613969
548.0	3542.014	-64.4707	30.8100	85.10	0.61	20992.1	85.40	0.57	22335.3	853.339	614420
550.0	3542.088	-64.3408	30.8194	85.18	0.61	21093.7	85.47	0.58	22436.9	860.067	614878
552.0	3542.163	-64.2101	30.8288	85.25	0.62	21196.0	85.54	0.59	22539.3	866.827	615345
554.0	3542.240	-64.0788	30.8381	85.33	0.63	21299.1	85.61	0.60	22642.4	873.620	615821
556.0	3542.319	-63.9469	30.8473	85.40	0.64	21402.9	85.68	0.61	22746.2	880.446	616307
558.0	3542.399	-63.8143	30.8564	85.48	0.65	21507.3	85.75	0.62	22850.7	887.306	616803
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)											
559.050	3542.441	-63.7444	30.8611	85.52	0.66	21562.5	85.78	0.62	22905.8	890.920	617068
S-II/S-IVB SEPARATION COMMAND											
560.000	3542.480	-63.6810	30.8654	85.56	0.65	21573.8	85.82	0.61	22917.2	894.194	617307
562.0	3542.559	-63.5476	30.8742	85.63	0.62	21572.9	85.89	0.58	22916.4	901.092	617795
564.0	3542.633	-63.4142	30.8828	85.71	0.59	21573.3	85.96	0.55	22916.8	907.988	618258
566.0	3542.705	-63.2807	30.8914	85.79	0.56	21593.5	86.04	0.53	22937.0	914.887	618701
568.0	3542.774	-63.1470	30.8997	85.87	0.55	21626.6	86.11	0.52	22970.2	921.795	619129
570.0	3542.841	-63.0131	30.9080	85.94	0.53	21660.3	86.18	0.50	23003.9	928.714	619545
572.0	3542.906	-62.8789	30.9160	86.02	0.52	21694.5	86.25	0.49	23038.2	935.644	619949
574.0	3542.969	-62.7445	30.9240	86.10	0.50	21729.2	86.32	0.47	23072.8	942.584	620341
576.0	3543.030	-62.6099	30.9318	86.17	0.48	21764.1	86.40	0.45	23107.8	949.535	620720
578.0	3543.089	-62.4750	30.9394	86.25	0.46	21799.4	86.47	0.44	23143.2	956.497	621087
580.0	3543.146	-62.3399	30.9470	86.33	0.45	21834.6	86.54	0.42	23178.4	963.471	621440
582.0	3543.200	-62.2045	30.9543	86.41	0.43	21870.3	86.62	0.40	23214.1	970.456	621782
584.0	3543.253	-62.0690	30.9615	86.49	0.41	21906.2	86.69	0.39	23250.0	977.452	622111

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
586.0	3543.304	-61.9331	30.9686	86.56	0.40	21942.1	86.76	0.37	23286.0	984.459	622428
588.0	3543.353	-61.7970	30.9755	86.64	0.38	21978.2	86.84	0.36	23322.1	991.478	622732
590.0	3543.400	-61.6607	30.9823	86.72	0.36	22014.4	86.91	0.34	23358.3	998.509	623024
592.0	3543.445	-61.5242	30.9889	86.80	0.35	22050.7	86.99	0.33	23394.7	1005.551	623303
594.0	3543.487	-61.3874	30.9954	86.88	0.33	22087.2	87.06	0.31	23431.2	1012.604	623570
596.0	3543.528	-61.2503	31.0017	86.96	0.31	22123.9	87.14	0.30	23467.8	1019.669	623825
598.0	3543.567	-61.1130	31.0079	87.04	0.30	22160.7	87.21	0.28	23504.7	1026.746	624068
600.0	3543.604	-60.9755	31.0139	87.12	0.28	22197.6	87.29	0.27	23541.6	1033.834	624300
602.0	3543.639	-60.8377	31.0198	87.20	0.27	22234.6	87.36	0.25	23578.6	1040.935	624520
604.0	3543.673	-60.6996	31.0255	87.28	0.25	22271.7	87.44	0.24	23615.8	1048.047	624728
606.0	3543.704	-60.5613	31.0310	87.36	0.24	22308.9	87.51	0.23	23653.0	1055.170	624926
608.0	3543.734	-60.4228	31.0364	87.44	0.23	22346.3	87.59	0.21	23690.4	1062.306	625113
610.0	3543.762	-60.2840	31.0416	87.52	0.21	22383.7	87.66	0.20	23727.8	1069.454	625288
612.0	3543.788	-60.1450	31.0467	87.61	0.20	22421.3	87.74	0.19	23765.4	1076.613	625453
614.0	3543.813	-60.0057	31.0516	87.69	0.18	22459.1	87.82	0.17	23803.2	1083.785	625608
616.0	3543.836	-59.8662	31.0563	87.77	0.17	22497.0	87.89	0.16	23841.1	1090.968	625752
618.0	3543.857	-59.7264	31.0609	87.85	0.16	22535.0	87.97	0.15	23879.2	1098.164	625886
620.0	3543.877	-59.5864	31.0653	87.93	0.15	22573.2	88.05	0.14	23917.4	1105.372	626011
622.0	3543.895	-59.4461	31.0696	88.01	0.13	22611.5	88.13	0.13	23955.7	1112.592	626127
624.0	3543.912	-59.3056	31.0737	88.10	0.12	22649.9	88.20	0.12	23994.1	1119.824	626233
626.0	3543.927	-59.1648	31.0776	88.18	0.11	22688.5	88.28	0.11	24032.7	1127.068	626330
628.0	3543.941	-59.0238	31.0813	88.26	0.10	22727.1	88.36	0.10	24071.4	1134.325	626419
630.0	3543.954	-58.8825	31.0849	88.34	0.09	22766.0	88.43	0.09	24110.2	1141.594	626500
632.0	3543.965	-58.7410	31.0884	88.42	0.08	22804.9	88.51	0.08	24149.1	1148.875	626573
634.0	3543.975	-58.5992	31.0916	88.51	0.07	22843.9	88.59	0.07	24188.1	1156.169	626638
636.0	3543.984	-58.4572	31.0947	88.59	0.06	22883.1	88.67	0.06	24227.3	1163.476	626696
638.0	3543.992	-58.3149	31.0976	88.67	0.05	22922.3	88.75	0.05	24266.6	1170.795	626747
640.0	3543.999	-58.1724	31.1003	88.75	0.05	22961.8	88.82	0.04	24306.0	1178.126	626790
642.0	3544.004	-58.0296	31.1029	88.84	0.04	23001.3	88.90	0.04	24345.6	1185.470	626827
644.0	3544.009	-57.8865	31.1053	88.92	0.03	23041.1	88.98	0.03	24385.3	1192.827	626857
646.0	3544.012	-57.7432	31.1075	89.00	0.02	23080.9	89.06	0.02	24425.1	1200.196	626882
648.0	3544.015	-57.5996	31.1096	89.09	0.02	23120.8	89.14	0.02	24465.1	1207.579	626900
650.0	3544.017	-57.4558	31.1114	89.17	0.01	23160.8	89.22	0.01	24505.1	1214.973	626913
652.0	3544.018	-57.3118	31.1131	89.25	0.00	23200.9	89.30	0.00	24545.2	1222.381	626922
654.0	3544.018	-57.1674	31.1147	89.34	-0.00	23241.2	89.37	-0.00	24585.5	1229.802	626925
656.0	3544.018	-57.0229	31.1160	89.42	-0.01	23281.6	89.45	-0.01	24625.9	1237.235	626923
658.0	3544.017	-56.8780	31.1172	89.51	-0.01	23322.2	89.53	-0.01	24666.5	1244.682	626918
660.0	3544.015	-56.7329	31.1181	89.59	-0.01	23363.0	89.61	-0.01	24707.3	1252.141	626909
662.0	3544.013	-56.5876	31.1189	89.67	-0.02	23403.9	89.69	-0.02	24748.2	1259.613	626896
664.0	3544.010	-56.4420	31.1196	89.76	-0.02	23445.0	89.77	-0.02	24789.3	1267.099	626881
666.0	3544.007	-56.2961	31.1200	89.84	-0.02	23486.1	89.85	-0.02	24830.4	1274.598	626862
668.0	3544.004	-56.1500	31.1203	89.93	-0.03	23527.3	89.93	-0.03	24871.6	1282.110	626842
670.0	3544.000	-56.0036	31.1203	90.01	-0.03	23568.6	90.01	-0.03	24912.9	1289.635	626819

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
672.0	3543.996	-55.8570	31.1202	90.09	-0.03	23610.1	90.09	-0.03	24954.3	1297.173	626793
674.0	3543.991	-55.7101	31.1199	90.18	-0.04	23651.7	90.17	-0.03	24995.9	1304.724	626764
676.0	3543.986	-55.5630	31.1194	90.26	-0.04	23693.4	90.25	-0.04	25037.7	1312.289	626733
678.0	3543.980	-55.4156	31.1187	90.35	-0.04	23735.3	90.33	-0.04	25079.5	1319.867	626699
680.0	3543.975	-55.2679	31.1179	90.43	-0.04	23777.3	90.41	-0.04	25121.5	1327.459	626665
682.0	3543.969	-55.1200	31.1168	90.52	-0.04	23819.4	90.49	-0.04	25163.6	1335.064	626630
684.0	3543.964	-54.9718	31.1156	90.60	-0.04	23861.6	90.57	-0.04	25205.8	1342.683	626594
686.0	3543.958	-54.8233	31.1141	90.69	-0.04	23903.9	90.65	-0.04	25248.1	1350.315	626560
688.0	3543.953	-54.6746	31.1125	90.78	-0.04	23946.3	90.73	-0.03	25290.6	1357.960	626527
690.0	3543.948	-54.5257	31.1107	90.86	-0.03	23988.9	90.82	-0.03	25333.1	1365.620	626496
692.0	3543.944	-54.3765	31.1087	90.95	-0.03	24031.6	90.90	-0.03	25375.8	1373.293	626468
694.0	3543.940	-54.2270	31.1065	91.03	-0.02	24074.4	90.98	-0.02	25418.7	1380.979	626443
696.0	3543.937	-54.0773	31.1041	91.12	-0.02	24117.4	91.06	-0.02	25461.6	1388.679	626422
698.0	3543.935	-53.9273	31.1015	91.20	-0.01	24160.4	91.14	-0.01	25504.7	1396.393	626406
700.0	3543.934	-53.7770	31.0987	91.29	-0.01	24203.5	91.22	-0.01	25547.8	1404.121	626395
S-IVB 1ST GUIDANCE CUTOFF											
700.560	3543.934	-53.7349	31.0978	91.31	-0.00	24215.6	91.25	-0.00	25559.9	1406.287	626393
702.0	3543.934	-53.6266	31.0957	91.38	-0.00	24220.5	91.30	-0.00	25564.8	1411.860	626393
704.0	3543.933	-53.4761	31.0925	91.46	-0.00	24220.8	91.39	-0.00	25565.0	1419.599	626382
706.0	3543.933	-53.3256	31.0891	91.55	-0.00	24221.0	91.47	-0.00	25565.2	1427.340	626378
708.0	3543.932	-53.1752	31.0855	91.64	-0.00	24221.3	91.55	-0.00	25565.5	1435.081	626372
710.0	3543.932	-53.0247	31.0817	91.72	-0.00	24221.5	91.63	-0.00	25565.8	1442.821	626365
PARKING ORBIT INSERTION											
710.560	3543.932	-52.9826	31.0806	91.75	-0.00	24221.6	91.66	-0.00	25565.8	1444.989	626364

TABLE C-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
PARKING ORBIT INSERTION								
710.560	3543.932	-52.9826	31.0806	31.2460	91.66	-0.00	25565.8	103.086
750.0	3543.963	-50.0199	30.9653	31.1304	93.27	-0.00	25566.4	103.097
800.0	3543.951	-46.2782	30.7110	30.8753	95.30	-0.00	25567.5	103.040
850.0	3543.935	-42.5620	30.3374	30.5006	97.30	-0.01	25568.0	102.957
900.0	3543.915	-38.8802	29.8475	30.0090	99.26	-0.01	25568.6	102.851
950.0	3543.890	-35.2406	29.2443	29.4039	101.16	-0.01	25569.3	102.722
1000.0	3543.862	-31.6501	28.5322	28.6892	103.00	-0.01	25570.1	102.573
1050.0	3543.831	-28.1142	27.7155	27.8696	104.77	-0.01	25571.0	102.404
1100.0	3543.795	-24.6372	26.7994	26.9500	106.46	-0.01	25571.9	102.217
1150.0	3543.756	-21.2221	25.7891	25.9358	108.07	-0.01	25572.9	102.016
1200.0	3543.713	-17.8707	24.6904	24.8325	109.59	-0.01	25574.0	101.802
1250.0	3543.666	-14.5838	23.5089	23.6459	111.03	-0.01	25575.1	101.577
1300.0	3543.616	-11.3608	22.2506	22.3819	112.36	-0.01	25576.3	101.344
1350.0	3543.562	-8.2006	20.9213	21.0463	113.61	-0.02	25577.5	101.106
1400.0	3543.504	-5.1008	19.5269	19.6450	114.75	-0.02	25578.7	100.865
1450.0	3543.442	-2.0587	18.0731	18.1836	115.80	-0.02	25579.9	100.625
1500.0	3543.378	0.9291	16.5655	16.6680	116.76	-0.02	25581.1	100.386
1550.0	3543.310	3.8667	15.0098	15.1036	117.62	-0.02	25582.4	100.153
1600.0	3543.238	6.7583	13.4112	13.4958	118.38	-0.02	25583.6	99.928
1650.0	3543.164	9.6086	11.7751	11.8500	119.05	-0.02	25584.8	99.713
1700.0	3543.087	12.4225	10.1065	10.1713	119.63	-0.02	25585.9	99.510
1750.0	3543.007	15.2051	8.4105	8.4648	120.11	-0.02	25587.0	99.321
1800.0	3542.925	17.9616	6.6919	6.7353	120.50	-0.02	25588.1	99.148
1850.0	3542.840	20.6974	4.9555	4.9878	120.80	-0.02	25589.1	98.993
1900.0	3542.755	23.4178	3.2061	3.2270	121.01	-0.02	25590.1	98.857
1950.0	3542.667	26.1284	1.4481	1.4576	121.13	-0.02	25591.0	98.741
2000.0	3542.579	28.8346	-0.3137	-0.3158	121.16	-0.02	25591.8	98.646
2050.0	3542.491	31.5419	-2.0748	-2.0884	121.10	-0.02	25592.5	98.572
2100.0	3542.403	34.2559	-3.8306	-3.8556	120.94	-0.02	25593.2	98.520
2150.0	3542.315	36.9821	-5.5764	-5.6127	120.70	-0.02	25593.8	98.490
2200.0	3542.228	39.7259	-7.3077	-7.3550	120.37	-0.02	25594.3	98.482
2250.0	3542.144	42.4926	-9.0196	-9.0777	119.95	-0.02	25594.7	98.495
2300.0	3542.061	45.2877	-10.7074	-10.7759	119.43	-0.02	25595.0	98.527
2350.0	3541.982	48.1163	-12.3660	-12.4445	118.82	-0.02	25595.3	98.579
2400.0	3541.906	50.9834	-13.9906	-14.0786	118.12	-0.02	25595.5	98.649
2450.0	3541.834	53.8939	-15.5757	-15.6727	117.32	-0.02	25595.6	98.736
2500.0	3541.767	56.8524	-17.1162	-17.2217	116.42	-0.02	25595.6	98.837
2550.0	3541.705	59.8629	-18.6065	-18.7199	115.43	-0.02	25595.6	98.952
2600.0	3541.650	62.9294	-20.0410	-20.1617	114.35	-0.01	25595.5	99.078
2650.0	3541.601	66.0551	-21.4140	-21.5414	113.16	-0.01	25595.3	99.213

