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TITLE APOLLO/SATURN V POSTFLIGHT TRAJECTORY - AS-506

MODEL NO. SATURN V

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ABSTRACT AND LIST OF KEY WORDS

This document presents the postflight trajectory for the Apollo/Saturn V AS-506 flight. Included is an analysis of the orbital and powered flight trajectories of the launch vehicle, the free flight trajectories of the expended S-IC and S-II stages, and the slingshot trajectory of the S-IVB/IU. 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 engine cutoff, stage separation, parking orbit insertion, and translunar injection conditions are included in this document. The heliocentric parameters of the S-IVB/IU are given. Figures of such parameters as altitude, surface and cross ranges, and magnitudes of total velocity and acceleration as a function of range time for the powered flight trajectories are presented.

The following is a list of key words for use in indexing this document for data retrieval:

Apollo/Saturn V
AS-506
Postflight Trajectory
Powered Flight Trajectory
Orbital Trajectory
Spent Stage Trajectory
Slingshot Trajectory

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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 MFT-1-69, "AS-506 G Mission Launch Vehicle Operational Trajectory," July 14, 1969.

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

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The analysis presented in Section 7 of this document was conducted by the following MSFC personnel of the S&E-AERO-M Division and is included for completeness in terms of spent stage trajectories:

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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
R-AERO-P-#35c	OMPT Format	6/16/69
R-AERO-P-#17	Tracking and Network Specifications	7/9/69
R-AERO-P-#35b	Transponder Locations	7/9/69
N/A	Operational Trajectory Certified Data (MSFC supplied)	7/18/69
I-MO-#4a	Insertion Point and/or Orbital Elements	7/17/69
I-MO-#4c	Six Seconds Raw Radar	7/17/69
I-MO-#4f	Meteorological Data (Final)	7/25/69
I-MO-#6	IP Raw MP	7/17/69
I-MO-#9	Pulse Radar	7/25/69
I-MO-#17c	Final Significant Time of Events	7/25/69
I-MO-#18a	Preliminary Guidance Velocities	7/18/69
I-MO-#18c	Orbital Venting Accelerations Data Cards	9/8/69

SECTION 1

SUMMARY AND INTRODUCTION

The Apollo/Saturn V AS-506 vehicle was launched from Launch Complex 39, Pad A at the Kennedy Space Center on July 16, 1969, at 8:32:00 A.M. Eastern Standard Time (Range Time Zero) at an azimuth of 90 degrees east of north. Range time, which is referenced to Range Time Zero, is used throughout this document unless otherwise specified. Guidance reference release (GRR) was established to have occurred at -16.968 seconds. First motion occurred at 0.3 second. At 13.2 seconds, a roll maneuver was initiated, orienting the vehicle to a flight azimuth of 72.058 degrees east of north. This 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.

The vehicle performed with only minor deviations throughout the entire flight. The vehicle was inserted into a parking orbit at 709.33 seconds at an altitude of 191.1 km (103.2 n mi) and a total space-fixed velocity of 7,793.1 m/s (25,567.9 ft/s). The vehicle remained in orbit for approximately one and one-half revolutions. The S-IVB stage was restarted during the second revolution approximately midway between Australia and Hawaii, at 9,856.2 seconds.

At 10,213.03 seconds, the vehicle was injected onto a circumlunar trajectory at an altitude of 334.4 km (180.6 n mi) and a total space-fixed velocity of 10,834.3 m/s (35,545.6 ft/s). At 11,723 seconds, the CSM separated from the launch vehicle at an altitude of 7,065.7 km (3,815.2 n mi) and a total space-fixed velocity of 7,608.6 m/s (24,962.6 ft/s). Following LM extraction, the launch vehicle maneuvered to a slingshot attitude fixed relative to local horizontal. The retrograde velocity to achieve S-IVB/IU lunar slingshot was accomplished by a LOX dump, APS burn, and LH_2 venting. The S-IVB/IU closest approach of 3,379 km (1,825 n mi) to the lunar surface occurred at 78.70 hours into the mission.

The impact location of the expended S-IC stage was determined to be 30.212 degrees north latitude and 74.038 degrees west longitude at 543.7 seconds. The impact location of the expended S-II stage was determined to be 31.535 degrees north latitude and 34.844 degrees west longitude at 1,213.7 seconds.

Section 2 of this document defines the coordinate systems and launch parameters used for the postflight trajectory analysis.

SECTION 1 (Continued)

The postflight mass point trajectory related parameters and analytical procedures are presented in Sections 3 through 7. The trajectory is divided into six phases:

a. Ascent Phase
b. Orbital Phase
c. Second Burn Phase
d. Post TLI Phase
e. Free Flight Phase
f. Slingshot Phase

The ascent phase, covering the portion of flight from guidance reference release to orbital insertion (709.33 seconds), is discussed in Section 3. This trajectory was established from data provided by external C-band radars and telemetered on-board data obtained from the ST-124M inertial platform.

The second burn phase, discussed in Section 3, covers the portion of flight from S-IVB restart preparations to trans-lunar injection (10,213.03 seconds). This trajectory was established by integrating the ST-124M platform telemetered guidance velocities between constraining state vectors ob-tained from the orbital and post TLI trajectory phases.

The orbital phase, discussed in Section 4, covers the portion of flight from orbital insertion to S-IVB restart preparations (9,278.2 seconds). The orbital trajectory was established from data provided by the C-band radars of the Manned Space Flight Network.

The post translunar injection (TLI) phase, discussed in Section 4, covers the portion of flight from the translunar injection to CSM separation (11,723 seconds). This trajectory was established from data provided by the C-band 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 boost, 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 simulation.

SECTION 1 (Continued)

The slingshot phase, discussed in Section 7, covers the trajectory of the S-IVB/IU after it was separated from the CSM/LM. This trajectory was produced by integrating orbital model equations forward from a state vector at 21.58 hours GMT, July 16, 1969, which was established by Goddard Space Flight Center from Unified S-band (USB) tracking data.

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

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

Appendix C tabulates the time history of the 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 in 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, PACSS1, and PACSS13, respectively. The trajectory symbols and terminology used in this document are defined in Appendix A.

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 center of gravity of the launch vehicle above the reference ellipsoid is 59.4 m (194.9 ft).

The azimuth alignments are as follows:

Launch Azimuth	90.0 degrees east of north
Flight Azimuth	72.058 degrees east of north
ST-124M Platform Azimuth	72.058 degrees east of north

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SECTION 3

POWERED FLIGHT TRAJECTORY RECONSTRUCTION

3.1 POWERED FLIGHT TRAJECTORY

3.1.1 Ascent Phase

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

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.

Various trajectory parameters, such as altitude, velocity, and acceleration are given at some 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 tabulated in Tables B-I through 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.

3.1.2 Second Burn Phase

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.

3.1.2 (Continued)

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.

3.1.3 Targeting Parameters

The actual and nominal targeting parameters are given in Table 3-V. These nominal parameters are used in the guidance computer as terminal conditions for the powered flight phases. The actual targeting parameters were close to nominal.

3.2 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. The antenna locations for the tracking system and the vehicle center of gravity are shown in Figure 3-12.

Considerable C-Band tracking data were furnished by the stations located at Cape Kennedy, Patrick Air Force Base, Merritt Island, Grand Turk Island, and Bermuda Island. These tracking data were provided as measured parameters in azimuth angle, elevation angle, and slant range. These measurements are defined in Reference 1 and designated as PACSS3a.

Comparisons between these data and the ascent trajectory were calculated in PACSS3a. The position components of the ascent trajectory in PACSS10 were corrected for the differences between the center of gravity and the transponder location. The corrected position components were transformed into the measured parameters of PACSS3a. 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.

Cape Kennedy (1.16) radar provided tracking data from 25 to 400 seconds. The azimuth angle measurements were noisy throughout the time span of tracking, and oscillated about

3.2.1 (Continued)

the trajectory up to about 175 seconds. After 175 seconds, the azimuth angle measurements agree favorably with the trajectory with maximum deviation of 0.016 degree. The elevation angle measurements were noisy throughout the tracking period with maximum deviation of 0.037 degree from the trajectory. The slant range measurements contained little noise throughout the tracking period with maximum deviation of 48 m (157 ft) from the trajectory.

Patrick (0.18) radar provided tracking data from 25 to 500 seconds. The azimuth angle measurements contained little noise throughout the tracking period. They deviated considerably from the trajectory up to about 225 seconds, but agree excellently thereafter with maximum deviation of 0.008 degree. The elevation angle measurements were noisy during the early portion (25 to 75 seconds) and the later portion (465 to 500 seconds) of tracking. The elevation angle measurements also deviated considerably from the trajectory up to about 100 seconds, and agree favorably with the trajectory in the time span from 100 to 465 seconds with maximum deviation of 0.028 degree. The slant range measurements contained little noise throughout the tracking period with maximum deviation of 32 m (105 ft) from the trajectory.

Merritt Island (19.18) radar furnished data from 80 to 425 seconds. The azimuth angle measurements were of good quality except in the time spans of 80-120 and 165-200 seconds, where the data were erratic. The azimuth angle measurements reached a maximum deviation of 0.059 degree at 115 seconds, and decreased rapidly thereafter with near zero deviation after 300 seconds. The elevation angle measurements were of good quality and deviated a maximum of 0.030 degree from the trajectory. The slant range measurements were of good quality except in the time span of 170-200 seconds, where the data were erratic. The slant range measurements had a discontinuity at about 390 seconds, indicating a switch from beacon to skin tracking. The maximum deviation of slant range measurements from the trajectory amounted to 35 m (115 ft).

Grand Turk (7.18) radar supplied data from 230 to 520 seconds. The azimuth and elevation angle measurements were noisy and erratic throughout the tracking period. Although the slant range measurements contained little noise and deviated reasonably from the ascent trajectory, the data were considered as invalid and were not used in the trajectory reconstruction.

Bermuda (67.16) radar provided data from 275 to 710 seconds. The azimuth angle measurements contained little noise through-

3.2.1 (Continued)

out the tracking period. Except for a characteristic deviation from 500 to 600 seconds, the azimuth angle measurements were in good agreement with the trajectory with maximum deviation of 0.012 degree. The elevation angle measurements were noisy at the beginning (275 to 330 seconds) of tracking. A characteristic deviation occurred from 500 to 625 seconds. The elevation angle measurements were in good agreement with the trajectory near the end of tracking with a deviation of 0.022 degree at parking orbit insertion (709.33 seconds). The slant range measurements contained little noise throughout the tracking period; however, a large deviation occurred in the interval 375 to 575 seconds. Approaching the end of the tracking period, the deviation in the slant range measurements decreased rapidly with a deviation of 48 m (157 ft) at parking orbit insertion.

Bermuda (67.18) radar provided data from 250 to 710 seconds. The azimuth angle measurements contained little noise throughout the tracking period. As with the 67.16 radar, a characteristic deviation was evident from 500 to 600 seconds. Otherwise, the azimuth angle measurements were in good agreement with the trajectory with maximum deviation of 0.024 degree. The elevation angle measurements were noisy at the beginning (250 to 330 seconds) of tracking. A characteristic deviation occurred from 500 to 625 seconds. The elevation angle measurements were in good agreement with the trajectory near the end of tracking with a deviation of 0.030 degree at parking orbit insertion. The slant range measurements contained little noise throughout the tracking period; however, a large deviation occurred from 400 to 575 seconds. Approaching the end of the tracking period, the deviation in the slant range measurements decreased rapidly with a deviation of 20 m (66 ft) at parking orbit insertion.

3.2.2 Second Burn Phase

Telemetered guidance velocity data during the S-IVB second burn period were received. Also, C-band radar tracking data were obtained from the Redstone Ship from 9,726 to 10,098 seconds. These tracking data were found to be invalid and were not used in the trajectory reconstruction.

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.

3.3.1 (Continued)

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

The launch phase (from first motion to 20 seconds) was established by integrating the telemetered guidance accelerometer data and by constraining it to the early portion of the ascent phase trajectory. The ascent phase (from 20 seconds to orbital insertion at 709.33 seconds) was based on a composite fit of external tracking data and telemetered onboard guidance velocity data. The ascent phase was constrained to the insertion vector obtained from the orbital analysis of Section 4. The output data were transformed to the vehicle center of gravity.

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 4 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 up to an altitude of 56.0 km (30.2 n mi). Above this altitude the measured data were merged into the U.S. Standard Reference Atmosphere.

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 (9,278.2 seconds) to 9,715 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 9,715 seconds to translunar injection (10,213.03 seconds). This trajectory segment was established by integrating the telemetered guidance velocity data forward from the state vector at 9,715 seconds and constraining the end point to the translunar injection vector (obtained from the post TLI trajectory of Section 4). The GATE program was utilized for the solution.

The Redstone Ship tracking data during the second burn phase were noisy and erratic. These tracking data were not utilized in the trajectory reconstruction.

The position components, in PACSS10, were filtered, differentiated, shaped, and transformed in the same manner as described in Paragraph 3.3.1.