TABLE C-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
2700.0	3541.560	69.2425	-22.7196	-22.8531	111.88	-0.01	25595.1	99.356
2750.0	3541.527	72.4936	-23.9520	-24.0910	110.51	-0.01	25594.9	99.503
2800.0	3541.502	75.8093	-25.1052	-25.2491	109.04	-0.01	25594.6	99.654
2850.0	3541.485	79.1897	-26.1733	-26.3216	107.48	-0.00	25594.2	99.807
2900.0	3541.479	82.6336	-27.1506	-27.3027	105.84	-0.00	25593.8	99.958
2950.0	3541.481	86.1387	-28.0315	-28.1869	104.11	0.00	25593.4	100.107
3000.0	3541.494	89.7015	-28.8107	-28.9689	102.31	0.00	25593.0	100.252
3050.0	3541.517	93.3173	-29.4833	-29.6438	100.45	0.01	25592.5	100.391
3100.0	3541.551	96.9798	-30.0449	-30.2072	98.52	0.01	25592.0	100.522
3150.0	3541.595	100.6818	-30.4917	-30.6554	96.54	0.01	25591.5	100.645
3200.0	3541.650	104.4150	-30.8205	-30.9852	94.53	0.02	25591.1	100.758
3250.0	3541.716	108.1701	-31.0290	-31.1943	92.49	0.02	25590.5	100.860
3300.0	3541.792	111.9375	-31.1156	-31.2812	90.43	0.02	25590.0	100.952
3350.0	3541.878	115.7067	-31.0798	-31.2453	88.37	0.02	25589.5	101.032
3400.0	3541.975	119.4677	-30.9218	-31.0869	86.32	0.03	25589.0	101.101
3450.0	3542.082	123.2104	-30.6429	-30.8070	84.29	0.03	25588.5	101.158
3500.0	3542.198	126.9254	-30.2449	-30.4079	82.30	0.03	25588.0	101.204
3550.0	3542.323	130.6038	-29.7309	-29.8922	80.35	0.04	25587.5	101.240
3600.0	3542.457	134.2381	-29.1043	-29.2635	78.46	0.04	25587.0	101.265
3650.0	3542.599	137.8216	-28.3694	-28.5260	76.63	0.04	25586.5	101.282
3700.0	3542.749	141.3490	-27.5309	-27.6844	74.87	0.04	25586.0	101.291
3750.0	3542.905	144.8163	-26.5939	-26.7438	73.19	0.04	25585.4	101.294
3800.0	3543.067	148.2207	-25.5640	-25.7098	71.60	0.04	25584.9	101.291
3850.0	3543.234	151.5606	-24.4467	-24.5878	70.10	0.05	25584.4	101.285
3900.0	3543.406	154.8356	-23.2481	-23.3839	68.68	0.05	25583.8	101.278
3950.0	3543.581	158.0463	-21.9739	-22.1039	67.37	0.05	25583.3	101.270
4000.0	3543.759	161.1942	-20.6301	-20.7536	66.14	0.05	25582.7	101.264
4050.0	3543.939	164.2817	-19.2225	-19.3390	65.02	0.05	25582.1	101.262
4100.0	3544.120	167.3117	-17.7570	-17.8659	63.99	0.05	25581.5	101.265
4150.0	3544.301	170.2879	-16.2392	-16.3398	63.05	0.05	25580.9	101.274
4200.0	3544.482	173.2142	-14.6745	-14.7664	62.21	0.05	25580.2	101.292
4250.0	3544.661	176.0952	-13.0684	-13.1510	61.47	0.05	25579.5	101.320
4300.0	3544.838	178.9354	-11.4261	-11.4989	60.82	0.05	25578.8	101.359
4350.0	3545.012	-178.2600	-9.7527	-9.8153	60.27	0.05	25578.0	101.411
4400.0	3545.182	-175.4861	-8.0532	-8.1052	59.80	0.05	25577.2	101.476
4450.0	3545.348	-172.7376	-6.3324	-6.3735	59.43	0.04	25576.4	101.555
4500.0	3545.509	-170.0090	-4.5951	-4.6250	59.15	0.04	25575.6	101.649
4550.0	3545.664	-167.2951	-2.8459	-2.8645	58.96	0.04	25574.7	101.758
4600.0	3545.812	-164.5902	-1.0894	-1.0966	58.86	0.04	25573.8	101.883
4650.0	3545.955	-161.8890	0.6697	0.6741	58.85	0.04	25572.8	102.022
4700.0	3546.090	-159.1859	2.4270	2.4429	58.93	0.04	25571.9	102.176
4750.0	3546.217	-156.4755	4.1779	4.2051	59.10	0.03	25570.9	102.345
4800.0	3546.337	-153.7522	5.9177	5.9562	59.35	0.03	25569.9	102.526

TABLE C-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
4850.0	3546.449	-151.0107	7.6419	7.6913	59.70	0.03	25568.9	102.720
4900.0	3546.553	-148.2456	9.3458	9.4059	60.14	0.03	25567.9	102.925
4950.0	3546.648	-145.4516	11.0245	11.0948	60.68	0.02	25566.9	103.138
5000.0	3546.736	-142.6236	12.6731	12.7533	61.30	0.02	25565.9	103.360
5050.0	3546.815	-139.7566	14.2867	14.3763	62.02	0.02	25564.9	103.587
5100.0	3546.885	-136.8459	15.8600	15.9584	62.84	0.02	25564.0	103.818
5150.0	3546.948	-133.8869	17.3877	17.4945	63.74	0.02	25563.0	104.050
5200.0	3547.003	-130.8756	18.8645	18.9790	64.75	0.01	25562.1	104.281
5250.0	3547.050	-127.8083	20.2847	20.4064	65.85	0.01	25561.3	104.509
5300.0	3547.089	-124.6819	21.6426	21.7709	67.05	0.01	25560.5	104.732
5350.0	3547.121	-121.4938	22.9326	23.0669	68.34	0.01	25559.7	104.948
5400.0	3547.147	-118.2423	24.1487	24.2883	69.73	0.01	25559.0	105.153
5450.0	3547.165	-114.9266	25.2851	25.4295	71.20	0.00	25558.4	105.346
5500.0	3547.177	-111.5468	26.3359	26.4847	72.77	0.00	25557.8	105.525
5550.0	3547.184	-108.1041	27.2957	27.4481	74.42	0.00	25557.3	105.687
5600.0	3547.184	-104.6011	28.1587	28.3143	76.15	-0.00	25557.0	105.831
5650.0	3547.180	-101.0413	28.9199	29.0782	77.96	-0.00	25556.6	105.956
5700.0	3547.170	-97.4297	29.5745	29.7350	79.83	-0.00	25556.4	106.059
5750.0	3547.156	-93.7726	30.1181	30.2804	81.76	-0.00	25556.3	106.139
5800.0	3547.137	-90.0771	30.5471	30.7108	83.74	-0.01	25556.3	106.196
5850.0	3547.114	-86.3517	30.8585	31.0231	85.75	-0.01	25556.4	106.229
5900.0	3547.087	-82.6055	31.0500	31.2152	87.79	-0.01	25556.5	106.236
5950.0	3547.057	-78.8484	31.1202	31.2856	89.84	-0.01	25556.8	106.218
6000.0	3547.024	-75.0905	31.0687	31.2339	91.90	-0.01	25557.2	106.176
6050.0	3546.987	-71.3417	30.8957	31.0604	93.94	-0.01	25557.6	106.108
6100.0	3546.947	-67.6121	30.6026	30.7664	95.96	-0.01	25558.2	106.017
6150.0	3546.905	-63.9109	30.1913	30.3539	97.94	-0.01	25558.8	105.902
6200.0	3546.860	-60.2466	29.6649	29.8257	99.88	-0.01	25559.6	105.765
6250.0	3546.812	-56.6268	29.0269	29.1856	101.76	-0.01	25560.4	105.607
6300.0	3546.762	-53.0577	28.2815	28.4375	103.58	-0.01	25561.2	105.430
6350.0	3546.710	-49.5446	27.4334	27.5863	105.32	-0.01	25562.2	105.236
6400.0	3546.655	-46.0914	26.4877	26.6370	106.98	-0.02	25563.2	105.026
6450.0	3546.597	-42.7006	25.4498	25.5950	108.56	-0.02	25564.3	104.804
6500.0	3546.537	-39.3737	24.3256	24.4660	110.06	-0.02	25565.4	104.571
6550.0	3546.475	-36.1110	23.1206	23.2558	111.46	-0.02	25566.5	104.329
6600.0	3546.411	-32.9119	21.8408	21.9700	112.76	-0.02	25567.7	104.082
6650.0	3546.344	-29.7747	20.4920	20.6147	113.98	-0.02	25568.9	103.831
6700.0	3546.275	-26.6971	19.0800	19.1957	115.09	-0.02	25570.1	103.580
6750.0	3546.203	-23.6760	17.6105	17.7185	116.11	-0.02	25571.3	103.331
6800.0	3546.130	-20.7078	16.0891	16.1889	117.04	-0.02	25572.5	103.086
6850.0	3546.054	-17.7884	14.5213	14.6123	117.86	-0.02	25573.6	102.849
6900.0	3545.975	-14.9135	12.9125	12.9941	118.60	-0.02	25574.8	102.621
6950.0	3545.895	-12.0784	11.2677	11.3396	119.24	-0.02	25575.9	102.404

TABLE C-IV. GEOGRAPHIC POLAR COORDINATES - PARKING ORBIT PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
7000.0	3545.813	-9.2780	9.5922	9.6537	119.78	-0.02	25577.0	102.201
7050.0	3545.729	-6.5073	7.8907	7.9417	120.24	-0.02	25578.1	102.014
7100.0	3545.644	-3.7611	6.1681	6.2082	120.60	-0.02	25579.1	101.843
7150.0	3545.557	-1.0339	4.4293	4.4582	120.87	-0.02	25580.0	101.692
7200.0	3545.469	1.6797	2.6788	2.6963	121.05	-0.02	25580.9	101.560
7250.0	3545.380	4.3850	0.9212	0.9272	121.15	-0.02	25581.7	101.449
7300.0	3545.291	7.0876	-0.8389	-0.8444	121.15	-0.02	25582.4	101.360
7350.0	3545.203	9.7930	-2.5969	-2.6139	121.06	-0.02	25583.0	101.292
7400.0	3545.114	12.5067	-4.3482	-4.3766	120.88	-0.02	25583.6	101.247
7450.0	3545.026	15.2341	-6.0882	-6.1278	120.61	-0.02	25584.1	101.223
7500.0	3544.940	17.9806	-7.8123	-7.8628	120.26	-0.02	25584.5	101.220
7550.0	3544.856	20.7516	-9.5157	-9.5769	119.81	-0.02	25584.9	101.239
7600.0	3544.774	23.5524	-11.1936	-11.2650	119.26	-0.02	25585.1	101.277
7650.0	3544.695	26.3882	-12.8410	-12.9222	118.63	-0.02	25585.3	101.334
7700.0	3544.620	29.2638	-14.4528	-14.5434	117.90	-0.02	25585.4	101.408
7750.0	3544.548	32.1840	-16.0238	-16.1233	117.07	-0.02	25585.5	101.498
7800.0	3544.482	35.1532	-17.5487	-17.6564	116.15	-0.02	25585.4	101.602
7850.0	3544.421	38.1756	-19.0219	-19.1374	115.13	-0.02	25585.3	101.719
7900.0	3544.365	41.2548	-20.4379	-20.5605	114.02	-0.01	25585.2	101.845
7950.0	3544.316	44.3938	-21.7908	-21.9199	112.81	-0.01	25584.9	101.980
8000.0	3544.274	47.5950	-23.0749	-23.2099	111.51	-0.01	25584.7	102.121
8050.0	3544.240	50.8601	-24.2842	-24.4246	110.11	-0.01	25584.4	102.266
8100.0	3544.213	54.1898	-25.4129	-25.5580	108.62	-0.01	25584.0	102.414
8150.0	3544.194	57.5838	-26.4551	-26.6044	107.04	-0.00	25583.6	102.560
8200.0	3544.184	61.0407	-27.4051	-27.5580	105.37	-0.00	25583.2	102.705
8250.0	3544.182	64.5578	-28.2574	-28.4135	103.63	0.00	25582.7	102.846
8300.0	3544.189	68.1313	-29.0069	-29.1656	101.81	0.00	25582.2	102.980
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6								
8334.200	3544.199	70.6055	-29.4578	-29.6181	100.53	0.00	25581.9	103.067

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TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6									
8334.200	-40407405	3579082	8403475	-10238.2	-6391.5	-21020.2	24.61	-6.33	-10.04
8340.0	-40466376	3541906	8281391	-10095.2	-6428.1	-21078.0	24.68	-6.29	-9.88
8350.0	-40566092	3477311	8070122	-9847.8	-6490.6	-21175.4	24.81	-6.21	-9.61
8360.0	-40663328	3412095	7857892	-9599.1	-6552.4	-21270.2	24.93	-6.14	-9.34
8370.0	-40758070	3346266	7644727	-9349.2	-6613.4	-21362.2	25.05	-6.06	-9.07
8380.0	-40850307	3279831	7430656	-9098.1	-6673.6	-21451.5	25.16	-5.98	-8.80
8390.0	-40940028	3212797	7215706	-8845.9	-6733.0	-21538.1	25.28	-5.90	-8.52
8400.0	-41027221	3145174	6999903	-8592.6	-6791.6	-21621.9	25.39	-5.82	-8.24
8410.0	-41111875	3076968	6783276	-8338.1	-6849.4	-21703.0	25.49	-5.74	-7.97
8420.0	-41193980	3008189	6565852	-8082.7	-6906.3	-21781.3	25.60	-5.66	-7.69
8430.0	-41273526	2938844	6347660	-7826.2	-6962.5	-21856.8	25.70	-5.57	-7.41
8440.0	-41350501	2868942	6128726	-7568.8	-7017.8	-21929.5	25.79	-5.49	-7.13
8450.0	-41424897	2798491	5909078	-7310.3	-7072.2	-21999.5	25.89	-5.40	-6.85
8460.0	-41496705	2727500	5688746	-7051.0	-7125.8	-22066.6	25.98	-5.32	-6.57
8470.0	-41565915	2655978	5467756	-6790.8	-7178.5	-22130.9	26.07	-5.23	-6.29
8480.0	-41632518	2583933	5246138	-6529.7	-7230.4	-22192.4	26.15	-5.14	-6.01
8490.0	-41696506	2511374	5023918	-6267.8	-7281.3	-22251.0	26.23	-5.05	-5.72
8500.0	-41757871	2438309	4801127	-6005.1	-7331.4	-22306.8	26.31	-4.96	-5.44
8510.0	-41816605	2364749	4577791	-5741.7	-7380.5	-22359.8	26.38	-4.87	-5.16
8520.0	-41872701	2290702	4353940	-5477.5	-7428.7	-22409.9	26.45	-4.78	-4.87
8530.0	-41926152	2216178	4129602	-5212.6	-7476.0	-22457.2	26.52	-4.68	-4.59
8540.0	-41976952	2141185	3904805	-4947.1	-7522.4	-22501.7	26.58	-4.59	-4.30
8550.0	-42025092	2065733	3679578	-4681.0	-7567.8	-22543.2	26.64	-4.50	-4.01
8560.0	-42070569	1989831	3453950	-4414.2	-7612.3	-22581.9	26.70	-4.40	-3.73
8570.0	-42113375	1913489	3227950	-4146.9	-7655.9	-22617.7	26.76	-4.30	-3.44
8580.0	-42153506	1836717	3001605	-3879.1	-7698.4	-22650.7	26.81	-4.21	-3.15
8590.0	-42190956	1759524	2774945	-3610.8	-7740.0	-22680.8	26.85	-4.11	-2.86
8600.0	-42225721	1681920	2547999	-3342.1	-7780.6	-22708.0	26.90	-4.01	-2.58
8610.0	-42257796	1603915	2320795	-3072.9	-7820.2	-22732.3	26.94	-3.91	-2.29
8620.0	-42287177	1525519	2093363	-2803.3	-7858.9	-22753.7	26.97	-3.81	-2.00
8630.0	-42313861	1446741	1865730	-2533.4	-7896.5	-22772.3	27.01	-3.71	-1.71
8640.0	-42337844	1367593	1637927	-2263.2	-7933.1	-22787.9	27.04	-3.61	-1.42
8650.0	-42359124	1288083	1409981	-1992.7	-7968.7	-22800.7	27.07	-3.51	-1.13
8660.0	-42377697	1208222	1181922	-1721.9	-8003.3	-22810.6	27.09	-3.41	-0.84
8670.0	-42393561	1128021	953779	-1450.9	-8036.8	-22817.6	27.11	-3.30	-0.56
8680.0	-42406714	1047490	725580	-1179.7	-8069.3	-22821.7	27.13	-3.20	-0.27
8690.0	-42417155	966639	497354	-908.4	-8100.7	-22822.9	27.14	-3.09	0.02
8700.0	-42424881	885479	269131	-637.0	-8131.1	-22821.3	27.15	-2.99	0.31
8710.0	-42429893	804019	40939	-365.4	-8160.5	-22816.7	27.15	-2.88	0.60
8720.0	-42432190	722272	-187193	-93.9	-8188.8	-22809.3	27.16	-2.77	0.89