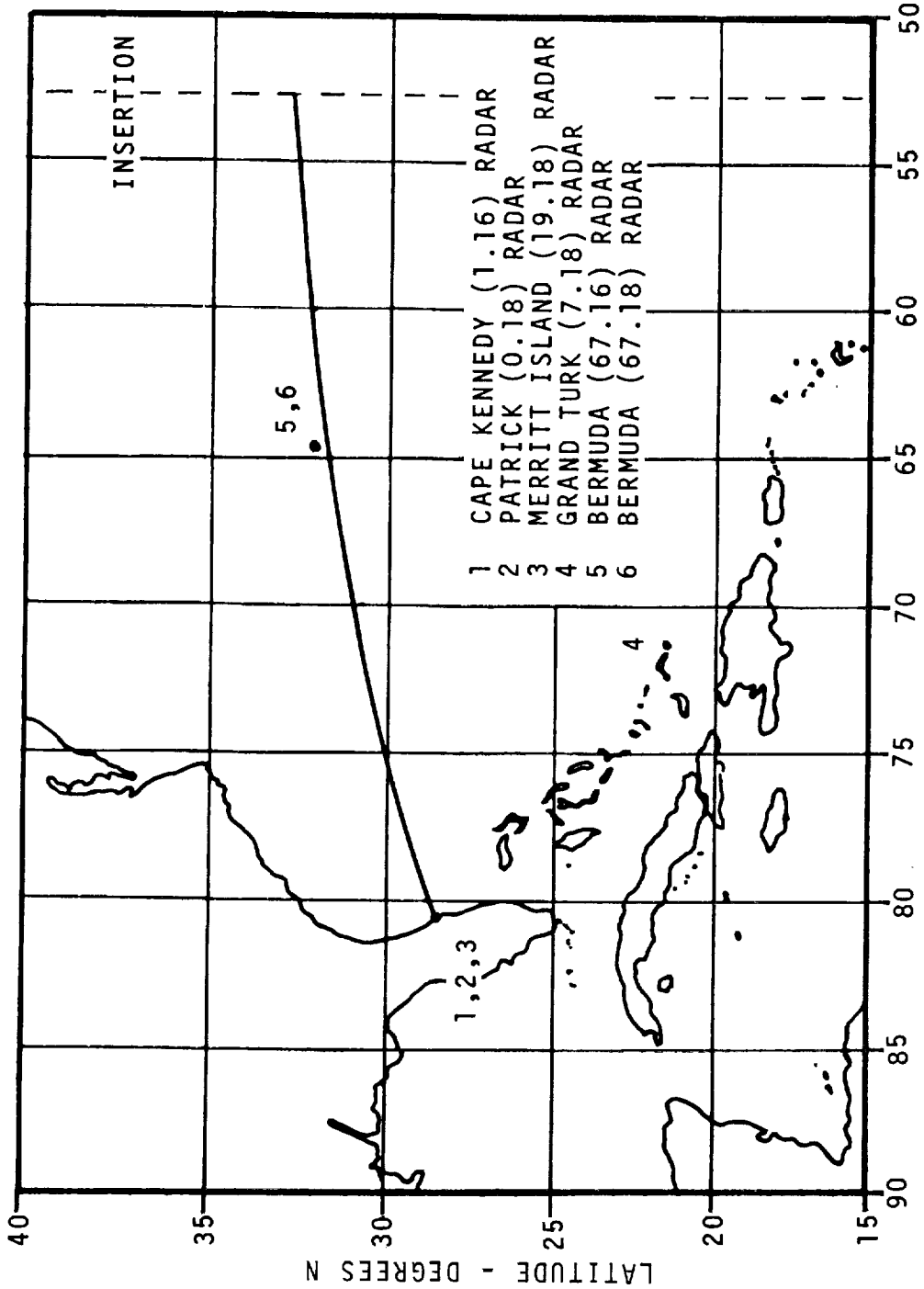

FIGURE 3-1. GROUND TRACK AND TRACKING STATIONS - ASCENT PHASE

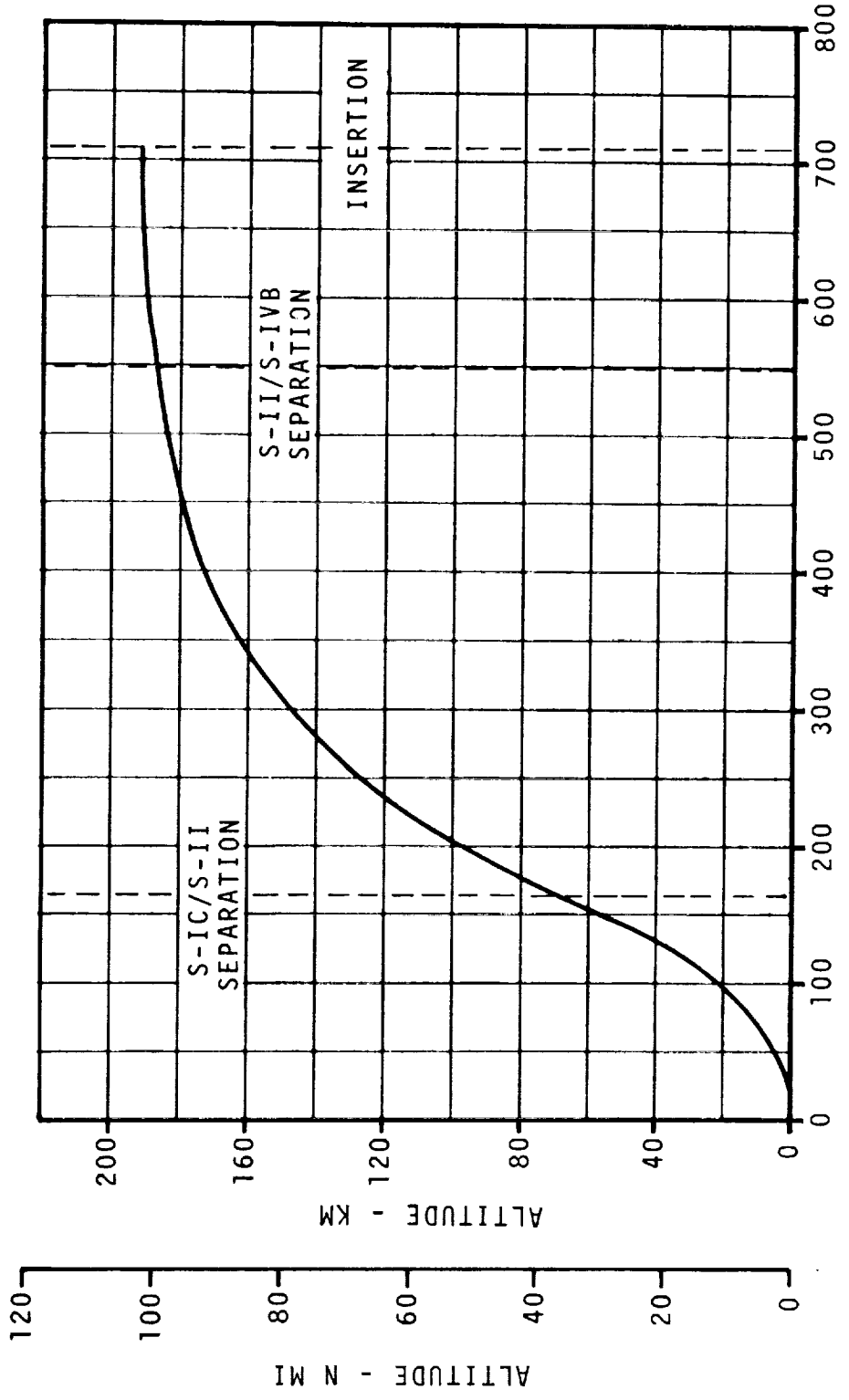

FIGURE 3-2. ALTITUDE - ASCENT PHASE

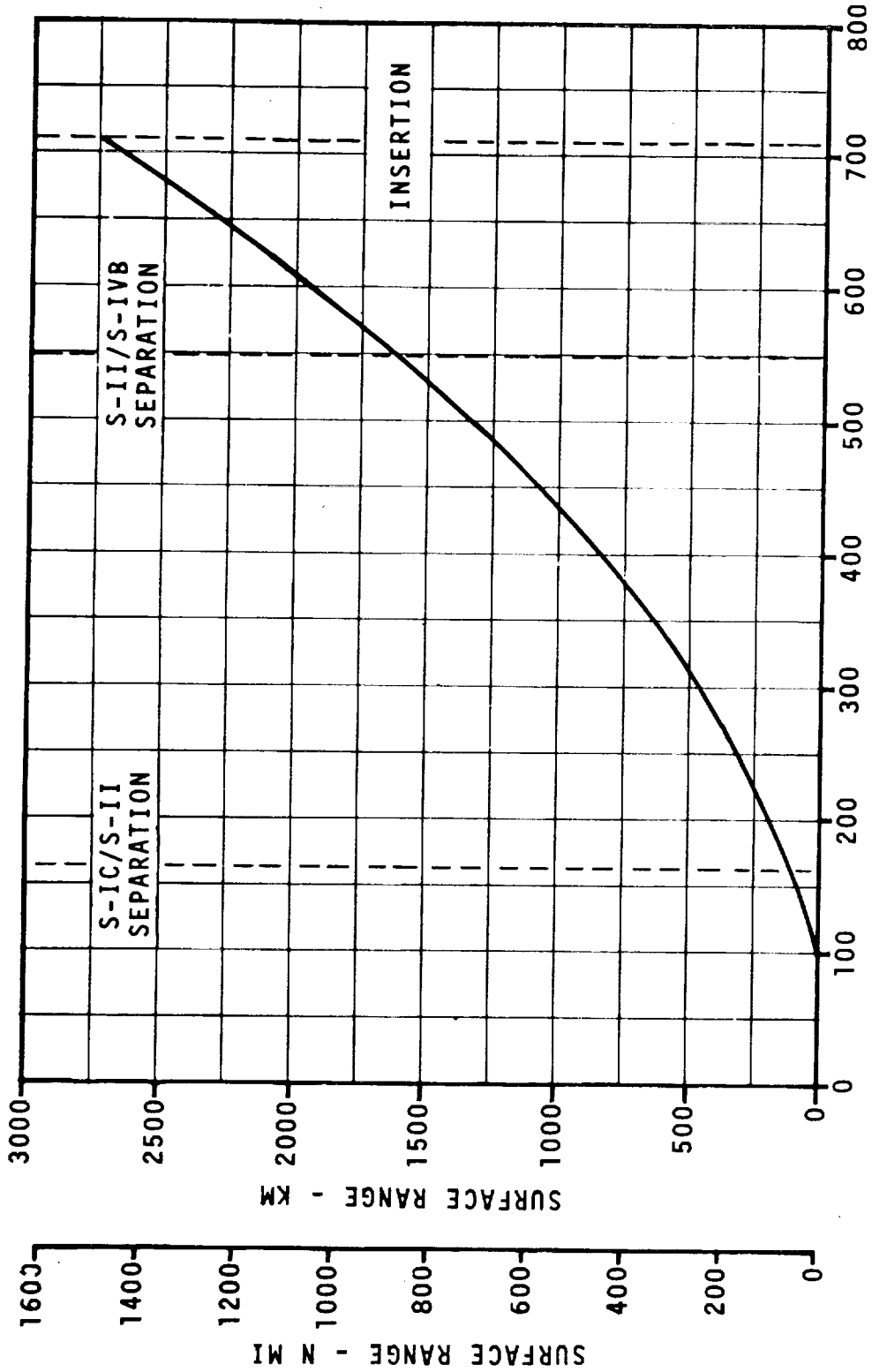

FIGURE 3-3. SURFACE RANGE - ASCENT PHASE

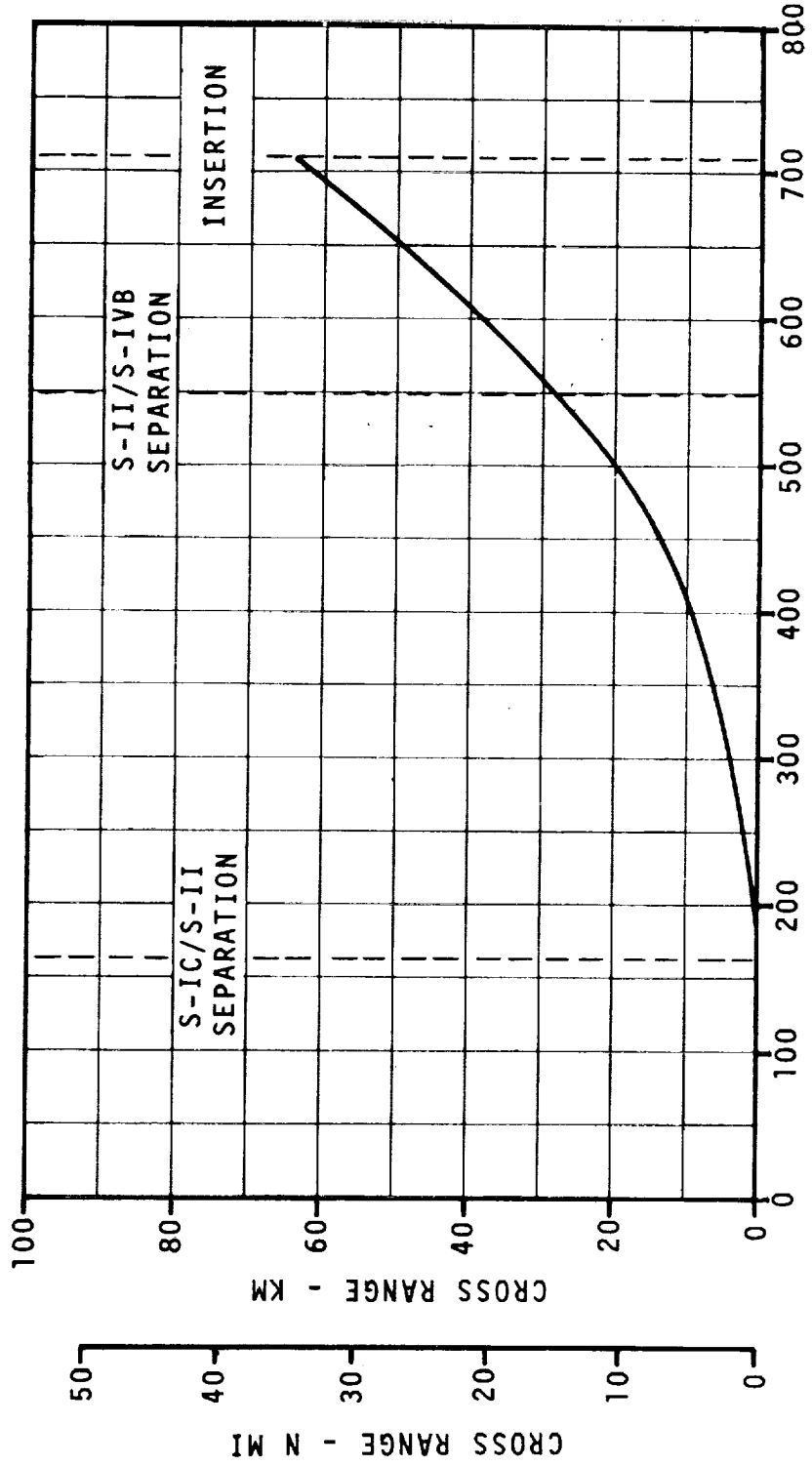

FIGURE 3-4. CROSS RANGE - ASCENT PHASE

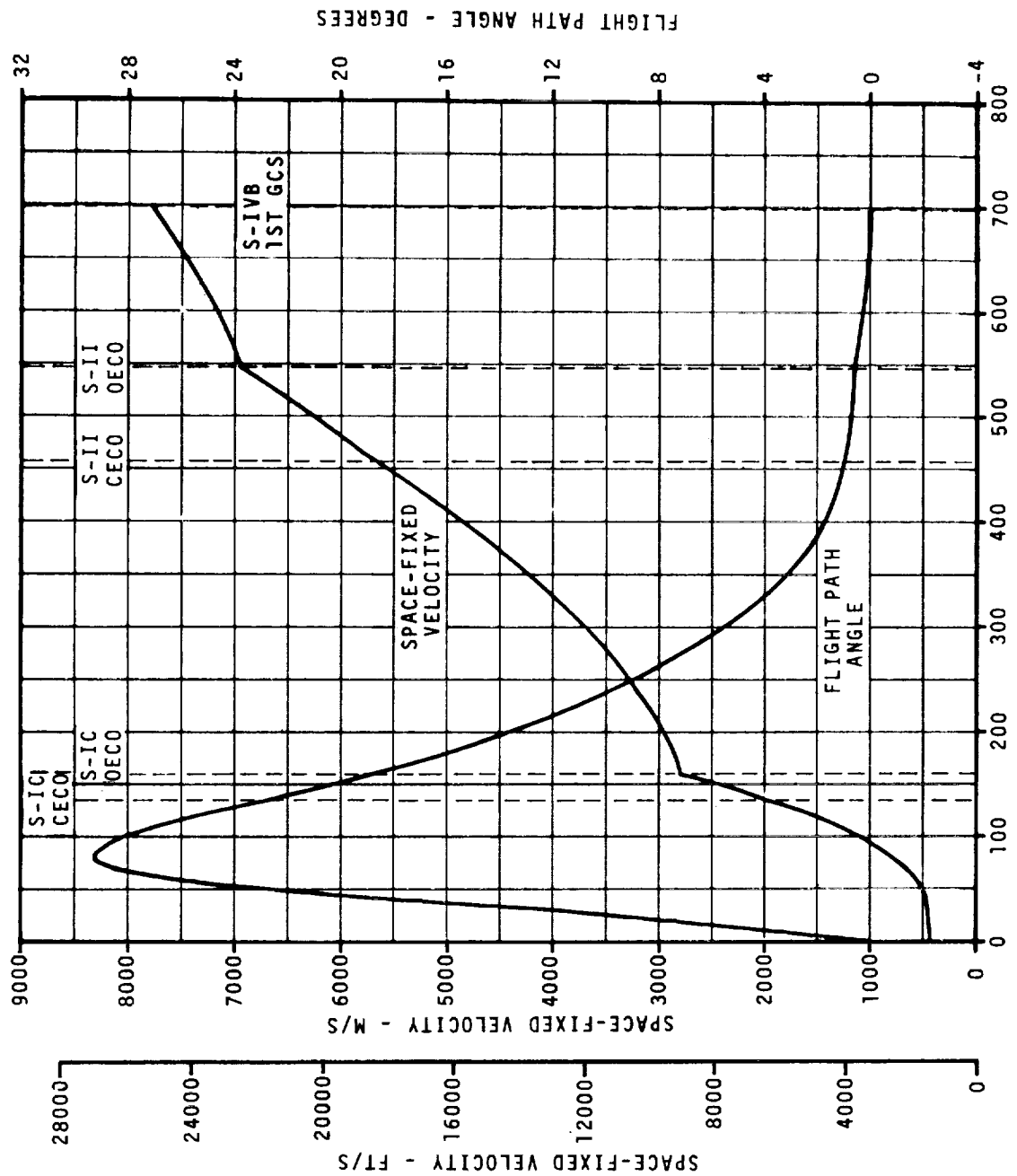

FIGURE 3-5. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - ASCENT PHASE

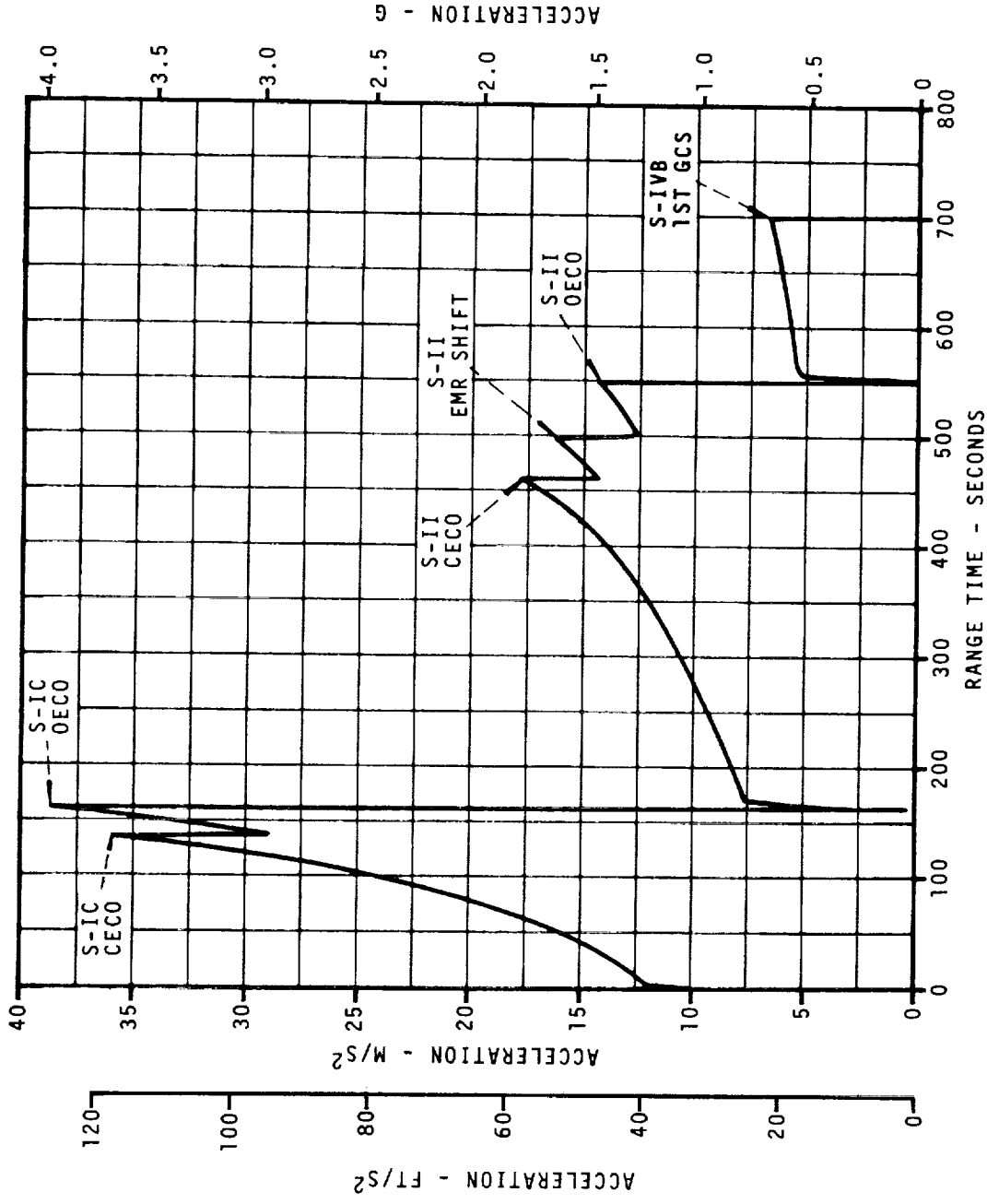

FIGURE 3-6. TOTAL INERTIAL ACCELERATION - ASCENT PHASE

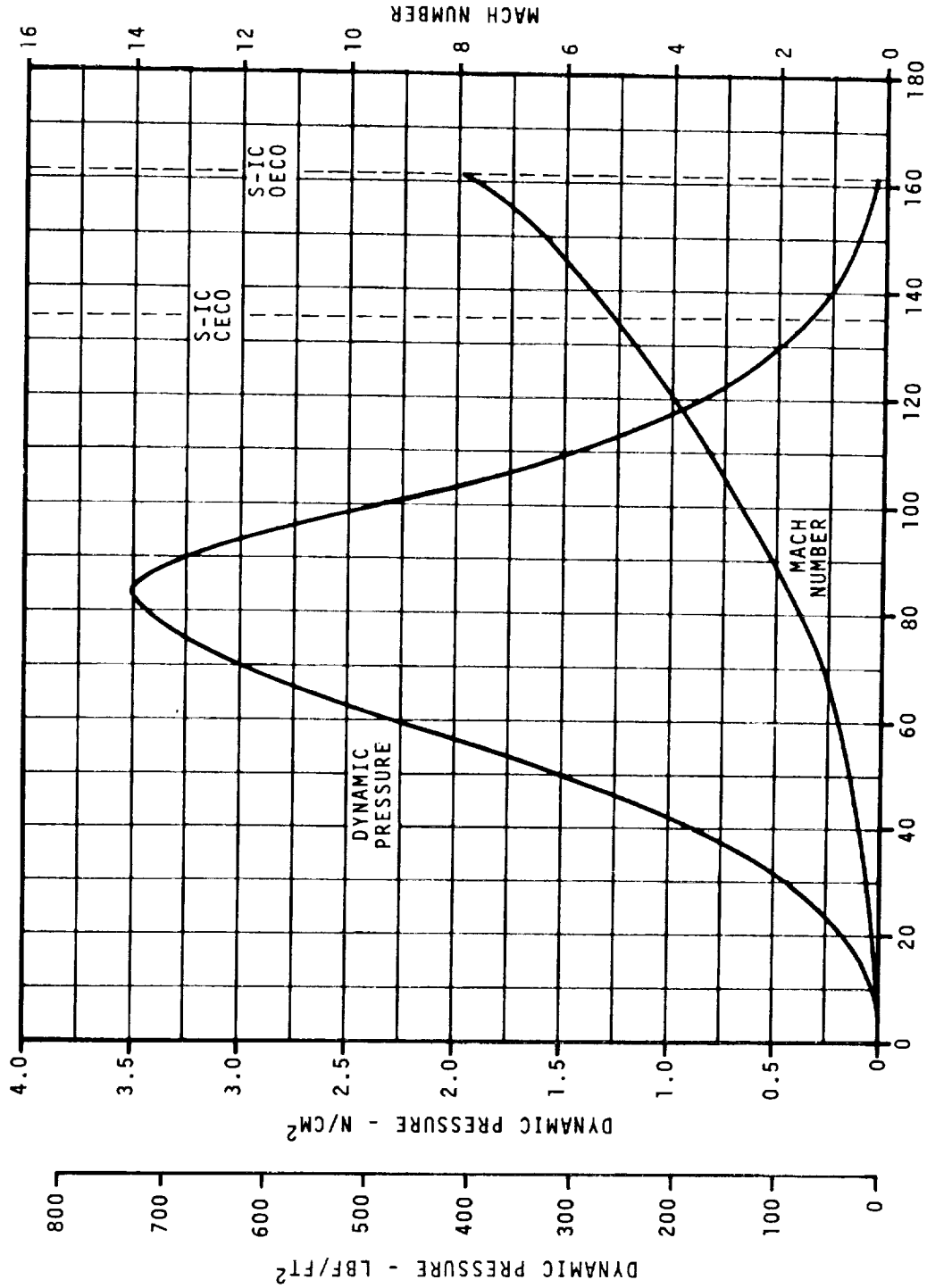

FIGURE 3-7. MACH NUMBER AND DYNAMIC PRESSURE - S-IC PHASE

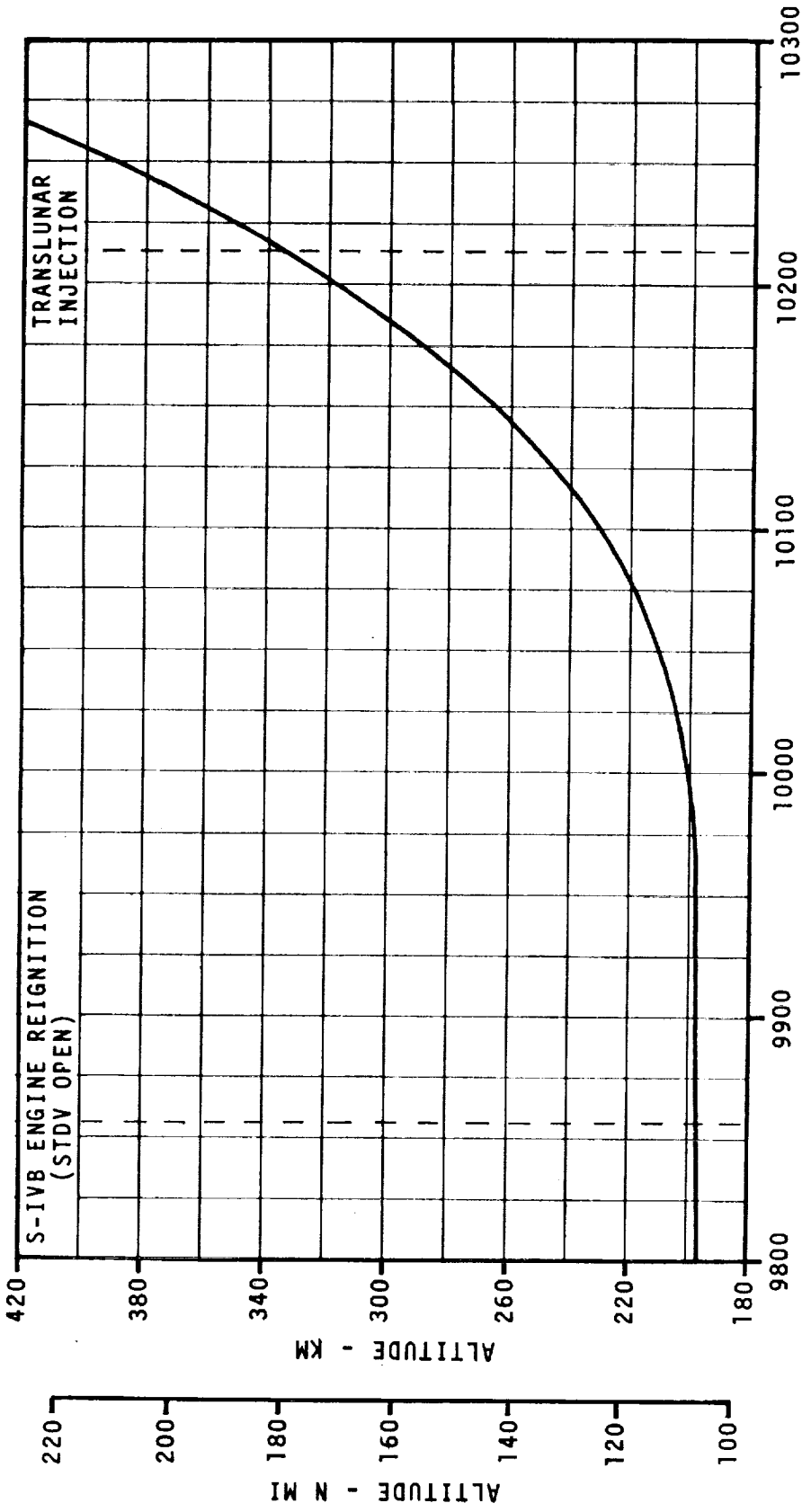

FIGURE 3-8. ALTITUDE - SECOND BURN PHASE

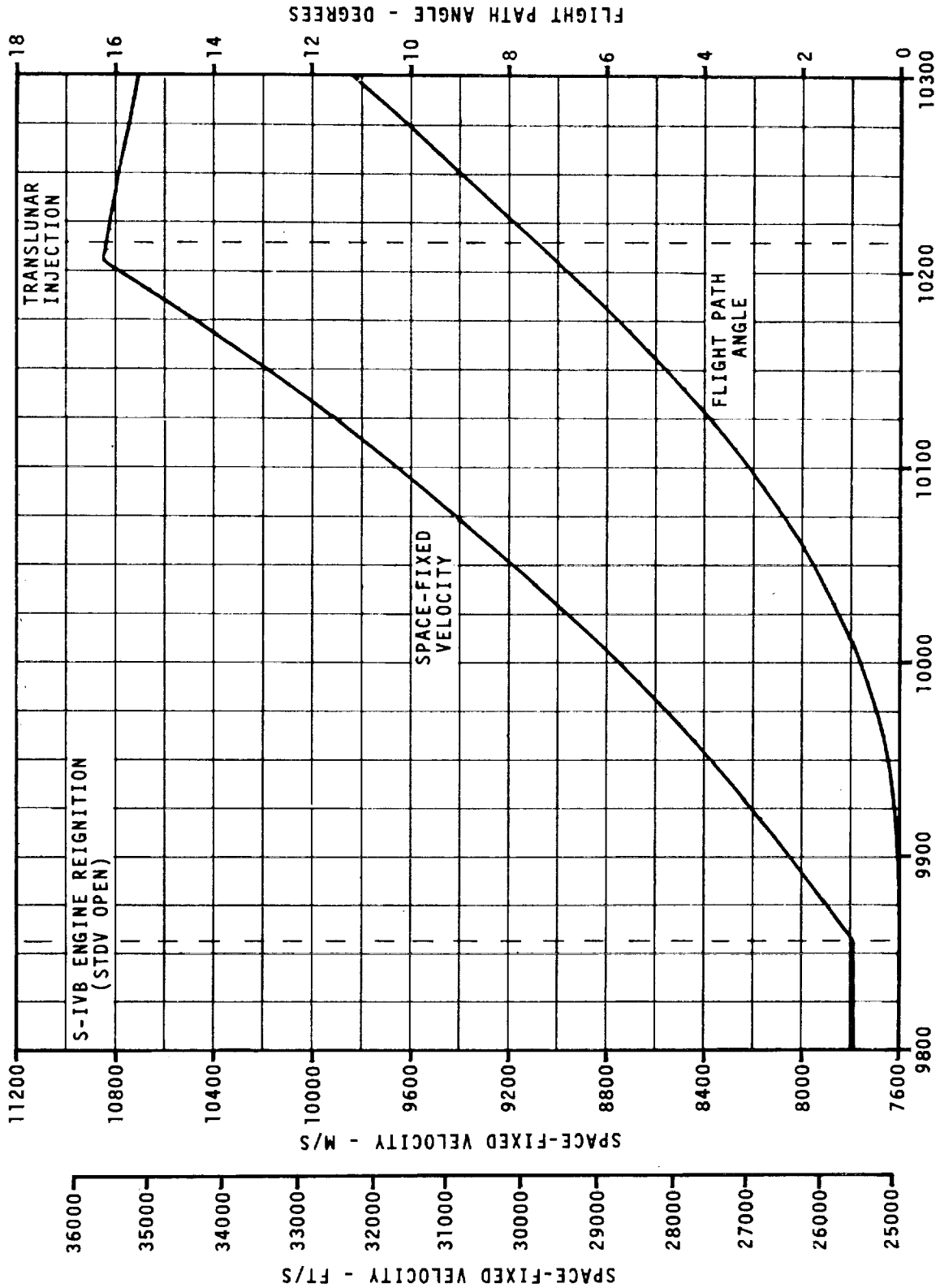

FIGURE 3-9. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - SECOND BURN PHASE