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
8730.0	-42431771	640248	-415237	177.7	-8216.0	-22798.9	27.16	-2.67	1.18
8740.0	-42428636	557956	-643163	449.3	-8242.1	-22785.7	27.15	-2.56	1.46
8750.0	-42422786	475409	-870942	720.8	-8267.2	-22769.7	27.15	-2.45	1.75
8760.0	-42414221	392617	-1098547	992.2	-8291.1	-22750.7	27.14	-2.34	2.04
8770.0	-42402943	309590	-1325947	1263.5	-8314.0	-22728.9	27.12	-2.23	2.33
8780.0	-42388953	226340	-1553115	1534.6	-8335.8	-22704.2	27.10	-2.12	2.61
8790.0	-42372252	142878	-1780021	1805.5	-8356.4	-22676.6	27.08	-2.01	2.90
8800.0	-42352843	59215	-2006638	2076.2	-8376.0	-22646.2	27.06	-1.90	3.18
8810.0	-42330729	-24638	-2232936	2346.7	-8394.5	-22613.0	27.03	-1.79	3.47
8820.0	-42305911	-108670	-2458888	2616.8	-8411.8	-22576.8	27.00	-1.68	3.75
8830.0	-42278394	-192871	-2684466	2886.5	-8427.8	-22538.0	26.97	-1.57	4.04
8840.0	-42248180	-277226	-2909640	3156.0	-8443.0	-22496.4	26.92	-1.45	4.32
8850.0	-42215274	-361726	-3134384	3425.1	-8457.0	-22451.8	26.89	-1.37	4.57
8860.0	-42179680	-446362	-3358668	3693.8	-8469.8	-22404.5	26.84	-1.22	4.89
8870.0	-42141401	-531120	-3582465	3962.0	-8481.5	-22354.4	26.79	-1.11	5.17
8880.0	-42100442	-615989	-3805746	4229.6	-8492.1	-22301.4	26.75	-1.01	5.41
8890.0	-42056810	-700958	-4028484	4496.8	-8501.5	-22245.6	26.68	-0.88	5.72
8900.0	-42010508	-786015	-4250651	4763.4	-8509.8	-22187.1	26.62	-0.76	6.02
8910.0	-41961544	-871150	-4472218	5029.4	-8517.0	-22125.8	26.56	-0.85	6.23
S-IVB RE-IGNITION (STDV OPEN)									
8912.400	-41949395	-891593	-4525302	5093.2	-8518.6	-22110.8	26.55	-0.91	6.28
8914.0	-41941213	-905225	-4560676	5137.4	-8523.0	-22109.6	28.60	-4.35	-4.62
8916.0	-41930878	-922284	-4604915	5196.9	-8536.0	-22127.5	30.03	-6.81	-10.90
8918.0	-41920422	-939369	-4649192	5257.4	-8549.7	-22149.2	30.15	-6.96	-10.85
8920.0	-41909851	-956483	-4693512	5317.6	-8563.5	-22170.8	30.28	-7.02	-10.80
8922.0	-41899152	-973624	-4737874	5378.2	-8577.7	-22192.4	30.50	-7.04	-10.75
8924.0	-41888335	-990793	-4782280	5439.3	-8591.7	-22213.8	30.73	-7.05	-10.71
8926.0	-41877394	-1007991	-4826729	5501.4	-8605.7	-22235.1	31.43	-7.05	-10.65
8928.0	-41866331	-1025216	-4871221	5565.0	-8619.7	-22256.3	32.14	-7.03	-10.60
8930.0	-41855137	-1042470	-4915754	5629.6	-8633.7	-22277.4	32.49	-7.02	-10.55
8932.0	-41843811	-1059751	-4960330	5694.6	-8647.8	-22298.5	32.50	-7.03	-10.50
8934.0	-41832357	-1077061	-5004948	5759.6	-8661.8	-22319.4	32.46	-6.97	-10.49
8936.0	-41820773	-1094398	-5049608	5824.6	-8675.6	-22340.4	32.51	-6.89	-10.49
8938.0	-41809058	-1111763	-5094310	5889.7	-8689.4	-22361.3	32.62	-6.86	-10.48
8940.0	-41797214	-1129156	-5139053	5955.0	-8703.1	-22382.3	32.68	-6.87	-10.47
8942.0	-41785238	-1146576	-5183839	6020.4	-8716.9	-22403.2	32.70	-6.87	-10.47
8944.0	-41773132	-1164023	-5228666	6085.8	-8730.6	-22424.1	32.70	-6.85	-10.47
8946.0	-41760895	-1181498	-5273535	6151.2	-8744.2	-22445.0	32.71	-6.81	-10.45
8948.0	-41748527	-1199000	-5318446	6216.7	-8757.8	-22466.0	32.75	-6.76	-10.45
8950.0	-41736028	-1216529	-5363399	6282.2	-8771.3	-22486.9	32.81	-6.73	-10.47
8952.0	-41723398	-1234085	-5408394	6347.9	-8784.8	-22507.8	32.86	-6.72	-10.47

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
8954.0	-41710636	-1251668	-5453430	6413.7	-8798.2	-22528.7	32.89	-6.71	-10.45
8956.0	-41697743	-1269278	-5498509	6479.4	-8811.6	-22549.6	32.90	-6.70	-10.42
8958.0	-41684719	-1286915	-5543629	6545.2	-8825.0	-22570.4	32.90	-6.70	-10.40
8960.0	-41671562	-1304578	-5588790	6611.1	-8838.4	-22591.2	32.92	-6.70	-10.40
8962.0	-41658274	-1322268	-5633994	6676.9	-8851.8	-22612.1	32.94	-6.69	-10.43
8964.0	-41644855	-1339985	-5679239	6742.8	-8865.1	-22632.9	32.97	-6.66	-10.44
8966.0	-41631303	-1357729	-5724525	6808.8	-8878.4	-22653.8	33.00	-6.62	-10.44
8968.0	-41617620	-1375499	-5769854	6874.8	-8891.6	-22674.7	33.02	-6.59	-10.43
8970.0	-41603804	-1393295	-5815224	6940.9	-8904.8	-22695.5	33.03	-6.58	-10.42
8972.0	-41589856	-1411118	-5860636	7006.9	-8917.9	-22716.4	33.03	-6.59	-10.41
8974.0	-41575776	-1428967	-5906089	7073.0	-8931.1	-22737.2	33.06	-6.61	-10.41
8976.0	-41561564	-1446842	-5951585	7139.2	-8944.4	-22758.0	33.10	-6.62	-10.40
8978.0	-41547219	-1464744	-5997121	7205.4	-8957.6	-22778.8	33.12	-6.62	-10.38
8980.0	-41532742	-1482673	-6042700	7271.7	-8970.8	-22799.5	33.14	-6.59	-10.38
8982.0	-41518133	-1500628	-6088320	7338.0	-8984.0	-22820.3	33.15	-6.56	-10.39
8984.0	-41503390	-1518609	-6133981	7404.3	-8997.1	-22841.1	33.17	-6.54	-10.39
8986.0	-41488516	-1536616	-6179684	7470.6	-9010.1	-22861.8	33.17	-6.52	-10.38
8988.0	-41473508	-1554649	-6225428	7536.9	-9023.2	-22882.6	33.17	-6.52	-10.38
8990.0	-41458368	-1572709	-6271214	7603.3	-9036.2	-22903.4	33.20	-6.52	-10.39
8992.0	-41443095	-1590794	-6317042	7669.8	-9049.3	-22924.1	33.23	-6.51	-10.38
8994.0	-41427689	-1608906	-6362911	7736.2	-9062.3	-22944.9	33.24	-6.51	-10.38
8996.0	-41412150	-1627043	-6408821	7802.7	-9075.3	-22965.7	33.23	-6.51	-10.37
8998.0	-41396478	-1645207	-6454773	7869.2	-9088.3	-22986.4	33.23	-6.50	-10.38
9000.0	-41380673	-1663397	-6500767	7935.7	-9101.3	-23007.1	33.26	-6.50	-10.37
9002.0	-41364735	-1681612	-6546802	8002.2	-9114.3	-23027.9	33.30	-6.50	-10.36
9004.0	-41348664	-1699854	-6592879	8068.8	-9127.3	-23048.6	33.32	-6.51	-10.37
9006.0	-41332460	-1718121	-6638997	8135.5	-9140.3	-23069.4	33.34	-6.49	-10.39
9008.0	-41316122	-1736415	-6685156	8202.2	-9153.3	-23090.2	33.35	-6.46	-10.40
9010.0	-41299651	-1754735	-6731357	8268.9	-9166.2	-23111.0	33.35	-6.45	-10.39
9012.0	-41283047	-1773080	-6777600	8335.6	-9179.1	-23131.8	33.36	-6.47	-10.40
9014.0	-41266309	-1791451	-6823884	8402.3	-9192.1	-23152.6	33.37	-6.49	-10.40
9016.0	-41249437	-1809848	-6870210	8469.1	-9205.1	-23173.4	33.39	-6.50	-10.40
9018.0	-41232432	-1828271	-6916578	8535.8	-9218.0	-23194.1	33.39	-6.47	-10.38
9020.0	-41215294	-1846720	-6962987	8602.6	-9231.0	-23214.9	33.40	-6.46	-10.38
9022.0	-41198022	-1865195	-7009437	8669.4	-9243.9	-23235.7	33.42	-6.45	-10.40
9024.0	-41180616	-1883696	-7055929	8736.3	-9256.8	-23256.5	33.44	-6.45	-10.40
9026.0	-41163077	-1902222	-7102463	8803.2	-9269.7	-23277.3	33.45	-6.45	-10.41
9028.0	-41145403	-1920775	-7149039	8870.1	-9282.6	-23298.1	33.44	-6.46	-10.42
9030.0	-41127596	-1939353	-7195656	8937.0	-9295.5	-23319.0	33.45	-6.46	-10.44
9032.0	-41109655	-1957957	-7242315	9003.9	-9308.4	-23339.9	33.48	-6.45	-10.44
9034.0	-41091581	-1976586	-7289015	9070.9	-9321.3	-23360.7	33.50	-6.46	-10.43
9036.0	-41073372	-1995242	-7335757	9137.9	-9334.3	-23381.6	33.51	-6.48	-10.42
9038.0	-41055029	-2013923	-7382541	9204.9	-9347.2	-23402.4	33.52	-6.47	-10.42

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
9040.0	-41036552	-2032631	-7429367	9272.0	-9360.2	-23423.3	33.53	-6.46	-10.44
9042.0	-41017941	-2051364	-7476235	9339.0	-9373.1	-23444.2	33.54	-6.45	-10.46
9044.0	-40999196	-2070123	-7523144	9406.1	-9385.9	-23465.0	33.51	-6.41	-10.38
9046.0	-40980317	-2088908	-7570095	9473.1	-9398.7	-23485.7	33.52	-6.39	-10.39
9048.0	-40961304	-2107718	-7617087	9540.4	-9411.7	-23507.1	33.77	-6.58	-10.91
9050.0	-40942155	-2126555	-7664124	9608.3	-9425.2	-23529.9	34.13	-6.96	-11.87
9052.0	-40922870	-2145419	-7711208	9676.8	-9439.5	-23554.5	34.45	-7.33	-12.82
9054.0	-40903447	-2164313	-7758343	9746.0	-9454.4	-23580.7	34.69	-7.54	-13.37
9056.0	-40883885	-2183237	-7805532	9815.7	-9469.5	-23607.7	34.89	-7.60	-13.55
9058.0	-40864184	-2202191	-7852774	9885.5	-9484.8	-23634.9	35.03	-7.61	-13.63
9060.0	-40844343	-2221176	-7900071	9955.6	-9499.9	-23662.1	35.02	-7.57	-13.62
9062.0	-40824362	-2240191	-7947423	10025.6	-9515.1	-23689.3	34.94	-7.55	-13.57
9064.0	-40804241	-2259236	-7994829	10095.5	-9530.2	-23716.5	34.99	-7.57	-13.62
9066.0	-40783980	-2278312	-8042289	10165.5	-9545.3	-23743.8	35.03	-7.57	-13.66
9068.0	-40763579	-2297417	-8089804	10235.6	-9560.4	-23771.2	35.08	-7.56	-13.71
9070.0	-40743037	-2316553	-8137373	10305.8	-9575.5	-23798.6	35.11	-7.55	-13.75
9072.0	-40722356	-2335720	-8184998	10376.1	-9590.6	-23826.1	35.15	-7.55	-13.77
9074.0	-40701533	-2354916	-8232678	10446.4	-9605.8	-23853.7	35.20	-7.57	-13.78
9076.0	-40680570	-2374143	-8280413	10516.9	-9620.9	-23881.3	35.24	-7.58	-13.81
9078.0	-40659466	-2393400	-8328203	10587.3	-9636.1	-23909.0	35.25	-7.57	-13.86
9080.0	-40638220	-2412687	-8376049	10657.9	-9651.2	-23936.7	35.29	-7.58	-13.90
9082.0	-40616834	-2432005	-8423950	10728.6	-9666.4	-23964.5	35.37	-7.64	-13.91
9084.0	-40595306	-2451353	-8471907	10799.3	-9681.9	-23992.3	35.38	-7.79	-13.90
9086.0	-40573637	-2470732	-8519920	10869.9	-9697.6	-24020.2	35.26	-7.96	-13.93
9088.0	-40551826	-2490143	-8567988	10940.4	-9713.6	-24048.1	35.14	-8.05	-14.00
9090.0	-40529875	-2509587	-8616112	11010.7	-9729.7	-24076.2	35.18	-8.04	-14.07
9092.0	-40507784	-2529062	-8664293	11081.1	-9745.8	-24104.3	35.29	-8.00	-14.10
9094.0	-40485551	-2548570	-8712530	11151.8	-9761.7	-24132.6	35.37	-7.98	-14.13
9096.0	-40463176	-2568109	-8760823	11222.6	-9777.7	-24160.9	35.39	-7.98	-14.18
9098.0	-40440660	-2587681	-8809173	11293.4	-9793.7	-24189.3	35.43	-8.00	-14.24
9100.0	-40418003	-2607284	-8857580	11364.3	-9809.7	-24217.8	35.50	-8.01	-14.29
9102.0	-40395203	-2626919	-8906045	11435.4	-9825.7	-24246.5	35.57	-8.02	-14.33
9104.0	-40372261	-2646587	-8954566	11506.5	-9841.7	-24275.1	35.62	-8.02	-14.36
9106.0	-40349177	-2666286	-9003145	11577.8	-9857.8	-24303.9	35.67	-8.03	-14.40
9108.0	-40325950	-2686018	-9051782	11649.2	-9873.8	-24332.8	35.72	-8.02	-14.46
9110.0	-40302580	-2705782	-9100477	11720.7	-9889.9	-24361.7	35.76	-8.01	-14.52
9112.0	-40279067	-2725577	-9149229	11792.3	-9905.9	-24390.8	35.79	-8.03	-14.56
9114.0	-40255411	-2745405	-9198040	11863.9	-9922.0	-24420.0	35.83	-8.06	-14.61
9116.0	-40231611	-2765265	-9246909	11935.6	-9938.1	-24449.3	35.90	-8.08	-14.66
9118.0	-40207668	-2785158	-9295837	12007.5	-9954.3	-24478.6	35.96	-8.07	-14.70
9120.0	-40183581	-2805083	-9344824	12079.4	-9970.4	-24508.1	36.02	-8.06	-14.74
9122.0	-40159351	-2825039	-9393869	12151.5	-9986.5	-24537.6	36.07	-8.05	-14.79
9124.0	-40134975	-2845029	-9442974	12223.7	-10002.6	-24567.3	36.13	-8.05	-14.87

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
9126.0	-40110456	-2865050	-9492139	12296.0	-10018.8	-24597.1	36.18	-8.07	-14.94
9128.0	-40085791	-2885104	-9541363	12368.4	-10034.9	-24627.0	36.23	-8.08	-14.99
9130.0	-40060982	-2905190	-9590647	12441.0	-10051.1	-24657.0	36.30	-8.09	-15.03
9132.0	-40036027	-2925308	-9639991	12513.6	-10067.2	-24687.1	36.37	-8.08	-15.08
9134.0	-40010927	-2945459	-9689395	12586.4	-10083.4	-24717.3	36.43	-8.08	-15.13
9136.0	-39985682	-2965641	-9738860	12659.3	-10099.5	-24747.7	36.49	-8.08	-15.20
9138.0	-39960290	-2985857	-9788386	12732.4	-10115.7	-24778.1	36.55	-8.09	-15.25
9140.0	-39934752	-3006104	-9837973	12805.6	-10131.9	-24808.7	36.63	-8.11	-15.32
9142.0	-39909067	-3026384	-9887621	12878.9	-10148.1	-24839.4	36.70	-8.12	-15.39
9144.0	-39883236	-3046697	-9937330	12952.4	-10164.4	-24870.3	36.75	-8.12	-15.46
9146.0	-39857258	-3067042	-9987102	13025.9	-10180.6	-24901.2	36.82	-8.13	-15.51
9148.0	-39831132	-3087419	-10036935	13099.7	-10196.9	-24932.3	36.91	-8.15	-15.58
9150.0	-39804859	-3107830	-10086831	13173.6	-10213.2	-24963.6	36.99	-8.17	-15.65
9152.0	-39778438	-3128272	-10136790	13247.6	-10229.6	-24994.9	37.05	-8.18	-15.71
9154.0	-39751869	-3148748	-10186811	13321.8	-10246.0	-25026.4	37.11	-8.20	-15.76
9156.0	-39725151	-3169256	-10236895	13396.1	-10262.3	-25058.0	37.19	-8.20	-15.83
9158.0	-39698284	-3189797	-10287043	13470.6	-10278.7	-25089.7	37.27	-8.19	-15.92
9160.0	-39671268	-3210371	-10337254	13545.2	-10295.1	-25121.7	37.33	-8.19	-16.01
9162.0	-39644103	-3230978	-10387530	13619.9	-10311.5	-25153.8	37.40	-8.20	-16.10
9164.0	-39616789	-3251617	-10437870	13694.8	-10327.9	-25186.0	37.49	-8.23	-16.16
9166.0	-39589324	-3272289	-10488274	13769.9	-10344.4	-25218.4	37.58	-8.24	-16.19
9168.0	-39561709	-3292995	-10538743	13845.1	-10360.9	-25250.8	37.65	-8.25	-16.26
9170.0	-39533944	-3313733	-10589277	13920.5	-10377.4	-25283.4	37.72	-8.25	-16.35
9172.0	-39506027	-3334504	-10639877	13996.0	-10393.9	-25316.2	37.81	-8.24	-16.42
9174.0	-39477959	-3355309	-10690542	14071.7	-10410.4	-25349.1	37.91	-8.25	-16.48
9176.0	-39449740	-3376146	-10741274	14147.7	-10426.9	-25382.2	38.02	-8.27	-16.57
9178.0	-39421369	-3397016	-10792071	14223.8	-10443.4	-25415.4	38.13	-8.29	-16.68
9180.0	-39392845	-3417920	-10842935	14300.2	-10460.0	-25448.8	38.22	-8.30	-16.76
9182.0	-39364168	-3438856	-10893867	14376.7	-10476.6	-25482.4	38.29	-8.30	-16.81
9184.0	-39335338	-3459826	-10944865	14453.3	-10493.2	-25516.1	38.36	-8.31	-16.87
9186.0	-39306354	-3480829	-10995931	14530.1	-10509.9	-25549.9	38.44	-8.33	-16.95
9188.0	-39277217	-3501866	-11047065	14607.1	-10526.6	-25583.8	38.53	-8.35	-17.01
9190.0	-39247926	-3522935	-11098267	14684.3	-10543.3	-25617.9	38.64	-8.35	-17.08
9192.0	-39218480	-3544039	-11149537	14761.7	-10560.0	-25652.2	38.76	-8.35	-17.17
9194.0	-39188879	-3565175	-11200875	14839.3	-10576.7	-25686.6	38.89	-8.36	-17.28
9196.0	-39159123	-3586345	-11252283	14917.2	-10593.4	-25721.3	39.02	-8.37	-17.38
9198.0	-39129210	-3607549	-11303761	14995.4	-10610.1	-25756.1	39.14	-8.37	-17.46
9200.0	-39099141	-3628786	-11355308	15073.7	-10626.9	-25791.2	39.23	-8.41	-17.55
9202.0	-39068915	-3650057	-11406926	15152.3	-10643.8	-25826.4	39.32	-8.45	-17.66
9204.0	-39038532	-3671361	-11458614	15231.0	-10660.7	-25861.8	39.42	-8.46	-17.74
9206.0	-39007991	-3692699	-11510373	15310.0	-10677.6	-25897.3	39.58	-8.46	-17.79
9208.0	-38977291	-3714071	-11562203	15389.4	-10694.5	-25932.9	39.76	-8.48	-17.85
9210.0	-38946433	-3735477	-11614105	15469.0	-10711.5	-25968.7	39.92	-8.50	-17.95

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
9212.0	-38915415	-3756917	-11666078	15549.0	-10728.5	-26004.8	40.03	-8.52	-18.08
9214.0	-38884237	-3778391	-11718124	15629.2	-10745.6	-26041.0	40.15	-8.53	-18.20
9216.0	-38852898	-3799900	-11770242	15709.6	-10762.6	-26077.6	40.30	-8.55	-18.33
9218.0	-38821398	-3821442	-11822434	15790.4	-10779.8	-26114.4	40.47	-8.58	-18.45
9220.0	-38789736	-3843019	-11874700	15871.5	-10797.0	-26151.3	40.64	-8.63	-18.54
9222.0	-38757912	-3864630	-11927040	15952.9	-10814.3	-26188.5	40.82	-8.65	-18.63
9224.0	-38725924	-3886276	-11979454	16034.8	-10831.6	-26225.9	41.01	-8.66	-18.74
9226.0	-38693773	-3907956	-12031943	16117.0	-10848.9	-26263.5	41.17	-8.67	-18.84
9228.0	-38661456	-3929672	-12084508	16199.5	-10866.3	-26301.2	41.33	-8.71	-18.93
9230.0	-38628975	-3951422	-12137148	16282.3	-10883.8	-26339.2	41.51	-8.77	-19.02
9232.0	-38596327	-3973207	-12189865	16365.5	-10901.3	-26377.3	41.71	-8.80	-19.13
9234.0	-38563512	-3995027	-12242658	16449.0	-10919.0	-26415.7	41.85	-8.85	-19.25
9236.0	-38530530	-4016883	-12295528	16533.1	-10936.7	-26454.2	42.22	-8.84	-19.24
9238.0	-38497379	-4038774	-12348475	16618.3	-10954.3	-26492.5	42.86	-8.78	-19.10
9240.0	-38464057	-4060700	-12401498	16704.6	-10971.8	-26530.6	43.49	-8.72	-18.98
9242.0	-38430560	-4082661	-12454597	16791.8	-10989.3	-26568.7	43.80	-8.73	-19.04
9244.0	-38396889	-4104657	-12507773	16879.5	-11006.8	-26606.9	43.82	-8.82	-19.24
9246.0	-38363042	-4126688	-12561025	16967.2	-11024.5	-26645.6	43.84	-8.89	-19.43
9248.0	-38329020	-4148755	-12614355	17054.9	-11042.3	-26684.6	43.93	-8.94	-19.59
9250.0	-38294823	-4170858	-12667764	17142.8	-11060.3	-26724.0	43.99	-8.99	-19.79
9252.0	-38260449	-4192996	-12721251	17230.9	-11078.3	-26763.8	44.09	-9.05	-20.00
9254.0	-38225899	-4215171	-12774819	17319.2	-11096.5	-26804.0	44.18	-9.13	-20.20
9256.0	-38191172	-4237382	-12828468	17407.6	-11114.8	-26844.5	44.25	-9.19	-20.39
9258.0	-38156268	-4259630	-12882198	17496.1	-11133.2	-26885.5	44.27	-9.25	-20.59
9260.0	-38121187	-4281915	-12936010	17584.7	-11151.8	-26926.9	44.29	-9.31	-20.79
9262.0	-38085929	-4304238	-12989906	17673.2	-11170.5	-26968.6	44.31	-9.36	-20.98
S-IVB 2ND GUIDANCE CUTOFF									
9263.240	-38063980	-4318096	-13023363	17728.1	-11182.1	-26994.6	44.32	-9.40	-21.11
9264.0	-38050502	-4326594	-13043875	17749.2	-11183.1	-26992.4	19.02	3.12	15.81
9266.0	-38014965	-4348954	-13097830	17787.2	-11176.9	-26960.7	18.95	3.15	15.86
9268.0	-37979351	-4371302	-13151723	17825.0	-11170.5	-26928.9	18.88	3.18	15.92
9270.0	-37943665	-4393636	-13205548	17862.7	-11164.1	-26897.0	18.81	3.21	15.98
9272.0	-37907902	-4415957	-13259311	17900.2	-11157.6	-26865.3	18.73	3.24	16.06
TRANSLUNAR INJECTION (TLI)									
9273.240	-37885688	-4429793	-13292615	17923.4	-11153.5	-26845.3	18.70	3.24	16.05
9300.0	-37399479	-4727063	-14005178	18410.7	-11062.6	-26408.0	17.72	3.55	16.62
9350.0	-36457573	-5275549	-15304453	19249.6	-10872.8	-25556.6	15.81	4.03	17.39
9400.0	-35476155	-5813982	-16560305	19990.8	-10661.4	-24673.5	13.85	4.41	17.88
9450.0	-34460111	-6341420	-17771522	20634.9	-10433.9	-23773.5	11.91	4.68	18.08

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
9500.0	-33414285	-6857181	-18937581	21182.6	-10195.1	-22869.2	10.02	4.86	18.05
9550.0	-32343382	-7360816	-20058564	21638.7	-9949.6	-21972.2	8.24	4.95	17.80
9600.0	-31251851	-7852094	-21135084	22008.8	-9701.4	-21092.1	6.59	4.97	17.38
9650.0	-30143824	-8330969	-22168181	22299.7	-9454.0	-20236.4	5.08	4.92	16.83
9700.0	-29023071	-8797549	-23159232	22519.0	-9210.0	-19411.0	3.72	4.83	16.18
9750.0	-27892987	-9252069	-24109859	22674.3	-8971.8	-18620.0	2.51	4.70	15.46
9800.0	-26756585	-9694857	-25021856	22773.0	-8741.0	-17866.2	1.46	4.53	14.69
9850.0	-25616516	-10126313	-25897120	22822.1	-8518.8	-17150.9	0.53	4.35	13.91
9900.0	-24475084	-10546889	-26737601	22828.5	-8305.9	-16474.9	-0.26	4.16	13.13
9950.0	-23334282	-10957067	-27545257	22798.0	-8102.9	-15837.8	-0.94	3.96	12.36
10000.0	-22195811	-11357346	-28322021	22736.0	-7910.0	-15239.0	-1.52	3.76	11.60
10050.0	-21061120	-11748233	-29069779	22647.5	-7727.2	-14677.3	-2.01	3.55	10.87
10100.0	-19931431	-12130231	-29790349	22536.7	-7554.4	-14151.3	-2.42	3.36	10.18
10150.0	-18807771	-12503835	-30485470	22406.8	-7391.3	-13659.0	-2.76	3.16	9.51
10200.0	-17690994	-12869525	-31156795	22261.9	-7237.8	-13199.2	-3.03	2.98	8.88
10250.0	-16581789	-13227768	-31805901	22104.4	-7093.4	-12769.9	-3.26	2.80	8.29
10300.0	-15480728	-13579011	-32434265	21936.5	-6957.7	-12369.3	-3.44	2.63	7.74
10350.0	-14388272	-13923680	-33043282	21760.5	-6830.4	-11995.7	-3.59	2.47	7.21
10400.0	-13304783	-14262178	-33634255	21578.1	-6710.8	-11647.3	-3.70	2.31	6.73
10450.0	-12230549	-14594887	-34208401	21390.6	-6598.7	-11322.4	-3.79	2.17	6.27
10500.0	-11165784	-14922169	-34766862	21199.7	-6493.7	-11019.7	-3.85	2.03	5.85
10550.0	-10110632	-15244370	-35310709	21006.1	-6395.4	-10737.5	-3.89	1.90	5.45
10600.0	-9065206	-15561809	-35840931	20810.8	-6303.2	-10474.5	-3.92	1.78	5.08
10650.0	-8029570	-15874788	-36358454	20614.6	-6216.9	-10229.3	-3.93	1.67	4.73
10700.0	-7003751	-16183594	-36864142	20418.1	-6136.2	-10000.9	-3.93	1.56	4.41
10750.0	-5987751	-16488494	-37358802	20222.0	-6060.6	-9788.0	-3.92	1.46	4.11
10800.0	-4981545	-16789740	-37843187	20026.5	-5990.0	-9589.7	-3.90	1.37	3.83
10850.0	-3985088	-17087571	-38317999	19832.0	-5924.0	-9404.9	-3.88	1.28	3.57
10900.0	-2998320	-17382209	-38783893	19638.9	-5862.3	-9232.9	-3.85	1.19	3.32
CSM SEPARATION									
10949.400	-2032837	-17670383	-39236039	19449.7	-5805.3	-9074.5	-3.81	1.11	3.09

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6									
8334.200	-3528.463	-22.817	-332.830	2402.6	-417.0	-25465.4	30.24	0.16	2.86
8340.0	-3526.086	-23.214	-357.130	2577.9	-416.1	-25448.2	30.22	0.16	3.07
8350.0	-3521.595	-23.898	-398.986	2879.8	-414.4	-25415.7	30.18	0.17	3.42
8360.0	-3516.607	-24.578	-440.786	3181.3	-412.8	-25379.7	30.14	0.17	3.78
8370.0	-3511.124	-25.256	-482.523	3482.4	-411.0	-25340.1	30.09	0.18	4.14
8380.0	-3505.145	-25.931	-524.192	3782.9	-409.2	-25296.9	30.04	0.18	4.49
8390.0	-3498.672	-26.603	-565.788	4082.9	-407.4	-25250.2	29.98	0.19	4.85
8400.0	-3491.706	-27.272	-607.303	4382.4	-405.5	-25199.9	29.92	0.20	5.20
8410.0	-3484.248	-27.938	-648.733	4681.2	-403.5	-25146.1	29.85	0.20	5.56
8420.0	-3476.298	-28.600	-690.071	4979.4	-401.5	-25088.7	29.79	0.21	5.91
8430.0	-3467.858	-29.259	-731.313	5276.8	-399.4	-25027.8	29.71	0.21	6.27
8440.0	-3458.929	-29.915	-772.450	5573.5	-397.3	-24963.3	29.64	0.22	6.62
8450.0	-3449.513	-30.567	-813.479	5869.4	-395.1	-24895.4	29.55	0.22	6.97
8460.0	-3439.610	-31.216	-854.394	6164.5	-392.9	-24823.9	29.47	0.23	7.32
8470.0	-3429.222	-31.860	-895.187	6458.7	-390.6	-24749.0	29.38	0.23	7.67
8480.0	-3418.351	-32.501	-935.855	6752.0	-388.2	-24670.6	29.29	0.24	8.02
8490.0	-3406.998	-33.138	-976.390	7044.4	-385.8	-24588.6	29.19	0.24	8.36
8500.0	-3395.165	-33.771	-1016.788	7335.7	-383.4	-24503.3	29.09	0.25	8.71
8510.0	-3382.852	-34.400	-1057.043	7626.1	-380.9	-24414.4	28.98	0.25	9.05
8520.0	-3370.063	-35.025	-1097.149	7915.3	-378.3	-24322.2	28.87	0.26	9.40
8530.0	-3356.799	-35.645	-1137.099	8203.4	-375.7	-24226.5	28.76	0.26	9.74
8540.0	-3343.062	-36.262	-1176.890	8490.4	-373.0	-24127.4	28.64	0.27	10.08
8550.0	-3328.853	-36.873	-1216.515	8776.1	-370.3	-24024.9	28.52	0.27	10.42
8560.0	-3314.175	-37.481	-1255.968	9060.6	-367.6	-23919.0	28.39	0.28	10.76
8570.0	-3299.030	-38.083	-1295.244	9343.9	-364.7	-23809.8	28.26	0.28	11.09
8580.0	-3283.420	-38.681	-1334.338	9625.8	-361.9	-23697.1	28.13	0.29	11.43
8590.0	-3267.347	-39.274	-1373.243	9906.4	-358.9	-23581.2	27.99	0.29	11.76
8600.0	-3250.813	-39.863	-1411.955	10185.5	-356.0	-23461.9	27.85	0.30	12.09
8610.0	-3233.821	-40.446	-1450.468	10463.3	-352.9	-23339.4	27.70	0.30	12.42
8620.0	-3216.373	-41.024	-1488.777	10739.5	-349.9	-23213.5	27.55	0.31	12.75
8630.0	-3198.472	-41.598	-1526.876	11014.2	-346.8	-23084.4	27.40	0.31	13.08
8640.0	-3180.120	-42.166	-1564.759	11287.4	-343.6	-22952.0	27.24	0.32	13.40
8650.0	-3161.320	-42.728	-1602.422	11559.0	-340.4	-22816.4	27.08	0.32	13.72
8660.0	-3142.073	-43.286	-1639.859	11829.0	-337.1	-22677.6	26.91	0.33	14.04
8670.0	-3122.384	-43.838	-1677.065	12097.3	-333.8	-22535.6	26.74	0.33	14.36
8680.0	-3102.255	-44.385	-1714.035	12363.8	-330.4	-22390.4	26.57	0.34	14.68
8690.0	-3081.689	-44.926	-1750.763	12628.7	-327.0	-22242.1	26.39	0.34	14.99
8700.0	-3060.688	-45.461	-1787.245	12891.7	-323.5	-22090.6	26.21	0.35	15.30
8710.0	-3039.256	-45.990	-1823.475	13153.0	-320.0	-21936.0	26.03	0.35	15.61
8720.0	-3017.395	-46.514	-1859.447	13412.4	-316.5	-21778.4	25.84	0.36	15.92