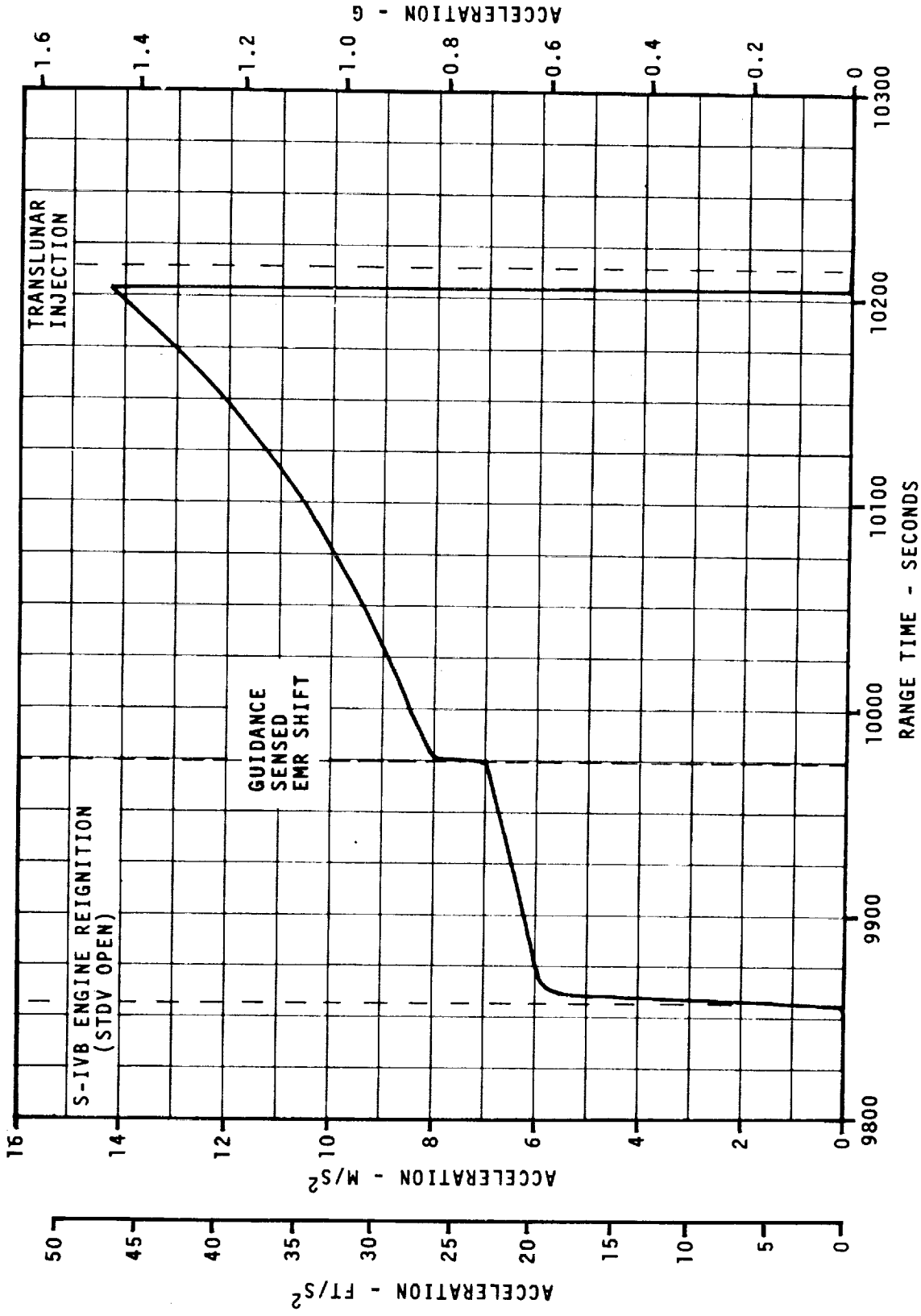

FIGURE 3-10. TOTAL INERTIAL ACCELERATION - SECOND BURN PHASE

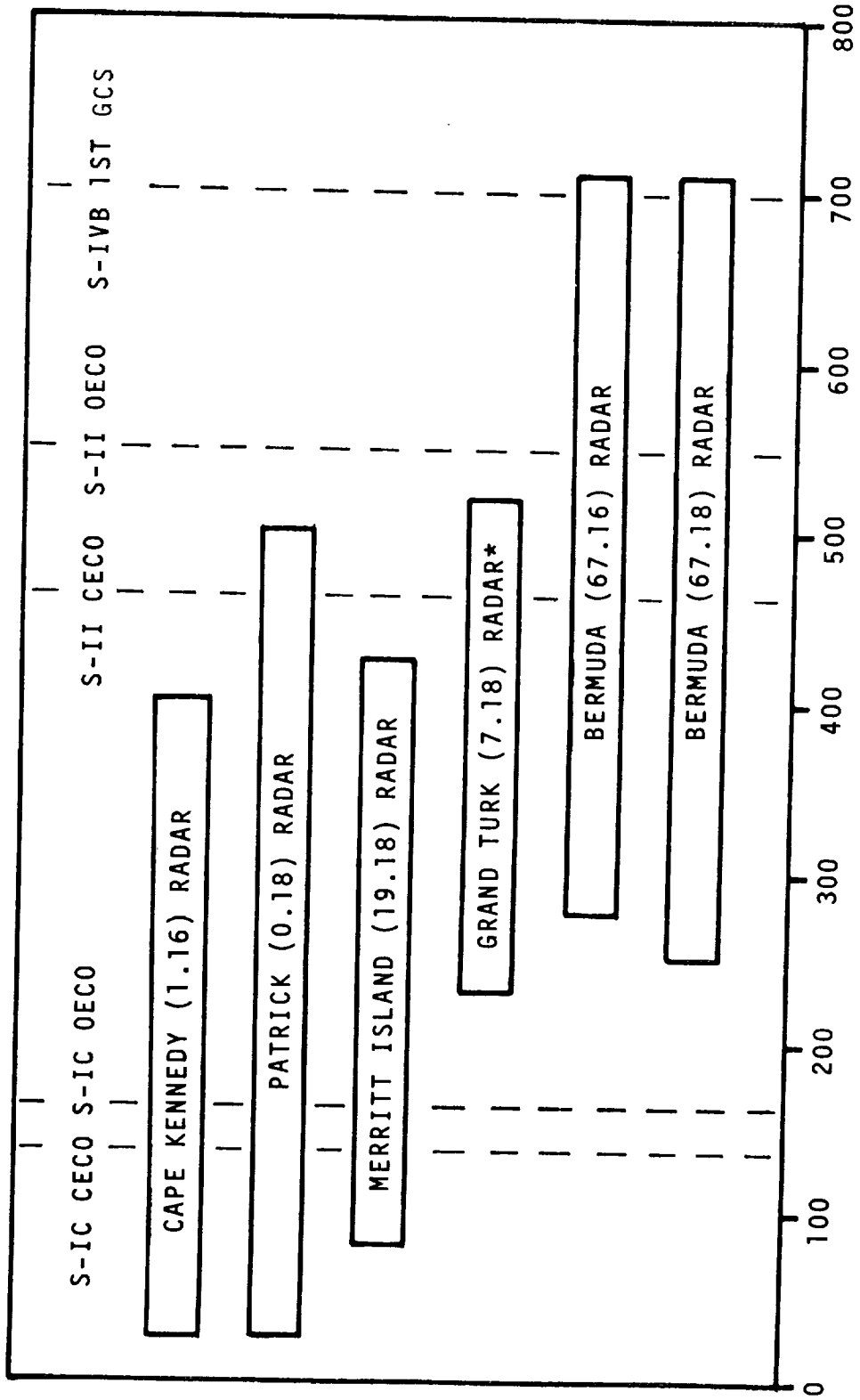

FIGURE 3-11. AVAILABLE TRACKING DATA - ASCENT PHASE

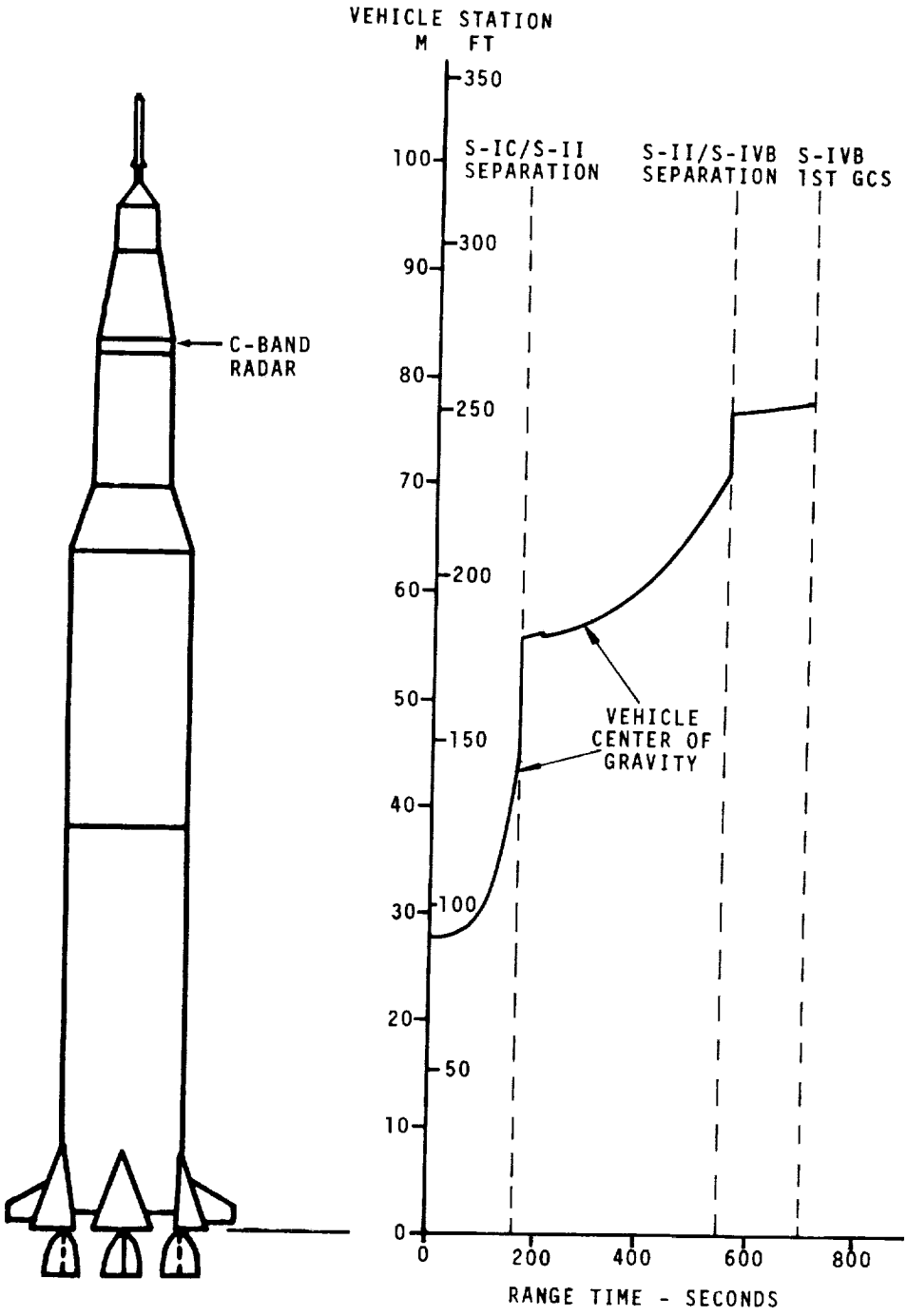

FIGURE 3-12. ANTENNA LOCATIONS AND CENTER OF GRAVITY

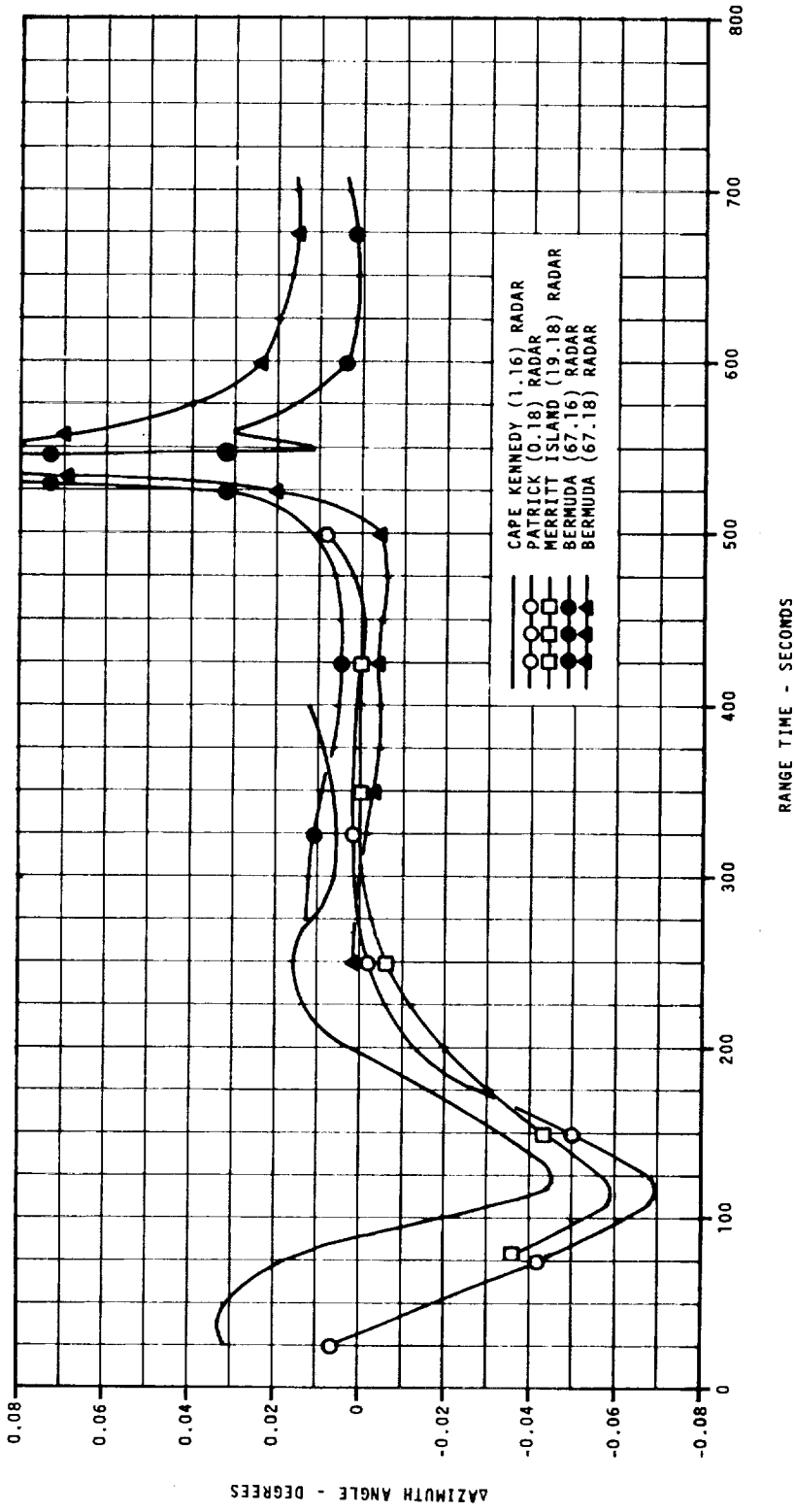

FIGURE 3-13. AZIMUTH ANGLE TRACKING COMPARISON - ASCENT PHASE

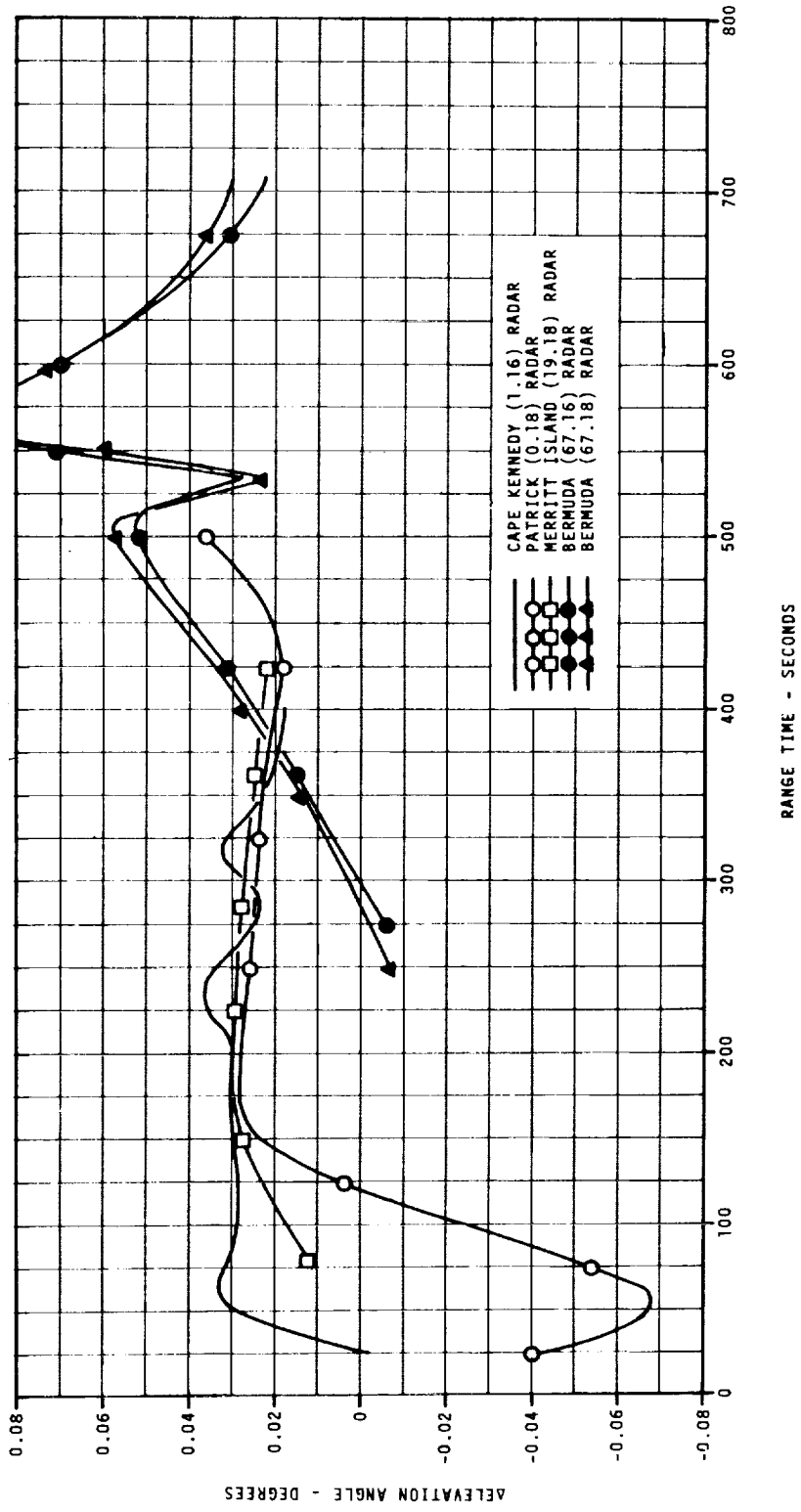

FIGURE 3-14. ELEVATION ANGLE TRACKING COMPARISON - ASCENT PHASE

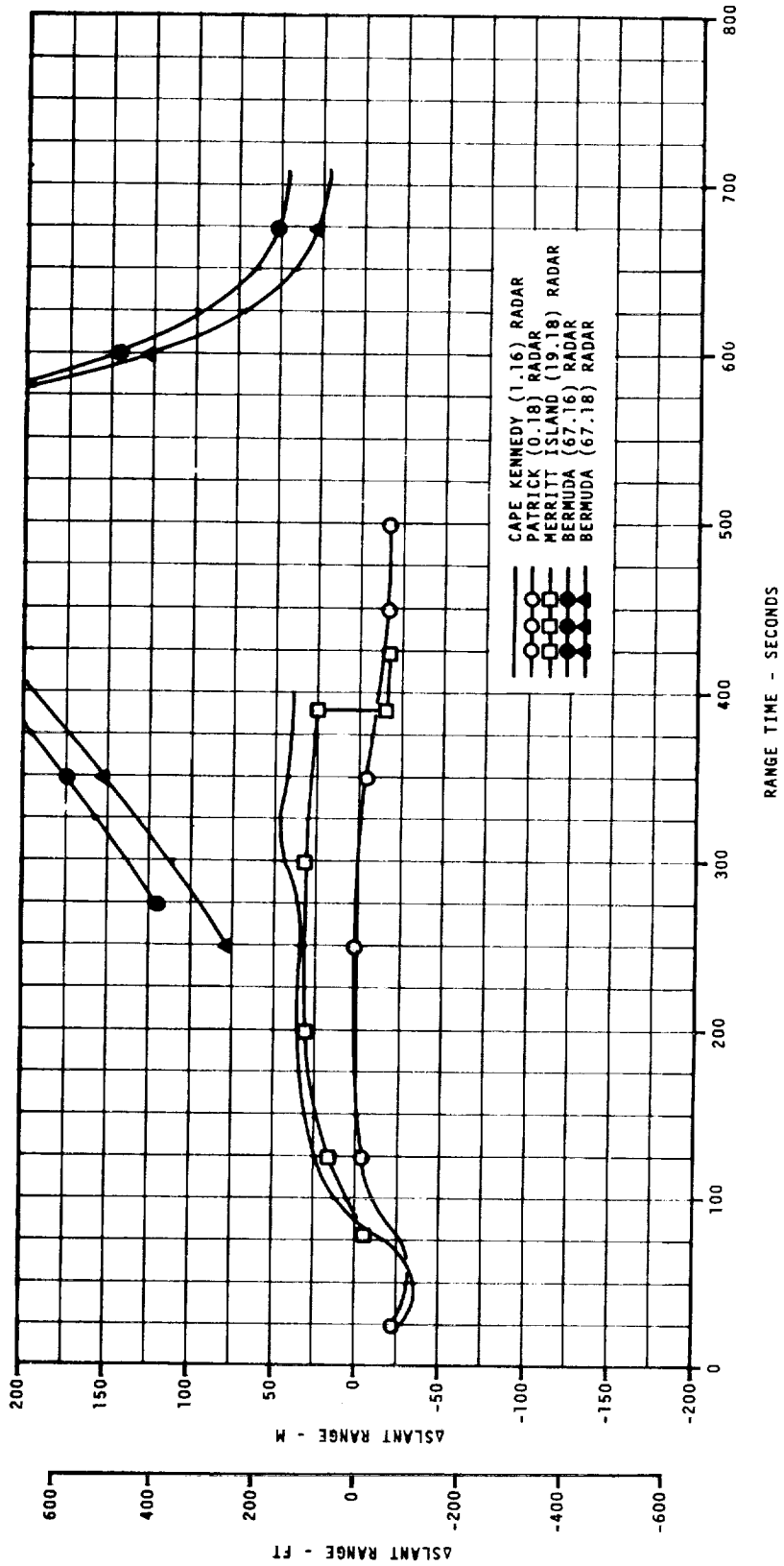

FIGURE 3-15. SLANT RANGE TRACKING COMPARISON - ASCENT PHASE

TABLE 3-I. TIMES OF SIGNIFICANT EVENTS

EVENT	RANGE TIME, SEC		
	ACTUAL	NOMINAL	ACT-NOM
Guidance Reference Release	-16.968	-16.987	0.019
First Motion	0.3	0.3	0.0
Start of Time Base 1	0.6	0.7	-0.1
Mach 1	66.3	65.6	0.7
Maximum Dynamic Pressure	83.0	81.3	1.7
S-IC Center Engine Cutoff	135.20	135.26	-0.06
S-IC Outboard Engine Cutoff	161.63	161.08	0.55
S-IC/S-II Separation Command	162.3	161.8	0.5
S-II Center Engine Cutoff	460.62	460.08	0.54
S-II Outboard Engine Cutoff	548.22	551.65	-3.43
S-II/S-IVB Separation Command	549.0	552.4	-3.4
S-IVB 1st Guidance Cutoff	699.33	699.49	-0.16
Parking Orbit Insertion	709.33	709.49	-0.16
Begin S-IVB Restart Preparations	9,278.2	9,277.3	0.9
S-IVB Engine Reignition (STDV Open)	9,856.2	9,855.5	0.7
S-IVB 2nd Guidance Cutoff	10,203.03	10,204.06	-1.03
Translunar Injection	10,213.03	10,214.06	-1.03
CSM Separation	11,723	11,704	19
Begin Slingshot Maneuver	17,467.7	17,404.4	63.3

TABLE 3-II. SIGNIFICANT TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
First Motion	Range Time, sec	0.3
	Total Inertial Acceleration, m/s^2	10.47
	(ft/s^2)	(34.35)
	(g)	(1.07)
Mach 1	Range Time, sec	66.3
	Altitude, km	7.8
	(n mi)	(4.2)
Maximum Dynamic Pressure	Range Time, sec	83.0
	Dynamic Pressure, N/cm^2	3.52
	(lbf/ft^2)	(735.2)
	Altitude, km	13.6
	(n mi)	(7.3)
Maximum Total Inertial Acceleration: S-IC	Range Time, sec	161.71
	Acceleration, m/s^2	38.61
	(ft/s^2)	(126.67)
	(g)	(3.94)
S-II	Range Time, sec	460.70
	Acceleration, m/s^2	17.84
	(ft/s^2)	(58.53)
	(g)	(1.82)
S-IVB 1st Burn	Range Time, sec	699.41
	Acceleration, m/s^2	6.73
	(ft/s^2)	(22.08)
	(g)	(0.69)
S-IVB 2nd Burn	Range Time, sec	10,203.11
	Acceleration, m/s^2	14.22
	(ft/s^2)	(46.65)
	(g)	(1.45)
Maximum Earth-Fixed Velocity: S-IC	Range Time, sec	162.30
	Velocity, m/s	2,402.7
	(ft/s)	(7,882.9)
S-II	Range Time, sec	549.00
	Velocity, m/s	6,515.7
	(ft/s)	(21,377.0)
S-IVB 1st Burn	Range Time, sec	709.33
	Velocity, m/s	7,389.5
	(ft/s)	(24,243.8)
S-IVB 2nd Burn	Range Time, sec	10,203.50
	Velocity, m/s	10,433.4
	(ft/s)	(34,230.3)

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	135.20	161.63	460.62	548.22	699.33	10,203.03
Altitude, km (n mi)	44.0 (23.8)	66.1 (35.7)	180.2 (97.3)	187.3 (101.1)	191.1 (103.2)	320.9 (173.3)
Surface Range, km (n mi)	46.4 (25.1)	93.6 (50.5)	1,114.3 (601.7)	1,618.4 (873.9)	2,633.5 (1,422.0)	
Space-Fixed Velocity, m/s (ft/s)	1,979.0 (6,492.8)	2,764.1 (9,068.6)	5,707.5 (18,725.4)	6,916.1 (22,690.6)	7,791.2 (25,561.7)	10,841.2 (35,568.2)
Flight Path Angle, deg	22.957	19.114	0.897	0.619	0.011	6.914
Heading Angle, deg	76.315	75.439	79.646	82.396	88.414	59.934
Cross Range, km (n mi)	0.2 (0.1)	0.5 (0.3)	15.0 (8.1)	27.4 (14.8)	60.9 (32.9)	
Cross Range Velocity, m/s (ft/s)	5.4 (17.7)	12.6 (41.3)	111.9 (367.1)	174.1 (571.2)	274.3 (899.9)	
Eccentricity						0.97548
C_3*, m^2/s^2 (ft^2/s^2)						-1,480,682 (15,937,928)
Inclination, deg						31.386
Descending Node, deg						121.849

* Twice the specific energy of orbit

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

where V = Inertial Velocity
μ = Gravitational Constant
R = Radius vector 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	162.3	549.0
Altitude, km (n mi)	66.7 (36.0)	187.4 (101.2)
Surface Range, km (n mi)	95.1 (51.3)	1,623.4 (876.6)
Space-Fixed Velocity, m/s (ft/s)	2,773.9 (9,100.7)	6,918.8 (22,699.5)
Flight Path Angle, deg	19.020	0.611
Heading Angle, deg	75.436	82.426
Cross Range, km (n mi)	0.5 (0.3)	27.5 (14.8)
Cross Range Velocity, m/s (ft/s)	12.8 (42.0)	174.7 (573.2)
Geodetic Latitude, deg N	28.865	31.883
Longitude, deg E	-79.676	-64.147

TABLE 3-V. TARGETING PARAMETERS

PARAMETER	ACTUAL	NOMINAL	ACT-NOM
S-IVB 1ST GUIDANCE CUTOFF			
Range Time, sec	699.33	699.49	-0.16
Altitude, km (n mi)	191.1 (103.2)	191.3 (103.3)	-0.2 (-0.1)
Space-Fixed Velocity, m/s (ft/s)	7,791.2 (25,561.7)	7,791.4 (25,562.3)	-0.2 (-0.6)
Flight Path Angle, deg	0.011	-0.002	0.013
TRANSLUNAR INJECTION			
Range Time, sec	10,213.03	10,214.06	-1.03
Eccentricity	0.97696	0.97667	0.00029
C_3, m^2/s^2 (ft^2/s^2)	-1,391,607 (-14,979,133)	-1,408,484 (-15,160,796)	16,877 (181,663)
Inclination, deg	31.383	31.379	0.004
Descending Node, deg	121.847	121.866	-0.019

TABLE 3-VI. AVAILABLE TRACKING DATA - POWERED FLIGHT TRAJECTORY

DATA SOURCE*	TIME AVAILABLE (SEC)
ASCENT PHASE	
Cape Kennedy (1.16) Radar (FPS-16)	25 - 400
Patrick (0.18) Radar (FPQ-6)	25 - 500
Merritt Island (19.18) Radar (TPQ-18)	80 - 425
Grand Turk (7.18) Radar (TPQ-18)**	230 - 520
Bermuda (67.16) Radar (FPS-16M)	275 - 710
Bermuda (67.18) Radar (FPQ-6)	250 - 710
SECOND BURN PHASE	
Redstone Ship Radar (FPS-16M)**	9,726 - 10,098

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

** Data invalid

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SECTION 4

ORBITAL TRAJECTORY RECONSTRUCTION

4.1 ORBITAL TRAJECTORIES

The S-IVB/LM/CSM was inserted into a circular parking orbit at 709.33 seconds. While in parking orbit, vehicle subsystem checkout was carried out from the tracking stations and Mission Control Center at Houston. During the second revolution, approximately midway between Australia and Hawaii, the S-IVB stage was restarted and the vehicle was placed onto a circumlunar trajectory.

The parking orbit insertion conditions were close to nominal. The space-fixed velocity at insertion was equal to nominal, and the flight path angle was 0.013 degree greater than nominal. The eccentricity was 0.00001 less than nominal. The apogee and perigee were 0.5 km (0.3 n mi) and 0.6 km (0.3 n mi) less than nominal, respectively.

The translunar injection (TLI) conditions were also close to nominal. The eccentricity was 0.00029 greater than nominal, the inclination was 0.004 degree greater than nominal, the node was 0.019 degree lower than nominal, and C_3 was 16,877 m^2/s^2 (181,663 ft^2/s^2) greater than nominal. The space-fixed velocity was 3.2 m/s (10.5 ft/s) greater than nominal, and the altitude was 3.1 km (1.6 n mi) less than nominal.

The parking orbit trajectory spans the interval from insertion to begin S-IVB restart preparations (9,278.2 seconds). The post TLI trajectory covers the period from translunar injection (10,213.03 seconds) to CSM separation (11,723 seconds). These two orbital trajectories were established by the 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 C-band radar tracking data in accordance with the weights assigned to the data. After all available C-band radar 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 C-band tracking data is given in Table 4-I. There were also considerable Unified S-band (USB) tracking data available during these periods of flight which were not used due to the abundance of C-band radar data.

4.2.2 Orbital Venting Acceleration Data

During the orbit, no major thrusting occurred; however, the orbit was continuously perturbed by low-level LH_2 venting thrust. To accurately model the orbit of the vehicle, this perturbation was taken into account. The venting model was derived from telemetered guidance velocity data from the ST-124M guidance platform. The guidance velocity data were fitted in segments by polynomials in time. These polynomials were analytically differentiated to obtain the acceleration components measured 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 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 C-band tracking data and the above-mentioned vent model. The insertion conditions are given in Table 4-III. The parking orbit solution was based on a composite fit of the two Bermuda stations at insertion, pass one of Carnarvon, pass two of Patrick, and pass two of Carnarvon. This combination of trackers is geometrically spaced to insure adequate coverage of the parking orbit. The Bermuda data at insertion were also used in the trajectory reconstruction of the ascent phase. The use of Bermuda data in the ascent phase solution and also in the orbital phase solution aids in assuring the continuity of the trajectory. The orbital solution, with the exception of the FPS-16M Bermuda radar, is based on the higher quality FPQ-6 radars. The ground track from parking orbit insertion to CSM separation is given in Figure 4-2. The parking orbit trajectory in PACSS1 is given in Tables B-IV and C-IV.

4.3.2 Translunar Injection Conditions

The translunar injection (TLI) conditions were determined by the Orbital Correction Program (OCP) utilizing the post injection C-band tracking data. The TLI conditions are given in Table 4-IV. The TLI state vector obtained by the GATE program from the integration of guidance velocity data agreed favorably with the OCP determined TLI vector. The post TLI trajectory is included in Tables B-V through B-VII in metric units and Tables C-V through C-VII in English units. The CSM separation conditions are given in Table 4-V.

4.4 ORBITAL TRACKING ANALYSIS

The stations used to obtain the parking orbit insertion conditions and translunar injection conditions are given by Tables 4-VI and 4-VII, respectively. These two tables also include the number of data points and the Root-Mean-Square (RMS) errors of the residuals for each data type. These RMS errors represent the difference between the actual radar 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.

The maximum RMS error of the radar residuals for the parking orbit was 18 m (59 ft) in slant range, 0.030 degree in elevation angle, and 0.015 degree in azimuth angle. The maximum RMS error of the radar residuals for the post TLI trajectory was 18 m (59 ft) in slant range, 0.025 degree in elevation angle, and 0.020 in azimuth angle. The magnitudes of these RMS errors are reasonable and indicate the validity of the parking orbit and post TLI trajectory.

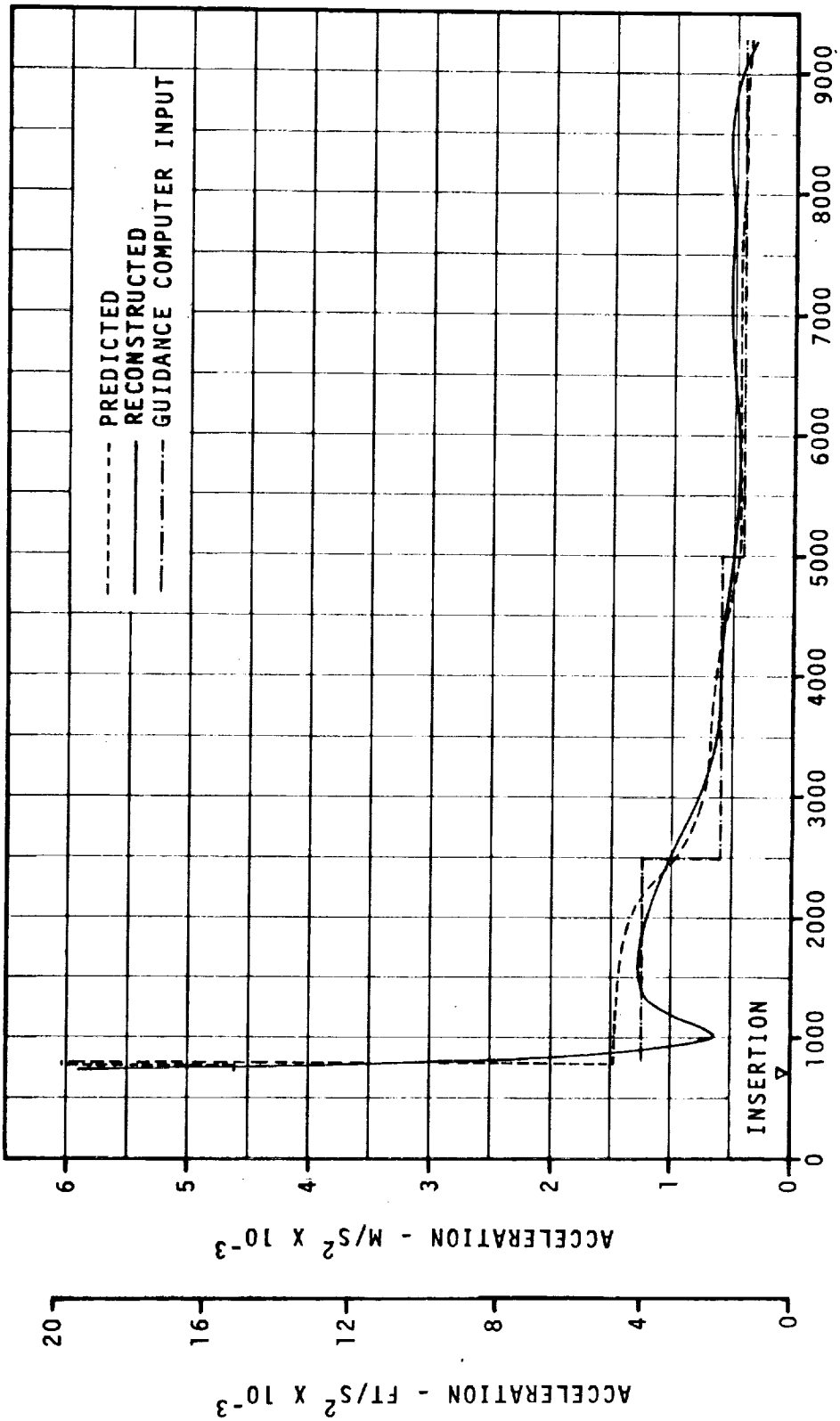

FIGURE 4-1. ORBITAL ACCELERATION DUE TO VENTING

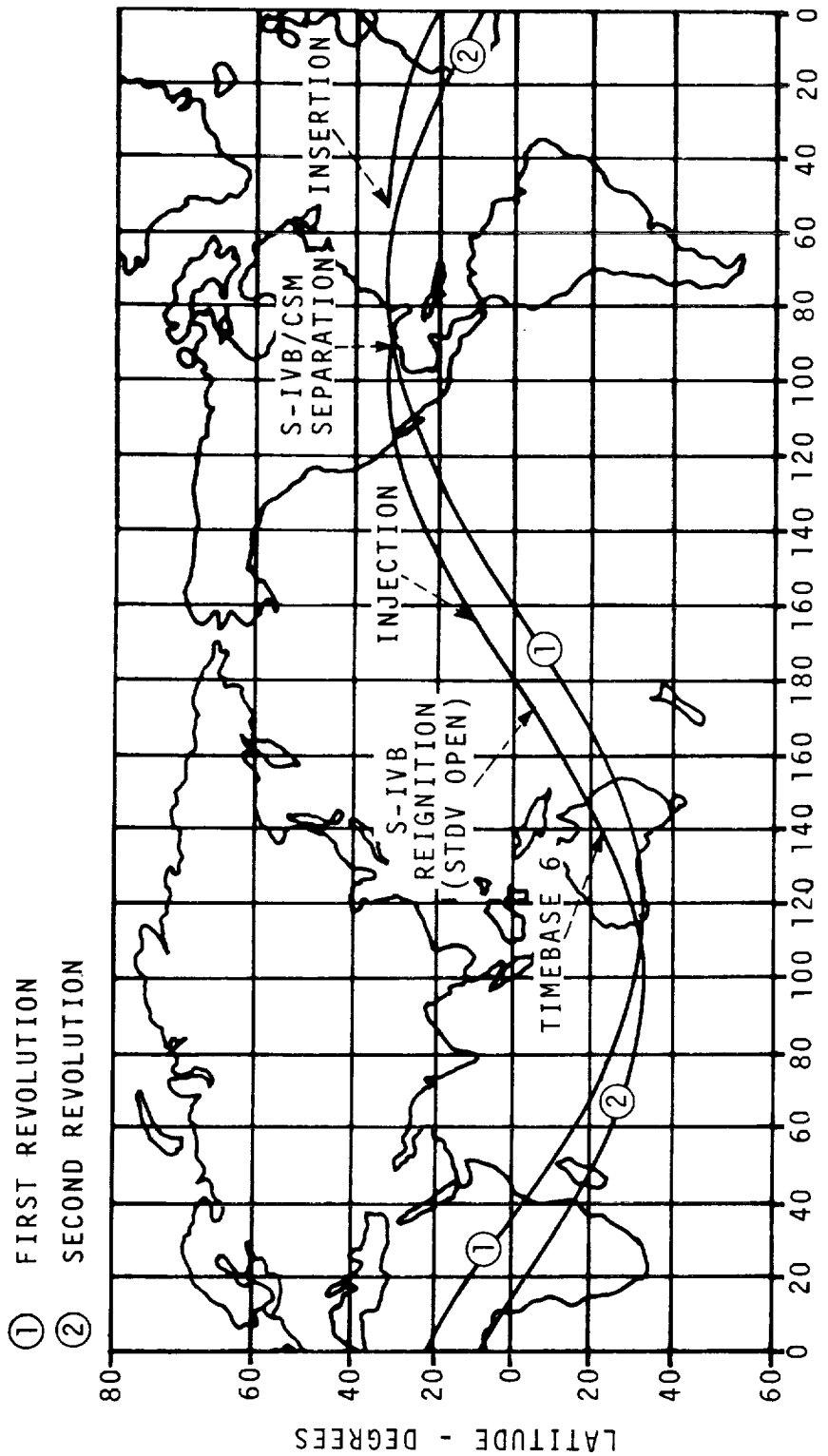

FIGURE 4-2. GROUND TRACK

TABLE 4-I. SUMMARY OF ORBITAL C-BAND TRACKING DATA AVAILABLE

STATION	TYPE OF RADARS	REV 1	REV 2	POST TLI
Bermuda	FPS-16M	X		
Bermuda	FPQ-6	X	X	X
Tananarive	FPS-16M	X	X	
Carnarvon	FPQ-6	X	X	
California	TPQ-18	X		X
Patrick	FPQ-6		X	X
Grand Turk	TPQ-18		X	X
Redstone Ship	FPS-16M		X	
Hawaii	FPS-16M			X
Antigua	FPQ-6			X
Ascension	TPQ-18			X

TABLE 4-II. ORBITAL VENTING ACCELERATION POLYNOMIALS*

	$\ddot{X}$**		
T_b	710	1,483	9,535
T_e	1,483	9,535	9,840
C_0	$-0.29883288 \times 10^{-5}$	$-0.12140570 \times 10^{-5}$	$-0.61607689 \times 10^{-6}$
C_1	$0.19159214 \times 10^{-7}$	$-0.25510786 \times 10^{-9}$	$0.49930034 \times 10^{-7}$
C_2	$-0.46780418 \times 10^{-10}$	$0.13961048 \times 10^{-11}$	$-0.39763102 \times 10^{-9}$
C_3	$0.34343775 \times 10^{-13}$	$-0.59877535 \times 10^{-15}$	$0.86249576 \times 10^{-12}$
C_4	0	$0.89589398 \times 10^{-19}$	0
C_5	0	$-0.44624259 \times 10^{-23}$	0
	$\ddot{Y}$		
T_b	710		
T_e	9,840		
C_0	$0.13272155 \times 10^{-7}$		
C_1	$0.60177901 \times 10^{-11}$		
C_2	0		
C_3	0		
C_4	0		
C_5	0		
	$\ddot{Z}$		
T_b	710	1,483	9,535
T_e	1,483	9,535	9,840
C_0	$0.54491435 \times 10^{-5}$	$0.39339382 \times 10^{-6}$	$-0.26517094 \times 10^{-6}$
C_1	$-0.37627287 \times 10^{-7}$	$-0.24289009 \times 10^{-8}$	$0.10419636 \times 10^{-7}$
C_2	$0.86370452 \times 10^{-10}$	$0.15008060 \times 10^{-11}$	$-0.92767644 \times 10^{-10}$
C_3	$-0.61633706 \times 10^{-13}$	$-0.30356055 \times 10^{-15}$	$0.22408258 \times 10^{-12}$
C_4	0	$0.20894634 \times 10^{-19}$	0
C_5	0	$-0.21112472 \times 10^{-24}$	0

* Polynomials 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 the end time (T_e) for the polynomial 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	709.33
Altitude, km (n mi)	191.1 (103.2)
Space-Fixed Velocity, m/s (ft/s)	7,793.1 (25,567.9)
Flight Path Angle, deg	0.012
Heading Angle, deg	88.848
Inclination, deg	32.521
Descending Node, deg	123.088
Eccentricity	0.00021
Apogee*, km (n mi)	186.0 (100.4)
Perigee*, km (n mi)	183.2 (98.9)
Period, min	88.18
Geodetic Latitude, deg N	32.672
Longitude, deg E	-52.694

*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	10,213.03
Altitude, km (n mi)	334.4 (180.6)
Space-Fixed Velocity, m/s (ft/s)	10,834.3 (35,545.6)
Flight Path Angle, deg	7.367
Heading Angle, deg	60.073
Inclination, deg	31.383
Descending Node, deg	121.847
Eccentricity	0.97696
C_3*, m^2/s^2 (ft^2/s^2)	-1,391,607 (-14,979,133)
Geodetic Latitude, deg N	9.983
Longitude, deg E	-164.837

* Twice the specific energy of orbit

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

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

TABLE 4-V. CSM SEPARATION CONDITIONS

PARAMETER	VALUE
Range Time, sec	11,723
Altitude, km (n mi)	7,065.7 (3,815.2)
Space-Fixed Velocity, m/s (ft/s)	7,608.6 (24,962.6)
Flight Path Angle, deg	45.148
Heading Angle, deg	93.758
Geodetic Latitude, deg N	31.246
Longitude, deg E	-90.622

TABLE 4-VI. PARKING ORBIT TRACKING UTILIZATION SUMMARY

STATION	TIME OF TRACK (SECONDS) BEGIN	END	DATA TYPE	VALID OBSERVATIONS	RMS ERROR OF RESIDUALS
Bermuda (FPS-16M)	714	750	Azimuth Angle Elevation Angle Slant Range	6 7 7	0.010 deg 0.030 deg 18 m (59 ft)
Bermuda (FPQ-6)	714	750	Azimuth Angle Elevation Angle Slant Range	7 6 7	0.015 deg 0.023 deg 3 m (10 ft)
Carnarvon (FPQ-6)	3,174	3,456	Azimuth Angle Elevation Angle Slant Range	48 47 47	0.005 deg 0.017 deg 10 m (33 ft)
Patrick (FPQ-6)	5,748	6,096	Azimuth Angle Elevation Angle Slant Range	52 53 58	0.007 deg 0.011 deg 9 m (30 ft)
Carnarvon (FPQ-6)	8,772	9,090	Azimuth Angle Elevation Angle Slant Range	50 49 54	0.003 deg 0.007 deg 7 m (23 ft)

TABLE 4-VII. POST TLI TRACKING UTILIZATION SUMMARY

STATION	TIME OF TRACK (SECONDS) BEGIN	END	DATA TYPE	VALID OBSERVATIONS	RMS ERROR OF RESIDUALS
Hawaii (FPS-16M)	10,218	10,752	Azimuth Angle	84	0.017 deg
			Elevation Angle	87	0.025 deg
			Slant Range	85	18 m (59 ft)
California (TPQ-18)	10,464	11,526	Azimuth Angle	80	0.009 deg
			Elevation Angle	84	0.009 deg
			Slant Range	83	9 m (30 ft)
Bermuda (FPQ-6)	10,944	11,520	Azimuth Angle	48	0.008 deg
			Elevation Angle	49	0.012 deg
			Slant Range	46	5 m (16 ft)
Grand Turk (TPQ-18)	11,028	11,520	Azimuth Angle	35	0.020 deg
			Elevation Angle	33	0.012 deg
			Slant Range	35	14 m (46 ft)
Antigua (FPQ-6)	11,052	11,520	Azimuth Angle	27	0.009 deg
			Elevation Angle	27	0.016 deg
			Slant Range	30	14 m (46 ft)

SECTION 5

TRAJECTORY ERROR ANALYSIS

5.1 ERROR ANALYSIS

The confidence level or uncertainty one may assign to a reconstructed trajectory depends on the degree of fulfillment of the following criteria:

a. Quantity of Tracking Data
b. Quality of Tracking Data
c. Consistency between Tracking and Guidance Velocity Data
d. Continuity between Trajectory Segments

These criteria 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 powered flight phases are given in Figure 3-11 and Table 3-VI. The tracking coverages for the parking orbit and post TLI phases are given in Table 4-I.

The tracking stations for the ascent and post TLI phases provided extensive redundant coverages. The available tracking data during parking orbit provided adequate coverage. The Redstone Ship C-band tracking data were available for a portion of the second burn phase.

5.1.2 Quality of Tracking Data

The tracking data were generally of good quality. The Grand Turk (7.18) radar data for the ascent phase and the Redstone Ship radar data for the second burn phase were found to be invalid. However, the tracking data furnished before and after the second burn phase were of good quality.

Comparisons of the tracking data in measured parameters (PACSS3a) with the ascent trajectory are shown in Figures 3-13 through 3-15. These plots indicated that the tracking data from the different stations were mutually consistent. Except for the characteristic data deviations from the Bermuda stations occurring approximately in the time span 400-600 seconds, the tracking data deviations were of acceptable magnitude. The tracking data obtained during the parking orbit and post TLI phases were

5.1.2 (Continued)

of good quality. The RMS errors of residuals for each data type are given in Tables 4-VI and 4-VII, respectively.

The tracking data were transformed into the 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. The tracking data spreads for the ascent, parking orbit, and post TLI phases are given in Tables 5-I through 5-III, respectively.

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.

The guidance velocity error plots for the ascent phase had reasonable shapes and magnitudes. The maximum error amounted to 1.5 m/s (4.9 ft/s) in the X-direction, 2.8 m/s (9.2 ft/s) in the Y-direction, and 0.7 m/s (2.3 ft/s) in the Z-direction, referenced to launch vehicle platform-accelerometer coordinate system (PACSS12).

The guidance velocity error plots for the second burn phase had reasonable shapes and magnitudes. The maximum error amounted to 1.2 m/s (3.9 ft/s) in the X-direction, 1.7 m/s (5.6 ft/s) in the Y-direction, and 0.9 m/s (3.0 ft/s) in the Z-direction, referenced to PACSS12.

5.1.4 Continuity Between Trajectory Segments

The continuity between trajectory segments can be obtained by examining the spread of solutions at parking orbit insertion and translunar injection before the trajectory segments were merged together.

Comparisons of the spread of solutions at the 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 70 m (230 ft) and 0.3 m/s (1.0 ft/s) in the downrange direction, 170 m (558 ft) and 0.8 m/s (2.6 ft/s) in the vertical direction, and 130 m (427 ft) and 1.7 m/s (5.6 ft/s) in the crossrange direction, referenced to the earth-fixed launch site coordinate system (PACSS10).

5.1.4 (Continued)

Comparisons of the TLI vectors determined independently from the powered flight and orbital analyses yielded good agreement. The TLI vector from the powered flight analysis was obtained by propagating forward the state vector at 9,715 seconds (from parking orbit analysis) to 10,213.03 seconds. The TLI vector from the orbital analysis was determined separately by using the post TLI tracking data. The position and velocity components of the two solutions had respectively a spread of 90 m (295 ft) and 0.3 m/s (1.0 ft/s) in the X-direction, 80 m (262 ft) and 1.2 m/s (3.9 ft/s) in the Y-direction, and 430 m (1,411 ft) and 1.4 m/s (4.6 ft/s) in the Z-direction, referenced to the earth-fixed launch site coordinate system (PACSS10).

A dispersion analysis was performed for the parking orbit trajectory. Three solutions were obtained by judiciously selecting various tracking data combinations. The parking orbit insertion vectors had a spread in position and velocity components respectively of 60 m (197 ft) and 0.3 m/s (1.0 ft/s) in downrange (Z), 275 m (902 ft) and 0.1 m/s (0.3 ft/s) in vertical (X), and 80 m (262 ft) and 0.2 m/s (0.7 ft/s) in crossrange (Y), referenced to the earth-fixed launch site coordinate system (PACSS10).

5.2 TRAJECTORY UNCERTAINTIES

Based on the information of Paragraph 5.1, past experience, and engineering judgment, the trajectory uncertainties were estimated.

The trajectory 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 ±60 m (±197 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 ±350 m (±1,148 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 ±750 m (±2,461 ft) in position components and ±1.5 m/s (±4.9 ft/s) in velocity components at TLI. The trajectory uncertainties at CSM separation are ±1,500 m (±4,921 ft) in position components and ±2.0 m/s (±6.6 ft/s) in velocity components.