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
8730.0	-2995.109	-47.032	-1895.158	13669.8	-312.9	-21617.6	25.65	0.36	16.23
8740.0	-2972.401	-47.544	-1930.602	13925.4	-309.3	-21453.9	25.46	0.36	16.53
8750.0	-2949.274	-48.050	-1965.774	14179.0	-305.6	-21287.1	25.26	0.37	16.83
8760.0	-2925.731	-48.550	-2000.668	14430.6	-301.8	-21117.3	25.06	0.37	17.13
8770.0	-2901.775	-49.044	-2035.281	14680.2	-298.1	-20944.5	24.85	0.38	17.43
8780.0	-2877.411	-49.531	-2069.607	14927.7	-294.3	-20768.8	24.64	0.38	17.72
8790.0	-2852.641	-50.012	-2103.642	15173.1	-290.4	-20590.2	24.43	0.39	18.01
8800.0	-2827.469	-50.487	-2137.380	15416.3	-286.5	-20408.6	24.21	0.39	18.30
8810.0	-2801.898	-50.955	-2170.817	15657.4	-282.6	-20224.2	23.99	0.39	18.59
8820.0	-2775.932	-51.417	-2203.948	15896.3	-278.6	-20037.0	23.77	0.40	18.87
8830.0	-2749.575	-51.872	-2236.769	16132.9	-274.4	-19847.0	23.55	0.40	19.15
8840.0	-2722.830	-52.321	-2269.274	16367.4	-270.3	-19654.3	23.31	0.41	19.42
8850.0	-2695.702	-52.762	-2301.461	16599.5	-266.3	-19458.7	23.11	0.39	19.67
8860.0	-2668.193	-53.197	-2333.323	16829.3	-262.1	-19260.4	22.84	0.42	19.98
8870.0	-2640.308	-53.625	-2364.856	17056.8	-257.9	-19059.5	22.61	0.42	20.25
8880.0	-2612.051	-54.046	-2396.057	17281.8	-253.7	-18855.8	22.40	0.42	20.48
8890.0	-2583.425	-54.460	-2426.920	17504.3	-249.4	-18649.5	22.12	0.42	20.76
8900.0	-2554.435	-54.867	-2457.442	17724.5	-245.1	-18440.6	21.86	0.43	21.04
8910.0	-2525.085	-55.267	-2487.618	17942.2	-240.8	-18229.0	21.69	0.26	21.20
S-IVB RE-IGNITION (STDV OPEN)									
8912.400	-2517.987	-55.362	-2494.808	17994.2	-239.9	-18178.0	21.65	0.19	21.23
8914.0	-2513.244	-55.425	-2499.591	18035.3	-239.4	-18151.0	29.50	0.62	12.69
8916.0	-2507.297	-55.503	-2505.562	18101.4	-239.2	-18132.3	34.34	0.44	7.79
8918.0	-2501.327	-55.582	-2511.528	18170.5	-238.4	-18116.5	34.45	0.29	7.87
8920.0	-2495.335	-55.660	-2517.489	18239.3	-237.8	-18100.7	34.54	0.22	7.97
8922.0	-2489.320	-55.739	-2523.444	18308.4	-237.5	-18084.7	34.71	0.20	8.14
8924.0	-2483.282	-55.817	-2529.394	18377.8	-237.1	-18068.3	34.87	0.18	8.31
8926.0	-2477.221	-55.895	-2535.338	18448.1	-236.6	-18051.2	35.44	0.21	8.75
8928.0	-2471.138	-55.972	-2541.277	18519.5	-236.0	-18033.2	36.00	0.24	9.18
8930.0	-2465.030	-56.050	-2547.210	18591.7	-235.5	-18014.6	36.27	0.25	9.42
8932.0	-2458.898	-56.127	-2553.137	18664.3	-235.0	-17995.7	36.25	0.23	9.49
8934.0	-2452.743	-56.205	-2559.057	18736.8	-234.5	-17976.6	36.19	0.28	9.50
8936.0	-2446.563	-56.282	-2564.971	18809.2	-233.9	-17957.5	36.22	0.36	9.56
8938.0	-2440.360	-56.359	-2570.878	18881.7	-233.2	-17938.3	36.29	0.39	9.65
8940.0	-2434.133	-56.435	-2576.780	18954.3	-232.4	-17918.9	36.34	0.39	9.70
8942.0	-2427.882	-56.512	-2582.675	19027.0	-231.6	-17899.5	36.35	0.39	9.73
8944.0	-2421.608	-56.588	-2588.563	19099.7	-230.8	-17880.0	36.34	0.40	9.74
8946.0	-2415.309	-56.664	-2594.445	19172.4	-229.9	-17860.5	36.33	0.44	9.78
8948.0	-2408.986	-56.739	-2600.321	19245.1	-229.0	-17840.9	36.35	0.49	9.83
8950.0	-2402.639	-56.814	-2606.190	19317.9	-228.0	-17821.2	36.40	0.53	9.87
8952.0	-2396.269	-56.889	-2612.053	19390.7	-226.9	-17801.4	36.44	0.55	9.91

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
8954.0	-2389.874	-56.964	-2617.909	19463.6	-225.8	-17781.6	36.45	0.56	9.96
8956.0	-2383.456	-57.038	-2623.759	19536.5	-224.7	-17761.6	36.43	0.55	10.00
8958.0	-2377.013	-57.112	-2629.602	19609.4	-223.6	-17741.6	36.42	0.55	10.04
8960.0	-2370.546	-57.185	-2635.439	19682.3	-222.5	-17721.5	36.44	0.55	10.05
8962.0	-2364.056	-57.258	-2641.268	19755.2	-221.3	-17701.4	36.46	0.57	10.06
8964.0	-2357.541	-57.331	-2647.092	19828.2	-220.1	-17681.2	36.48	0.61	10.09
8966.0	-2351.003	-57.403	-2652.908	19901.1	-218.9	-17661.0	36.50	0.65	10.13
8968.0	-2344.440	-57.475	-2658.718	19974.2	-217.6	-17640.7	36.50	0.67	10.17
8970.0	-2337.853	-57.546	-2664.521	20047.2	-216.2	-17620.4	36.49	0.68	10.20
8972.0	-2331.243	-57.617	-2670.318	20120.2	-214.8	-17599.9	36.49	0.67	10.21
8974.0	-2324.608	-57.688	-2676.108	20193.2	-213.5	-17579.5	36.52	0.65	10.24
8976.0	-2317.949	-57.758	-2681.891	20266.3	-212.2	-17559.0	36.54	0.64	10.28
8978.0	-2311.266	-57.827	-2687.667	20339.4	-210.9	-17538.4	36.55	0.64	10.32
8980.0	-2304.559	-57.897	-2693.437	20412.5	-209.6	-17517.7	36.56	0.67	10.35
8982.0	-2297.828	-57.965	-2699.199	20485.6	-208.2	-17497.0	36.56	0.70	10.38
8984.0	-2291.073	-58.034	-2704.955	20558.8	-206.8	-17476.2	36.56	0.73	10.40
8986.0	-2284.294	-58.101	-2710.704	20631.9	-205.3	-17455.4	36.55	0.74	10.43
8988.0	-2277.491	-58.169	-2716.446	20705.0	-203.8	-17434.5	36.55	0.75	10.44
8990.0	-2270.664	-58.236	-2722.182	20778.1	-202.3	-17413.6	36.58	0.75	10.46
8992.0	-2263.813	-58.302	-2727.910	20851.3	-200.8	-17392.7	36.60	0.76	10.50
8994.0	-2256.937	-58.368	-2733.631	20924.5	-199.2	-17371.7	36.60	0.76	10.52
8996.0	-2250.038	-58.433	-2739.346	20997.7	-197.7	-17350.6	36.58	0.77	10.54
8998.0	-2243.114	-58.498	-2745.054	21070.9	-196.2	-17329.5	36.58	0.78	10.55
9000.0	-2236.166	-58.562	-2750.754	21144.1	-194.6	-17308.4	36.60	0.77	10.58
9002.0	-2229.195	-58.626	-2756.448	21217.3	-193.0	-17287.2	36.62	0.77	10.62
9004.0	-2222.199	-58.689	-2762.135	21290.6	-191.5	-17266.0	36.64	0.77	10.63
9006.0	-2215.179	-58.752	-2767.814	21363.9	-189.9	-17244.7	36.66	0.80	10.65
9008.0	-2208.134	-58.814	-2773.487	21437.3	-188.3	-17223.4	36.66	0.83	10.67
9010.0	-2201.066	-58.876	-2779.153	21510.6	-186.6	-17202.0	36.65	0.84	10.69
9012.0	-2193.974	-58.937	-2784.811	21583.9	-184.9	-17180.7	36.66	0.83	10.70
9014.0	-2186.857	-58.998	-2790.463	21657.3	-183.3	-17159.3	36.68	0.81	10.71
9016.0	-2179.716	-59.058	-2796.108	21730.7	-181.7	-17137.8	36.68	0.80	10.73
9018.0	-2172.551	-59.117	-2801.745	21804.0	-180.0	-17116.3	36.67	0.82	10.77
9020.0	-2165.362	-59.176	-2807.376	21877.4	-178.4	-17094.8	36.67	0.84	10.79
9022.0	-2158.149	-59.235	-2812.999	21950.8	-176.7	-17073.2	36.69	0.85	10.80
9024.0	-2150.912	-59.293	-2818.615	22024.2	-175.0	-17051.6	36.71	0.86	10.83
9026.0	-2143.650	-59.350	-2824.224	22097.6	-173.2	-17029.9	36.72	0.86	10.83
9028.0	-2136.365	-59.407	-2829.826	22171.1	-171.5	-17008.2	36.72	0.86	10.83
9030.0	-2129.055	-59.463	-2835.421	22244.6	-169.8	-16986.6	36.73	0.87	10.84
9032.0	-2121.721	-59.518	-2841.009	22318.1	-168.0	-16964.9	36.75	0.88	10.86
9034.0	-2114.362	-59.573	-2846.589	22391.6	-166.3	-16943.1	36.76	0.87	10.89
9036.0	-2106.980	-59.628	-2852.163	22465.1	-164.5	-16921.3	36.77	0.85	10.92
9038.0	-2099.573	-59.682	-2857.729	22538.7	-162.8	-16899.5	36.77	0.86	10.94

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
9040.0	-2092.142	-59.735	-2863.288	22612.2	-161.1	-16877.6	36.78	0.88	10.95
9042.0	-2084.687	-59.788	-2868.840	22685.8	-159.3	-16855.7	36.79	0.89	10.95
9044.0	-2077.208	-59.840	-2874.384	22759.3	-157.5	-16833.7	36.71	0.91	11.02
9046.0	-2069.704	-59.892	-2879.921	22832.7	-155.6	-16811.6	36.72	0.93	11.04
9048.0	-2062.177	-59.942	-2885.452	22906.7	-153.8	-16789.9	37.23	0.94	10.72
9050.0	-2054.625	-59.993	-2890.975	22982.1	-151.9	-16769.1	38.09	0.92	10.07
9052.0	-2047.047	-60.042	-2896.491	23059.0	-150.1	-16749.6	38.91	0.90	9.41
9054.0	-2039.444	-60.092	-2902.001	23137.4	-148.3	-16731.2	39.43	0.90	9.06
9056.0	-2031.815	-60.140	-2907.506	23216.6	-146.4	-16713.1	39.69	0.92	9.02
9058.0	-2024.160	-60.188	-2913.004	23296.2	-144.6	-16695.1	39.86	0.95	9.04
9060.0	-2016.479	-60.235	-2918.496	23375.8	-142.6	-16677.0	39.83	0.98	9.07
9062.0	-2008.772	-60.282	-2923.983	23455.5	-140.7	-16658.8	39.73	0.98	9.09
9064.0	-2001.038	-60.328	-2929.463	23535.0	-138.7	-16640.7	39.79	0.98	9.09
9066.0	-1993.278	-60.373	-2934.937	23614.6	-136.7	-16622.5	39.85	1.00	9.09
9068.0	-1985.492	-60.418	-2940.406	23694.4	-134.6	-16604.3	39.91	1.04	9.09
9070.0	-1977.680	-60.462	-2945.868	23774.3	-132.5	-16586.2	39.95	1.06	9.10
9072.0	-1969.841	-60.505	-2951.325	23854.2	-130.4	-16567.9	39.99	1.07	9.11
9074.0	-1961.976	-60.548	-2956.775	23934.3	-128.3	-16549.7	40.04	1.06	9.14
9076.0	-1954.085	-60.589	-2962.220	24014.4	-126.1	-16531.4	40.08	1.07	9.15
9078.0	-1946.167	-60.631	-2967.658	24094.6	-124.0	-16513.1	40.12	1.09	9.13
9080.0	-1938.223	-60.671	-2973.090	24175.0	-121.8	-16494.9	40.17	1.10	9.13
9082.0	-1930.252	-60.711	-2978.517	24255.4	-119.6	-16476.5	40.25	1.05	9.17
9084.0	-1922.255	-60.750	-2983.937	24336.0	-117.6	-16458.2	40.29	0.91	9.16
9086.0	-1914.232	-60.788	-2989.352	24416.5	-116.0	-16440.1	40.23	0.76	9.04
9088.0	-1906.181	-60.826	-2994.760	24496.9	-114.5	-16422.1	40.19	0.69	8.91
9090.0	-1898.105	-60.864	-3000.163	24577.4	-113.1	-16404.3	40.25	0.72	8.90
9092.0	-1890.002	-60.901	-3005.559	24658.0	-111.6	-16386.4	40.35	0.78	8.96
9094.0	-1881.872	-60.937	-3010.950	24738.8	-109.9	-16368.5	40.42	0.82	8.99
9096.0	-1873.716	-60.973	-3016.335	24819.7	-108.3	-16350.5	40.45	0.84	8.98
9098.0	-1865.533	-61.008	-3021.714	24900.7	-106.6	-16332.6	40.52	0.85	8.97
9100.0	-1857.323	-61.043	-3027.087	24981.8	-104.9	-16314.7	40.60	0.86	8.98
9102.0	-1849.087	-61.077	-3032.454	25063.1	-103.1	-16296.7	40.68	0.87	9.00
9104.0	-1840.824	-61.111	-3037.815	25144.5	-101.4	-16278.7	40.74	0.88	9.01
9106.0	-1832.534	-61.144	-3043.170	25226.1	-99.6	-16260.7	40.80	0.89	9.02
9108.0	-1824.217	-61.177	-3048.520	25307.8	-97.8	-16242.6	40.87	0.92	9.02
9110.0	-1815.874	-61.208	-3053.863	25389.6	-95.9	-16224.6	40.92	0.95	9.01
9112.0	-1807.503	-61.240	-3059.201	25471.5	-94.0	-16206.6	40.97	0.96	9.00
9114.0	-1799.105	-61.270	-3064.532	25553.5	-92.0	-16188.6	41.03	0.95	8.99
9116.0	-1790.681	-61.300	-3069.858	25635.7	-90.1	-16170.6	41.12	0.96	9.00
9118.0	-1782.229	-61.330	-3075.178	25718.0	-88.2	-16152.6	41.19	0.98	9.02
9120.0	-1773.750	-61.358	-3080.491	25800.4	-86.2	-16134.6	41.25	1.01	9.04
9122.0	-1765.244	-61.386	-3085.799	25883.0	-84.1	-16116.5	41.31	1.04	9.04
9124.0	-1756.711	-61.414	-3091.101	25965.7	-82.0	-16098.4	41.39	1.07	9.03