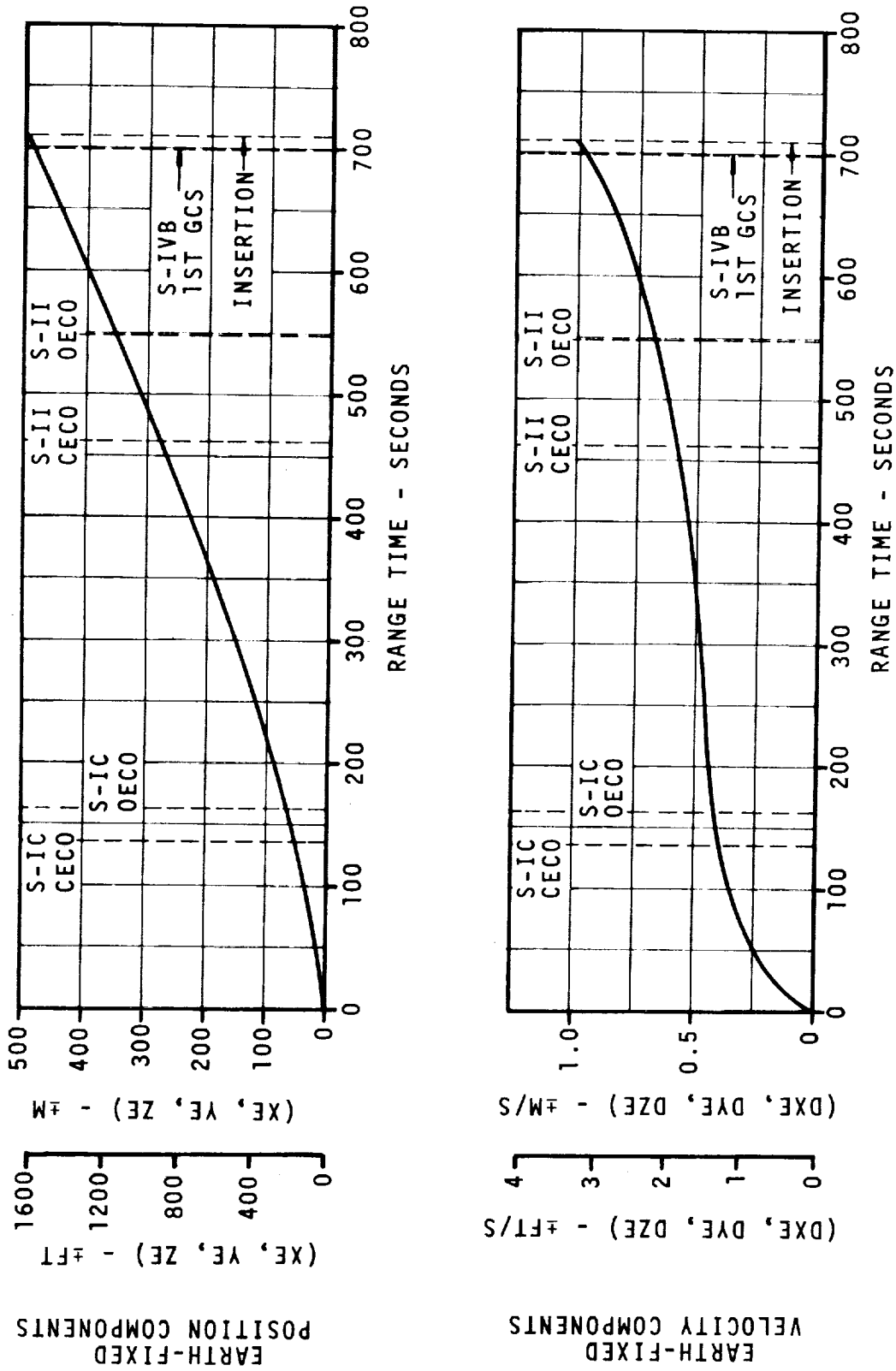

FIGURE 5-1. ESTIMATED TRAJECTORY UNCERTAINTY - ASCENT PHASE

TABLE 5-I. TRACKING DATA SPREAD* - ASCENT PHASE

STATION	ΔX	ΔY	ΔZ
Cape Kennedy (1.16) Radar (FPS-16)	120 m (394 ft)	80 m (262 ft)	40 m (131 ft)
Patrick (0.18) Radar (FPQ-6)	100 m (328 ft)	40 m (131 ft)	50 m (164 ft)
Merritt Island (19.18) Radar (TPQ-18)	160 m (525 ft)	80 m (262 ft)	20 m (66 ft)
Bermuda (67.16) Radar (FPS-16M)	500 m (1,640 ft)	80 m (262 ft)	80 m (262 ft)
Bermuda (67.18) Radar (FPQ-6)	500 m (1,640 ft)	110 m (361 ft)	60 m (197 ft)

* Expressed in PACSS10

TABLE 5-II. TRACKING DATA SPREAD* - PARKING ORBIT PHASE

STATION	ΔX	ΔY	ΔZ
Bermuda (FPS-16M) Rev 1	500 m (1,640 ft)	300 m (984 ft)	200 m (656 ft)
Bermuda (FPQ-6) Rev 1	500 m (1,640 ft)	300 m (984 ft)	200 m (656 ft)
Carnarvon (FPQ-6) Rev 1	300 m (984 ft)	100 m (328 ft)	200 m (656 ft)
Patrick (FPQ-6) Rev 2	120 m (394 ft)	120 m (394 ft)	200 m (656 ft)
Carnarvon (FPQ-6) Rev 2	200 m (656 ft)	130 m (427 ft)	180 m (591 ft)

* Expressed in PACSS10

TABLE 5-III. TRACKING DATA SPREAD* - POST TLI PHASE

STATION	SLANT RANGE MIN	SLANT RANGE MAX	ΔX	ΔY	ΔZ
Hawaii (FPS-16M)	1,476 km (797 n mi)	4,259 km (2,300 n mi)	250 m (820 ft)	400 m (1,312 ft)	1,000 m (3,281 ft)
California (TPQ-18)	3,315 km (1,790 n mi)	6,836 km (3,691 n mi)	500 m (1,640 ft)	700 m (2,297 ft)	400 m (1,312 ft)
Bermuda (FPQ-6)	6,582 km (3,554 n mi)	7,207 km (3,892 n mi)	1,200 m (3,937 ft)	600 m (1,969 ft)	1,200 m (3,937 ft)
Grand Turk (TPQ-18)	6,224 km (3,361 n mi)	7,024 km (3,793 n mi)	1,100 m (3,609 ft)	2,000 m (6,562 ft)	800 m (2,625 ft)
Antigua (FPQ-6)	7,298 km (3,941 n mi)	7,895 km (4,263 n mi)	1,500 m (4,921 ft)	1,500 m (4,921 ft)	1,500 m (4,921 ft)

* Expressed in PACSS10

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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 retro rocket 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.

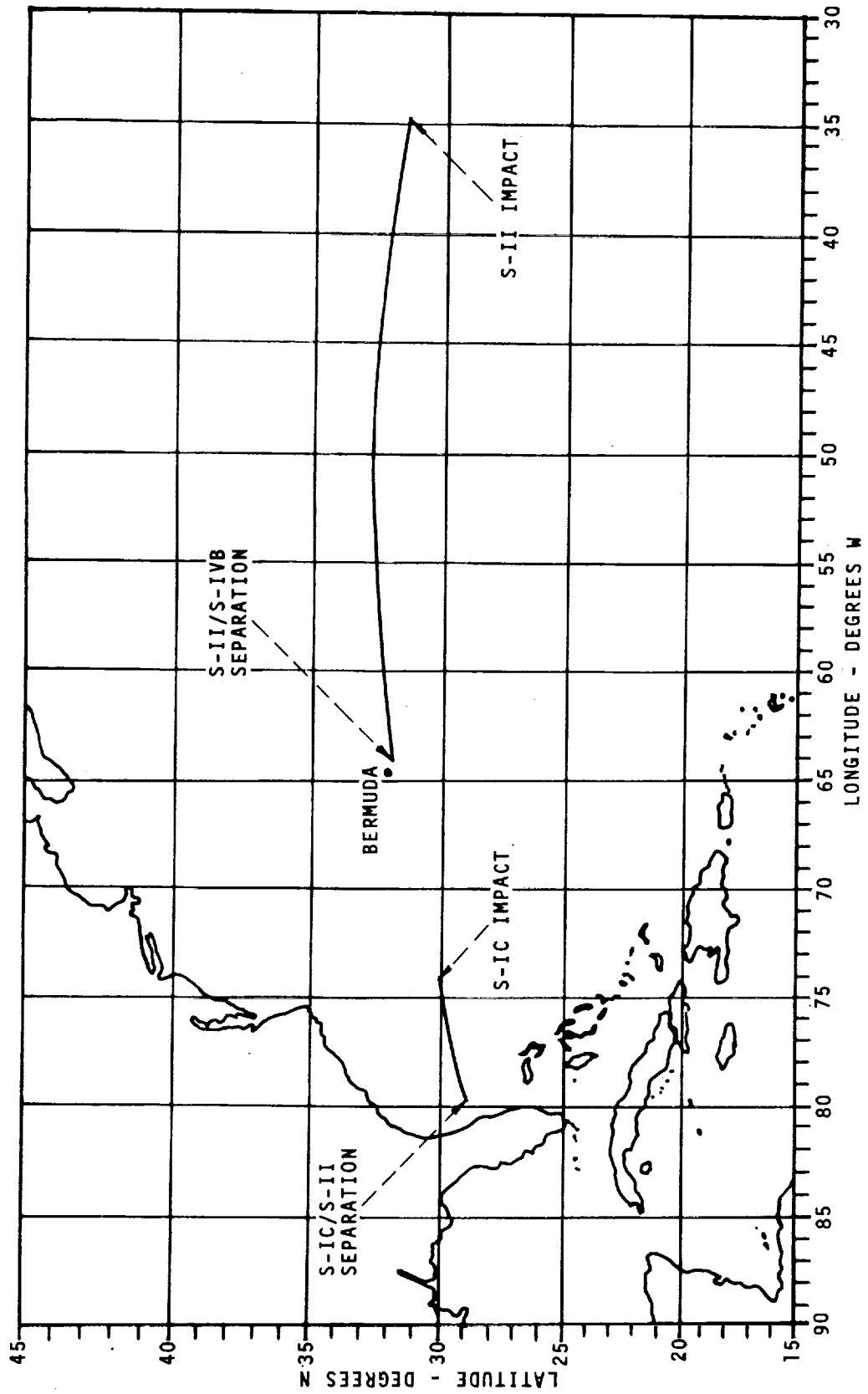

FIGURE 6-1. GROUND TRACKS FOR S-IC AND S-II SPENT STAGES

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

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	543.7
	Latitude, deg N	30.212
	Longitude, deg E	-74.038
	Surface Range, km (n mi)	661.4 (357.1)
Impact: 0° Angle-of-Attack	Range Time, sec	503.5
	Latitude, deg N	30.231
	Longitude, deg E	-73.942
	Surface Range, km (n mi)	671.0 (362.3)
Impact: 90° Angle-of-Attack	Range Time, sec	577.8
	Latitude, deg N	30.198
	Longitude, deg E	-74.105
	Surface Range, km (n mi)	654.9 (353.6)
Apex: Tumbling Case	Range Time, sec	269.1
	Altitude, km (n mi)	115.0 (62.1)
	Surface Range, km (n mi)	327.4 (176.8)

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

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	1,213.7
	Latitude, deg N	31.535
	Longitude, deg E	-34.844
	Surface Range, km (n mi)	4,392.5 (2,371.8)
Impact: 0° Angle-of-Attack	Range Time, sec	1,179.9
	Latitude, deg N	31.497
	Longitude, deg E	-34.582
	Surface Range, km (n mi)	4,417.8 (2,385.4)
Impact: 90° Angle-of-Attack	Range Time, sec	1,252.7
	Latitude, deg N	31.573
	Longitude, deg E	35.113
	Surface Range, km (n mi)	4,366.7 (2,357.8)
Apex: Tumbling Case	Range Time, sec	587.0
	Altitude, km (n mi)	188.8 (101.9)
	Surface Range, km (n mi)	1,862.9 (1,005.9)

SECTION 7

S-IVB/IU SLINGSHOT TRAJECTORY

Following LM extraction, the S-IVB/IU was placed on a lunar slingshot trajectory. This was accomplished by slowing down the S-IVB/IU to make it pass by the trailing edge of the moon and obtain sufficient energy to continue to a solar orbit. The velocity increase was achieved by a combination of 108-second LOX dump, 280-second APS burn, and LH_2 vent. A time history of the vehicle longitudinal velocity increase for the slingshot maneuver is presented in Figure 7-1. Table 7-I presents a comparison of the actual and nominal velocity increase due to the various phases of the maneuver. The major error contribution in total velocity increase is the resulting 7.3 m/s (24.0 ft/s) from the continuous venting system (CVS) as compared to 3.5 m/s (11.5 ft/s) for the predicted value. Figure 7-2 presents the resultant conditions for various velocity increases at the given attitude of the vehicle for the maneuver.

The S-IVB/IU closest approach of 3,379 kilometers (1,825 n mi) above the lunar surface occurred at 78.70 hours into the mission. The trajectory parameters were obtained by integrating forward a vector furnished by Goddard Space Flight Center (GSFC) which was obtained from USB tracking data during the active lifetime of the S-IVB/IU. The actual and nominal conditions at closest approach are presented in Table 7-II. Figure 7-3 illustrates the influence of the moon on the S-IVB/IU energy (velocity) relative to the earth and shows that the S-IVB/IU escaped as a result of the lunar encounter. Figure 7-4 illustrates the relationship between the S-IVB/IU and the spacecraft in the lunar vicinity, with all paths shown in the spacecraft's orbital plane. The spacecraft had completed one lunar revolution prior to S-IVB/spacecraft close approach, at which time the two vehicles were approximately 3,500 km (1,890 n mi) apart. Some of the heliocentric orbit parameters of the S-IVB/IU are presented in Table 7-III. The same parameters for the orbit of the earth are also presented for comparison.

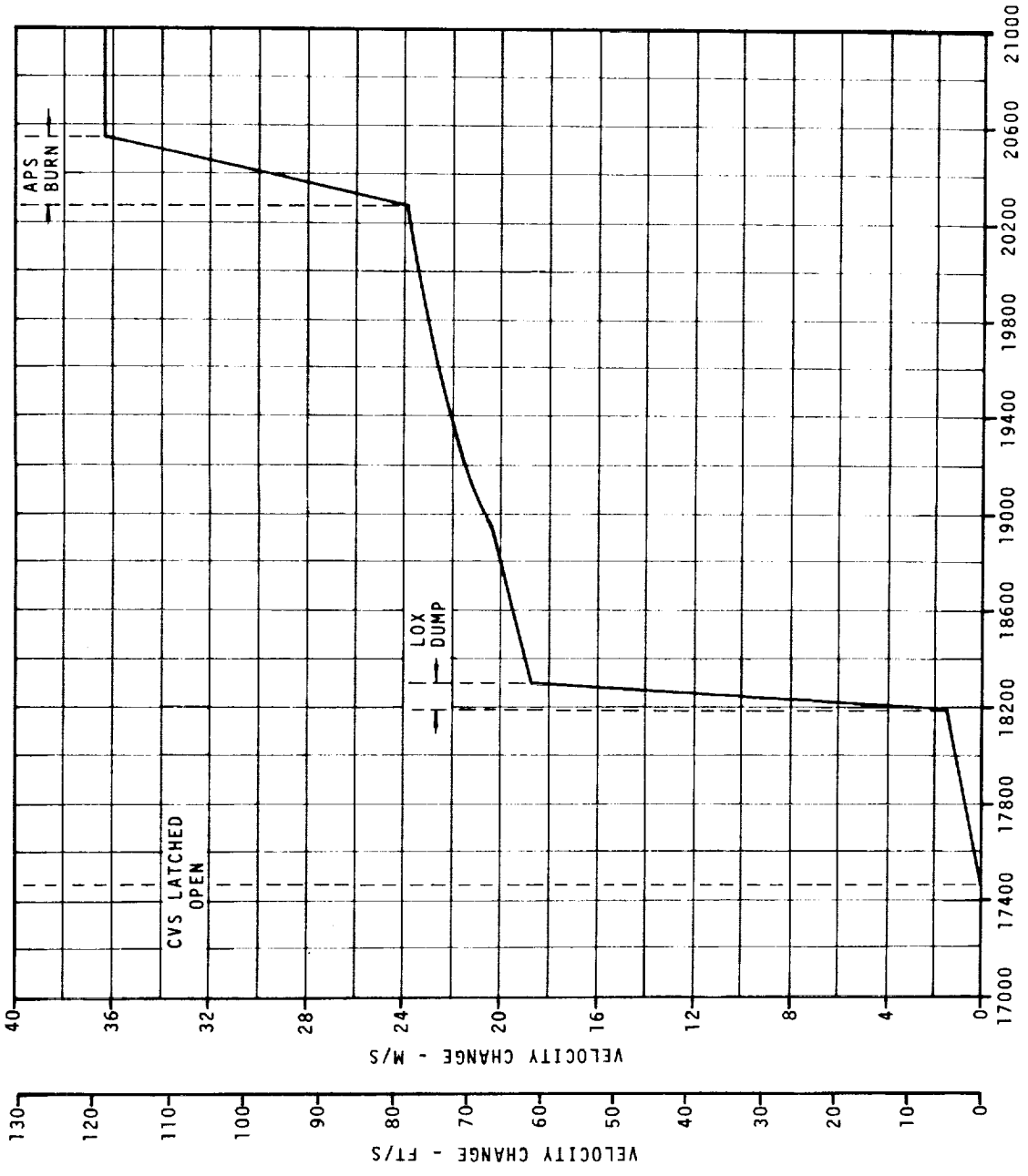

FIGURE 7-1. SLINGSHOT MANEUVER LONGITUDINAL VELOCITY INCREASE

ATTITUDE (LOCAL HORIZONTAL REFERENCE SYSTEM)

218° PITCH
0° YAW
170° ROLL

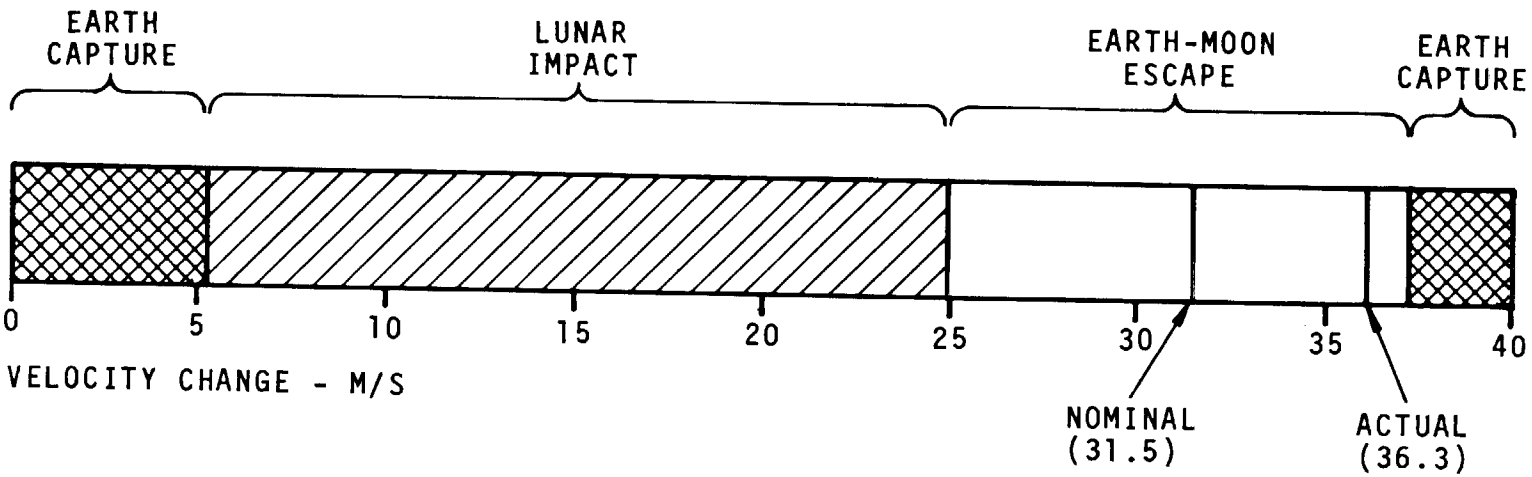

FIGURE 7-2. TRAJECTORY CONDITIONS RESULTING FROM SLINGSHOT MANEUVER VELOCITY INCREMENT

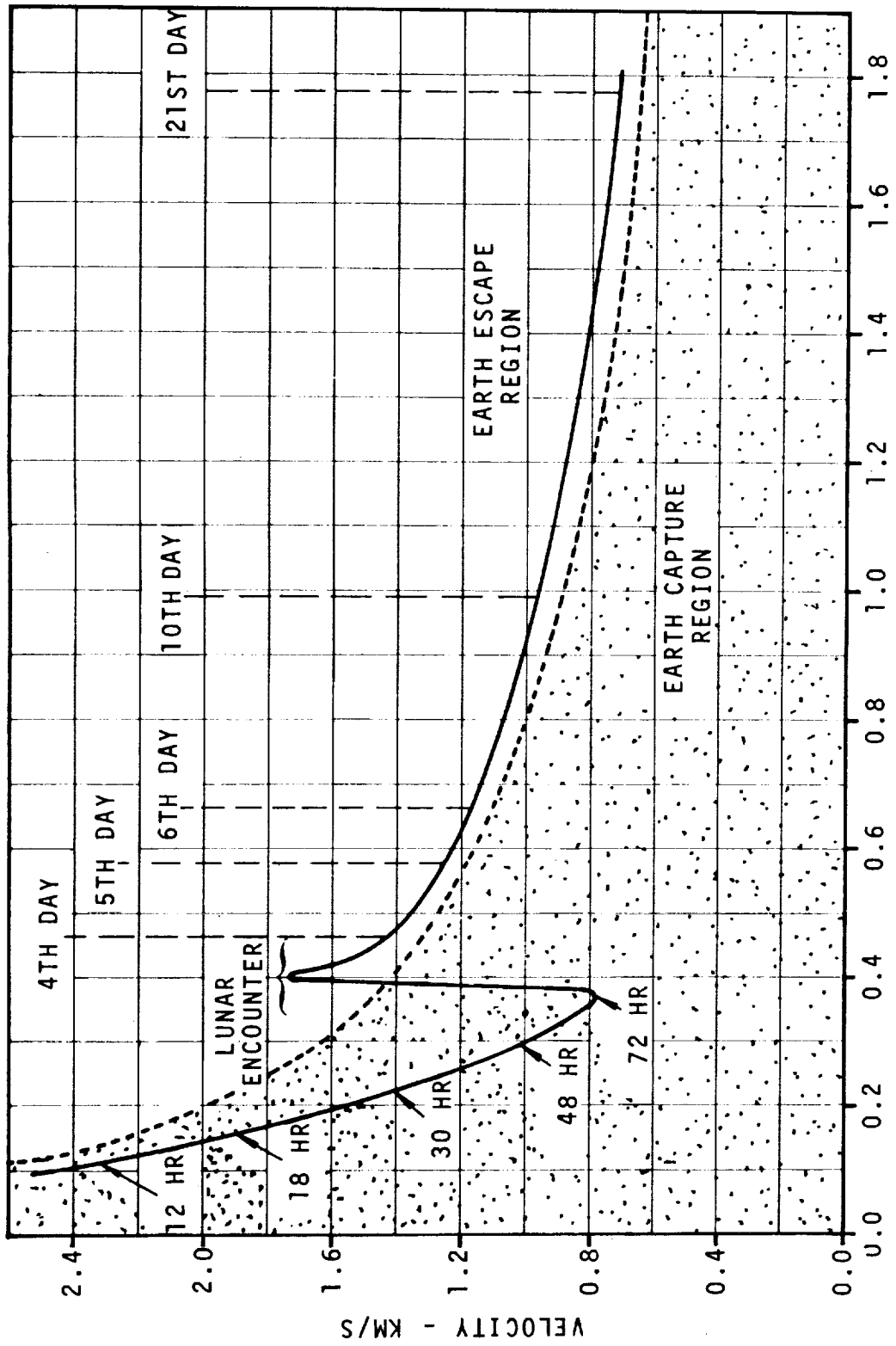

FIGURE 7-3. S-IVB/IU VELOCITY RELATIVE TO EARTH DISTANCE

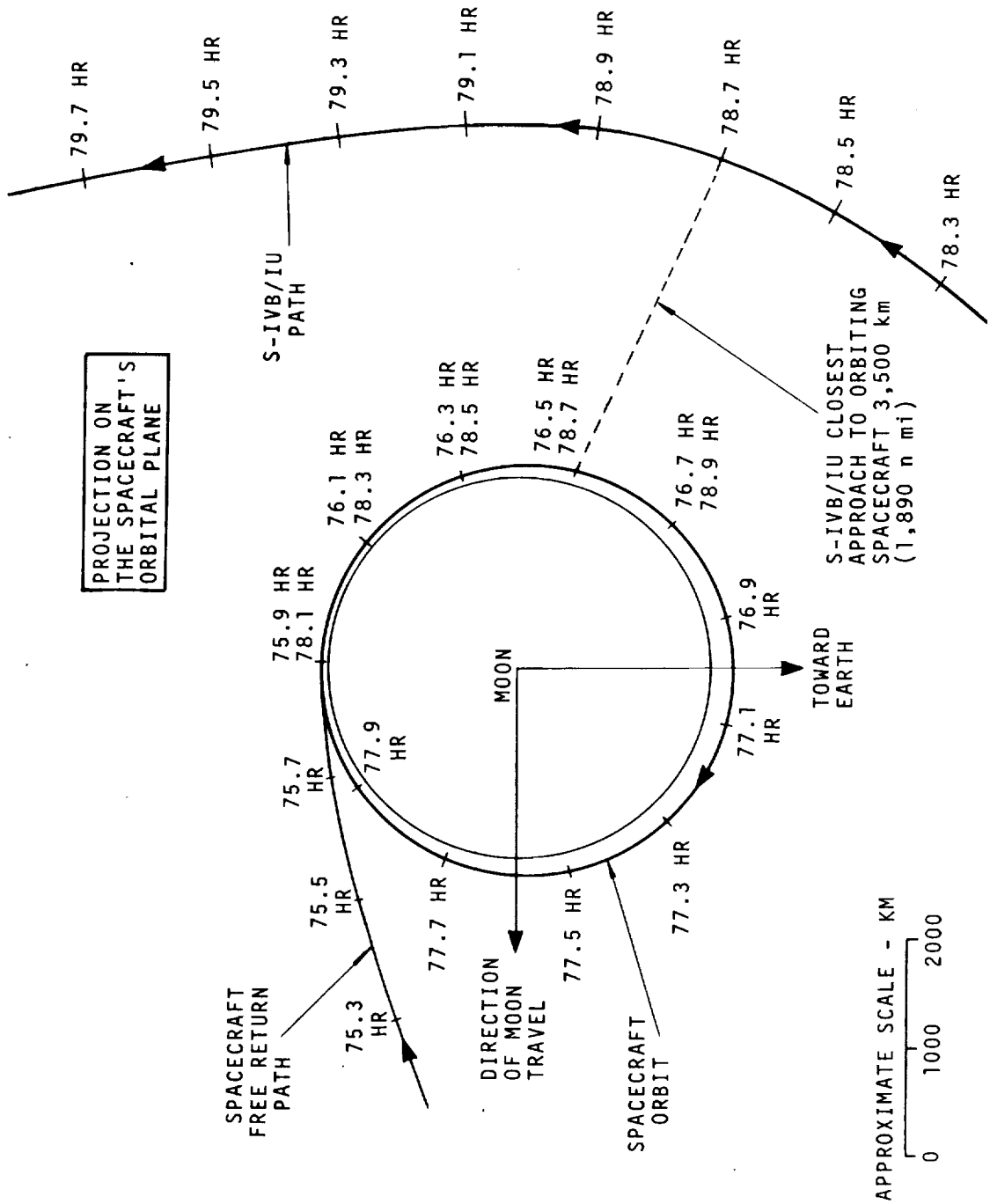

FIGURE 7-4. S-IVB/IU AND SPACECRAFT RELATIVE TRAJECTORIES

TABLE 7-I. COMPARISON OF SLINGSHOT MANEUVER VELOCITY INCREMENT

PARAMETER	ACTUAL	NOMINAL
Longitudinal Velocity Increase, m/s (ft/s)	36.3 (119.1)	31.5 (103.3)
LOX Dump, m/s (ft/s)	17.0 (55.8)	16.0 (52.5)
APS Burn, m/s (ft/s)	12.0 (39.4)	12.0 (39.4)
Continuous Vent System*, m/s (ft/s)	7.3 (24.0)	3.5 (11.5)

* Latched open at 17,468 seconds

TABLE 7-II. COMPARISON OF LUNAR CLOSEST APPROACH PARAMETERS

PARAMETER	ACTUAL	NOMINAL
Selenocentric Distance, km (n mi)	5,117 (2,763)	3,700 (1,998)
Altitude Above Lunar Surface, km (n mi)	3,379 (1,825)	1,962 (1,059)
Time from Launch, hr	78.7	78.4
Velocity Increase Relative to Earth from Lunar Encounter, km/s (n mi/s)	0.680 (0.367)	0.860 (0.464)

TABLE 7-III. HELIOCENTRIC ORBIT PARAMETERS

PARAMETER	S-IVB/IU	EARTH
Semimajor Axis, 10^6 km (10^6 n mi)	143.08 (77.26)	149.00 (80.45)
Aphelion, 10^6 km (10^6 n mi)	151.86 (82.00)	151.15 (81.61)
Perihelion, 10^6 km (10^6 n mi)	134.30 (72.52)	146.84 (79.29)
Inclination,* deg	0.3836	0.0000
Period, days	342	365

* Measured with respect to the ecliptic plane

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 center of gravity 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 center of gravity 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 center of gravity 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 distance from the geocenter to vehicle center of gravity. 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

APPENDIX A (Continued)

SYMBOL	DEFINITION
	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 center of gravity 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 center of gravity 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 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.

APPENDIX A (Continued)

SYMBOL	DEFINITION
ALTITUDE	Perpendicular distance from vehicle center of gravity 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 the flight.

Table B-II gives the launch vehicle navigation position, velocity, and acceleration components for the ascent phase of the 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 the 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									
-16.968	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	59	0	0	0.0	0.0	0.0	0.0	0.0	0.0
FIRST MOTION									
0.300	59	0	0	0.0	0.0	0.0	0.67	0.0	0.0
START OF TIME BASE 1									
0.600	60	0	0	0.5	0.0	0.0	1.73	-0.01	0.01
1.0	61	0	0	1.1	-0.0	0.0	2.10	-0.04	0.02
2.0	63	0	0	3.2	-0.1	0.0	2.18	-0.11	0.01
3.0	67	0	0	5.6	-0.2	0.0	2.23	-0.16	0.01
4.0	73	0	0	7.8	-0.4	0.0	2.28	-0.12	0.01
5.0	82	-1	0	10.2	-0.4	0.0	2.34	0.02	0.00
6.0	94	-1	0	12.6	-0.3	0.1	2.41	0.13	0.01
7.0	108	-2	0	15.1	-0.2	0.1	2.49	0.19	0.01
8.0	124	-2	0	17.6	0.0	0.1	2.57	0.18	0.01
9.0	142	-1	0	20.0	0.2	0.1	2.65	0.17	0.01
10.0	164	-1	1	22.7	0.4	0.1	2.71	0.21	0.01
11.0	188	-1	1	25.5	0.6	0.1	2.77	0.22	0.01
12.0	215	0	1	28.2	0.8	0.1	2.84	0.14	0.01
13.0	245	1	1	31.1	0.9	0.1	2.89	0.05	0.00
14.0	277	2	1	34.1	0.9	0.1	2.95	-0.04	-0.01

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	313	3	1	37.1	0.8	0.1	3.01	-0.04	-0.01
16.0	351	3	1	40.1	0.8	0.2	3.07	0.01	0.04
17.0	393	4	2	43.2	0.9	0.2	3.13	0.05	0.09
18.0	439	5	2	46.4	0.9	0.3	3.19	0.07	0.13
19.0	486	6	2	49.6	1.0	0.5	3.26	0.05	0.17
20.0	537	7	3	52.9	1.0	0.7	3.34	-0.00	0.20
21.0	592	8	4	56.3	1.0	0.9	3.41	-0.01	0.25
22.0	650	9	5	59.8	1.0	1.2	3.48	-0.00	0.31
23.0	711	10	6	63.3	1.0	1.5	3.55	-0.01	0.36
24.0	776	11	8	66.9	1.0	1.9	3.63	-0.01	0.41
25.0	845	12	10	70.6	1.0	2.3	3.70	-0.01	0.47
26.0	917	13	12	74.3	1.0	2.8	3.78	-0.01	0.53
27.0	994	14	15	78.1	1.0	3.4	3.86	-0.02	0.60
28.0	1074	15	19	82.0	1.0	4.0	3.93	-0.02	0.67
29.0	1158	16	24	86.0	0.9	4.7	4.01	-0.02	0.75
30.0	1246	17	29	90.0	0.9	5.5	4.10	-0.03	0.84
31.0	1338	18	35	94.2	0.9	6.4	4.18	-0.03	0.93
32.0	1434	19	42	98.4	0.8	7.4	4.26	-0.04	1.04
33.0	1535	20	49	102.7	0.8	8.5	4.34	-0.05	1.15
34.0	1639	20	59	107.1	0.8	9.7	4.43	-0.05	1.26
35.0	1749	21	69	111.5	0.7	11.0	4.51	-0.05	1.38
36.0	1863	22	81	116.1	0.7	12.5	4.58	-0.05	1.50
37.0	1981	22	94	120.7	0.6	14.0	4.66	-0.04	1.63
38.0	2104	23	109	125.4	0.6	15.7	4.74	-0.04	1.76
39.0	2232	24	125	130.2	0.5	17.6	4.83	-0.03	1.90
40.0	2364	24	144	135.1	0.5	19.5	4.91	-0.04	2.04
41.0	2502	25	164	140.0	0.4	21.6	5.00	-0.05	2.19
42.0	2645	25	187	145.1	0.4	23.9	5.09	-0.05	2.35
43.0	2792	25	212	150.2	0.3	26.3	5.17	-0.06	2.51
44.0	2945	26	240	155.4	0.3	28.9	5.25	-0.07	2.68
45.0	3103	26	270	160.7	0.2	31.7	5.33	-0.07	2.85
46.0	3266	26	303	166.0	0.1	34.6	5.40	-0.07	3.03
47.0	3435	26	340	171.5	0.1	37.8	5.48	-0.07	3.22
48.0	3609	26	379	177.0	0.0	41.1	5.56	-0.07	3.41
49.0	3789	26	422	182.6	-0.1	44.6	5.63	-0.06	3.61
50.0	3975	26	468	188.3	-0.1	48.3	5.70	-0.05	3.82
51.0	4166	26	519	194.0	-0.2	52.2	5.77	-0.05	4.04
52.0	4363	26	573	199.8	-0.2	56.4	5.83	-0.05	4.26
53.0	4565	25	631	205.7	-0.3	60.8	5.90	-0.04	4.50
54.0	4774	25	694	211.6	-0.3	65.4	5.96	-0.03	4.73
55.0	4989	25	762	217.6	-0.3	70.2	6.02	-0.03	4.96
56.0	5209	25	835	223.7	-0.4	75.3	6.08	-0.02	5.20
57.0	5436	24	913	229.8	-0.4	80.6	6.14	-0.03	5.44

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	5669	24	996	235.9	-0.4	86.2	6.19	-0.04	5.68
59.0	5908	23	1085	242.1	-0.4	92.0	6.23	-0.03	5.91
60.0	6153	23	1180	248.4	-0.5	98.0	6.27	-0.02	6.15
61.0	6405	22	1282	254.7	-0.5	104.3	6.31	0.00	6.38
62.0	6662	22	1389	261.0	-0.4	110.8	6.35	0.03	6.60
63.0	6927	22	1503	267.4	-0.4	117.5	6.38	0.05	6.83
64.0	7197	21	1624	273.8	-0.4	124.4	6.41	0.07	7.08
65.0	7474	21	1752	280.2	-0.3	131.6	6.42	0.07	7.33
66.0	7757	21	1887	286.6	-0.2	139.1	6.42	0.07	7.58
MACH 1									
66.300	7844	21	1930	288.5	-0.2	141.4	6.42	0.07	7.66
67.0	8047	20	2030	293.0	-0.2	146.8	6.41	0.07	7.85
68.0	8343	20	2181	299.4	-0.1	154.8	6.40	0.07	8.12
69.0	8646	20	2340	305.8	0.0	163.0	6.40	0.09	8.39
70.0	8955	20	2507	312.2	0.1	171.6	6.41	0.12	8.66
71.0	9271	21	2683	318.7	0.3	180.4	6.43	0.16	8.93
72.0	9592	21	2868	325.1	0.4	189.4	6.46	0.19	9.22
73.0	9921	21	3062	331.6	0.6	198.8	6.49	0.20	9.52
74.0	10256	22	3266	338.1	0.8	208.5	6.51	0.22	9.83
75.0	10597	23	3479	344.6	1.1	218.5	6.53	0.23	10.14
76.0	10945	24	3703	351.1	1.3	228.8	6.56	0.22	10.46
77.0	11299	26	3937	357.7	1.5	239.4	6.58	0.22	10.78
78.0	11660	27	4182	364.3	1.7	250.3	6.60	0.21	11.08
79.0	12028	29	4438	370.9	1.9	261.6	6.62	0.19	11.39
80.0	12402	31	4705	377.6	2.1	273.1	6.65	0.17	11.70
81.0	12783	33	4984	384.2	2.3	285.0	6.68	0.14	12.00
82.0	13170	36	5275	390.9	2.4	297.1	6.72	0.12	12.31
MAXIMUM DYNAMIC PRESSURE									
83.000	13565	38	5578	397.7	2.5	309.6	6.75	0.09	12.63
84.0	13966	41	5894	404.4	2.6	322.4	6.78	0.09	12.95
85.0	14374	43	6223	411.2	2.7	335.5	6.81	0.09	13.24
86.0	14788	46	6565	418.0	2.8	348.8	6.85	0.09	13.52
87.0	15210	49	6921	424.9	2.9	362.5	6.89	0.08	13.80
88.0	15638	52	7290	431.8	2.9	376.4	6.94	0.06	14.06
89.0	16073	55	7674	438.8	3.0	390.6	6.99	0.03	14.33
90.0	16516	58	8072	445.8	3.0	405.1	7.03	-0.00	14.62
91.0	16965	61	8484	452.9	2.9	419.9	7.07	-0.04	14.94
92.0	17421	63	8912	459.9	2.9	435.0	7.10	-0.07	15.27
93.0	17885	66	9354	467.0	2.8	450.4	7.11	-0.08	15.61

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
94.0	18356	69	9813	474.2	2.8	466.2	7.11	-0.07	15.96
95.0	18833	72	10287	481.3	2.7	482.3	7.11	-0.06	16.31
96.0	19318	75	10777	488.4	2.6	498.8	7.09	-0.04	16.66
97.0	19810	77	11285	495.4	2.6	515.6	7.08	-0.02	17.00
98.0	20309	80	11809	502.5	2.6	532.8	7.06	-0.01	17.34
99.0	20815	82	12350	509.6	2.6	550.3	7.04	-0.01	17.70
100.0	21328	85	12910	516.6	2.6	568.2	7.02	-0.02	18.05
101.0	21848	87	13487	523.6	2.5	586.4	7.01	-0.02	18.40
102.0	22375	90	14083	530.6	2.5	605.0	6.99	-0.02	18.77
103.0	22909	93	14697	537.6	2.5	624.0	6.98	-0.02	19.13
104.0	23451	95	15331	544.6	2.5	643.3	6.96	-0.01	19.49
105.0	23999	98	15984	551.5	2.5	662.9	6.94	0.01	19.85
106.0	24554	100	16657	558.4	2.5	683.0	6.92	0.03	20.21
107.0	25115	103	17350	565.4	2.5	703.4	6.90	0.05	20.58
108.0	25684	105	18064	572.2	2.6	724.1	6.88	0.09	20.93
109.0	26260	108	18798	579.1	2.7	745.2	6.86	0.13	21.29
110.0	26842	111	19554	586.0	2.9	766.7	6.87	0.18	21.64
111.0	27432	114	20332	592.9	3.1	788.5	6.88	0.22	21.98
112.0	28028	117	21131	599.8	3.3	810.7	6.91	0.26	22.30
113.0	28631	120	21953	606.7	3.6	833.1	6.96	0.27	22.62
114.0	29242	124	22798	613.7	3.8	855.9	7.02	0.25	22.93
115.0	29859	128	23665	620.8	4.0	879.0	7.08	0.20	23.24
116.0	30483	132	24556	627.9	4.2	902.4	7.14	0.14	23.56
117.0	31115	136	25470	635.0	4.3	926.1	7.18	0.07	23.90
118.0	31753	141	26408	642.2	4.4	950.2	7.19	0.01	24.28
119.0	32399	145	27370	649.4	4.4	974.7	7.17	-0.03	24.68
120.0	33052	149	28358	656.5	4.3	999.6	7.13	-0.05	25.10
121.0	33712	154	29370	663.6	4.3	1024.9	7.06	-0.05	25.53
122.0	34379	158	30407	670.6	4.2	1050.6	6.99	-0.04	25.98
123.0	35053	162	31471	677.6	4.2	1076.8	6.93	-0.03	26.43
124.0	35734	166	32561	684.5	4.2	1103.5	6.88	-0.01	26.87
125.0	36422	171	33678	691.4	4.2	1130.6	6.85	0.01	27.30
126.0	37117	175	34823	698.2	4.2	1158.1	6.84	0.03	27.73
127.0	37819	179	35995	705.1	4.2	1186.0	6.87	0.05	28.14
128.0	38527	183	37195	712.0	4.3	1214.4	6.91	0.10	28.57
129.0	39243	188	38424	718.9	4.4	1243.2	6.95	0.09	29.00
130.0	39965	192	39681	725.9	4.5	1272.4	6.99	0.13	29.43
131.0	40694	197	40968	732.9	4.7	1302.0	7.03	0.15	29.86
132.0	41431	201	42285	739.9	4.8	1332.1	7.07	0.18	30.29
133.0	42174	206	43633	747.0	5.0	1362.6	7.11	0.18	30.72
134.0	42925	211	45011	754.1	5.2	1393.5	7.15	0.16	31.15
135.0	43682	216	46420	761.3	5.3	1424.9	7.19	0.16	31.58
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.200	43835	218	46707	762.7	5.4	1431.2	7.19	0.16	31.67

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	44446	222	47860	766.8	5.5	1454.0	3.75	0.19	26.08
137.0	45215	228	49326	770.6	5.7	1479.7	3.77	0.21	25.75
138.0	45986	233	50818	774.4	5.9	1505.6	3.78	0.27	25.98
139.0	46764	239	52338	778.2	6.2	1531.7	3.80	0.28	26.33
140.0	47544	246	53883	782.0	6.5	1558.2	3.82	0.31	26.68
141.0	48327	252	55455	785.8	6.8	1585.1	3.85	0.35	27.02
142.0	49115	259	57054	789.6	7.2	1612.3	3.87	0.30	27.37
143.0	49907	267	58680	793.5	7.5	1639.8	3.90	0.30	27.75
144.0	50703	274	60334	797.4	7.7	1668.2	3.94	0.29	28.14
145.0	51502	282	62017	801.3	8.0	1696.5	3.99	0.27	28.50
146.0	52306	290	63727	805.4	8.3	1725.2	4.04	0.25	28.89
147.0	53114	299	65467	809.4	8.5	1754.3	4.08	0.24	29.29
148.0	53925	307	67236	813.5	8.8	1783.7	4.13	0.24	29.67
149.0	54741	316	69035	817.7	9.0	1813.6	4.17	0.24	30.05
150.0	55562	326	70863	821.9	9.3	1843.8	4.22	0.25	30.45
151.0	56386	335	72723	826.1	9.5	1874.5	4.27	0.25	30.86
152.0	57214	345	74613	830.4	9.8	1905.6	4.32	0.26	31.28
153.0	58047	355	76534	834.7	10.0	1937.1	4.36	0.26	31.71
154.0	58885	365	78487	839.1	10.3	1969.0	4.41	0.27	32.15
155.0	59726	375	80472	843.6	10.6	2001.4	4.47	0.27	32.61
156.0	60573	386	82490	848.1	10.9	2034.2	4.52	0.29	33.08
157.0	61423	397	84540	852.6	11.2	2067.5	4.58	0.30	33.54
158.0	62279	408	86625	857.2	11.5	2101.3	4.64	0.34	34.01
159.0	63139	420	88743	861.9	11.9	2135.5	4.69	0.32	34.47
160.0	64003	432	90896	866.6	12.1	2170.2	4.75	0.31	34.93
161.0	64873	444	93083	871.4	12.4	2205.4	4.80	0.32	35.40
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
161.630	65426	452	94489	874.4	12.6	2227.8	4.84	0.27	35.68
162.0	65750	457	95314	874.3	12.7	2236.4	-3.65	0.20	13.64
	S-IC/S-II SEPARATION COMMAND								
162.300	66011	461	95984	872.6	12.8	2238.6	-9.13	0.16	1.23
164.0	67480	482	99785	857.2	13.0	2238.9	-9.11	0.16	0.17
166.0	69179	509	104271	840.1	13.2	2242.1	-7.10	0.09	5.29
168.0	70845	535	108765	826.2	13.5	2253.4	-6.84	0.15	5.71
170.0	72483	563	113284	812.9	13.8	2266.0	-6.46	0.13	6.82
172.0	74096	591	117830	800.0	14.1	2279.6	-6.41	0.11	6.88
174.0	75683	619	122403	787.2	14.3	2293.5	-6.37	0.16	6.96
176.0	77245	648	127004	774.5	14.6	2307.6	-6.34	0.15	7.02
178.0	78782	677	131634	761.9	14.9	2321.6	-6.30	0.15	7.07

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
180.0	80293	708	136291	749.3	15.2	2335.8	-6.27	0.16	7.10
182.0	81779	738	140977	736.8	15.6	2350.1	-6.24	0.16	7.14
184.0	83240	770	145691	724.3	15.9	2364.4	-6.22	0.16	7.17
186.0	84676	802	150434	711.9	16.2	2378.7	-6.21	0.17	7.20
188.0	86088	835	155206	699.5	16.5	2393.1	-6.19	0.17	7.22
190.0	87474	868	160007	687.2	16.9	2407.6	-6.16	0.17	7.25
192.0	88836	902	164837	674.9	17.2	2422.2	-6.14	0.17	7.29
194.0	90174	937	169696	662.6	17.6	2436.8	-6.11	0.17	7.33
196.0	91487	973	174584	650.4	17.9	2451.5	-6.09	0.18	7.37
198.0	92776	1009	179502	638.3	18.3	2466.3	-6.03	0.18	7.41
200.0	94040	1046	184449	626.2	18.6	2481.2	-6.04	0.19	7.48
202.0	95281	1083	189426	614.1	19.0	2496.2	-6.08	0.19	7.54
204.0	96497	1122	194434	602.0	19.4	2511.3	-6.05	0.18	7.56
206.0	97689	1161	199472	590.0	19.8	2526.4	-5.88	0.17	7.52
208.0	98857	1201	204539	578.6	20.1	2541.3	-5.54	0.15	7.41
210.0	100004	1241	209637	567.9	20.4	2556.0	-5.21	0.14	7.28
212.0	101129	1282	214763	557.6	20.6	2570.5	-5.00	0.13	7.21
214.0	102234	1324	219918	547.8	20.9	2584.9	-4.88	0.14	7.19
216.0	103320	1366	225102	538.1	21.2	2599.2	-4.84	0.14	7.19
218.0	104387	1408	230315	528.4	21.5	2613.6	-4.79	0.15	7.20
220.0	105434	1452	235557	518.9	21.8	2628.1	-4.78	0.15	7.24
222.0	106462	1496	240828	509.3	22.1	2642.6	-4.78	0.16	7.28
224.0	107471	1540	246127	499.7	22.4	2657.2	-4.79	0.16	7.32
226.0	108461	1585	251457	490.2	22.7	2671.9	-4.79	0.15	7.36
228.0	109432	1631	256815	480.6	23.0	2686.7	-4.80	0.15	7.41
230.0	110383	1677	262203	471.0	23.3	2701.5	-4.81	0.16	7.45
232.0	111316	1724	267621	461.3	23.6	2716.5	-4.81	0.17	7.49
234.0	112229	1772	273069	451.7	24.0	2731.5	-4.81	0.18	7.53
236.0	113123	1820	278547	442.1	24.3	2746.6	-4.81	0.17	7.56
238.0	113997	1869	284055	432.5	24.7	2761.7	-4.82	0.17	7.60
240.0	114852	1919	289594	422.8	25.0	2777.0	-4.82	0.18	7.65
242.0	115688	1969	295164	413.2	25.4	2792.4	-4.82	0.18	7.70
244.0	116505	2021	300764	403.5	25.8	2807.8	-4.83	0.18	7.74
246.0	117302	2072	306395	393.9	26.1	2823.3	-4.83	0.18	7.78
248.0	118081	2125	312057	384.2	26.5	2838.9	-4.84	0.19	7.83
250.0	118839	2178	317751	374.5	26.9	2854.6	-4.85	0.20	7.87
252.0	119579	2233	323476	364.8	27.3	2870.4	-4.85	0.20	7.92
254.0	120299	2288	329232	355.1	27.7	2886.3	-4.85	0.20	7.97
256.0	120999	2343	335021	345.4	28.1	2902.3	-4.85	0.20	8.01
258.0	121680	2400	340842	335.7	28.5	2918.4	-4.86	0.21	8.05
260.0	122342	2457	346695	326.0	28.9	2934.5	-4.86	0.21	8.09
262.0	122984	2516	352580	316.3	29.3	2950.8	-4.87	0.21	8.15
264.0	123607	2575	358498	306.5	29.8	2967.1	-4.88	0.21	8.21

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
266.0	124210	2635	364448	296.7	30.2	2983.6	-4.89	0.22	8.27
268.0	124794	2695	370432	286.9	30.6	3000.2	-4.89	0.22	8.30
270.0	125358	2757	376449	277.2	31.1	3016.8	-4.89	0.22	8.35
272.0	125902	2820	382500	267.4	31.5	3033.6	-4.90	0.22	8.41
274.0	126427	2883	388584	257.6	32.0	3050.5	-4.91	0.23	8.48
276.0	126933	2948	394702	247.7	32.4	3067.5	-4.92	0.23	8.52
278.0	127418	3013	400854	237.9	32.9	3084.6	-4.93	0.23	8.56
280.0	127884	3079	407040	228.0	33.4	3101.8	-4.94	0.24	8.62
282.0	128330	3146	413261	218.1	33.8	3119.1	-4.95	0.25	8.68
284.0	128757	3214	419516	208.2	34.3	3136.5	-4.96	0.25	8.74
286.0	129163	3284	425807	198.3	34.8	3154.0	-4.97	0.25	8.79
288.0	129550	3354	432132	188.3	35.4	3171.6	-4.97	0.26	8.83
290.0	129916	3425	438493	178.4	35.9	3189.3	-4.98	0.27	8.88
292.0	130263	3497	444890	168.4	36.4	3207.1	-4.99	0.27	8.93
294.0	130590	3571	451322	158.4	37.0	3225.1	-5.01	0.27	9.00
296.0	130897	3645	457790	148.4	37.5	3243.1	-5.02	0.28	9.06
298.0	131184	3721	464294	138.4	38.1	3261.3	-5.02	0.29	9.11
300.0	131450	3797	470835	128.3	38.6	3279.6	-5.03	0.28	9.16
302.0	131697	3875	477413	118.2	39.2	3297.9	-5.04	0.28	9.20
304.0	131923	3954	484027	108.1	39.7	3316.4	-5.05	0.28	9.27
306.0	132129	4034	490679	98.0	40.3	3335.0	-5.06	0.29	9.33
308.0	132315	4115	497367	87.9	40.9	3353.7	-5.08	0.29	9.39
310.0	132481	4198	504094	77.7	41.5	3372.6	-5.10	0.29	9.45
312.0	132626	4281	510858	67.5	42.0	3391.5	-5.11	0.29	9.51
314.0	132751	4366	517660	57.3	42.6	3410.6	-5.12	0.30	9.56
316.0	132855	4452	524500	47.0	43.2	3429.8	-5.13	0.30	9.62
318.0	132939	4539	531379	36.7	43.8	3449.1	-5.15	0.30	9.70
320.0	133002	4627	538296	26.4	44.5	3468.6	-5.16	0.31	9.76
322.0	133045	4717	545253	16.1	45.1	3488.1	-5.18	0.32	9.82
324.0	133066	4808	552249	5.7	45.7	3507.8	-5.19	0.32	9.87
326.0	133067	4900	559284	-4.7	46.3	3527.6	-5.20	0.32	9.93
328.0	133048	4993	566360	-15.1	47.0	3547.6	-5.22	0.32	10.01
330.0	133007	5088	573475	-25.5	47.6	3567.6	-5.24	0.33	10.07
332.0	132946	5184	580630	-36.0	48.3	3587.8	-5.26	0.34	10.13
334.0	132863	5281	587826	-46.6	49.0	3608.2	-5.27	0.34	10.19
336.0	132759	5380	595063	-57.1	49.7	3628.6	-5.28	0.34	10.27
338.0	132634	5480	602341	-67.7	50.4	3649.2	-5.30	0.35	10.34
340.0	132488	5581	609660	-78.3	51.1	3670.0	-5.32	0.35	10.40
342.0	132321	5684	617021	-89.0	51.8	3690.8	-5.35	0.36	10.46
344.0	132132	5788	624423	-99.7	52.5	3711.8	-5.37	0.37	10.53
346.0	131922	5894	631868	-110.5	53.2	3732.9	-5.39	0.37	10.61
348.0	131690	6001	639355	-121.3	54.0	3754.2	-5.40	0.37	10.68
350.0	131437	6110	646885	-132.1	54.7	3775.7	-5.41	0.38	10.75

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
352.0	131162	6220	654458	-142.9	55.5	3797.2	-5.44	0.39	10.82
354.0	130865	6332	662074	-153.9	56.3	3819.0	-5.48	0.39	10.90
356.0	130547	6445	669734	-164.8	57.1	3840.8	-5.49	0.39	10.98
358.0	130206	6560	677438	-175.8	57.8	3862.9	-5.50	0.39	11.05
360.0	129843	6677	685185	-186.8	58.6	3885.0	-5.52	0.39	11.12
362.0	129459	6795	692978	-197.9	59.4	3907.4	-5.55	0.40	11.19
364.0	129052	6914	700815	-209.0	60.2	3929.8	-5.58	0.41	11.27
366.0	128622	7036	708697	-220.2	61.0	3952.4	-5.61	0.40	11.35
368.0	128171	7158	716625	-231.5	61.8	3975.2	-5.63	0.40	11.44
370.0	127696	7283	724598	-242.8	62.6	3998.2	-5.66	0.41	11.52
372.0	127200	7409	732618	-254.1	63.5	4021.3	-5.68	0.42	11.60
374.0	126680	7537	740684	-265.5	64.3	4044.5	-5.70	0.42	11.65
376.0	126138	7666	748796	-276.9	65.2	4067.8	-5.73	0.43	11.67
378.0	125572	7797	756955	-288.4	66.0	4091.3	-5.77	0.43	11.79
380.0	124984	7930	765161	-300.0	66.9	4115.1	-5.81	0.44	11.95
382.0	124372	8065	773416	-311.7	67.8	4139.1	-5.84	0.45	12.09
384.0	123737	8202	781718	-323.3	68.7	4163.3	-5.85	0.46	12.14
386.0	123079	8340	790069	-335.1	69.6	4187.6	-5.87	0.47	12.17
388.0	122397	8480	798469	-346.8	70.6	4212.1	-5.90	0.48	12.25
390.0	121691	8622	806917	-358.7	71.5	4236.7	-5.93	0.48	12.34
392.0	120962	8766	815415	-370.6	72.5	4261.4	-5.98	0.47	12.43
394.0	120209	8912	823963	-382.6	73.4	4286.4	-6.02	0.45	12.53
396.0	119432	9060	832561	-394.6	74.3	4311.5	-6.06	0.45	12.63
398.0	118630	9209	841209	-406.8	75.2	4336.9	-6.10	0.48	12.74
400.0	117805	9361	849909	-419.0	76.2	4362.5	-6.13	0.51	12.83
402.0	116954	9514	858659	-431.3	77.3	4388.2	-6.16	0.52	12.91
404.0	116079	9670	867462	-443.6	78.3	4414.1	-6.19	0.51	13.00
406.0	115180	9828	876316	-456.1	79.3	4440.2	-6.23	0.51	13.10
408.0	114255	9987	885223	-468.6	80.4	4466.5	-6.28	0.51	13.20
410.0	113305	10149	894182	-481.2	81.4	4493.0	-6.33	0.52	13.26
412.0	112330	10313	903195	-493.9	82.4	4519.6	-6.37	0.52	13.33
414.0	111330	10479	912261	-506.6	83.5	4546.4	-6.40	0.54	13.48
416.0	110304	10647	921381	-519.5	84.6	4573.5	-6.42	0.55	13.66
418.0	109252	10817	930555	-532.4	85.7	4601.0	-6.46	0.56	13.80
420.0	108174	10990	939785	-545.3	86.8	4628.7	-6.52	0.56	13.87
422.0	107070	11164	949070	-558.4	87.9	4656.5	-6.57	0.56	13.94
424.0	105940	11341	958411	-571.6	89.1	4684.4	-6.61	0.56	14.03
426.0	104784	11521	967808	-584.9	90.2	4712.6	-6.65	0.57	14.14
428.0	103601	11702	977261	-598.2	91.3	4741.0	-6.69	0.57	14.26
430.0	102391	11886	986772	-611.7	92.5	4769.6	-6.74	0.58	14.38
432.0	101154	12072	996340	-625.2	93.7	4798.5	-6.79	0.59	14.50
434.0	99890	12261	1005966	-638.8	94.8	4827.6	-6.84	0.60	14.61
436.0	98599	12452	1015651	-652.6	96.1	4857.0	-6.90	0.61	14.73

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
438.0	97280	12645	1025394	-666.4	97.3	4886.6	-6.95	0.62	14.85
440.0	95933	12841	1035197	-680.3	98.5	4916.4	-6.99	0.62	14.97
442.0	94558	13039	1045060	-694.4	99.8	4946.4	-7.04	0.63	15.10
444.0	93155	13240	1054983	-708.5	101.0	4976.8	-7.09	0.62	15.23
446.0	91724	13443	1064967	-722.8	102.3	5007.3	-7.15	0.62	15.36
448.0	90264	13649	1075013	-737.1	103.5	5038.2	-7.21	0.63	15.49
450.0	88776	13857	1085120	-751.6	104.8	5069.3	-7.27	0.65	15.61
452.0	87258	14068	1095290	-766.2	106.1	5100.6	-7.32	0.66	15.74
454.0	85711	14282	1105523	-780.9	107.4	5132.2	-7.39	0.65	15.87
456.0	84134	14498	1115819	-795.8	108.8	5164.1	-7.47	0.69	16.00
458.0	82528	14717	1126180	-810.7	110.1	5196.2	-7.52	0.69	16.13
460.0	80891	14939	1136605	-825.8	111.5	5228.6	-7.62	0.66	16.26
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
460.620	80394	15006	1139745	-830.4	111.9	5238.4	-7.63	0.66	16.30
462.0	79224	15163	1147091	-841.2	112.8	5257.0	-7.78	0.62	12.84
464.0	77526	15390	1157632	-856.8	114.0	5282.8	-7.85	0.54	12.90
466.0	75796	15619	1168224	-872.5	115.1	5308.6	-7.85	0.57	12.96
468.0	74036	15850	1178867	-888.2	116.2	5334.6	-7.82	0.58	13.04
470.0	72244	16084	1189563	-903.6	117.5	5360.7	-7.59	0.62	13.12
472.0	70421	16320	1200311	-918.6	118.7	5387.3	-7.43	0.62	13.20
474.0	68569	16559	1211112	-933.2	120.0	5413.8	-7.24	0.62	13.27
476.0	66688	16800	1221967	-947.7	121.2	5440.4	-7.18	0.62	13.36
478.0	64779	17044	1232874	-962.0	122.5	5467.2	-7.20	0.64	13.46
480.0	62840	17290	1243836	-976.5	123.8	5494.3	-7.26	0.65	13.57
482.0	60873	17539	1254851	-991.1	125.1	5521.5	-7.33	0.67	13.68
484.0	58876	17790	1265922	-1005.8	126.4	5549.0	-7.42	0.68	13.79
486.0	56849	18045	1277048	-1020.8	127.8	5576.7	-7.52	0.69	13.90
488.0	54793	18302	1288229	-1035.9	129.2	5604.6	-7.62	0.70	14.00
490.0	52706	18561	1299466	-1051.2	130.6	5632.7	-7.71	0.71	14.10
492.0	50588	18824	1310760	-1066.8	132.1	5661.0	-7.78	0.73	14.21
494.0	48439	19090	1322110	-1082.5	133.5	5689.5	-7.91	0.71	14.31
496.0	46258	19358	1333518	-1098.3	135.0	5718.2	-7.96	0.76	14.42
498.0	44045	19629	1344983	-1114.4	136.5	5747.2	-8.11	0.74	14.52
500.0	41800	19904	1356504	-1130.9	137.8	5772.1	-8.30	0.67	11.11
502.0	39522	20181	1368069	-1147.6	139.2	5793.9	-8.37	0.71	10.84
504.0	37210	20461	1379679	-1164.4	140.6	5815.6	-8.41	0.70	10.85
506.0	34864	20743	1391332	-1181.2	142.1	5837.3	-8.42	0.74	10.87
508.0	32485	21029	1403029	-1198.1	143.5	5859.1	-8.49	0.72	10.90
510.0	30072	21318	1414770	-1215.1	145.0	5881.2	-8.52	0.72	10.96
512.0	27625	21609	1426554	-1232.2	146.4	5903.2	-8.52	0.72	11.00
514.0	25143	21903	1438383	-1249.2	147.9	5925.2	-8.52	0.73	11.05

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
516.0	22628	22200	1450255	-1266.2	149.3	5947.4	-8.53	0.73	11.10
518.0	20078	22500	1462172	-1283.4	150.8	5969.7	-8.58	0.74	11.16
520.0	17494	22804	1474134	-1300.6	152.3	5992.0	-8.64	0.75	11.22
522.0	14876	23110	1486140	-1317.9	153.8	6014.5	-8.71	0.75	11.29
524.0	12222	23419	1498192	-1335.4	155.3	6037.2	-8.79	0.75	11.35
526.0	9534	23731	1510289	-1353.1	156.8	6059.9	-8.86	0.75	11.41
528.0	6810	24046	1522432	-1370.9	158.3	6082.8	-8.93	0.76	11.48
530.0	4050	24364	1534621	-1388.8	159.8	6105.8	-9.01	0.77	11.54
532.0	1255	24685	1546855	-1406.9	161.4	6129.0	-9.09	0.77	11.60
534.0	-1577	25010	1559137	-1425.2	162.9	6152.2	-9.16	0.78	11.66
536.0	-4446	25337	1571465	-1443.5	164.5	6175.6	-9.23	0.79	11.73
538.0	-7352	25668	1583839	-1462.1	166.1	6199.2	-9.29	0.79	11.80
540.0	-10294	26001	1596261	-1480.7	167.7	6222.8	-9.35	0.80	11.86
542.0	-13275	26338	1608731	-1499.5	169.3	6246.5	-9.42	0.80	11.92
544.0	-16292	26678	1621248	-1518.4	170.9	6270.4	-9.48	0.82	11.98
546.0	-19348	27022	1633813	-1537.4	172.5	6294.4	-9.54	0.82	12.04
548.0	-22442	27368	1646426	-1556.6	174.0	6318.6	-9.61	0.72	12.11
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
548.220	-22785	27407	1647816	-1558.8	174.1	6321.4	-9.61	0.68	12.11
	S-II/S-IVB SEPARATION COMMAND								
549.000	-24001	27543	1652745	-1565.3	174.7	6322.5	-8.14	0.57	-1.94
550.0	-25568	27718	1659064	-1573.5	175.2	6320.6	-8.15	0.51	-1.93
552.0	-28737	28069	1671707	-1589.8	176.2	6316.7	-8.16	0.48	-1.90
554.0	-31932	28423	1684341	-1606.3	177.2	6315.0	-8.53	0.52	1.11
556.0	-35162	28778	1696977	-1623.6	178.3	6319.7	-8.67	0.58	2.84
558.0	-38427	29136	1709621	-1640.9	179.4	6325.7	-8.61	0.58	3.12
560.0	-41727	29496	1722279	-1658.0	180.5	6332.1	-8.51	0.55	3.21
562.0	-45060	29858	1734950	-1675.2	181.6	6338.5	-8.41	0.52	3.24
564.0	-48427	30222	1747634	-1692.0	182.6	6345.0	-8.39	0.52	3.25
566.0	-51828	30589	1760331	-1708.8	183.7	6351.5	-8.42	0.54	3.27
568.0	-55262	30957	1773040	-1725.7	184.8	6358.2	-8.48	0.56	3.27
570.0	-58731	31328	1785763	-1742.7	185.9	6364.7	-8.52	0.56	3.28
572.0	-62233	31701	1798499	-1759.7	187.1	6371.3	-8.54	0.57	3.27
574.0	-65770	32076	1811248	-1776.9	188.2	6377.8	-8.58	0.59	3.26
576.0	-69341	32454	1824011	-1794.1	189.4	6384.3	-8.62	0.60	3.25
578.0	-72946	32834	1836786	-1811.3	190.6	6390.8	-8.67	0.61	3.24
580.0	-76586	33216	1849574	-1828.7	191.9	6397.3	-8.70	0.62	3.24
582.0	-80261	33601	1862375	-1846.1	193.1	6403.8	-8.72	0.63	3.23
584.0	-83971	33989	1875189	-1863.6	194.4	6410.2	-8.74	0.63	3.22