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
9126.0	-1748.150	-61.440	-3096.397	26048.6	-79.8	-16080.4	41.47	1.08	9.01
9128.0	-1739.563	-61.466	-3101.687	26131.7	-77.7	-16062.4	41.54	1.09	9.01
9130.0	-1730.947	-61.491	-3106.971	26214.8	-75.4	-16044.3	41.62	1.10	9.03
9132.0	-1722.305	-61.516	-3112.249	26298.2	-73.2	-16026.3	41.70	1.13	9.05
9134.0	-1713.635	-61.540	-3117.522	26381.7	-70.9	-16008.2	41.78	1.16	9.05
9136.0	-1704.937	-61.563	-3122.788	26465.3	-68.5	-15990.1	41.85	1.19	9.05
9138.0	-1696.212	-61.585	-3128.048	26549.1	-66.1	-15972.0	41.93	1.20	9.05
9140.0	-1687.460	-61.606	-3133.302	26633.1	-63.7	-15953.9	42.04	1.21	9.05
9142.0	-1678.679	-61.627	-3138.551	26717.3	-61.3	-15935.8	42.13	1.23	9.04
9144.0	-1669.871	-61.646	-3143.793	26801.6	-58.8	-15917.7	42.20	1.26	9.04
9146.0	-1661.035	-61.665	-3149.030	26886.2	-56.2	-15899.7	42.29	1.27	9.04
9148.0	-1652.172	-61.683	-3154.260	26970.9	-53.7	-15881.6	42.40	1.28	9.05
9150.0	-1643.280	-61.701	-3159.485	27055.8	-51.1	-15863.5	42.50	1.30	9.05
9152.0	-1634.360	-61.717	-3164.703	27140.9	-48.5	-15845.4	42.58	1.31	9.04
9154.0	-1625.413	-61.733	-3169.916	27226.1	-45.8	-15827.3	42.66	1.32	9.05
9156.0	-1616.437	-61.747	-3175.123	27311.6	-43.2	-15809.2	42.76	1.35	9.06
9158.0	-1607.433	-61.761	-3180.323	27397.2	-40.4	-15791.1	42.86	1.39	9.05
9160.0	-1598.401	-61.774	-3185.518	27483.1	-37.6	-15773.1	42.96	1.43	9.02
9162.0	-1589.341	-61.786	-3190.707	27569.1	-34.7	-15755.0	43.06	1.45	9.00
9164.0	-1580.252	-61.797	-3195.890	27655.4	-31.8	-15737.0	43.17	1.45	9.02
9166.0	-1571.135	-61.807	-3201.067	27741.8	-28.9	-15719.0	43.26	1.46	9.05
9168.0	-1561.989	-61.816	-3206.238	27828.4	-25.9	-15700.9	43.35	1.48	9.05
9170.0	-1552.815	-61.824	-3211.403	27915.3	-22.9	-15682.8	43.45	1.52	9.03
9172.0	-1543.612	-61.831	-3216.562	28002.3	-19.8	-15664.7	43.56	1.55	9.04
9174.0	-1534.380	-61.837	-3221.715	28089.5	-16.7	-15646.6	43.67	1.58	9.06
9176.0	-1525.120	-61.842	-3226.863	28177.1	-13.5	-15628.5	43.81	1.59	9.07
9178.0	-1515.831	-61.846	-3232.004	28264.8	-10.3	-15610.4	43.95	1.62	9.05
9180.0	-1506.513	-61.849	-3237.139	28352.9	-7.0	-15592.3	44.07	1.64	9.05
9182.0	-1497.166	-61.850	-3242.269	28441.1	-3.7	-15574.2	44.15	1.67	9.07
9184.0	-1487.790	-61.851	-3247.392	28529.5	-0.4	-15556.1	44.24	1.68	9.07
9186.0	-1478.384	-61.851	-3252.509	28618.1	3.0	-15538.0	44.35	1.69	9.06
9188.0	-1468.950	-61.849	-3257.621	28707.0	6.4	-15519.8	44.46	1.71	9.07
9190.0	-1459.486	-61.846	-3262.726	28796.0	9.9	-15501.7	44.58	1.74	9.09
9192.0	-1449.993	-61.842	-3267.826	28885.3	13.4	-15483.5	44.72	1.77	9.10
9194.0	-1440.470	-61.837	-3272.919	28975.0	17.0	-15465.3	44.89	1.81	9.10
9196.0	-1430.918	-61.831	-3278.007	29064.9	20.7	-15447.1	45.05	1.85	9.11
9198.0	-1421.336	-61.824	-3283.088	29155.2	24.4	-15428.9	45.18	1.88	9.13
9200.0	-1411.725	-61.815	-3288.164	29245.7	28.2	-15410.6	45.31	1.88	9.12
9202.0	-1402.084	-61.805	-3293.233	29336.5	32.0	-15392.4	45.44	1.89	9.08
9204.0	-1392.412	-61.794	-3298.297	29427.5	35.8	-15374.3	45.58	1.91	9.09
9206.0	-1382.711	-61.782	-3303.355	29518.8	39.6	-15356.0	45.72	1.94	9.15
9208.0	-1372.980	-61.768	-3308.406	29610.5	43.5	-15337.7	45.90	1.96	9.21
9210.0	-1363.218	-61.753	-3313.452	29702.5	47.5	-15319.2	46.09	1.98	9.24

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
9212.0	-1353.426	-61.737	-3318.491	29794.8	51.5	-15300.8	46.25	2.01	9.21
9214.0	-1343.604	-61.719	-3323.524	29887.5	55.6	-15282.4	46.41	2.06	9.19
9216.0	-1333.751	-61.700	-3328.552	29980.5	59.7	-15264.0	46.60	2.09	9.19
9218.0	-1323.867	-61.680	-3333.573	30074.0	63.9	-15245.7	46.81	2.11	9.19
9220.0	-1313.952	-61.658	-3338.588	30167.8	68.1	-15227.3	47.01	2.11	9.22
9222.0	-1304.007	-61.635	-3343.597	30262.0	72.4	-15208.8	47.21	2.13	9.26
9224.0	-1294.030	-61.610	-3348.600	30356.7	76.7	-15190.2	47.41	2.17	9.30
9226.0	-1284.023	-61.584	-3353.597	30451.7	81.1	-15171.6	47.60	2.20	9.32
9228.0	-1273.983	-61.557	-3358.588	30547.1	85.5	-15153.0	47.79	2.20	9.34
9230.0	-1263.913	-61.528	-3363.573	30642.9	89.9	-15134.2	47.99	2.20	9.38
9232.0	-1253.811	-61.498	-3368.551	30739.2	94.3	-15115.5	48.22	2.21	9.41
9234.0	-1243.677	-61.466	-3373.523	30835.8	98.8	-15096.7	48.40	2.22	9.40
9236.0	-1233.511	-61.433	-3378.489	30932.9	103.2	-15077.7	48.70	2.24	9.63
9238.0	-1223.313	-61.398	-3383.449	31030.8	107.8	-15057.9	49.14	2.28	10.13
9240.0	-1213.083	-61.362	-3388.402	31129.5	112.4	-15037.2	49.59	2.34	10.60
9242.0	-1202.820	-61.324	-3393.348	31229.0	117.1	-15015.9	49.88	2.36	10.75
9244.0	-1192.524	-61.285	-3398.287	31328.9	121.8	-14994.5	50.01	2.35	10.60
9246.0	-1182.196	-61.244	-3403.219	31429.1	126.5	-14973.4	50.13	2.35	10.46
9248.0	-1171.834	-61.202	-3408.145	31529.5	131.3	-14952.6	50.30	2.37	10.38
9250.0	-1161.439	-61.158	-3413.063	31630.3	136.1	-14932.0	50.46	2.40	10.27
9252.0	-1151.011	-61.112	-3417.975	31731.5	140.9	-14911.5	50.66	2.42	10.16
9254.0	-1140.550	-61.065	-3422.879	31833.0	145.7	-14891.3	50.86	2.42	10.05
9256.0	-1130.055	-61.016	-3427.778	31934.9	150.6	-14871.4	51.02	2.43	9.94
9258.0	-1119.527	-60.966	-3432.670	32037.0	155.5	-14851.6	51.15	2.45	9.80
9260.0	-1108.964	-60.914	-3437.555	32139.5	160.4	-14832.2	51.27	2.47	9.66
9262.0	-1098.369	-60.860	-3442.434	32242.1	165.3	-14813.0	51.40	2.48	9.52
S-IVB 2ND GUIDANCE CUTOFF									
9263.240	-1091.782	-60.826	-3445.456	32305.8	168.4	-14801.2	51.48	2.49	9.43
9264.0	-1087.741	-60.805	-3447.306	32323.8	169.2	-14785.1	8.83	0.47	27.79
9266.0	-1077.098	-60.749	-3452.164	32341.4	170.2	-14729.5	8.73	0.47	27.80
9268.0	-1066.449	-60.693	-3457.003	32358.7	171.1	-14673.9	8.63	0.47	27.82
9270.0	-1055.796	-60.636	-3461.824	32375.9	172.0	-14618.2	8.52	0.47	27.83
9272.0	-1045.136	-60.579	-3466.626	32393.0	173.2	-14562.7	8.40	0.46	27.86
TRANSLUNAR INJECTION (TLI)									
9273.240	-1038.523	-60.544	-3469.595	32403.3	173.8	-14528.2	8.37	0.46	27.84
9300.0	-895.347	-59.752	-3531.938	32610.0	186.0	-13782.7	7.07	0.44	27.86
9350.0	-625.705	-58.130	-3639.638	32905.7	207.8	-12395.7	4.74	0.42	27.57
9400.0	-354.102	-56.335	-3736.007	33087.6	228.2	-11031.2	2.55	0.39	26.97
9450.0	-81.438	-54.379	-3821.288	33165.5	247.0	-9703.1	0.55	0.35	26.12

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN PHASE (CONT.)

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
9500.0	191.467	-52.274	-3895.833	33147.8	264.2	-8423.3	-1.24	0.32	25.06
9550.0	463.876	-50.035	-3960.074	33046.6	279.7	-7200.4	-2.80	0.29	23.85
9600.0	735.145	-47.675	-4014.509	32872.9	293.7	-6040.5	-4.14	0.26	22.54
9650.0	1004.726	-45.206	-4059.672	32638.0	306.1	-4947.5	-5.25	0.23	21.19
9700.0	1272.158	-42.641	-4096.121	32352.4	317.0	-3922.7	-6.16	0.20	19.82
9750.0	1537.067	-39.992	-4124.418	32026.0	326.6	-2966.1	-6.89	0.17	18.46
9800.0	1799.151	-37.270	-4145.119	31667.5	334.9	-2076.2	-7.45	0.15	17.15
9850.0	2058.179	-34.483	-4158.765	31284.4	342.1	-1250.8	-7.87	0.13	15.89
9900.0	2313.977	-31.642	-4165.873	30883.5	348.3	-486.7	-8.17	0.11	14.69
9950.0	2566.422	-28.754	-4166.934	30470.2	353.5	219.3	-8.37	0.09	13.57
10000.0	2815.432	-25.826	-4162.412	30049.4	357.9	871.0	-8.48	0.08	12.52
10050.0	3060.962	-22.866	-4152.739	29624.9	361.6	1472.0	-8.52	0.06	11.54
10100.0	3302.994	-19.877	-4138.315	29199.8	364.6	2026.1	-8.50	0.05	10.64
10150.0	3541.533	-16.867	-4119.512	28776.4	367.0	2536.8	-8.44	0.04	9.80
10200.0	3776.605	-13.838	-4096.675	28357.4	369.0	3007.4	-8.34	0.03	9.04
10250.0	4008.251	-10.795	-4070.118	27944.0	370.4	3441.2	-8.21	0.02	8.33
10300.0	4236.522	-7.742	-4040.133	27537.4	371.5	3841.1	-8.06	0.01	7.68
10350.0	4461.480	-4.682	-4006.986	27138.7	372.3	4210.1	-7.90	0.01	7.09
10400.0	4683.191	-1.616	-3970.922	26748.5	372.7	4550.5	-7.72	0.00	6.54
10450.0	4901.727	1.451	-3932.166	26367.0	372.9	4864.9	-7.54	-0.00	6.04
10500.0	5117.162	4.519	-3890.922	25995.1	372.8	5155.4	-7.35	-0.01	5.59
10550.0	5329.576	7.586	-3847.379	25632.5	372.5	5424.0	-7.16	-0.01	5.17
10600.0	5539.045	10.649	-3801.709	25279.4	372.0	5672.6	-6.97	-0.01	4.78
10650.0	5745.647	13.708	-3754.071	24935.8	371.4	5902.7	-6.78	-0.01	4.43
10700.0	5949.461	16.762	-3704.609	24601.6	370.7	6115.9	-6.59	-0.02	4.10
10750.0	6150.563	19.808	-3653.458	24276.7	369.8	6313.6	-6.41	-0.02	3.81
10800.0	6349.030	22.847	-3600.741	23960.9	368.8	6496.9	-6.23	-0.02	3.53
10850.0	6544.934	25.878	-3546.569	23654.0	367.8	6667.1	-6.05	-0.02	3.28
10900.0	6738.349	28.900	-3491.048	23355.8	366.6	6825.1	-5.88	-0.02	3.04
CSM SEPARATION									
10949.400	6927.066	31.876	-3434.961	23069.5	365.5	6970.2	-5.71	-0.02	2.83