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	-87715	34379	1888016	-1881.1	195.6	6416.7	-8.77	0.64	3.22
588.0	-91495	34771	1900856	-1898.7	196.9	6423.1	-8.80	0.65	3.22
590.0	-95310	35166	1913708	-1916.3	198.2	6429.5	-8.84	0.65	3.22
592.0	-99160	35564	1926574	-1934.0	199.5	6436.0	-8.87	0.65	3.22
594.0	-103046	35964	1939452	-1951.8	200.8	6442.4	-8.89	0.66	3.21
596.0	-106968	36367	1952343	-1969.6	202.1	6448.8	-8.92	0.66	3.20
598.0	-110925	36773	1965248	-1987.5	203.5	6455.2	-8.95	0.66	3.19
600.0	-114917	37181	1978164	-2005.4	204.8	6461.6	-8.98	0.66	3.18
602.0	-118946	37592	1991094	-2023.4	206.1	6468.0	-9.01	0.67	3.18
604.0	-123011	38006	2004036	-2041.4	207.4	6474.3	-9.03	0.67	3.17
606.0	-127112	38422	2016991	-2059.5	208.8	6480.6	-9.05	0.68	3.16
608.0	-131249	38841	2029959	-2077.6	210.2	6487.0	-9.08	0.68	3.16
610.0	-135423	39263	2042939	-2095.8	211.5	6493.3	-9.11	0.68	3.16
612.0	-139632	39687	2055932	-2114.1	212.9	6499.6	-9.14	0.68	3.17
614.0	-143879	40114	2068937	-2132.4	214.2	6505.9	-9.17	0.69	3.17
616.0	-148162	40544	2081956	-2150.7	215.6	6512.3	-9.19	0.69	3.16
618.0	-152482	40976	2094986	-2169.1	217.0	6518.6	-9.22	0.68	3.15
620.0	-156838	41412	2108030	-2187.6	218.3	6524.9	-9.24	0.68	3.14
622.0	-161232	41850	2121086	-2206.1	219.7	6531.1	-9.27	0.68	3.13
624.0	-165663	42291	2134154	-2224.7	221.1	6537.4	-9.30	0.70	3.12
626.0	-170131	42734	2147235	-2243.3	222.5	6543.6	-9.32	0.70	3.11
628.0	-174636	43181	2160329	-2262.0	223.9	6549.8	-9.35	0.70	3.11
630.0	-179179	43630	2173435	-2280.7	225.3	6556.0	-9.37	0.69	3.11
632.0	-183759	44082	2186553	-2299.4	226.6	6562.2	-9.39	0.69	3.10
634.0	-188377	44536	2199684	-2318.2	228.0	6568.4	-9.41	0.69	3.09
636.0	-193032	44994	2212827	-2337.1	229.4	6574.6	-9.44	0.69	3.08
638.0	-197725	45454	2225982	-2356.0	230.8	6580.8	-9.46	0.69	3.07
640.0	-202456	45917	2239150	-2375.0	232.2	6586.9	-9.49	0.70	3.06
642.0	-207225	46382	2252329	-2394.0	233.6	6593.0	-9.52	0.69	3.05
644.0	-212032	46851	2265522	-2413.0	234.9	6599.1	-9.54	0.69	3.05
646.0	-216877	47322	2278726	-2432.1	236.3	6605.2	-9.56	0.69	3.04
648.0	-221760	47796	2291942	-2451.3	237.7	6611.3	-9.59	0.69	3.04
650.0	-226682	48273	2305171	-2470.5	239.1	6617.3	-9.62	0.70	3.04
652.0	-231642	48753	2318412	-2489.8	240.5	6623.4	-9.65	0.70	3.05
654.0	-236641	49235	2331665	-2509.1	241.9	6629.5	-9.67	0.71	3.04
656.0	-241679	49720	2344930	-2528.5	243.3	6635.6	-9.70	0.71	3.03
658.0	-246755	50209	2358207	-2547.9	244.7	6641.6	-9.73	0.70	3.01
660.0	-251870	50699	2371496	-2567.4	246.2	6647.7	-9.76	0.70	3.00
662.0	-257025	51193	2384798	-2586.9	247.6	6653.7	-9.78	0.70	2.99
664.0	-262218	51690	2398111	-2606.5	249.0	6659.7	-9.78	0.70	2.99
666.0	-267450	52189	2411436	-2626.0	250.4	6665.6	-9.80	0.70	2.99
668.0	-272722	52691	2424774	-2645.7	251.8	6671.6	-9.88	0.70	2.97
670.0	-278033	53196	2438123	-2665.6	253.2	6677.5	-9.99	0.71	2.93

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	-283385	53704	2451483	-2685.7	254.6	6683.3	-10.07	0.72	2.89
674.0	-288776	54214	2464856	-2705.8	256.0	6689.1	-10.09	0.71	2.90
676.0	-294208	54728	2478240	-2726.0	257.5	6694.9	-10.06	0.71	2.91
678.0	-299680	55244	2491636	-2746.1	258.9	6700.7	-10.05	0.72	2.92
680.0	-305192	55763	2505043	-2766.2	260.3	6706.6	-10.05	0.72	2.91
682.0	-310745	56286	2518462	-2786.3	261.8	6712.4	-10.05	0.73	2.92
684.0	-316337	56811	2531892	-2806.4	263.2	6718.2	-10.04	0.72	2.93
686.0	-321970	57338	2545335	-2826.4	264.7	6724.1	-10.03	0.72	2.93
688.0	-327643	57869	2558789	-2846.5	266.1	6730.0	-10.02	0.72	2.93
690.0	-333356	58403	2572255	-2866.5	267.6	6735.8	-10.02	0.72	2.93
692.0	-339109	58939	2585732	-2886.5	269.0	6741.7	-10.01	0.72	2.94
694.0	-344902	59479	2599221	-2906.6	270.5	6747.6	-10.01	0.72	2.94
696.0	-350735	60021	2612722	-2926.6	271.9	6753.4	-10.00	0.72	2.94
698.0	-356608	60566	2626235	-2946.6	273.3	6759.3	-10.00	0.72	2.94
S-IVB 1ST GUIDANCE CUTOFF									
699.330	-360536	60931	2635228	-2959.9	274.3	6763.2	-10.00	0.72	2.95
700.0	-362521	61115	2639759	-2965.5	274.7	6762.6	-7.64	0.51	-3.34
702.0	-368467	61665	2653277	-2980.7	275.7	6755.9	-7.61	0.51	-3.36
704.0	-374444	62217	2666782	-2995.9	276.7	6749.1	-7.60	0.51	-3.39
706.0	-380452	62772	2680274	-3011.1	277.7	6742.3	-7.59	0.51	-3.41
708.0	-386489	63328	2693752	-3026.3	278.7	6735.5	-7.59	0.51	-3.43
PARKING ORBIT INSERTION									
709.330	-390587	63703	2702683	-3036.5	279.4	6731.0	-7.58	0.51	-3.45

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									
-16.968	6373.329	17.087	-5.533	0.0	125.9	388.8	-0.02	-0.01	0.00
-16.0	6373.329	17.208	-5.156	-0.0	125.9	388.8	-0.02	-0.01	0.00
-15.0	6373.329	17.334	-4.768	-0.1	125.9	388.8	-0.02	-0.01	0.00
-14.0	6373.329	17.460	-4.379	-0.1	125.8	388.8	-0.02	-0.01	0.00
-13.0	6373.329	17.586	-3.990	-0.1	125.8	388.8	-0.02	-0.01	0.00
-12.0	6373.329	17.712	-3.601	-0.1	125.8	388.8	-0.02	-0.01	0.00
-11.0	6373.329	17.838	-3.212	-0.2	125.8	388.8	-0.02	-0.01	0.00
-10.0	6373.329	17.963	-2.824	-0.2	125.8	388.8	-0.02	-0.01	0.00
-9.0	6373.329	18.089	-2.435	-0.2	125.8	388.8	-0.02	-0.01	0.00
-8.0	6373.328	18.215	-2.046	-0.2	125.8	388.8	-0.02	-0.01	0.00
-7.0	6373.328	18.341	-1.657	-0.3	125.7	388.8	-0.02	-0.01	0.00
-6.0	6373.328	18.466	-1.268	-0.3	125.7	388.8	-0.02	-0.01	0.00
-5.0	6373.328	18.592	-0.880	-0.3	125.7	388.8	-0.02	-0.01	0.00
-4.0	6373.327	18.718	-0.491	-0.3	125.7	388.8	-0.02	-0.01	0.00
-3.0	6373.327	18.844	-0.102	-0.4	125.7	388.8	-0.02	-0.01	0.00
-2.0	6373.327	18.969	0.287	-0.4	125.7	388.8	-0.02	-0.01	0.00
-1.0	6373.326	19.095	0.676	-0.4	125.7	388.8	-0.02	-0.01	0.00
0.0	6373.326	19.221	1.065	-0.4	125.7	388.8	-0.02	-0.01	0.00
FIRST MOTION									
0.300	6373.326	19.258	1.181	-0.5	125.6	388.8	0.65	-0.01	0.00
START OF TIME BASE 1									
0.600	6373.326	19.296	1.298	-0.0	125.6	388.8	1.71	-0.02	0.02
1.0	6373.327	19.346	1.453	0.6	125.6	388.9	2.08	-0.05	0.02
2.0	6373.328	19.472	1.842	2.7	125.5	388.9	2.16	-0.12	0.02
3.0	6373.332	19.597	2.231	5.0	125.4	388.9	2.21	-0.17	0.01
4.0	6373.338	19.723	2.620	7.2	125.3	388.9	2.26	-0.13	0.01
5.0	6373.346	19.848	3.009	9.6	125.2	388.9	2.32	0.01	0.01
6.0	6373.357	19.973	3.398	12.0	125.3	388.9	2.39	0.12	0.02
7.0	6373.370	20.098	3.787	14.4	125.4	389.0	2.47	0.18	0.02
8.0	6373.386	20.224	4.176	16.9	125.6	389.0	2.55	0.18	0.02
9.0	6373.404	20.350	4.565	19.3	125.7	389.0	2.62	0.16	0.02
10.0	6373.425	20.475	4.954	22.0	125.9	389.0	2.69	0.20	0.02
11.0	6373.448	20.601	5.343	24.7	126.1	389.1	2.75	0.21	0.02
12.0	6373.474	20.728	5.732	27.5	126.3	389.1	2.81	0.13	0.02
13.0	6373.503	20.854	6.121	30.3	126.4	389.1	2.87	0.04	0.02
14.0	6373.535	20.980	6.510	33.3	126.4	389.1	2.93	-0.05	0.01

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	6373.569	21.107	6.899	36.2	126.3	389.1	2.99	-0.04	0.01
16.0	6373.607	21.233	7.288	39.2	126.3	389.2	3.05	0.00	0.06
17.0	6373.648	21.359	7.678	42.3	126.3	389.2	3.10	0.04	0.10
18.0	6373.692	21.486	8.067	45.5	126.4	389.4	3.17	0.06	0.15
19.0	6373.739	21.612	8.456	48.7	126.4	389.5	3.24	0.04	0.19
20.0	6373.789	21.738	8.846	52.0	126.4	389.7	3.32	-0.01	0.22
21.0	6373.843	21.865	9.236	55.3	126.4	390.0	3.39	-0.02	0.27
22.0	6373.900	21.991	9.626	58.7	126.4	390.3	3.46	-0.01	0.32
23.0	6373.960	22.118	10.017	62.2	126.4	390.6	3.53	-0.01	0.38
24.0	6374.024	22.244	10.407	65.8	126.4	391.0	3.61	-0.01	0.43
25.0	6374.092	22.371	10.799	69.4	126.4	391.5	3.68	-0.02	0.49
26.0	6374.163	22.497	11.190	73.2	126.4	392.0	3.75	-0.02	0.56
27.0	6374.238	22.623	11.583	76.9	126.3	392.6	3.83	-0.02	0.62
28.0	6374.317	22.750	11.976	80.8	126.3	393.3	3.91	-0.02	0.69
29.0	6374.400	22.876	12.369	84.8	126.3	394.0	3.99	-0.03	0.77
30.0	6374.487	23.002	12.764	88.8	126.3	394.8	4.07	-0.03	0.86
31.0	6374.578	23.128	13.159	92.9	126.2	395.8	4.15	-0.04	0.96
32.0	6374.673	23.255	13.555	97.1	126.2	396.8	4.23	-0.05	1.06
33.0	6374.772	23.381	13.953	101.4	126.1	397.9	4.32	-0.05	1.17
34.0	6374.875	23.507	14.351	105.7	126.1	399.1	4.40	-0.06	1.29
35.0	6374.983	23.633	14.751	110.1	126.0	400.5	4.48	-0.06	1.41
36.0	6375.096	23.759	15.152	114.7	125.9	401.9	4.55	-0.05	1.54
37.0	6375.213	23.885	15.555	119.2	125.9	403.5	4.63	-0.05	1.66
38.0	6375.334	24.011	15.959	123.9	125.8	405.3	4.71	-0.04	1.79
39.0	6375.461	24.136	16.365	128.7	125.8	407.1	4.80	-0.04	1.93
40.0	6375.592	24.262	16.774	133.5	125.8	409.1	4.88	-0.05	2.08
41.0	6375.728	24.388	17.184	138.4	125.7	411.3	4.96	-0.05	2.23
42.0	6375.868	24.514	17.596	143.4	125.6	413.6	5.05	-0.06	2.39
43.0	6376.014	24.639	18.011	148.5	125.6	416.1	5.13	-0.07	2.55
44.0	6376.165	24.765	18.428	153.7	125.5	418.7	5.21	-0.07	2.72
45.0	6376.322	24.890	18.849	158.9	125.4	421.5	5.29	-0.08	2.90
46.0	6376.483	25.016	19.272	164.2	125.4	424.5	5.37	-0.08	3.08
47.0	6376.650	25.141	19.698	169.6	125.3	427.7	5.44	-0.08	3.26
48.0	6376.823	25.266	20.127	175.1	125.2	431.0	5.52	-0.07	3.46
49.0	6377.001	25.391	20.560	180.7	125.1	434.6	5.59	-0.07	3.66
50.0	6377.184	25.516	20.996	186.3	125.1	438.4	5.66	-0.06	3.87
51.0	6377.373	25.641	21.437	192.0	125.0	442.4	5.72	-0.06	4.09
52.0	6377.568	25.766	21.881	197.7	124.9	446.6	5.79	-0.06	4.32
53.0	6377.769	25.891	22.330	203.5	124.9	451.0	5.85	-0.05	4.55
54.0	6377.975	26.016	22.783	209.4	124.8	455.7	5.91	-0.05	4.78
55.0	6378.187	26.141	23.241	215.4	124.8	460.6	5.97	-0.04	5.02
56.0	6378.406	26.266	23.704	221.4	124.7	465.7	6.03	-0.04	5.25
57.0	6378.630	26.390	24.173	227.4	124.7	471.1	6.08	-0.04	5.50

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	6378.861	26.515	24.647	233.5	124.6	476.7	6.13	-0.05	5.74
59.0	6379.097	26.640	25.126	239.6	124.6	482.6	6.17	-0.05	5.97
60.0	6379.340	26.764	25.612	245.8	124.6	488.6	6.20	-0.03	6.21
61.0	6379.589	26.889	26.103	252.1	124.5	495.0	6.25	-0.01	6.44
62.0	6379.844	27.013	26.602	258.3	124.5	501.5	6.28	0.01	6.67
63.0	6380.106	27.138	27.107	264.6	124.6	508.3	6.31	0.03	6.90
64.0	6380.373	27.262	27.618	270.9	124.6	515.3	6.34	0.05	7.14
65.0	6380.647	27.387	28.137	277.3	124.6	522.6	6.35	0.05	7.40
66.0	6380.928	27.512	28.664	283.6	124.7	530.1	6.34	0.05	7.65
MACH 1									
66.300	6381.013	27.549	28.823	285.5	124.7	532.5	6.34	0.05	7.73
67.0	6381.215	27.636	29.198	289.9	124.7	537.9	6.33	0.05	7.92
68.0	6381.508	27.761	29.740	296.2	124.8	546.0	6.32	0.05	8.19
69.0	6381.807	27.886	30.290	302.6	124.8	554.3	6.31	0.06	8.46
70.0	6382.113	28.011	30.848	308.9	124.9	562.9	6.32	0.10	8.73
71.0	6382.425	28.136	31.416	315.2	125.0	571.8	6.34	0.13	9.01
72.0	6382.743	28.261	31.992	321.6	125.2	580.9	6.36	0.16	9.29
73.0	6383.068	28.386	32.578	327.9	125.3	590.4	6.39	0.17	9.60
74.0	6383.399	28.512	33.173	334.3	125.5	600.1	6.41	0.18	9.91
75.0	6383.737	28.637	33.778	340.7	125.7	610.2	6.43	0.20	10.22
76.0	6384.081	28.763	34.393	347.2	125.9	620.6	6.45	0.19	10.55
77.0	6384.431	28.889	35.019	353.6	126.1	631.3	6.47	0.18	10.86
78.0	6384.788	29.015	35.656	360.1	126.2	642.3	6.48	0.17	11.17
79.0	6385.151	29.141	36.304	366.6	126.4	653.6	6.50	0.15	11.48
80.0	6385.521	29.268	36.963	373.1	126.5	665.3	6.53	0.13	11.78
81.0	6385.897	29.394	37.635	379.6	126.6	677.2	6.55	0.10	12.09
82.0	6386.280	29.521	38.318	386.2	126.7	689.5	6.58	0.07	12.41
MAXIMUM DYNAMIC PRESSURE									
83.000	6386.670	29.648	39.014	392.8	126.8	702.0	6.61	0.04	12.73
84.0	6387.066	29.775	39.722	399.4	126.8	714.9	6.64	0.03	13.04
85.0	6387.469	29.902	40.444	406.1	126.9	728.1	6.67	0.03	13.34
86.0	6387.878	30.028	41.178	412.7	126.9	741.6	6.70	0.03	13.62
87.0	6388.294	30.155	41.927	419.5	126.9	755.3	6.74	0.02	13.90
88.0	6388.717	30.282	42.689	426.2	126.9	769.3	6.78	0.00	14.16
89.0	6389.147	30.409	43.466	433.0	126.9	783.7	6.82	-0.03	14.43
90.0	6389.583	30.536	44.257	439.9	126.8	798.2	6.87	-0.06	14.72
91.0	6390.026	30.663	45.062	446.7	126.8	813.1	6.90	-0.10	15.04
92.0	6390.477	30.790	45.883	453.6	126.7	828.3	6.92	-0.13	15.37
93.0	6390.934	30.916	46.719	460.5	126.5	843.9	6.93	-0.15	15.71

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
94.0	6391.398	31.043	47.571	467.5	126.4	859.8	6.92	-0.15	16.07
95.0	6391.869	31.169	48.439	474.4	126.2	876.0	6.91	-0.14	16.42
96.0	6392.346	31.295	49.323	481.3	126.1	892.6	6.90	-0.12	16.77
97.0	6392.831	31.421	50.224	488.2	126.0	909.5	6.87	-0.10	17.11
98.0	6393.323	31.547	51.142	495.0	125.9	926.8	6.85	-0.10	17.46
99.0	6393.821	31.673	52.078	501.9	125.8	944.5	6.83	-0.10	17.81
100.0	6394.327	31.799	53.031	508.7	125.7	962.4	6.80	-0.11	18.16
101.0	6394.839	31.924	54.003	515.5	125.6	980.8	6.78	-0.11	18.52
102.0	6395.357	32.050	54.993	522.2	125.4	999.5	6.76	-0.12	18.88
103.0	6395.883	32.175	56.002	529.0	125.3	1018.6	6.74	-0.12	19.25
104.0	6396.415	32.300	57.030	535.7	125.2	1038.0	6.72	-0.11	19.61
105.0	6396.954	32.426	58.078	542.4	125.1	1057.8	6.69	-0.10	19.97
106.0	6397.500	32.551	59.146	549.1	125.0	1077.9	6.66	-0.08	20.33
107.0	6398.053	32.676	60.234	555.7	124.9	1098.4	6.63	-0.06	20.70
108.0	6398.612	32.801	61.343	562.3	124.9	1119.3	6.61	-0.02	21.06
109.0	6399.177	32.925	62.473	568.9	124.9	1140.6	6.58	0.02	21.41
110.0	6399.749	33.050	63.624	575.5	124.9	1162.2	6.58	0.05	21.77
111.0	6400.328	33.175	64.797	582.1	125.0	1184.1	6.59	0.10	22.11
112.0	6400.914	33.300	65.992	588.7	125.1	1206.4	6.62	0.13	22.43
113.0	6401.506	33.426	67.210	595.3	125.2	1229.0	6.66	0.13	22.75
114.0	6402.104	33.551	68.450	602.0	125.4	1251.9	6.71	0.11	23.07
115.0	6402.710	33.676	69.714	608.7	125.4	1275.1	6.77	0.06	23.37
116.0	6403.322	33.802	71.001	615.5	125.4	1298.6	6.82	-0.01	23.69
117.0	6403.941	33.927	72.311	622.4	125.4	1322.5	6.85	-0.08	24.04
118.0	6404.566	34.053	73.646	629.2	125.3	1346.7	6.85	-0.14	24.41
119.0	6405.199	34.178	75.005	636.0	125.2	1371.3	6.83	-0.18	24.82
120.0	6405.839	34.303	76.388	642.8	125.0	1396.4	6.78	-0.21	25.24
121.0	6406.485	34.428	77.798	649.5	124.8	1421.8	6.70	-0.21	25.67
122.0	6407.138	34.552	79.232	656.2	124.5	1447.7	6.62	-0.21	26.13
123.0	6407.797	34.677	80.693	662.8	124.3	1474.1	6.55	-0.20	26.57
124.0	6408.463	34.801	82.181	669.3	124.1	1500.9	6.49	-0.18	27.01
125.0	6409.136	34.925	83.695	675.8	124.0	1528.1	6.45	-0.17	27.44
126.0	6409.815	35.049	85.237	682.2	123.8	1555.7	6.44	-0.15	27.87
127.0	6410.500	35.173	86.807	688.7	123.6	1583.8	6.45	-0.14	28.29
128.0	6411.192	35.296	88.405	695.1	123.5	1612.3	6.48	-0.09	28.72
129.0	6411.890	35.420	90.031	701.6	123.4	1641.3	6.51	-0.11	29.15
130.0	6412.595	35.543	91.687	708.1	123.3	1670.6	6.55	-0.07	29.58
131.0	6413.307	35.666	93.373	714.7	123.3	1700.4	6.58	-0.06	30.01
132.0	6414.025	35.789	95.088	721.3	123.2	1730.7	6.61	-0.04	30.44
133.0	6414.749	35.913	96.834	727.9	123.2	1761.3	6.64	-0.04	30.88
134.0	6415.481	36.036	98.612	734.5	123.1	1792.4	6.67	-0.07	31.31
135.0	6416.218	36.159	100.420	741.2	123.0	1823.9	6.70	-0.07	31.74
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
135.200	6416.367	36.183	100.786	742.6	123.0	1830.3	6.70	-0.07	31.82

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	6416.962	36.282	102.258	746.3	123.0	1853.2	3.31	-0.03	26.21
137.0	6417.710	36.405	104.124	749.6	123.0	1879.0	3.32	-0.00	25.88
138.0	6418.460	36.528	106.015	752.9	123.0	1905.0	3.33	0.06	26.11
139.0	6419.216	36.651	107.935	756.3	123.0	1931.3	3.34	0.06	26.46
140.0	6419.974	36.774	109.880	759.6	123.1	1957.9	3.35	0.09	26.81
141.0	6420.735	36.897	111.851	762.9	123.2	1984.9	3.37	0.12	27.16
142.0	6421.499	37.020	113.850	766.3	123.3	2012.3	3.39	0.07	27.50
143.0	6422.268	37.144	115.876	769.7	123.4	2039.9	3.41	0.07	27.88
144.0	6423.039	37.267	117.930	773.1	123.4	2068.4	3.44	0.04	28.27
145.0	6423.814	37.390	120.013	776.5	123.4	2096.9	3.48	0.02	28.64
146.0	6424.593	37.514	122.124	780.0	123.5	2125.7	3.52	-0.00	29.02
147.0	6425.375	37.637	124.265	783.5	123.4	2154.9	3.55	-0.01	29.43
148.0	6426.161	37.761	126.434	787.1	123.4	2184.5	3.59	-0.02	29.81
149.0	6426.950	37.884	128.634	790.7	123.4	2214.5	3.63	-0.02	30.20
150.0	6427.743	38.008	130.864	794.3	123.4	2244.9	3.66	-0.02	30.59
151.0	6428.539	38.131	133.124	798.0	123.3	2275.7	3.71	-0.03	31.00
152.0	6429.340	38.254	135.415	801.7	123.3	2307.0	3.74	-0.03	31.42
153.0	6430.144	38.378	137.738	805.5	123.3	2338.6	3.77	-0.03	31.85
154.0	6430.951	38.501	140.093	809.3	123.3	2370.7	3.82	-0.02	32.30
155.0	6431.763	38.624	142.480	813.1	123.2	2403.2	3.86	-0.03	32.76
156.0	6432.578	38.747	144.899	817.0	123.2	2436.2	3.90	-0.01	33.23
157.0	6433.397	38.871	147.352	820.9	123.2	2469.7	3.95	-0.01	33.69
158.0	6434.221	38.994	149.839	824.9	123.2	2503.6	3.99	0.02	34.16
159.0	6435.048	39.117	152.359	828.9	123.2	2538.0	4.04	-0.01	34.62
160.0	6435.879	39.240	154.915	832.9	123.2	2572.8	4.08	-0.02	35.09
161.0	6436.715	39.363	157.505	837.0	123.2	2608.2	4.13	-0.02	35.56
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
161.630	6437.246	39.441	159.164	839.6	123.1	2630.6	4.15	-0.07	35.83
162.0	6437.557	39.486	160.138	839.4	123.1	2639.3	-4.09	-0.03	13.71
	S-IC/S-II SEPARATION COMMAND								
162.300	6437.808	39.523	160.929	837.5	123.1	2641.6	-9.44	-0.01	1.23
164.0	6439.216	39.733	165.415	821.6	123.0	2641.8	-9.40	-0.01	0.18
166.0	6440.844	39.979	170.707	803.8	122.9	2645.0	-7.46	-0.10	5.31
168.0	6442.436	40.224	176.007	789.3	122.8	2656.3	-7.20	-0.05	5.73
170.0	6444.000	40.470	181.332	775.1	122.6	2669.0	-6.83	-0.08	6.84
172.0	6445.537	40.715	186.684	761.5	122.5	2682.7	-6.79	-0.10	6.90
174.0	6447.046	40.960	192.064	747.9	122.4	2696.6	-6.76	-0.05	6.98
176.0	6448.529	41.204	197.471	734.5	122.2	2710.7	-6.72	-0.07	7.04
178.0	6449.984	41.449	202.907	721.0	122.1	2724.9	-6.69	-0.06	7.08

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
180.0	6451.413	41.693	208.371	707.7	122.0	2739.1	-6.66	-0.06	7.12
182.0	6452.815	41.937	213.863	694.4	121.8	2753.3	-6.64	-0.06	7.15
184.0	6454.191	42.180	219.384	681.1	121.7	2767.7	-6.62	-0.06	7.18
186.0	6455.540	42.423	224.934	667.9	121.6	2782.1	-6.61	-0.06	7.21
188.0	6456.862	42.666	230.512	654.7	121.4	2796.5	-6.59	-0.06	7.23
190.0	6458.158	42.909	236.120	641.5	121.3	2811.0	-6.57	-0.06	7.26
192.0	6459.428	43.152	241.756	628.4	121.2	2825.5	-6.55	-0.06	7.29
194.0	6460.672	43.394	247.422	615.3	121.1	2840.2	-6.53	-0.06	7.33
196.0	6461.890	43.636	253.117	602.3	120.9	2854.9	-6.51	-0.06	7.37
198.0	6463.081	43.878	258.842	589.3	120.8	2869.7	-6.45	-0.06	7.41
200.0	6464.247	44.119	264.596	576.4	120.7	2884.5	-6.46	-0.06	7.47
202.0	6465.387	44.360	270.380	563.4	120.6	2899.5	-6.51	-0.06	7.53
204.0	6466.500	44.601	276.194	550.4	120.4	2914.6	-6.48	-0.07	7.55
206.0	6467.588	44.842	282.038	537.6	120.3	2929.7	-6.31	-0.08	7.51
208.0	6468.651	45.082	287.913	525.3	120.1	2944.6	-5.97	-0.10	7.40
210.0	6469.690	45.322	293.817	513.6	119.9	2959.3	-5.65	-0.11	7.28
212.0	6470.706	45.562	299.750	502.5	119.6	2973.8	-5.44	-0.12	7.21
214.0	6471.700	45.801	305.712	491.8	119.4	2988.2	-5.32	-0.12	7.18
216.0	6472.673	46.039	311.702	481.2	119.2	3002.5	-5.28	-0.11	7.18
218.0	6473.625	46.277	317.722	470.6	118.9	3016.9	-5.24	-0.11	7.19
220.0	6474.556	46.515	323.770	460.2	118.7	3031.3	-5.22	-0.10	7.23
222.0	6475.466	46.752	329.847	449.7	118.5	3045.8	-5.23	-0.10	7.27
224.0	6476.354	46.989	335.954	439.2	118.3	3060.4	-5.24	-0.11	7.31
226.0	6477.222	47.225	342.089	428.7	118.1	3075.1	-5.25	-0.12	7.35
228.0	6478.069	47.461	348.254	418.2	117.8	3089.8	-5.26	-0.12	7.39
230.0	6478.895	47.697	354.449	407.7	117.6	3104.7	-5.27	-0.11	7.43
232.0	6479.700	47.932	360.673	397.1	117.4	3119.6	-5.28	-0.10	7.47
234.0	6480.484	48.166	366.927	386.6	117.1	3134.6	-5.28	-0.10	7.51
236.0	6481.246	48.400	373.211	376.0	116.9	3149.6	-5.28	-0.11	7.54
238.0	6481.988	48.634	379.525	365.4	116.7	3164.7	-5.29	-0.11	7.58
240.0	6482.708	48.867	385.870	354.8	116.5	3179.9	-5.30	-0.11	7.62
242.0	6483.407	49.100	392.245	344.2	116.3	3195.2	-5.31	-0.11	7.67
244.0	6484.085	49.332	398.651	333.5	116.1	3210.6	-5.31	-0.11	7.71
246.0	6484.741	49.564	405.088	322.9	115.8	3226.1	-5.32	-0.11	7.75
248.0	6485.376	49.796	411.555	312.2	115.6	3241.6	-5.33	-0.11	7.79
250.0	6485.990	50.027	418.054	301.5	115.4	3257.3	-5.34	-0.10	7.84
252.0	6486.582	50.257	424.585	290.8	115.2	3273.0	-5.35	-0.10	7.88
254.0	6487.153	50.487	431.146	280.1	115.0	3288.8	-5.35	-0.10	7.93
256.0	6487.703	50.717	437.740	269.4	114.8	3304.7	-5.36	-0.10	7.97
258.0	6488.231	50.947	444.365	258.6	114.6	3320.7	-5.37	-0.10	8.01
260.0	6488.737	51.176	451.023	247.9	114.4	3336.7	-5.38	-0.10	8.05
262.0	6489.222	51.404	457.712	237.1	114.2	3352.9	-5.39	-0.11	8.10
264.0	6489.685	51.632	464.434	226.3	113.9	3369.2	-5.41	-0.11	8.16

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
266.0	6490.127	51.860	471.189	215.4	113.7	3385.5	-5.42	-0.10	8.21
268.0	6490.547	52.087	477.976	204.6	113.5	3402.0	-5.42	-0.10	8.24
270.0	6490.946	52.314	484.797	193.7	113.3	3418.5	-5.43	-0.11	8.29
272.0	6491.322	52.540	491.651	182.9	113.1	3435.2	-5.44	-0.10	8.35
274.0	6491.677	52.766	498.538	172.0	112.9	3452.0	-5.46	-0.10	8.42
276.0	6492.010	52.992	505.458	161.0	112.7	3468.8	-5.47	-0.10	8.46
278.0	6492.321	53.217	512.413	150.1	112.5	3485.8	-5.48	-0.10	8.49
280.0	6492.610	53.442	519.402	139.1	112.3	3502.9	-5.49	-0.10	8.55
282.0	6492.877	53.666	526.425	128.1	112.0	3520.0	-5.51	-0.10	8.61
284.0	6493.122	53.890	533.482	117.0	111.8	3537.3	-5.52	-0.10	8.67
286.0	6493.345	54.114	540.574	105.9	111.6	3554.7	-5.54	-0.10	8.71
288.0	6493.546	54.337	547.701	94.9	111.5	3572.2	-5.54	-0.09	8.75
290.0	6493.725	54.559	554.863	83.7	111.3	3589.7	-5.56	-0.09	8.80
292.0	6493.881	54.782	562.060	72.6	111.1	3607.4	-5.57	-0.09	8.85
294.0	6494.015	55.004	569.292	61.4	110.9	3625.1	-5.59	-0.10	8.91
296.0	6494.127	55.225	576.560	50.2	110.7	3643.0	-5.60	-0.09	8.98
298.0	6494.216	55.447	583.864	39.0	110.5	3661.1	-5.62	-0.08	9.03
300.0	6494.283	55.667	591.205	27.7	110.4	3679.1	-5.63	-0.09	9.07
302.0	6494.327	55.888	598.581	16.5	110.2	3697.3	-5.64	-0.10	9.11
304.0	6494.348	56.108	605.994	5.1	110.0	3715.6	-5.65	-0.10	9.17
306.0	6494.347	56.328	613.444	-6.2	109.8	3734.0	-5.68	-0.09	9.24
308.0	6494.324	56.547	620.930	-17.6	109.6	3752.6	-5.70	-0.09	9.29
310.0	6494.277	56.766	628.454	-29.0	109.4	3771.2	-5.72	-0.10	9.35
312.0	6494.208	56.985	636.015	-40.5	109.2	3790.0	-5.73	-0.10	9.40
314.0	6494.115	57.203	643.614	-52.0	109.0	3808.8	-5.75	-0.10	9.46
316.0	6494.000	57.421	651.251	-63.5	108.8	3827.8	-5.77	-0.10	9.52
318.0	6493.861	57.638	658.925	-75.1	108.6	3846.9	-5.79	-0.10	9.59
320.0	6493.699	57.855	666.638	-86.7	108.4	3866.2	-5.80	-0.09	9.65
322.0	6493.514	58.071	674.390	-98.3	108.2	3885.5	-5.82	-0.09	9.70
324.0	6493.306	58.287	682.180	-110.0	108.0	3905.0	-5.84	-0.10	9.75
326.0	6493.075	58.503	690.010	-121.7	107.8	3924.6	-5.86	-0.10	9.81
328.0	6492.819	58.719	697.879	-133.4	107.6	3944.3	-5.88	-0.10	9.88
330.0	6492.541	58.934	705.787	-145.3	107.4	3964.1	-5.91	-0.09	9.95
332.0	6492.238	59.148	713.735	-157.1	107.2	3984.0	-5.93	-0.09	10.00
334.0	6491.912	59.362	721.723	-169.0	107.0	4004.1	-5.95	-0.09	10.06
336.0	6491.562	59.576	729.752	-180.9	106.8	4024.3	-5.97	-0.09	10.14
338.0	6491.189	59.790	737.821	-192.9	106.7	4044.7	-5.99	-0.09	10.21
340.0	6490.791	60.003	745.931	-204.9	106.5	4065.2	-6.02	-0.09	10.26
342.0	6490.369	60.216	754.081	-217.0	106.3	4085.7	-6.04	-0.08	10.32
344.0	6489.923	60.428	762.274	-229.1	106.1	4106.5	-6.07	-0.08	10.39
346.0	6489.452	60.640	770.507	-241.3	105.9	4127.3	-6.10	-0.08	10.47
348.0	6488.957	60.852	778.783	-253.5	105.8	4148.3	-6.11	-0.09	10.54
350.0	6488.438	61.063	787.101	-265.8	105.6	4169.5	-6.13	-0.08	10.60