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6										
8334.200	3544.199	70.6055	-29.4578	101.12	0.01	24238.8	100.53	0.00	25581.9	626250
8340.0	3544.202	71.0273	-29.5292	100.89	0.01	24238.7	100.31	0.01	25581.8	626343
8350.0	3544.206	71.7560	-29.6488	100.48	0.01	24238.5	99.93	0.01	25581.7	626493
8360.0	3544.210	72.4866	-29.7639	100.08	0.01	24238.3	99.54	0.01	25581.6	626641
8370.0	3544.215	73.2189	-29.8744	99.67	0.01	24238.1	99.16	0.01	25581.5	626787
8380.0	3544.220	73.9528	-29.9805	99.26	0.01	24238.0	98.77	0.01	25581.4	626930
8390.0	3544.225	74.6884	-30.0819	98.85	0.01	24237.8	98.38	0.01	25581.4	627071
8400.0	3544.231	75.4256	-30.1788	98.43	0.01	24237.7	97.99	0.01	25581.3	627210
8410.0	3544.237	76.1642	-30.2711	98.02	0.01	24237.6	97.59	0.01	25581.3	627347
8420.0	3544.244	76.9043	-30.3587	97.60	0.01	24237.4	97.20	0.01	25581.2	627481
8430.0	3544.251	77.6457	-30.4416	97.18	0.01	24237.3	96.80	0.01	25581.1	627612
8440.0	3544.258	78.3884	-30.5198	96.76	0.01	24237.2	96.40	0.01	25581.1	627741
8450.0	3544.266	79.1324	-30.5933	96.33	0.01	24237.0	96.00	0.01	25581.0	627867
8460.0	3544.274	79.8775	-30.6621	95.91	0.01	24236.9	95.60	0.01	25580.9	627991
8470.0	3544.283	80.6237	-30.7261	95.48	0.01	24236.8	95.20	0.01	25580.9	628113
8480.0	3544.292	81.3708	-30.7854	95.06	0.01	24236.7	94.79	0.01	25580.8	628231
8490.0	3544.301	82.1190	-30.8398	94.63	0.01	24236.5	94.39	0.01	25580.7	628347
8500.0	3544.311	82.8679	-30.8895	94.20	0.01	24236.4	93.98	0.01	25580.7	628460
8510.0	3544.321	83.6177	-30.9343	93.77	0.01	24236.3	93.57	0.01	25580.6	628571
8520.0	3544.332	84.3681	-30.9743	93.34	0.02	24236.2	93.16	0.01	25580.5	628679
8530.0	3544.343	85.1192	-31.0094	92.91	0.02	24236.1	92.75	0.02	25580.5	628783
8540.0	3544.354	85.8708	-31.0397	92.47	0.02	24236.0	92.34	0.02	25580.4	628886
8550.0	3544.366	86.6229	-31.0651	92.04	0.02	24235.9	91.93	0.02	25580.3	628985
8560.0	3544.378	87.3753	-31.0856	91.61	0.02	24235.8	91.52	0.02	25580.2	629081
8570.0	3544.391	88.1281	-31.1013	91.17	0.02	24235.7	91.11	0.02	25580.2	629175
8580.0	3544.404	88.8810	-31.1120	90.74	0.02	24235.7	90.70	0.02	25580.1	629266
8590.0	3544.417	89.6341	-31.1179	90.30	0.02	24235.6	90.29	0.02	25580.0	629353
8600.0	3544.431	90.3873	-31.1189	89.87	0.02	24235.5	89.88	0.02	25580.0	629438
8610.0	3544.445	91.1404	-31.1150	89.44	0.02	24235.4	89.47	0.02	25579.9	629520
8620.0	3544.460	91.8934	-31.1062	89.00	0.02	24235.4	89.05	0.02	25579.8	629599
8630.0	3544.475	92.6462	-31.0925	88.57	0.02	24235.3	88.64	0.02	25579.7	629676
8640.0	3544.490	93.3987	-31.0739	88.13	0.02	24235.2	88.23	0.02	25579.7	629749
8650.0	3544.506	94.1509	-31.0505	87.70	0.02	24235.2	87.82	0.02	25579.6	629819
8660.0	3544.522	94.9026	-31.0222	87.27	0.02	24235.1	87.41	0.02	25579.5	629887
8670.0	3544.539	95.6539	-30.9890	86.83	0.02	24235.1	87.00	0.02	25579.4	629951
8680.0	3544.556	96.4045	-30.9510	86.40	0.02	24235.0	86.59	0.02	25579.4	630013
8690.0	3544.573	97.1544	-30.9081	85.97	0.03	24235.0	86.18	0.02	25579.3	630071
8700.0	3544.591	97.9036	-30.8604	85.54	0.03	24234.9	85.78	0.02	25579.2	630127
8710.0	3544.609	98.6520	-30.8079	85.11	0.03	24234.9	85.37	0.02	25579.1	630180
8720.0	3544.627	99.3994	-30.7506	84.69	0.03	24234.8	84.97	0.03	25579.1	630230

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
8730.0	3544.646	100.1459	-30.6885	84.26	0.03	24234.8	84.56	0.03	25579.0	630278
8740.0	3544.665	100.8913	-30.6217	83.84	0.03	24234.8	84.16	0.03	25578.9	630322
8750.0	3544.685	101.6355	-30.5501	83.41	0.03	24234.8	83.76	0.03	25578.8	630364
8760.0	3544.705	102.3786	-30.4737	82.99	0.03	24234.7	83.36	0.03	25578.8	630403
8770.0	3544.725	103.1204	-30.3927	82.57	0.03	24234.7	82.96	0.03	25578.7	630439
8780.0	3544.745	103.8608	-30.3070	82.15	0.03	24234.7	82.57	0.03	25578.6	630472
8790.0	3544.766	104.5999	-30.2167	81.74	0.03	24234.7	82.17	0.03	25578.5	630503
8800.0	3544.788	105.3374	-30.1217	81.32	0.03	24234.7	81.78	0.03	25578.5	630531
8810.0	3544.809	106.0734	-30.0221	80.91	0.03	24234.7	81.39	0.03	25578.4	630557
8820.0	3544.831	106.8078	-29.9180	80.50	0.03	24234.7	81.00	0.03	25578.3	630579
8830.0	3544.854	107.5406	-29.8093	80.09	0.03	24234.7	80.61	0.03	25578.3	630601
8840.0	3544.876	108.2716	-29.6960	79.68	0.03	24235.0	80.23	0.03	25578.4	630619
8850.0	3544.900	109.0008	-29.5783	79.28	0.03	24235.0	79.85	0.03	25578.4	630636
8860.0	3544.923	109.7282	-29.4562	78.88	0.03	24235.2	79.47	0.03	25578.5	630650
8870.0	3544.947	110.4537	-29.3296	78.48	0.03	24235.4	79.09	0.03	25578.6	630662
8880.0	3544.971	111.1773	-29.1987	78.08	0.03	24235.5	78.72	0.03	25578.6	630672
8890.0	3544.996	111.8989	-29.0634	77.69	0.04	24235.6	78.34	0.03	25578.6	630679
8900.0	3545.020	112.6184	-28.9237	77.30	0.04	24235.8	77.97	0.03	25578.8	630685
8910.0	3545.046	113.3359	-28.7798	76.91	0.04	24236.0	77.61	0.03	25578.9	630689
S-IVB RE-IGNITION (STDV OPEN)										
8912.400	3545.052	113.5078	-28.7446	76.81	0.04	24236.2	77.52	0.03	25579.0	630688
8914.0	3545.056	113.6223	-28.7211	76.75	0.04	24246.0	77.46	0.04	25588.8	630690
8916.0	3545.061	113.7655	-28.6914	76.68	0.04	24279.5	77.39	0.04	25622.3	630692
8918.0	3545.067	113.9089	-28.6615	76.60	0.04	24317.1	77.31	0.04	25659.9	630694
8920.0	3545.073	114.0524	-28.6314	76.52	0.05	24354.8	77.24	0.04	25697.5	630704
8922.0	3545.079	114.1960	-28.6011	76.45	0.05	24392.7	77.17	0.05	25735.4	630709
8924.0	3545.087	114.3397	-28.5706	76.37	0.05	24430.6	77.09	0.05	25773.3	630721
8926.0	3545.094	114.4836	-28.5399	76.29	0.05	24468.8	77.02	0.05	25811.5	630733
8928.0	3545.101	114.6276	-28.5089	76.22	0.05	24507.4	76.95	0.05	25850.0	630748
8930.0	3545.108	114.7718	-28.4778	76.14	0.05	24546.2	76.87	0.04	25888.9	630758
8932.0	3545.114	114.9161	-28.4464	76.07	0.04	24585.3	76.80	0.04	25927.9	630763
8934.0	3545.120	115.0606	-28.4148	75.99	0.04	24624.3	76.73	0.04	25966.9	630765
8936.0	3545.126	115.2051	-28.3830	75.91	0.04	24663.5	76.66	0.03	26006.0	630765
8938.0	3545.131	115.3499	-28.3509	75.84	0.03	24702.7	76.58	0.03	26045.2	630763
8940.0	3545.135	115.4947	-28.3187	75.76	0.03	24742.1	76.51	0.03	26084.7	630758
8942.0	3545.140	115.6397	-28.2862	75.69	0.03	24781.7	76.44	0.03	26124.2	630752
8944.0	3545.144	115.7848	-28.2535	75.61	0.03	24821.4	76.37	0.03	26163.9	630744
8946.0	3545.148	115.9301	-28.2206	75.54	0.03	24861.2	76.29	0.03	26203.7	630735
8948.0	3545.152	116.0755	-28.1874	75.46	0.03	24901.1	76.22	0.03	26243.6	630726
8950.0	3545.156	116.2211	-28.1541	75.39	0.03	24941.2	76.15	0.03	26283.6	630717
8952.0	3545.160	116.3668	-28.1205	75.31	0.03	24981.4	76.08	0.03	26323.8	630708

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
8954.0	3545.165	116.5126	-28.0867	75.24	0.03	25021.7	76.01	0.03	26364.2	630700
8956.0	3545.169	116.6585	-28.0526	75.16	0.03	25062.2	75.93	0.03	26404.6	630693
8958.0	3545.174	116.8047	-28.0184	75.09	0.03	25102.7	75.86	0.03	26445.1	630687
8960.0	3545.179	116.9509	-27.9839	75.02	0.04	25143.3	75.79	0.04	26485.7	630684
8962.0	3545.185	117.0973	-27.9492	74.94	0.04	25184.1	75.72	0.04	26526.5	630683
8964.0	3545.191	117.2438	-27.9143	74.87	0.05	25225.1	75.65	0.04	26567.5	630686
8966.0	3545.198	117.3905	-27.8792	74.79	0.05	25266.2	75.58	0.05	26608.6	630692
8968.0	3545.206	117.5373	-27.8438	74.72	0.05	25307.4	75.51	0.05	26649.8	630703
8970.0	3545.214	117.6842	-27.8082	74.64	0.06	25348.7	75.43	0.06	26691.1	630717
8972.0	3545.224	117.8313	-27.7724	74.57	0.07	25390.1	75.36	0.06	26732.5	630738
8974.0	3545.234	117.9785	-27.7363	74.50	0.07	25431.7	75.29	0.07	26774.0	630763
8976.0	3545.245	118.1259	-27.7001	74.42	0.08	25473.4	75.22	0.08	26815.7	630795
8978.0	3545.257	118.2734	-27.6636	74.35	0.09	25515.3	75.15	0.08	26857.6	630833
8980.0	3545.271	118.4210	-27.6268	74.28	0.10	25557.2	75.08	0.09	26899.5	630879
8982.0	3545.286	118.5688	-27.5899	74.20	0.11	25599.3	75.01	0.10	26941.6	630932
8984.0	3545.302	118.7167	-27.5527	74.13	0.12	25641.5	74.94	0.11	26983.8	630993
8986.0	3545.320	118.8647	-27.5153	74.06	0.13	25683.8	74.87	0.12	27026.1	631063
8988.0	3545.339	119.0129	-27.4776	73.98	0.14	25726.2	74.80	0.13	27068.5	631143
8990.0	3545.360	119.1613	-27.4397	73.91	0.15	25768.7	74.73	0.14	27111.0	631232
8992.0	3545.383	119.3097	-27.4016	73.84	0.16	25811.4	74.65	0.15	27153.7	631331
8994.0	3545.407	119.4583	-27.3633	73.76	0.17	25854.3	74.58	0.16	27196.5	631442
8996.0	3545.434	119.6071	-27.3247	73.69	0.18	25897.2	74.51	0.18	27239.5	631563
8998.0	3545.462	119.7560	-27.2859	73.62	0.20	25940.2	74.44	0.19	27282.5	631697
9000.0	3545.493	119.9050	-27.2469	73.54	0.21	25983.4	74.37	0.20	27325.7	631844
9002.0	3545.525	120.0542	-27.2076	73.47	0.23	26026.7	74.30	0.22	27369.0	632004
9004.0	3545.560	120.2035	-27.1681	73.40	0.24	26070.2	74.23	0.23	27412.4	632177
9006.0	3545.598	120.3529	-27.1284	73.32	0.26	26113.8	74.16	0.25	27456.0	632365
9008.0	3545.638	120.5025	-27.0884	73.25	0.27	26157.5	74.09	0.26	27499.8	632568
9010.0	3545.680	120.6522	-27.0482	73.18	0.29	26201.3	74.02	0.28	27543.6	632786
9012.0	3545.725	120.8020	-27.0077	73.11	0.31	26245.3	73.95	0.29	27587.6	633020
9014.0	3545.773	120.9520	-26.9670	73.03	0.33	26289.4	73.88	0.31	27631.7	633271
9016.0	3545.824	121.1022	-26.9261	72.96	0.35	26333.7	73.81	0.33	27676.0	633539
9018.0	3545.878	121.2524	-26.8850	72.89	0.36	26378.0	73.74	0.35	27720.3	633825
9020.0	3545.935	121.4028	-26.8436	72.82	0.38	26422.5	73.67	0.37	27764.8	634130
9022.0	3545.995	121.5534	-26.8019	72.75	0.41	26467.1	73.60	0.39	27809.4	634453
9024.0	3546.058	121.7040	-26.7601	72.67	0.43	26511.8	73.53	0.41	27854.1	634797
9026.0	3546.125	121.8548	-26.7180	72.60	0.45	26556.6	73.46	0.43	27899.0	635160
9028.0	3546.195	122.0058	-26.6756	72.53	0.47	26601.6	73.39	0.45	27944.0	635545
9030.0	3546.269	122.1569	-26.6330	72.46	0.49	26646.8	73.32	0.47	27989.2	635951
9032.0	3546.346	122.3081	-26.5902	72.39	0.52	26692.1	73.25	0.49	28034.5	636379
9034.0	3546.427	122.4594	-26.5471	72.31	0.54	26737.5	73.19	0.52	28079.9	636831
9036.0	3546.513	122.6109	-26.5038	72.24	0.57	26783.0	73.12	0.54	28125.4	637305
9038.0	3546.602	122.7626	-26.4602	72.17	0.59	26828.6	73.05	0.56	28171.1	637804

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
9040.0	3546.695	122.9143	-26.4164	72.10	0.62	26874.4	72.98	0.59	28216.9	638328
9042.0	3546.792	123.0662	-26.3724	72.03	0.64	26920.3	72.91	0.61	28262.8	638877
9044.0	3546.894	123.2183	-26.3281	71.96	0.67	26966.2	72.84	0.64	28308.7	639452
9046.0	3547.000	123.3704	-26.2836	71.88	0.70	27012.1	72.77	0.67	28354.7	640054
9048.0	3547.111	123.5227	-26.2388	71.81	0.73	27058.9	72.70	0.69	28401.5	640683
9050.0	3547.226	123.6752	-26.1938	71.74	0.76	27107.4	72.63	0.72	28450.0	641340
9052.0	3547.347	123.8278	-26.1485	71.67	0.79	27158.1	72.56	0.75	28500.7	642026
9054.0	3547.472	123.9805	-26.1030	71.60	0.82	27210.7	72.49	0.78	28553.3	642742
9056.0	3547.602	124.1334	-26.0572	71.53	0.85	27264.3	72.43	0.81	28607.0	643488
9058.0	3547.737	124.2865	-26.0112	71.46	0.88	27318.3	72.36	0.84	28661.1	644266
9060.0	3547.878	124.4398	-25.9648	71.39	0.91	27372.6	72.29	0.87	28715.4	645075
9062.0	3548.024	124.5933	-25.9183	71.32	0.94	27426.9	72.22	0.90	28769.7	645916
9064.0	3548.175	124.7469	-25.8715	71.25	0.98	27481.2	72.15	0.93	28824.1	646791
9066.0	3548.332	124.9007	-25.8244	71.18	1.01	27535.8	72.08	0.96	28878.7	647700
9068.0	3548.495	125.0546	-25.7770	71.11	1.05	27590.5	72.02	1.00	28933.5	648644
9070.0	3548.663	125.2087	-25.7294	71.04	1.08	27645.5	71.95	1.03	28988.5	649623
9072.0	3548.838	125.3630	-25.6816	70.97	1.12	27700.7	71.88	1.07	29043.7	650638
9074.0	3549.019	125.5175	-25.6335	70.90	1.15	27756.0	71.81	1.10	29099.1	651691
9076.0	3549.206	125.6721	-25.5851	70.83	1.19	27811.6	71.74	1.14	29154.7	652781
9078.0	3549.399	125.8270	-25.5364	70.76	1.23	27867.2	71.68	1.17	29210.5	653910
9080.0	3549.599	125.9819	-25.4875	70.69	1.27	27923.2	71.61	1.21	29266.4	655078
9082.0	3549.806	126.1371	-25.4383	70.62	1.31	27979.3	71.54	1.25	29322.6	656286
9084.0	3550.019	126.2924	-25.3889	70.55	1.35	28035.6	71.47	1.28	29379.0	657535
9086.0	3550.240	126.4479	-25.3392	70.48	1.39	28092.1	71.40	1.32	29435.6	658826
9088.0	3550.467	126.6036	-25.2892	70.41	1.43	28148.9	71.34	1.36	29492.3	660160
9090.0	3550.702	126.7594	-25.2389	70.34	1.47	28205.8	71.27	1.40	29549.3	661538
9092.0	3550.944	126.9154	-25.1884	70.27	1.52	28262.9	71.20	1.45	29606.5	662962
9094.0	3551.194	127.0716	-25.1376	70.20	1.56	28320.2	71.13	1.49	29663.9	664432
9096.0	3551.451	127.2279	-25.0865	70.13	1.60	28377.8	71.06	1.53	29721.5	665948
9098.0	3551.716	127.3844	-25.0352	70.06	1.65	28435.5	70.99	1.57	29779.3	667512
9100.0	3551.990	127.5411	-24.9836	69.99	1.69	28493.5	70.93	1.62	29837.4	669124
9102.0	3552.271	127.6979	-24.9317	69.92	1.74	28551.8	70.86	1.66	29895.7	670786
9104.0	3552.561	127.8550	-24.8795	69.85	1.79	28610.2	70.79	1.71	29954.2	672497
9106.0	3552.859	128.0121	-24.8271	69.78	1.84	28668.8	70.72	1.75	30012.9	674258
9108.0	3553.165	128.1695	-24.7744	69.71	1.88	28727.7	70.65	1.80	30071.8	676071
9110.0	3553.481	128.3270	-24.7214	69.64	1.93	28786.8	70.59	1.85	30131.0	677937
9112.0	3553.804	128.4847	-24.6681	69.57	1.98	28846.1	70.52	1.89	30190.4	679855
9114.0	3554.137	128.6425	-24.6146	69.50	2.03	28905.6	70.45	1.94	30250.0	681828
9116.0	3554.479	128.8005	-24.5608	69.43	2.08	28965.4	70.39	1.99	30309.8	683855
9118.0	3554.830	128.9587	-24.5067	69.37	2.13	29025.3	70.32	2.04	30369.9	685939
9120.0	3555.191	129.1171	-24.4523	69.30	2.19	29085.5	70.25	2.09	30430.1	688078
9122.0	3555.561	129.2756	-24.3977	69.23	2.24	29145.9	70.18	2.14	30490.6	690276
9124.0	3555.940	129.4343	-24.3428	69.16	2.29	29206.5	70.12	2.19	30551.4	692531

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
9126.0	3556.330	129.5931	-24.2875	69.09	2.35	29267.4	70.05	2.24	30612.4	694845
9128.0	3556.729	129.7521	-24.2321	69.02	2.40	29328.6	69.99	2.29	30673.6	697220
9130.0	3557.138	129.9113	-24.1763	68.96	2.45	29390.0	69.92	2.35	30735.1	699655
9132.0	3557.557	130.0707	-24.1203	68.89	2.51	29451.6	69.85	2.40	30796.8	702152
9134.0	3557.987	130.2302	-24.0639	68.82	2.57	29513.4	69.79	2.45	30858.7	704712
9136.0	3558.427	130.3898	-24.0073	68.75	2.62	29575.4	69.72	2.51	30920.9	707335
9138.0	3558.878	130.5497	-23.9505	68.69	2.68	29637.8	69.66	2.56	30983.3	710023
9140.0	3559.340	130.7097	-23.8933	68.62	2.74	29700.3	69.59	2.62	31046.0	712775
9142.0	3559.812	130.8699	-23.8359	68.55	2.80	29763.2	69.53	2.68	31109.0	715594
9144.0	3560.296	131.0302	-23.7781	68.49	2.86	29826.3	69.46	2.73	31172.2	718479
9146.0	3560.791	131.1907	-23.7201	68.42	2.92	29889.7	69.40	2.79	31235.7	721433
9148.0	3561.297	131.3514	-23.6618	68.35	2.98	29953.3	69.33	2.85	31299.4	724455
9150.0	3561.814	131.5122	-23.6032	68.29	3.04	30017.2	69.27	2.91	31363.5	727547
9152.0	3562.343	131.6732	-23.5444	68.22	3.10	30081.4	69.20	2.96	31427.8	730710
9154.0	3562.884	131.8344	-23.4852	68.16	3.16	30145.8	69.14	3.02	31492.4	733944
9156.0	3563.437	131.9957	-23.4258	68.09	3.22	30210.5	69.07	3.08	31557.2	737250
9158.0	3564.002	132.1572	-23.3661	68.02	3.29	30275.4	69.01	3.15	31622.3	740630
9160.0	3564.580	132.3189	-23.3061	67.96	3.35	30340.7	68.94	3.21	31687.7	744084
9162.0	3565.169	132.4807	-23.2458	67.89	3.41	30406.3	68.88	3.27	31753.4	747613
9164.0	3565.772	132.6426	-23.1853	67.83	3.48	30472.1	68.82	3.33	31819.4	751219
9166.0	3566.387	132.8048	-23.1244	67.76	3.54	30538.2	68.75	3.39	31885.6	754902
9168.0	3567.015	132.9671	-23.0633	67.70	3.61	30604.6	68.69	3.46	31952.1	758663
9170.0	3567.656	133.1296	-23.0019	67.63	3.68	30671.2	68.63	3.52	32018.9	762503
9172.0	3568.310	133.2922	-22.9401	67.57	3.74	30738.1	68.56	3.59	32086.0	766423
9174.0	3568.977	133.4550	-22.8781	67.51	3.81	30805.3	68.50	3.65	32153.4	770424
9176.0	3569.658	133.6180	-22.8159	67.44	3.88	30872.8	68.44	3.72	32221.1	774507
9178.0	3570.353	133.7811	-22.7533	67.38	3.95	30940.7	68.38	3.78	32289.1	778672
9180.0	3571.061	133.9444	-22.6904	67.31	4.02	31008.9	68.31	3.85	32357.5	782921
9182.0	3571.783	134.1078	-22.6273	67.25	4.09	31077.4	68.25	3.92	32426.1	787255
9184.0	3572.520	134.2714	-22.5638	67.19	4.16	31146.1	68.19	3.99	32495.0	791675
9186.0	3573.271	134.4352	-22.5001	67.13	4.23	31215.1	68.13	4.06	32564.2	796182
9188.0	3574.036	134.5991	-22.4361	67.06	4.30	31284.3	68.07	4.12	32633.6	800776
9190.0	3574.816	134.7632	-22.3718	67.00	4.37	31353.9	68.01	4.19	32703.4	805459
9192.0	3575.610	134.9275	-22.3072	66.94	4.45	31423.8	67.94	4.26	32773.5	810231
9194.0	3576.420	135.0919	-22.2424	66.88	4.52	31494.0	67.88	4.33	32843.9	815094
9196.0	3577.245	135.2565	-22.1772	66.81	4.59	31564.7	67.82	4.41	32914.8	820049
9198.0	3578.085	135.4212	-22.1117	66.75	4.67	31635.7	67.76	4.48	32986.0	825096
9200.0	3578.940	135.5861	-22.0460	66.69	4.74	31707.0	67.70	4.55	33057.5	830237
9202.0	3579.811	135.7512	-21.9800	66.63	4.82	31778.7	67.64	4.62	33129.4	835472
9204.0	3580.697	135.9164	-21.9136	66.57	4.89	31850.7	67.58	4.70	33201.6	840803
9206.0	3581.600	136.0818	-21.8470	66.51	4.97	31923.0	67.52	4.77	33274.2	846230
9208.0	3582.519	136.2473	-21.7801	66.45	5.05	31995.7	67.46	4.84	33347.1	851755
9210.0	3583.453	136.4130	-21.7129	66.38	5.13	32068.7	67.40	4.92	33420.3	857378

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
9212.0	3584.405	136.5789	-21.6454	66.32	5.20	32142.2	67.34	4.99	33494.0	863101
9214.0	3585.372	136.7449	-21.5777	66.26	5.28	32216.0	67.28	5.07	33568.1	868923
9216.0	3586.357	136.9111	-21.5096	66.20	5.36	32290.3	67.22	5.14	33642.6	874847
9218.0	3587.358	137.0775	-21.4412	66.14	5.44	32365.1	67.17	5.22	33717.6	880874
9220.0	3588.376	137.2440	-21.3726	66.08	5.52	32440.3	67.11	5.30	33793.0	887003
9222.0	3589.412	137.4106	-21.3036	66.02	5.60	32515.9	67.05	5.37	33868.9	893238
9224.0	3590.464	137.5775	-21.2344	65.97	5.68	32591.9	66.99	5.45	33945.2	899577
9226.0	3591.535	137.7445	-21.1649	65.91	5.76	32668.4	66.93	5.53	34021.9	906022
9228.0	3592.622	137.9116	-21.0950	65.85	5.84	32745.3	66.87	5.61	34099.1	912575
9230.0	3593.728	138.0790	-21.0249	65.79	5.92	32822.6	66.82	5.69	34176.6	919235
9232.0	3594.852	138.2464	-20.9545	65.73	6.00	32900.4	66.76	5.77	34254.7	926005
9234.0	3595.994	138.4141	-20.8838	65.67	6.09	32978.6	66.70	5.85	34333.1	932884
9236.0	3597.154	138.5819	-20.8128	65.61	6.17	33057.2	66.64	5.92	34412.1	939875
9238.0	3598.332	138.7499	-20.7415	65.56	6.25	33136.4	66.59	6.00	34491.5	946976
9240.0	3599.528	138.9180	-20.6699	65.50	6.33	33215.9	66.53	6.08	34571.3	954188
9242.0	3600.743	139.0863	-20.5981	65.44	6.41	33296.0	66.47	6.16	34651.7	961509
9244.0	3601.975	139.2548	-20.5259	65.38	6.49	33376.6	66.42	6.24	34732.6	968940
9246.0	3603.226	139.4234	-20.4534	65.33	6.57	33457.6	66.36	6.31	34813.9	976482
9248.0	3604.496	139.5922	-20.3806	65.27	6.65	33539.1	66.30	6.39	34895.7	984137
9250.0	3605.784	139.7612	-20.3076	65.21	6.74	33621.1	66.25	6.47	34978.0	991907
9252.0	3607.092	139.9303	-20.2342	65.16	6.82	33703.6	66.19	6.55	35060.8	999794
9254.0	3608.419	140.0996	-20.1605	65.10	6.90	33786.7	66.14	6.64	35144.2	1007798
9256.0	3609.766	140.2691	-20.0866	65.04	6.99	33870.3	66.08	6.72	35228.1	1015923
9258.0	3611.132	140.4387	-20.0123	64.99	7.08	33954.3	66.02	6.80	35312.4	1024168
9260.0	3612.519	140.6085	-19.9377	64.93	7.16	34038.8	65.97	6.89	35397.2	1032537
9262.0	3613.927	140.7785	-19.8629	64.87	7.25	34123.7	65.91	6.97	35482.5	1041031
S-IVB 2ND GUIDANCE CUTOFF										
9263.240	3614.810	140.8840	-19.8163	64.84	7.31	34176.5	65.88	7.03	35535.5	1046361
9264.0	3615.355	140.9486	-19.7877	64.82	7.34	34186.1	65.86	7.06	35545.2	1049652
9266.0	3616.803	141.1186	-19.7124	64.75	7.44	34178.8	65.80	7.15	35538.0	1058388
9268.0	3618.269	141.2882	-19.6370	64.69	7.53	34171.3	65.74	7.24	35530.8	1067235
9270.0	3619.752	141.4575	-19.5614	64.63	7.63	34163.8	65.68	7.33	35523.5	1076190
9272.0	3621.254	141.6265	-19.4858	64.56	7.72	34156.3	65.62	7.42	35516.3	1085255
TRANSLUNAR INJECTION (TLI)										
9273.240	3622.194	141.7312	-19.4388	64.52	7.78	34151.5	65.58	7.48	35511.6	1090930
9300.0	3644.146	143.9595	-18.4160	63.71	9.03	34039.9	64.82	8.68	35403.6	1223543
9350.0	3693.488	147.9683	-16.4689	62.35	11.33	33792.0	63.56	10.88	35163.7	1521981
9400.0	3753.173	151.7725	-14.4991	61.17	13.56	33497.4	62.48	13.02	34878.8	1883392
9450.0	3822.543	155.3727	-12.5321	60.18	15.73	33164.0	61.59	15.08	34556.6	2303790

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN PHASE (CONT.)

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
9500.0	3900.885	158.7732	-10.5896	59.35	17.82	32797.0	60.87	17.06	34202.3	2778867
9550.0	3987.464	161.9811	-8.6893	58.67	19.83	32403.8	60.29	18.96	33823.1	3304161
9600.0	4081.543	165.0050	-6.8449	58.12	21.76	31990.3	59.86	20.78	33424.6	3875184
9650.0	4182.398	167.8548	-5.0665	57.68	23.61	31562.1	59.54	22.51	33012.2	4487542
9700.0	4289.337	170.5406	-3.3609	57.35	25.38	31124.3	59.32	24.16	32590.9	5137007
9750.0	4401.704	173.0727	-1.7324	57.11	27.06	30681.0	59.20	25.72	32164.7	5819583
9800.0	4518.887	175.4610	-0.1829	56.94	28.68	30235.9	59.16	27.21	31737.2	6531541
9850.0	4640.325	177.7152	1.2873	56.84	30.22	29792.2	59.18	28.61	31311.3	7269442
9900.0	4765.499	179.8445	2.6792	56.79	31.69	29352.1	59.26	29.95	30889.3	8030137
9950.0	4893.944	-178.1426	3.9949	56.79	33.10	28917.8	59.39	31.21	30473.1	8810771
10000.0	5025.236	-176.2380	5.2370	56.82	34.44	28490.8	59.56	32.41	30064.2	9608763
10050.0	5158.997	-174.4343	6.4087	56.89	35.72	28072.1	59.77	33.54	29663.7	10421797
10100.0	5294.885	-172.7245	7.5134	56.99	36.95	27662.8	60.00	34.62	29272.3	11247799
10150.0	5432.598	-171.1025	8.5548	57.10	38.13	27262.9	60.26	35.64	28890.3	12084913
10200.0	5571.865	-169.5622	9.5364	57.23	39.26	26873.8	60.53	36.61	28518.8	12931489
10250.0	5712.447	-168.0983	10.4617	57.38	40.35	26495.1	60.82	37.54	28157.5	13786070
10300.0	5854.131	-166.7058	11.3342	57.54	41.40	26127.0	61.13	38.41	27806.5	14647358
10350.0	5996.729	-165.3802	12.1574	57.70	42.40	25769.6	61.44	39.25	27465.8	15514203
10400.0	6140.074	-164.1172	12.9342	57.87	43.37	25422.6	61.76	40.05	27135.3	16385586
10450.0	6284.016	-162.9131	13.6678	58.04	44.31	25085.8	62.09	40.80	26814.6	17260599
10500.0	6428.424	-161.7641	14.3609	58.22	45.21	24759.4	62.42	41.53	26504.0	18138442
10550.0	6573.185	-160.6670	15.0163	58.39	46.09	24442.8	62.75	42.22	26202.8	19018419
10600.0	6718.193	-159.6188	15.6364	58.56	46.93	24135.7	63.08	42.89	25910.7	19899896
10650.0	6863.359	-158.6166	16.2235	58.74	47.76	23838.0	63.41	43.52	25627.6	20782322
10700.0	7008.602	-157.6578	16.7798	58.90	48.55	23549.3	63.74	44.13	25353.1	21665207
10750.0	7153.851	-156.7400	17.3073	59.07	49.33	23269.4	64.08	44.71	25087.0	22548119
10800.0	7299.043	-155.8610	17.8079	59.23	50.08	22997.9	64.40	45.27	24828.8	23430678
10850.0	7444.124	-155.0187	18.2832	59.39	50.82	22734.5	64.73	45.80	24578.4	24312549
10900.0	7589.044	-154.2111	18.7349	59.54	51.53	22478.9	65.05	46.32	24335.4	25193436
	CSM SEPARATION									
10949.400	7732.026	-153.4456	19.1594	59.69	52.22	22233.8	65.37	46.81	24102.3	26062531

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