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
352.0	6487.894	61.274	795.461	-278.1	105.4	4190.7	-6.17	-0.08	10.67
354.0	6487.326	61.485	803.864	-290.5	105.3	4212.2	-6.21	-0.08	10.75
356.0	6486.732	61.695	812.310	-303.0	105.1	4233.7	-6.23	-0.08	10.82
358.0	6486.114	61.905	820.799	-315.4	104.9	4255.5	-6.24	-0.09	10.89
360.0	6485.470	62.115	829.332	-328.0	104.7	4277.3	-6.27	-0.09	10.96
362.0	6484.802	62.324	837.908	-340.6	104.6	4299.3	-6.30	-0.08	11.03
364.0	6484.108	62.533	846.529	-353.2	104.4	4321.5	-6.34	-0.08	11.10
366.0	6483.389	62.742	855.194	-365.9	104.2	4343.7	-6.37	-0.09	11.18
368.0	6482.644	62.950	863.904	-378.7	104.0	4366.2	-6.40	-0.09	11.26
370.0	6481.874	63.158	872.659	-391.6	103.8	4388.8	-6.44	-0.10	11.35
372.0	6481.078	63.365	881.459	-404.5	103.6	4411.6	-6.47	-0.09	11.42
374.0	6480.256	63.572	890.305	-417.5	103.4	4434.5	-6.49	-0.09	11.47
376.0	6479.408	63.779	899.197	-430.5	103.3	4457.4	-6.53	-0.09	11.49
378.0	6478.534	63.985	908.135	-443.6	103.1	4480.5	-6.57	-0.09	11.60
380.0	6477.634	64.191	917.119	-456.8	102.9	4503.9	-6.62	-0.09	11.76
382.0	6476.707	64.397	926.151	-470.1	102.7	4527.5	-6.65	-0.08	11.89
384.0	6475.753	64.602	935.230	-483.4	102.6	4551.4	-6.68	-0.08	11.95
386.0	6474.773	64.807	944.356	-496.8	102.4	4575.3	-6.70	-0.07	11.97
388.0	6473.766	65.012	953.531	-510.3	102.3	4599.3	-6.73	-0.07	12.05
390.0	6472.732	65.216	962.754	-523.8	102.1	4623.5	-6.77	-0.07	12.14
392.0	6471.670	65.420	972.025	-537.4	102.0	4647.9	-6.83	-0.08	12.22
394.0	6470.582	65.624	981.346	-551.1	101.8	4672.4	-6.87	-0.11	12.32
396.0	6469.466	65.827	990.715	-564.9	101.5	4697.2	-6.92	-0.11	12.42
398.0	6468.322	66.030	1000.134	-578.8	101.3	4722.1	-6.96	-0.08	12.52
400.0	6467.151	66.233	1009.604	-592.8	101.2	4747.2	-7.00	-0.06	12.61
402.0	6465.951	66.435	1019.123	-606.9	101.1	4772.5	-7.04	-0.06	12.69
404.0	6464.723	66.637	1028.694	-621.0	100.9	4798.0	-7.08	-0.07	12.77
406.0	6463.467	66.839	1038.316	-635.2	100.8	4823.7	-7.13	-0.07	12.87
408.0	6462.182	67.040	1047.989	-649.6	100.6	4849.5	-7.19	-0.08	12.97
410.0	6460.868	67.241	1057.714	-664.0	100.4	4875.5	-7.24	-0.08	13.02
412.0	6459.526	67.442	1067.491	-678.5	100.3	4901.6	-7.28	-0.08	13.09
414.0	6458.154	67.642	1077.320	-693.2	100.1	4927.9	-7.32	-0.07	13.23
416.0	6456.753	67.842	1087.203	-707.9	100.0	4954.6	-7.36	-0.06	13.41
418.0	6455.323	68.042	1097.139	-722.6	99.8	4981.5	-7.41	-0.07	13.55
420.0	6453.863	68.242	1107.129	-737.5	99.7	5008.7	-7.47	-0.07	13.62
422.0	6452.373	68.441	1117.174	-752.5	99.5	5036.0	-7.53	-0.08	13.67
424.0	6450.852	68.640	1127.273	-767.7	99.4	5063.5	-7.58	-0.08	13.77
426.0	6449.302	68.839	1137.428	-782.9	99.2	5091.1	-7.63	-0.08	13.87
428.0	6447.721	69.037	1147.638	-798.2	99.1	5119.0	-7.68	-0.08	13.99
430.0	6446.109	69.235	1157.904	-813.6	98.9	5147.1	-7.73	-0.08	14.11
432.0	6444.466	69.433	1168.226	-829.2	98.8	5175.4	-7.79	-0.07	14.22
434.0	6442.792	69.630	1178.605	-844.8	98.6	5203.9	-7.85	-0.07	14.32
436.0	6441.087	69.827	1189.042	-860.6	98.5	5232.7	-7.91	-0.06	14.44

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
438.0	6439.350	70.024	1199.536	-876.5	98.3	5261.7	-7.97	-0.06	14.56
440.0	6437.581	70.220	1210.089	-892.5	98.2	5291.0	-8.02	-0.06	14.68
442.0	6435.780	70.417	1220.700	-908.6	98.1	5320.4	-8.08	-0.07	14.80
444.0	6433.946	70.613	1231.371	-924.9	97.9	5350.2	-8.14	-0.08	14.92
446.0	6432.080	70.808	1242.101	-941.2	97.7	5380.1	-8.21	-0.09	15.05
448.0	6430.181	71.004	1252.892	-957.8	97.6	5410.4	-8.28	-0.08	15.17
450.0	6428.249	71.199	1263.743	-974.4	97.4	5440.8	-8.35	-0.07	15.29
452.0	6426.284	71.393	1274.655	-991.2	97.2	5471.5	-8.41	-0.07	15.42
454.0	6424.284	71.588	1285.629	-1008.1	97.1	5502.5	-8.48	-0.08	15.55
456.0	6422.251	71.782	1296.665	-1025.2	96.9	5533.7	-8.57	-0.05	15.67
458.0	6420.184	71.975	1307.764	-1042.4	96.8	5565.2	-8.63	-0.06	15.80
460.0	6418.082	72.169	1318.927	-1059.7	96.7	5596.9	-8.75	-0.09	15.92
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
460.620	6417.443	72.228	1322.295	-1065.0	96.6	5606.5	-8.76	-0.10	15.96
462.0	6415.945	72.362	1330.149	-1077.3	96.5	5624.6	-8.81	-0.08	12.49
464.0	6413.773	72.555	1341.424	-1095.0	96.3	5649.7	-8.88	-0.17	12.54
466.0	6411.564	72.747	1352.749	-1112.8	95.9	5674.8	-8.90	-0.14	12.60
468.0	6409.321	72.939	1364.124	-1130.5	95.7	5700.1	-8.87	-0.14	12.68
470.0	6407.042	73.130	1375.550	-1148.0	95.4	5725.5	-8.65	-0.10	12.76
472.0	6404.729	73.320	1387.027	-1165.2	95.2	5751.4	-8.49	-0.10	12.85
474.0	6402.382	73.511	1398.556	-1182.0	95.0	5777.2	-8.31	-0.11	12.92
476.0	6400.001	73.700	1410.136	-1198.6	94.8	5803.1	-8.26	-0.11	13.00
478.0	6397.587	73.890	1421.768	-1215.1	94.6	5829.2	-8.29	-0.10	13.10
480.0	6395.140	74.079	1433.453	-1231.8	94.4	5855.5	-8.36	-0.09	13.21
482.0	6392.660	74.267	1445.190	-1248.6	94.2	5882.0	-8.44	-0.08	13.31
484.0	6390.146	74.455	1456.981	-1265.6	94.0	5908.8	-8.53	-0.08	13.42
486.0	6387.597	74.643	1468.826	-1282.8	93.9	5935.7	-8.64	-0.07	13.52
488.0	6385.014	74.831	1480.724	-1300.2	93.7	5962.9	-8.74	-0.07	13.62
490.0	6382.397	75.018	1492.677	-1317.8	93.6	5990.2	-8.84	-0.07	13.72
492.0	6379.743	75.205	1504.685	-1335.6	93.4	6017.7	-8.92	-0.06	13.82
494.0	6377.054	75.392	1516.748	-1353.6	93.3	6045.4	-9.06	-0.09	13.91
496.0	6374.329	75.578	1528.867	-1371.9	93.2	6073.4	-9.12	-0.03	14.01
498.0	6371.567	75.764	1541.042	-1390.3	93.0	6101.5	-9.28	-0.07	14.11
500.0	6368.768	75.950	1553.270	-1409.0	92.9	6125.6	-9.36	-0.08	10.69
502.0	6365.931	76.136	1565.542	-1427.8	92.8	6146.6	-9.43	-0.04	10.41
504.0	6363.056	76.321	1577.856	-1446.8	92.7	6167.4	-9.47	-0.05	10.42
506.0	6360.144	76.507	1590.212	-1465.7	92.6	6188.3	-9.49	-0.02	10.44
508.0	6357.193	76.692	1602.610	-1484.8	92.5	6209.2	-9.56	-0.03	10.46
510.0	6354.205	76.877	1615.050	-1504.0	92.4	6230.4	-9.61	-0.04	10.51
512.0	6351.177	77.061	1627.532	-1523.2	92.3	6251.5	-9.61	-0.05	10.55
514.0	6348.112	77.246	1640.056	-1542.5	92.2	6272.7	-9.61	-0.05	10.60

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
516.0	6345.007	77.430	1652.623	-1561.7	92.1	6293.9	-9.63	-0.04	10.65
518.0	6341.865	77.615	1665.232	-1581.1	92.0	6315.3	-9.68	-0.04	10.70
520.0	6338.683	77.799	1677.884	-1600.5	92.0	6336.7	-9.75	-0.04	10.76
522.0	6335.463	77.982	1690.579	-1620.1	91.9	6358.3	-9.83	-0.04	10.81
524.0	6332.203	78.166	1703.317	-1639.9	91.8	6380.0	-9.91	-0.05	10.87
526.0	6328.903	78.349	1716.099	-1659.8	91.7	6401.8	-9.99	-0.05	10.93
528.0	6325.563	78.533	1728.924	-1679.9	91.6	6423.7	-10.06	-0.05	10.99
530.0	6322.183	78.716	1741.794	-1700.1	91.5	6445.8	-10.15	-0.05	11.04
532.0	6318.763	78.898	1754.708	-1720.5	91.3	6467.9	-10.23	-0.05	11.10
534.0	6315.301	79.081	1767.666	-1741.1	91.2	6490.2	-10.31	-0.05	11.16
536.0	6311.798	79.263	1780.668	-1761.8	91.1	6512.6	-10.39	-0.04	11.22
538.0	6308.254	79.446	1793.716	-1782.6	91.0	6535.1	-10.46	-0.04	11.28
540.0	6304.668	79.628	1806.809	-1803.6	90.9	6557.7	-10.52	-0.04	11.33
542.0	6301.039	79.809	1819.947	-1824.8	90.9	6580.3	-10.60	-0.04	11.39
544.0	6297.369	79.991	1833.130	-1846.1	90.8	6603.2	-10.66	-0.03	11.45
546.0	6293.655	80.172	1846.360	-1867.5	90.7	6626.1	-10.73	-0.03	11.50
548.0	6289.898	80.354	1859.635	-1889.0	90.4	6649.2	-10.80	-0.15	11.56
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
548.220	6289.483	80.374	1861.098	-1891.5	90.4	6651.8	-10.81	-0.19	11.56
	S-II/S-IVB SEPARATION COMMAND								
549.000	6288.006	80.444	1866.285	-1898.7	90.5	6652.6	-8.86	-0.00	-2.43
550.0	6286.106	80.535	1872.934	-1907.6	90.4	6650.2	-8.86	-0.06	-2.42
552.0	6282.267	80.715	1886.235	-1925.3	90.2	6645.3	-8.87	-0.09	-2.40
554.0	6278.400	80.896	1899.525	-1943.4	90.0	6642.6	-9.34	-0.12	0.60
556.0	6274.493	81.075	1912.815	-1962.5	89.8	6646.3	-9.55	-0.10	2.31
558.0	6270.549	81.255	1926.111	-1981.6	89.6	6651.3	-9.50	-0.10	2.59
560.0	6266.566	81.434	1939.420	-2000.5	89.3	6656.6	-9.40	-0.14	2.68
562.0	6262.546	81.612	1952.738	-2019.4	89.0	6662.0	-9.30	-0.17	2.71
564.0	6258.489	81.790	1966.068	-2038.0	88.6	6667.4	-9.28	-0.16	2.72
566.0	6254.394	81.966	1979.408	-2056.6	88.3	6672.8	-9.32	-0.15	2.74
568.0	6250.262	82.143	1992.760	-2075.4	88.0	6678.4	-9.38	-0.13	2.73
570.0	6246.092	82.319	2006.122	-2094.2	87.7	6683.9	-9.42	-0.13	2.73
572.0	6241.885	82.494	2019.495	-2113.1	87.5	6689.4	-9.44	-0.12	2.72
574.0	6237.640	82.669	2032.879	-2132.0	87.2	6694.8	-9.48	-0.11	2.71
576.0	6233.357	82.843	2046.275	-2151.0	87.0	6700.2	-9.52	-0.09	2.69
578.0	6229.036	83.017	2059.680	-2170.1	86.8	6705.6	-9.57	-0.09	2.68
580.0	6224.676	83.190	2073.097	-2189.3	86.7	6711.0	-9.60	-0.08	2.67
582.0	6220.278	83.363	2086.524	-2208.6	86.5	6716.3	-9.63	-0.07	2.66
584.0	6215.842	83.536	2099.962	-2227.9	86.4	6721.6	-9.65	-0.07	2.65

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	6211.367	83.709	2113.411	-2247.2	86.2	6726.9	-9.67	-0.07	2.64
588.0	6206.853	83.881	2126.870	-2266.6	86.1	6732.2	-9.71	-0.06	2.63
590.0	6202.300	84.053	2140.340	-2286.1	85.9	6737.5	-9.75	-0.06	2.64
592.0	6197.708	84.225	2153.820	-2305.7	85.8	6742.8	-9.78	-0.06	2.63
594.0	6193.078	84.396	2167.311	-2325.3	85.7	6748.0	-9.80	-0.06	2.62
596.0	6188.407	84.567	2180.812	-2344.9	85.5	6753.2	-9.83	-0.06	2.60
598.0	6183.698	84.738	2194.324	-2364.7	85.4	6758.4	-9.86	-0.06	2.58
600.0	6178.949	84.909	2207.846	-2384.4	85.3	6763.6	-9.89	-0.06	2.57
602.0	6174.160	85.079	2221.378	-2404.3	85.2	6768.7	-9.92	-0.06	2.57
604.0	6169.332	85.250	2234.921	-2424.2	85.0	6773.9	-9.94	-0.05	2.56
606.0	6164.463	85.420	2248.473	-2444.1	84.9	6779.0	-9.96	-0.05	2.54
608.0	6159.555	85.589	2262.036	-2464.1	84.8	6784.1	-9.99	-0.05	2.53
610.0	6154.607	85.759	2275.610	-2484.1	84.7	6789.1	-10.02	-0.05	2.53
612.0	6149.619	85.928	2289.193	-2504.2	84.6	6794.2	-10.05	-0.05	2.53
614.0	6144.590	86.097	2302.786	-2524.4	84.5	6799.3	-10.09	-0.04	2.53
616.0	6139.521	86.266	2316.390	-2544.6	84.4	6804.3	-10.11	-0.05	2.51
618.0	6134.412	86.435	2330.004	-2564.9	84.3	6809.3	-10.14	-0.06	2.50
620.0	6129.262	86.603	2343.627	-2585.2	84.1	6814.3	-10.16	-0.06	2.49
622.0	6124.071	86.771	2357.261	-2605.6	84.0	6819.3	-10.19	-0.06	2.47
624.0	6118.839	86.939	2370.904	-2626.0	83.9	6824.2	-10.22	-0.05	2.45
626.0	6113.567	87.107	2384.558	-2646.5	83.8	6829.1	-10.24	-0.04	2.44
628.0	6108.254	87.274	2398.221	-2667.0	83.7	6834.0	-10.27	-0.05	2.44
630.0	6102.899	87.442	2411.894	-2687.6	83.6	6838.9	-10.30	-0.05	2.43
632.0	6097.503	87.609	2425.576	-2708.2	83.4	6843.8	-10.32	-0.06	2.42
634.0	6092.066	87.775	2439.269	-2728.9	83.3	6848.6	-10.34	-0.07	2.40
636.0	6086.587	87.942	2452.971	-2749.6	83.2	6853.4	-10.36	-0.07	2.39
638.0	6081.067	88.108	2466.682	-2770.4	83.0	6858.2	-10.39	-0.06	2.38
640.0	6075.506	88.274	2480.403	-2791.3	82.9	6862.9	-10.42	-0.06	2.36
642.0	6069.902	88.439	2494.134	-2812.1	82.7	6867.6	-10.44	-0.06	2.35
644.0	6064.257	88.605	2507.874	-2833.1	82.6	6872.3	-10.47	-0.07	2.34
646.0	6058.570	88.770	2521.623	-2854.1	82.5	6877.0	-10.49	-0.07	2.33
648.0	6052.841	88.935	2535.382	-2875.1	82.3	6881.7	-10.52	-0.07	2.32
650.0	6047.069	89.099	2549.150	-2896.2	82.1	6886.3	-10.55	-0.07	2.32
652.0	6041.256	89.263	2562.927	-2917.4	82.0	6891.0	-10.58	-0.07	2.32
654.0	6035.400	89.427	2576.714	-2938.6	81.9	6895.6	-10.61	-0.06	2.31
656.0	6029.502	89.591	2590.510	-2959.8	81.7	6900.2	-10.63	-0.07	2.29
658.0	6023.561	89.754	2604.315	-2981.1	81.6	6904.8	-10.66	-0.07	2.27
660.0	6017.577	89.917	2618.129	-3002.5	81.4	6909.3	-10.69	-0.07	2.26
662.0	6011.550	90.080	2631.952	-3024.0	81.3	6913.8	-10.71	-0.07	2.24
664.0	6005.481	90.242	2645.784	-3045.4	81.1	6918.3	-10.72	-0.08	2.24
666.0	5999.369	90.404	2659.625	-3066.9	80.9	6922.8	-10.74	-0.08	2.23
668.0	5993.214	90.565	2673.475	-3088.5	80.7	6927.3	-10.81	-0.08	2.20
670.0	5987.015	90.727	2687.334	-3110.2	80.6	6931.6	-10.92	-0.07	2.15

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	5980.773	90.988	2701.202	-3132.2	80.4	6935.9	-11.00	-0.07	2.11
674.0	5974.486	91.048	2715.078	-3154.2	80.2	6940.1	-11.02	-0.08	2.11
676.0	5968.156	91.209	2728.962	-3176.3	80.1	6944.4	-11.00	-0.08	2.12
678.0	5961.781	91.369	2742.855	-3198.3	79.9	6948.6	-10.98	-0.08	2.12
680.0	5955.362	91.528	2756.757	-3220.3	79.7	6952.9	-10.99	-0.07	2.12
682.0	5948.900	91.688	2770.667	-3242.3	79.6	6957.1	-10.98	-0.07	2.12
684.0	5942.393	91.847	2784.585	-3264.3	79.4	6961.4	-10.98	-0.08	2.12
686.0	5935.843	92.005	2798.512	-3286.2	79.3	6965.6	-10.97	-0.08	2.12
688.0	5929.248	92.164	2812.448	-3308.2	79.1	6969.9	-10.96	-0.08	2.12
690.0	5922.610	92.322	2826.392	-3330.2	78.9	6974.1	-10.96	-0.08	2.12
692.0	5915.928	92.479	2840.344	-3352.1	78.7	6978.4	-10.95	-0.08	2.12
694.0	5909.202	92.637	2854.305	-3374.0	78.6	6982.6	-10.95	-0.08	2.12
696.0	5902.432	92.794	2868.275	-3396.0	78.4	6986.8	-10.95	-0.09	2.12
698.0	5895.618	92.950	2882.253	-3417.9	78.2	6991.1	-10.95	-0.09	2.12
S-IVB 1ST GUIDANCE CUTOFF									
699.330	5891.062	93.054	2891.553	-3432.5	78.1	6993.9	-10.94	-0.09	2.12
700.0	5888.761	93.106	2896.238	-3438.6	78.0	6992.8	-8.31	-0.11	-4.07
702.0	5881.867	93.262	2910.215	-3455.2	77.7	6984.6	-8.28	-0.11	-4.09
704.0	5874.940	93.417	2924.176	-3471.8	77.5	6976.4	-8.27	-0.11	-4.12
706.0	5867.979	93.572	2938.121	-3488.3	77.3	6968.2	-8.26	-0.11	-4.14
708.0	5860.986	93.726	2952.049	-3504.9	77.0	6959.9	-8.25	-0.11	-4.17
PARKING ORBIT INSERTION									
709.330	5856.252	93.832	2961.276	-3516.0	76.9	6954.4	-8.24	-0.11	-4.18

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE

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
	GUIDANCE REFERENCE RELEASE										
-16.968	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-16.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-15.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-14.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-13.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-12.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-11.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-10.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-9.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-8.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-7.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-6.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-5.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-4.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-3.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-2.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
-1.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
0.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
	FIRST MOTION										
0.300	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	59
	START OF TIME BASE 1										
0.600	6373.355	-80.6041	28.4470	106.50	89.40	0.5	90.00	0.06	408.6	0	60
1.0	6373.356	-80.6041	28.4470	30.52	89.27	1.1	90.00	0.15	408.6	0	61
2.0	6373.358	-80.6041	28.4470	358.16	88.30	3.2	89.99	0.45	408.6	0	63
3.0	6373.362	-80.6041	28.4470	351.17	87.58	5.6	89.97	0.78	408.6	0	67
4.0	6373.369	-80.6041	28.4470	349.26	87.25	7.8	89.95	1.09	408.6	1	73
5.0	6373.378	-80.6041	28.4470	349.42	87.53	10.2	89.94	1.43	408.7	1	82
6.0	6373.389	-80.6041	28.4470	352.28	88.34	12.6	89.95	1.77	408.8	1	94
7.0	6373.403	-80.6041	28.4470	3.00	89.16	15.1	89.97	2.11	408.9	2	108
8.0	6373.419	-80.6041	28.4470	57.20	89.68	17.6	89.99	2.46	409.1	2	124
9.0	6373.438	-80.6041	28.4470	123.49	89.49	20.0	90.01	2.80	409.3	2	142
10.0	6373.459	-80.6041	28.4470	139.97	89.13	22.7	90.04	3.18	409.5	2	164
11.0	6373.484	-80.6041	28.4470	146.54	88.77	25.5	90.06	3.56	409.7	1	188
12.0	6373.510	-80.6041	28.4470	148.89	88.54	28.2	90.09	3.95	410.0	1	215
13.0	6373.540	-80.6041	28.4470	149.71	88.52	31.1	90.10	4.35	410.2	1	245
14.0	6373.573	-80.6041	28.4470	149.25	88.65	34.1	90.10	4.77	410.5	1	277

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	FF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
15.0	6373.608	-80.6041	28.4470	148.23	88.93	37.1	90.09	5.18	410.7	2	313
16.0	6373.647	-80.6041	28.4469	146.80	88.94	40.1	90.09	5.60	411.0	3	351
17.0	6373.688	-80.6041	28.4469	142.86	88.95	43.2	90.09	6.03	411.4	4	393
18.0	6373.733	-80.6041	28.4469	136.71	88.90	46.4	90.09	6.46	411.9	4	438
19.0	6373.781	-80.6041	28.4469	130.20	88.84	49.6	90.09	6.91	412.4	5	486
20.0	6373.833	-80.6041	28.4469	122.71	88.78	53.0	90.09	7.36	413.0	6	537
21.0	6373.887	-80.6041	28.4469	114.44	88.69	56.3	90.07	7.82	413.7	8	592
22.0	6373.945	-80.6041	28.4469	107.07	88.57	59.8	90.06	8.29	414.4	9	650
23.0	6374.007	-80.6040	28.4469	100.52	88.39	63.3	90.05	8.77	415.3	10	711
24.0	6374.072	-80.6040	28.4469	95.05	88.19	66.9	90.03	9.25	416.2	12	776
25.0	6374.141	-80.6040	28.4469	90.74	87.95	70.6	90.00	9.74	417.2	14	845
26.0	6374.213	-80.6040	28.4469	87.27	87.68	74.4	89.98	10.23	418.3	17	917
27.0	6374.289	-80.6039	28.4469	84.49	87.40	78.2	89.95	10.73	419.6	20	994
28.0	6374.369	-80.6039	28.4469	82.27	87.09	82.1	89.92	11.23	420.9	23	1074
29.0	6374.453	-80.6039	28.4469	80.41	86.76	86.1	89.89	11.75	422.4	28	1158
30.0	6374.541	-80.6038	28.4469	78.85	86.41	90.2	89.85	12.26	423.9	33	1246
31.0	6374.633	-80.6037	28.4469	77.56	86.03	94.4	89.81	12.78	425.7	38	1338
32.0	6374.729	-80.6037	28.4470	76.45	85.63	98.7	89.76	13.31	427.5	45	1434
33.0	6374.830	-80.6036	28.4470	75.54	85.21	103.0	89.70	13.83	429.5	53	1535
34.0	6374.935	-80.6035	28.4470	74.77	84.77	107.5	89.65	14.36	431.7	62	1639
35.0	6375.044	-80.6034	28.4470	74.14	84.30	112.1	89.58	14.89	434.0	72	1749
36.0	6375.158	-80.6033	28.4470	73.62	83.82	116.8	89.52	15.42	436.5	84	1863
37.0	6375.276	-80.6031	28.4471	73.21	83.32	121.5	89.45	15.95	439.2	97	1981
38.0	6375.399	-80.6030	28.4471	72.89	82.80	126.4	89.37	16.48	442.1	112	2104
39.0	6375.527	-80.6028	28.4472	72.64	82.27	131.4	89.29	17.01	445.1	128	2232
40.0	6375.660	-80.6027	28.4472	72.43	81.73	136.5	89.21	17.53	448.4	147	2364
41.0	6375.797	-80.6025	28.4473	72.25	81.17	141.7	89.12	18.05	451.8	167	2502
42.0	6375.940	-80.6022	28.4473	72.08	80.59	147.0	89.02	18.57	455.4	190	2645
43.0	6376.087	-80.6020	28.4474	71.92	80.00	152.5	88.92	19.08	459.3	215	2792
44.0	6376.240	-80.6017	28.4475	71.79	79.40	158.1	88.81	19.59	463.4	243	2945
45.0	6376.398	-80.6014	28.4476	71.66	78.79	163.8	88.69	20.09	467.6	273	3103
46.0	6376.562	-80.6011	28.4477	71.56	78.17	169.6	88.57	20.59	472.1	306	3266
47.0	6376.730	-80.6007	28.4478	71.48	77.53	175.6	88.45	21.07	476.9	343	3435
48.0	6376.904	-80.6004	28.4479	71.41	76.89	181.7	88.32	21.55	481.8	382	3609
49.0	6377.084	-80.5999	28.4480	71.36	76.23	188.0	88.18	22.02	487.0	425	3789
50.0	6377.270	-80.5995	28.4481	71.33	75.56	194.4	88.05	22.47	492.5	472	3975
51.0	6377.461	-80.5990	28.4483	71.31	74.88	200.9	87.90	22.91	498.2	522	4166
52.0	6377.658	-80.5985	28.4484	71.30	74.19	207.6	87.75	23.35	504.1	576	4363
53.0	6377.860	-80.5979	28.4486	71.30	73.49	214.5	87.60	23.76	510.3	635	4565
54.0	6378.069	-80.5973	28.4488	71.31	72.78	221.5	87.45	24.17	516.8	698	4774
55.0	6378.283	-80.5966	28.4490	71.32	72.07	228.7	87.29	24.55	523.5	766	4989
56.0	6378.504	-80.5959	28.4492	71.34	71.35	236.0	87.12	24.93	530.5	839	5209
57.0	6378.731	-80.5952	28.4494	71.35	70.62	243.5	86.95	25.29	537.7	917	5436

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	6378.963	-80.5944	28.4497	71.36	69.89	251.2	86.78	25.63	545.3	1000	5669
59.0	6379.202	-80.5935	28.4499	71.38	69.16	259.0	86.61	25.96	553.0	1089	5908
60.0	6379.449	-80.5926	28.4502	71.41	68.43	267.0	86.43	26.27	561.0	1184	6153
61.0	6379.699	-80.5916	28.4505	71.43	67.69	275.2	86.25	26.57	569.2	1286	6405
62.0	6379.957	-80.5906	28.4508	71.47	66.97	283.5	86.08	26.85	577.7	1393	6663
63.0	6380.221	-80.5895	28.4511	71.52	66.24	292.0	85.90	27.12	586.4	1507	6927
64.0	6380.491	-80.5883	28.4515	71.57	65.52	300.7	85.73	27.37	595.4	1628	7197
65.0	6380.768	-80.5870	28.4518	71.61	64.80	309.6	85.55	27.60	604.6	1756	7474
66.0	6381.052	-80.5857	28.4522	71.66	64.08	318.6	85.37	27.81	614.0	1892	7758
	MACH 1										
66.300	6381.138	-80.5853	28.4523	71.67	63.86	321.3	85.32	27.88	616.9	1934	7844
67.0	6381.341	-80.5843	28.4526	71.70	63.35	327.7	85.19	28.01	623.7	2035	8048
68.0	6381.637	-80.5829	28.4530	71.74	62.63	337.1	85.01	28.19	633.6	2185	8344
69.0	6381.940	-80.5813	28.4535	71.79	61.91	346.6	84.83	28.36	643.7	2344	8647
70.0	6382.249	-80.5797	28.4539	71.83	61.19	356.3	84.66	28.50	654.1	2511	8956
71.0	6382.564	-80.5780	28.4544	71.88	60.46	366.2	84.48	28.64	664.8	2687	9271
72.0	6382.886	-80.5762	28.4550	71.94	59.75	376.3	84.31	28.75	675.7	2872	9593
73.0	6383.214	-80.5743	28.4555	72.00	59.03	386.6	84.13	28.86	686.9	3066	9922
74.0	6383.549	-80.5723	28.4561	72.05	58.32	397.2	83.96	28.95	698.3	3269	10256
75.0	6383.890	-80.5703	28.4566	72.11	57.61	408.0	83.79	29.02	710.1	3483	10598
76.0	6384.238	-80.5681	28.4573	72.16	56.90	419.1	83.62	29.09	722.2	3706	10946
77.0	6384.592	-80.5658	28.4579	72.21	56.19	430.4	83.45	29.14	734.5	3940	11300
78.0	6384.953	-80.5634	28.4586	72.25	55.49	442.0	83.28	29.18	747.1	4184	11662
79.0	6385.321	-80.5610	28.4593	72.28	54.80	453.9	83.11	29.21	760.0	4440	12029
80.0	6385.695	-80.5584	28.4600	72.31	54.11	466.0	82.93	29.23	773.2	4706	12404
81.0	6386.076	-80.5556	28.4608	72.33	53.43	478.4	82.76	29.24	786.6	4985	12785
82.0	6386.464	-80.5528	28.4616	72.34	52.75	491.0	82.58	29.24	800.4	5275	13173
	MAXIMUM DYNAMIC PRESSURE										
83.000	6386.858	-80.5499	28.4624	72.35	52.10	504.0	82.41	29.23	814.4	5578	13567
84.0	6387.259	-80.5468	28.4632	72.35	51.44	517.2	82.24	29.21	828.7	5893	13969
85.0	6387.667	-80.5436	28.4641	72.36	50.80	530.7	82.06	29.19	843.3	6222	14377
86.0	6388.081	-80.5403	28.4651	72.36	50.17	544.5	81.89	29.16	858.1	6563	14792
87.0	6388.503	-80.5368	28.4660	72.36	49.55	558.5	81.72	29.12	873.2	6918	15214
88.0	6388.931	-80.5332	28.4670	72.36	48.94	572.9	81.56	29.08	888.6	7286	15642
89.0	6389.367	-80.5295	28.4681	72.35	48.34	587.5	81.39	29.04	904.3	7668	16078
90.0	6389.809	-80.5256	28.4692	72.35	47.76	602.4	81.22	28.99	920.2	8065	16521
91.0	6390.259	-80.5216	28.4703	72.33	47.19	617.6	81.06	28.94	936.4	8476	16971
92.0	6390.715	-80.5175	28.4714	72.32	46.63	633.1	80.89	28.88	952.9	8902	17428
93.0	6391.179	-80.5132	28.4727	72.30	46.07	648.9	80.73	28.81	969.7	9344	17892

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
94.0	6391.650	-80.5087	28.4739	72.29	45.52	665.0	80.57	28.74	986.8	9800	18363
95.0	6392.128	-80.5041	28.4752	72.27	44.98	681.4	80.41	28.66	1004.2	10273	18842
96.0	6392.613	-80.4994	28.4765	72.26	44.44	698.1	80.26	28.57	1021.9	10761	19327
97.0	6393.106	-80.4944	28.4779	72.25	43.91	715.1	80.11	28.48	1039.9	11267	19820
98.0	6393.605	-80.4893	28.4793	72.25	43.38	732.4	79.96	28.38	1058.3	11789	20320
99.0	6394.112	-80.4841	28.4808	72.24	42.86	750.0	79.82	28.28	1076.9	12328	20827
100.0	6394.625	-80.4787	28.4824	72.24	42.34	768.0	79.67	28.17	1095.8	12885	21341
101.0	6395.146	-80.4731	28.4839	72.23	41.83	786.2	79.53	28.05	1115.1	13460	21862
102.0	6395.674	-80.4673	28.4856	72.23	41.33	804.7	79.40	27.93	1134.7	14053	22391
103.0	6396.209	-80.4613	28.4872	72.22	40.83	823.6	79.26	27.80	1154.6	14664	22926
104.0	6396.751	-80.4552	28.4890	72.22	40.34	842.8	79.13	27.67	1174.8	15295	23469
105.0	6397.300	-80.4489	28.4907	72.22	39.85	862.4	79.00	27.54	1195.3	15944	24019
106.0	6397.856	-80.4423	28.4926	72.22	39.37	882.2	78.88	27.40	1216.2	16614	24575
107.0	6398.420	-80.4356	28.4945	72.22	38.90	902.4	78.76	27.26	1237.3	17303	25139
108.0	6398.990	-80.4287	28.4964	72.23	38.43	922.9	78.64	27.11	1258.9	18013	25710
109.0	6399.567	-80.4216	28.4984	72.24	37.97	943.8	78.53	26.96	1280.7	18744	26288
110.0	6400.151	-80.4143	28.5005	72.25	37.52	965.0	78.42	26.81	1302.9	19495	26872
111.0	6400.742	-80.4067	28.5026	72.26	37.07	986.5	78.32	26.66	1325.3	20268	27464
112.0	6401.340	-80.3990	28.5048	72.28	36.64	1008.4	78.22	26.51	1348.1	21063	28063
113.0	6401.946	-80.3910	28.5070	72.29	36.21	1030.6	78.12	26.36	1371.3	21880	28669
114.0	6402.558	-80.3829	28.5093	72.31	35.80	1053.2	78.03	26.21	1394.7	22719	29282
115.0	6403.178	-80.3745	28.5117	72.32	35.39	1076.1	77.93	26.06	1418.5	23580	29903
116.0	6403.805	-80.3658	28.5141	72.33	35.00	1099.3	77.84	25.92	1442.6	24465	30530
117.0	6404.439	-80.3570	28.5166	72.34	34.62	1122.9	77.75	25.78	1467.0	25373	31165
118.0	6405.080	-80.3479	28.5191	72.34	34.24	1146.9	77.65	25.63	1491.7	26304	31808
119.0	6405.729	-80.3386	28.5217	72.34	33.87	1171.2	77.56	25.49	1516.8	27260	32457
120.0	6406.386	-80.3290	28.5244	72.34	33.50	1195.9	77.46	25.34	1542.3	28240	33115
121.0	6407.050	-80.3193	28.5271	72.33	33.14	1221.0	77.37	25.19	1568.1	29244	33779
122.0	6407.721	-80.3092	28.5299	72.33	32.77	1246.4	77.28	25.04	1594.4	30274	34451
123.0	6408.399	-80.2989	28.5328	72.33	32.41	1272.3	77.19	24.88	1621.0	31329	35130
124.0	6409.085	-80.2884	28.5358	72.33	32.05	1298.6	77.11	24.72	1648.0	32410	35817
125.0	6409.777	-80.2776	28.5388	72.33	31.70	1325.2	77.02	24.56	1675.4	33518	36511
126.0	6410.477	-80.2665	28.5419	72.33	31.35	1352.3	76.94	24.40	1703.3	34653	37212
127.0	6411.184	-80.2552	28.5450	72.34	31.00	1379.8	76.86	24.23	1731.5	35815	37920
128.0	6411.899	-80.2436	28.5483	72.34	30.67	1407.7	76.79	24.07	1760.1	37004	38635
129.0	6412.620	-80.2317	28.5516	72.35	30.33	1436.1	76.72	23.91	1789.2	38222	39358
130.0	6413.349	-80.2196	28.5550	72.36	30.01	1464.9	76.65	23.76	1818.7	39468	40088
131.0	6414.086	-80.2071	28.5585	72.37	29.69	1494.1	76.58	23.60	1848.6	40743	40825
132.0	6414.829	-80.1944	28.5620	72.38	29.38	1523.8	76.51	23.44	1879.0	42047	41570
133.0	6415.581	-80.1814	28.5657	72.39	29.07	1553.9	76.45	23.29	1909.8	43382	42322
134.0	6416.340	-80.1681	28.5694	72.40	28.77	1584.5	76.39	23.14	1941.0	44746	43083
135.0	6417.106	-80.1545	28.5732	72.40	28.48	1615.5	76.33	22.99	1972.6	46141	43850
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
135.200	6417.260	-80.1517	28.5739	72.41	28.42	1621.8	76.32	22.96	1979.0	46425	44005

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
136.0	6417.879	-80.1406	28.5770	72.41	28.18	1643.9	76.27	22.82	2001.6	47566	44625
137.0	6418.657	-80.1264	28.5810	72.43	27.90	1668.4	76.23	22.66	2026.8	49017	45404
138.0	6419.440	-80.1120	28.5850	72.44	27.62	1693.0	76.19	22.49	2052.1	50492	46188
139.0	6420.228	-80.0973	28.5891	72.45	27.35	1718.1	76.15	22.33	2077.7	51996	46977
140.0	6421.019	-80.0824	28.5932	72.47	27.08	1743.4	76.11	22.16	2103.7	53524	47770
141.0	6421.815	-80.0672	28.5974	72.49	26.82	1769.2	76.08	22.00	2130.1	55078	48567
142.0	6422.615	-80.0518	28.6017	72.50	26.55	1795.3	76.04	21.85	2156.8	56659	49368
143.0	6423.420	-80.0361	28.6060	72.52	26.30	1821.7	76.01	21.69	2183.8	58266	50175
144.0	6424.230	-80.0201	28.6104	72.53	26.04	1849.0	75.97	21.53	2211.6	59900	50986
145.0	6425.044	-80.0039	28.6149	72.54	25.79	1876.3	75.94	21.38	2239.5	61562	51801
146.0	6425.863	-79.9874	28.6195	72.56	25.54	1903.9	75.90	21.22	2267.7	63252	52622
147.0	6426.687	-79.9706	28.6241	72.57	25.30	1932.0	75.87	21.08	2296.3	64970	53447
148.0	6427.515	-79.9535	28.6288	72.58	25.07	1960.5	75.83	20.93	2325.3	66716	54277
149.0	6428.349	-79.9362	28.6336	72.59	24.83	1989.4	75.80	20.78	2354.7	68492	55112
150.0	6429.187	-79.9185	28.6384	72.61	24.61	2019.7	75.77	20.64	2384.5	70296	55952
151.0	6430.031	-79.9006	28.6434	72.62	24.38	2048.5	75.73	20.50	2414.8	72131	56797
152.0	6430.879	-79.8824	28.6484	72.63	24.15	2078.7	75.70	20.36	2445.4	73995	57647
153.0	6431.733	-79.8639	28.6534	72.64	23.95	2109.3	75.67	20.22	2476.5	75890	58503
154.0	6432.592	-79.8450	28.6586	72.66	23.73	2140.4	75.64	20.09	2508.0	77816	59363
155.0	6433.457	-79.8259	28.6638	72.67	23.52	2171.9	75.61	19.95	2540.0	79773	60229
156.0	6434.327	-79.8064	28.6692	72.68	23.32	2203.9	75.58	19.82	2572.5	81761	61101
157.0	6435.202	-79.7867	28.6746	72.70	23.11	2236.4	75.56	19.69	2605.4	83782	61978
158.0	6436.083	-79.7666	28.6801	72.71	22.92	2269.4	75.53	19.56	2638.8	85835	62861
159.0	6436.970	-79.7462	28.6856	72.72	22.72	2302.9	75.50	19.44	2672.7	87922	63750
160.0	6437.863	-79.7254	28.6913	72.74	22.53	2336.9	75.48	19.31	2707.1	90042	64644
161.0	6438.762	-79.7043	28.6970	72.75	22.34	2371.3	75.45	19.19	2741.9	92196	65545
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
161.630	6439.335	-79.6908	28.7007	72.76	22.22	2393.3	75.44	19.11	2764.1	93579	66119
162.0	6439.669	-79.6828	28.7029	72.77	22.15	2401.3	75.43	19.06	2772.3	94391	66455
	S-IC/S-II SEPARATION COMMAND										
162.300	6439.940	-79.6764	28.7046	72.77	22.10	2402.7	75.44	19.02	2773.9	95050	66726
164.0	6441.463	-79.6398	28.7146	72.79	21.79	2397.4	75.46	18.74	2769.3	98790	68252
166.0	6443.230	-79.5966	28.7263	72.82	21.42	2394.3	75.48	18.42	2767.2	103203	70023
168.0	6444.966	-79.5533	28.7380	72.85	21.06	2400.1	75.49	18.11	2773.8	107621	71762
170.0	6446.678	-79.5098	28.7498	72.88	20.69	2407.4	75.50	17.80	2782.0	112062	73478
172.0	6448.368	-79.4660	28.7616	72.90	20.34	2416.0	75.51	17.50	2791.4	116528	75172
174.0	6450.037	-79.4220	28.7735	72.93	19.98	2424.9	75.52	17.21	2801.1	121019	76844
176.0	6451.683	-79.3777	28.7854	72.96	19.63	2434.1	75.53	16.91	2811.1	125535	78494
178.0	6453.308	-79.3331	28.7974	72.99	19.29	2443.5	75.54	16.62	2821.3	130078	80123

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
180.0	6454.912	-79.2883	28.8094	73.01	18.95	2453.1	75.56	16.34	2831.7	134646	81731
182.0	6456.494	-79.2432	28.8214	73.04	18.61	2462.9	75.57	16.05	2842.2	139241	83317
184.0	6458.056	-79.1978	28.8335	73.07	18.28	2472.9	75.58	15.77	2852.9	143862	84882
186.0	6459.597	-79.1522	28.8457	73.10	17.95	2483.0	75.59	15.50	2863.7	148510	86427
188.0	6461.117	-79.1063	28.8579	73.13	17.62	2493.3	75.60	15.22	2874.7	153185	87951
190.0	6462.616	-79.0601	28.8701	73.16	17.30	2503.8	75.62	14.95	2885.8	157886	89454
192.0	6464.095	-79.0136	28.8825	73.19	16.98	2514.5	75.63	14.68	2897.1	162614	90937
194.0	6465.554	-78.9669	28.8948	73.22	16.67	2525.3	75.64	14.42	2908.6	167370	92399
196.0	6466.992	-78.9199	28.9072	73.25	16.36	2536.4	75.65	14.16	2920.2	172153	93842
198.0	6468.411	-78.8726	28.9197	73.28	16.05	2547.6	75.67	13.90	2932.0	176964	95265
200.0	6469.810	-78.8250	28.9322	73.31	15.75	2559.0	75.68	13.65	2944.0	181802	96668
202.0	6471.190	-78.7771	28.9447	73.34	15.45	2570.7	75.70	13.39	2956.2	186668	98051
204.0	6472.550	-78.7289	28.9573	73.37	15.15	2582.5	75.71	13.14	2968.6	191563	99415
206.0	6473.890	-78.6804	28.9700	73.40	14.86	2594.4	75.72	12.90	2981.0	196486	100760
208.0	6475.212	-78.6317	28.9827	73.42	14.59	2606.4	75.74	12.67	2993.5	201437	102086
210.0	6476.517	-78.5826	28.9955	73.45	14.33	2618.4	75.75	12.45	3005.9	206416	103394
212.0	6477.805	-78.5333	29.0083	73.48	14.09	2630.4	75.76	12.25	3018.3	211422	104687
214.0	6479.079	-78.4837	29.0211	73.51	13.86	2642.4	75.78	12.06	3030.7	216456	105964
216.0	6480.337	-78.4338	29.0340	73.54	13.64	2654.4	75.79	11.87	3043.2	221516	107227
218.0	6481.582	-78.3836	29.0470	73.57	13.42	2666.6	75.81	11.68	3055.7	226603	108476
220.0	6482.813	-78.3331	29.0600	73.60	13.20	2678.9	75.82	11.50	3068.4	231718	109711
222.0	6484.030	-78.2824	29.0730	73.63	12.99	2691.3	75.84	11.32	3081.1	236859	110932
224.0	6485.232	-78.2314	29.0861	73.66	12.78	2703.9	75.85	11.14	3094.1	242028	112139
226.0	6486.422	-78.1801	29.0992	73.69	12.57	2716.6	75.87	10.97	3107.1	247225	113332
228.0	6487.597	-78.1285	29.1124	73.71	12.36	2729.4	75.88	10.79	3120.2	252449	114512
230.0	6488.759	-78.0766	29.1257	73.74	12.16	2742.4	75.90	10.62	3133.5	257701	115678
232.0	6489.907	-78.0244	29.1389	73.77	11.95	2755.5	75.91	10.45	3146.9	262981	116830
234.0	6491.042	-77.9719	29.1523	73.81	11.75	2768.7	75.93	10.28	3160.5	268289	117969
236.0	6492.163	-77.9192	29.1656	73.84	11.56	2782.0	75.95	10.11	3174.1	273626	119095
238.0	6493.271	-77.8661	29.1790	73.87	11.36	2795.5	75.96	9.95	3187.9	278992	120207
240.0	6494.366	-77.8127	29.1925	73.90	11.17	2809.1	75.98	9.78	3201.8	284387	121306
242.0	6495.447	-77.7591	29.2060	73.93	10.97	2822.9	76.00	9.62	3215.8	289810	122392
244.0	6496.515	-77.7051	29.2196	73.96	10.78	2836.8	76.02	9.46	3230.0	295263	123464
246.0	6497.570	-77.6508	29.2332	73.99	10.60	2850.8	76.03	9.30	3244.3	300745	124523
248.0	6498.612	-77.5962	29.2468	74.02	10.41	2864.9	76.05	9.14	3258.7	306257	125570
250.0	6499.641	-77.5413	29.2605	74.06	10.23	2879.2	76.07	8.99	3273.2	311798	126603
252.0	6500.657	-77.4861	29.2743	74.09	10.05	2893.7	76.09	8.83	3287.9	317370	127624
254.0	6501.661	-77.4306	29.2881	74.12	9.87	2908.2	76.11	8.68	3302.7	322972	128631
256.0	6502.651	-77.3747	29.3019	74.16	9.69	2922.9	76.13	8.53	3317.6	328604	129626
258.0	6503.629	-77.3186	29.3158	74.19	9.52	2937.8	76.15	8.38	3332.7	334267	130609
260.0	6504.594	-77.2621	29.3297	74.22	9.35	2952.7	76.17	8.24	3347.9	339960	131578
262.0	6505.547	-77.2052	29.3437	74.26	9.18	2967.8	76.19	8.09	3363.2	345685	132536
264.0	6506.488	-77.1481	29.3577	74.29	9.01	2983.1	76.21	7.95	3378.7	351441	133481

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
266.0	6507.416	-77.0906	29.3718	74.32	8.84	2998.5	76.23	7.80	3394.3	357228	134413
268.0	6508.331	-77.0328	29.3859	74.36	8.68	3014.0	76.25	7.66	3410.0	363047	135333
270.0	6509.235	-76.9747	29.4001	74.39	8.52	3029.7	76.27	7.53	3425.9	368898	136241
272.0	6510.126	-76.9162	29.4143	74.43	8.36	3045.5	76.29	7.39	3441.9	374782	137137
274.0	6511.006	-76.8574	29.4286	74.46	8.20	3061.5	76.31	7.25	3458.1	380697	138021
276.0	6511.873	-76.7982	29.4429	74.50	8.04	3077.6	76.33	7.12	3474.4	386646	138893
278.0	6512.728	-76.7387	29.4572	74.53	7.89	3093.9	76.35	6.99	3490.8	392627	139753
280.0	6513.572	-76.6788	29.4717	74.57	7.74	3110.3	76.38	6.86	3507.4	398641	140601
282.0	6514.404	-76.6186	29.4861	74.60	7.59	3126.9	76.40	6.73	3524.1	404688	141438
284.0	6515.224	-76.5581	29.5006	74.64	7.44	3143.6	76.42	6.60	3541.0	410770	142263
286.0	6516.033	-76.4971	29.5152	74.67	7.30	3160.4	76.44	6.48	3558.0	416885	143076
288.0	6516.830	-76.4359	29.5298	74.71	7.15	3177.4	76.47	6.35	3575.2	423034	143878
290.0	6517.615	-76.3742	29.5444	74.75	7.01	3194.5	76.49	6.23	3592.4	429217	144668
292.0	6518.390	-76.3122	29.5591	74.78	6.87	3211.8	76.52	6.11	3609.8	435435	145447
294.0	6519.153	-76.2499	29.5738	74.82	6.73	3229.2	76.54	5.99	3627.4	441687	146215
296.0	6519.904	-76.1871	29.5886	74.86	6.60	3246.7	76.57	5.88	3645.1	447974	146971
298.0	6520.645	-76.1240	29.6034	74.90	6.47	3264.5	76.59	5.76	3662.9	454297	147717
300.0	6521.375	-76.0605	29.6183	74.93	6.33	3282.3	76.62	5.65	3680.9	460655	148451
302.0	6522.094	-75.9967	29.6332	74.97	6.20	3300.3	76.64	5.53	3699.0	467049	149175
304.0	6522.801	-75.9324	29.6482	75.01	6.08	3318.4	76.67	5.42	3717.3	473479	149888
306.0	6523.499	-75.8678	29.6632	75.05	5.95	3336.7	76.69	5.31	3735.7	479945	150590
308.0	6524.185	-75.8028	29.6783	75.09	5.83	3355.1	76.72	5.21	3754.2	486447	151281
310.0	6524.861	-75.7374	29.6934	75.13	5.70	3373.7	76.74	5.10	3772.9	492986	151962
312.0	6525.526	-75.6716	29.7086	75.17	5.58	3392.4	76.77	4.99	3791.8	499563	152632
314.0	6526.181	-75.6054	29.7238	75.20	5.46	3411.3	76.80	4.89	3810.7	506176	153292
316.0	6526.826	-75.5388	29.7390	75.24	5.35	3430.4	76.82	4.79	3829.9	512827	153941
318.0	6527.460	-75.4718	29.7543	75.28	5.23	3449.6	76.85	4.69	3849.2	519515	154581
320.0	6528.084	-75.4045	29.7696	75.32	5.12	3468.9	76.88	4.59	3868.7	526242	155210
322.0	6528.699	-75.3367	29.7850	75.36	5.01	3488.5	76.91	4.49	3888.3	533007	155829
324.0	6529.303	-75.2685	29.8005	75.40	4.90	3508.1	76.94	4.40	3908.0	539811	156438
326.0	6529.897	-75.1998	29.8160	75.44	4.79	3527.9	76.96	4.30	3927.9	546653	157037
328.0	6530.481	-75.1308	29.8315	75.49	4.69	3547.9	76.99	4.21	3948.0	553535	157627
330.0	6531.056	-75.0613	29.8471	75.53	4.58	3568.0	77.02	4.12	3968.2	560456	158206
332.0	6531.621	-74.9915	29.8627	75.57	4.48	3588.3	77.05	4.03	3988.6	567417	158776
334.0	6532.177	-74.9212	29.8783	75.61	4.38	3608.8	77.08	3.94	4009.1	574418	159337
336.0	6532.723	-74.8504	29.8940	75.65	4.28	3629.4	77.11	3.85	4029.8	581459	159888
338.0	6533.260	-74.7793	29.9098	75.69	4.18	3650.2	77.14	3.77	4050.7	588541	160430
340.0	6533.787	-74.7077	29.9256	75.74	4.08	3671.2	77.17	3.68	4071.7	595663	160963
342.0	6534.306	-74.6356	29.9414	75.78	3.99	3692.3	77.20	3.60	4092.9	602827	161487
344.0	6534.815	-74.5632	29.9573	75.82	3.90	3713.5	77.23	3.52	4114.2	610032	162001
346.0	6535.316	-74.4902	29.9733	75.87	3.81	3735.0	77.27	3.44	4135.7	617279	162507
348.0	6535.807	-74.4169	29.9893	75.91	3.72	3756.6	77.30	3.36	4157.4	624568	163003
350.0	6536.290	-74.3430	30.0053	75.95	3.63	3778.4	77.33	3.28	4179.3	631900	163491

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
352.0	6536.764	-74.2687	30.0213	76.00	3.54	3800.3	77.36	3.21	4201.3	639274	163971
354.0	6537.230	-74.1940	30.0374	76.04	3.46	3822.5	77.40	3.13	4223.5	646691	164442
356.0	6537.687	-74.1188	30.0536	76.09	3.38	3844.8	77.43	3.06	4245.9	654152	164904
358.0	6538.136	-74.0431	30.0698	76.13	3.30	3867.3	77.46	2.99	4268.4	661657	165358
360.0	6538.576	-73.9670	30.0860	76.18	3.22	3890.0	77.50	2.91	4291.2	669205	165804
362.0	6539.008	-73.8903	30.1023	76.22	3.14	3912.8	77.53	2.85	4314.0	676798	166241
364.0	6539.433	-73.8132	30.1186	76.27	3.06	3935.8	77.56	2.78	4337.1	684436	166671
366.0	6539.849	-73.7356	30.1350	76.32	2.99	3959.0	77.60	2.71	4360.4	692118	167093
368.0	6540.258	-73.6576	30.1514	76.36	2.91	3982.4	77.63	2.65	4383.8	699846	167507
370.0	6540.659	-73.5790	30.1679	76.41	2.84	4006.0	77.67	2.58	4407.5	707620	167913
372.0	6541.052	-73.5000	30.1844	76.45	2.77	4029.8	77.70	2.52	4431.3	715440	168311
374.0	6541.437	-73.4204	30.2009	76.50	2.70	4053.8	77.74	2.46	4455.3	723306	168702
376.0	6541.816	-73.3403	30.2175	76.55	2.63	4077.8	77.78	2.40	4479.3	731219	169086
378.0	6542.187	-73.2598	30.2341	76.60	2.57	4102.0	77.81	2.34	4503.6	739179	169462
380.0	6542.550	-73.1787	30.2508	76.64	2.50	4126.5	77.85	2.28	4528.2	747186	169832
382.0	6542.907	-73.0971	30.2675	76.69	2.44	4151.4	77.89	2.22	4553.0	755241	170194
384.0	6543.257	-73.0150	30.2842	76.74	2.38	4176.4	77.92	2.17	4578.1	763344	170549
386.0	6543.599	-72.9324	30.3010	76.79	2.31	4201.6	77.96	2.11	4603.4	771497	170897
388.0	6543.935	-72.8492	30.3178	76.84	2.26	4226.9	78.00	2.06	4628.7	779698	171238
390.0	6544.265	-72.7655	30.3347	76.89	2.20	4252.4	78.04	2.01	4654.2	787949	171573
392.0	6544.588	-72.6813	30.3516	76.94	2.14	4278.1	78.08	1.96	4680.0	796250	171902
394.0	6544.905	-72.5965	30.3685	76.99	2.09	4304.1	78.12	1.91	4705.9	804600	172224
396.0	6545.215	-72.5112	30.3855	77.04	2.03	4330.2	78.16	1.86	4732.1	813002	172540
398.0	6545.519	-72.4253	30.4025	77.09	1.98	4356.6	78.20	1.81	4758.5	821454	172850
400.0	6545.817	-72.3389	30.4195	77.14	1.93	4383.2	78.24	1.77	4785.2	829958	173153
402.0	6546.109	-72.2519	30.4366	77.19	1.88	4410.0	78.28	1.72	4812.0	838513	173451
404.0	6546.396	-72.1644	30.4538	77.24	1.83	4437.1	78.32	1.68	4839.1	847121	173743
406.0	6546.676	-72.0763	30.4709	77.30	1.78	4464.3	78.36	1.64	4866.3	855781	174029
408.0	6546.951	-71.9876	30.4881	77.35	1.74	4491.8	78.40	1.59	4893.8	864495	174310
410.0	6547.221	-71.8983	30.5053	77.40	1.69	4519.4	78.45	1.55	4921.5	873262	174585
412.0	6547.485	-71.8085	30.5226	77.45	1.65	4547.2	78.49	1.51	4949.4	882083	174855
414.0	6547.744	-71.7180	30.5399	77.51	1.61	4575.3	78.53	1.48	4977.5	890957	175120
416.0	6547.998	-71.6270	30.5572	77.56	1.56	4603.7	78.58	1.44	5005.9	899887	175379
418.0	6548.247	-71.5354	30.5746	77.62	1.53	4632.5	78.62	1.40	5034.7	908872	175634
420.0	6548.491	-71.4431	30.5920	77.67	1.49	4661.5	78.66	1.37	5063.7	917913	175884
422.0	6548.731	-71.3503	30.6094	77.72	1.45	4690.7	78.71	1.34	5092.9	927011	176129
424.0	6548.966	-71.2568	30.6269	77.78	1.41	4720.0	78.75	1.30	5122.3	936165	176370
426.0	6549.197	-71.1627	30.6444	77.83	1.38	4749.6	78.80	1.27	5151.9	945377	176606
428.0	6549.423	-71.0680	30.6619	77.89	1.35	4779.5	78.84	1.24	5181.8	954646	176839
430.0	6549.646	-70.9727	30.6794	77.95	1.31	4809.6	78.89	1.21	5211.9	963973	177067
432.0	6549.864	-70.8767	30.6970	78.00	1.28	4840.0	78.94	1.18	5242.3	973359	177291
434.0	6550.079	-70.7801	30.7146	78.06	1.25	4870.6	78.98	1.16	5273.0	982804	177512
436.0	6550.290	-70.6828	30.7323	78.12	1.22	4901.6	79.03	1.13	5303.9	992309	177729

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
438.0	6550.498	-70.5849	30.7499	78.17	1.20	4932.7	79.08	1.11	5335.1	1001874	177942
440.0	6550.702	-70.4863	30.7676	78.23	1.17	4964.2	79.13	1.08	5366.6	1011499	178152
442.0	6550.903	-70.3870	30.7854	78.29	1.14	4995.9	79.18	1.06	5398.4	1021186	178359
444.0	6551.101	-70.2871	30.8031	78.35	1.12	5028.0	79.22	1.04	5430.4	1030935	178563
446.0	6551.296	-70.1865	30.8209	78.41	1.10	5060.3	79.27	1.02	5462.7	1040746	178764
448.0	6551.489	-70.0852	30.8387	78.47	1.08	5092.9	79.32	1.00	5495.3	1050620	178963
450.0	6551.679	-69.9832	30.8565	78.53	1.06	5125.8	79.37	0.98	5528.3	1060557	179159
452.0	6551.867	-69.8805	30.8743	78.59	1.04	5159.0	79.42	0.96	5561.4	1070559	179353
454.0	6552.053	-69.7772	30.8922	78.65	1.02	5192.4	79.47	0.95	5594.9	1080625	179544
456.0	6552.237	-69.6731	30.9101	78.71	1.00	5226.2	79.53	0.93	5628.7	1090756	179734
458.0	6552.418	-69.5683	30.9280	78.77	0.99	5260.3	79.58	0.92	5662.8	1100953	179922
460.0	6552.599	-69.4627	30.9459	78.83	0.97	5294.6	79.63	0.90	5697.2	1111216	180108
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
460.620	6552.652	-69.4309	30.9513	78.85	0.97	5305.0	79.65	0.90	5707.5	1114308	180163
462.0	6552.777	-69.3565	30.9638	78.89	0.95	5325.1	79.68	0.88	5727.7	1121543	180292
464.0	6552.951	-69.2496	30.9818	78.96	0.92	5353.0	79.74	0.85	5755.6	1131926	180472
466.0	6553.120	-69.1422	30.9997	79.02	0.89	5381.1	79.79	0.83	5783.7	1142363	180646
468.0	6553.285	-69.0341	31.0176	79.08	0.87	5409.3	79.84	0.81	5811.9	1152855	180818
470.0	6553.447	-68.9254	31.0355	79.14	0.85	5437.6	79.90	0.79	5840.2	1163401	180986
472.0	6553.607	-68.8162	31.0534	79.21	0.83	5466.4	79.95	0.78	5869.0	1174003	181152
474.0	6553.766	-68.7063	31.0713	79.27	0.83	5495.0	80.01	0.77	5897.6	1184660	181317
476.0	6553.924	-68.5958	31.0892	79.33	0.82	5523.7	80.07	0.77	5926.3	1195372	181481
478.0	6554.083	-68.4846	31.1071	79.40	0.82	5552.6	80.12	0.76	5955.3	1206140	181645
480.0	6554.242	-68.3729	31.1249	79.46	0.82	5581.7	80.18	0.76	5984.4	1216964	181811
482.0	6554.402	-68.2605	31.1427	79.53	0.82	5611.2	80.24	0.76	6013.8	1227845	181977
484.0	6554.563	-68.1475	31.1606	79.59	0.82	5640.8	80.29	0.76	6043.5	1238783	182143
486.0	6554.725	-68.0338	31.1784	79.66	0.82	5670.8	80.35	0.77	6073.5	1249779	182311
488.0	6554.888	-67.9195	31.1962	79.73	0.82	5701.0	80.41	0.77	6103.7	1260833	182480
490.0	6555.051	-67.8046	31.2139	79.79	0.82	5731.4	80.47	0.77	6134.1	1271945	182649
492.0	6555.216	-67.6889	31.2316	79.86	0.82	5762.1	80.53	0.77	6164.9	1283117	182820
494.0	6555.382	-67.5727	31.2494	79.93	0.82	5793.1	80.59	0.77	6195.8	1294348	182991
496.0	6555.548	-67.4557	31.2671	80.00	0.82	5824.3	80.65	0.77	6227.1	1305640	183164
498.0	6555.716	-67.3381	31.2847	80.07	0.82	5855.8	80.71	0.77	6258.6	1316992	183337
500.0	6555.884	-67.2198	31.3024	80.14	0.81	5883.4	80.78	0.76	6286.2	1328402	183511
502.0	6556.050	-67.1010	31.3199	80.21	0.80	5908.1	80.84	0.75	6310.9	1339862	183683
504.0	6556.214	-66.9816	31.3375	80.28	0.78	5932.7	80.90	0.73	6335.5	1351369	183853
506.0	6556.375	-66.8617	31.3550	80.35	0.77	5957.3	80.97	0.72	6360.2	1362925	184020
508.0	6556.535	-66.7412	31.3724	80.42	0.76	5982.0	81.03	0.71	6384.9	1374528	184185
510.0	6556.692	-66.6202	31.3898	80.49	0.75	6007.2	81.10	0.70	6410.0	1386179	184348
512.0	6556.848	-66.4986	31.4071	80.57	0.73	6032.2	81.16	0.69	6435.1	1397879	184510
514.0	6557.002	-66.3765	31.4243	80.64	0.73	6057.3	81.23	0.68	6460.2	1409626	184669

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
516.0	6557.155	-66.2538	31.4415	80.71	0.72	6082.5	81.29	0.67	6485.4	1421423	184828
518.0	6557.306	-66.1306	31.4586	80.78	0.71	6107.9	81.36	0.67	6510.8	1433268	184985
520.0	6557.458	-66.0068	31.4757	80.86	0.70	6133.4	81.42	0.66	6536.4	1445163	185142
522.0	6557.608	-65.8825	31.4927	80.93	0.70	6159.2	81.49	0.66	6562.1	1457107	185298
524.0	6557.758	-65.7576	31.5096	81.00	0.69	6185.1	81.56	0.65	6588.0	1469101	185454
526.0	6557.907	-65.6321	31.5265	81.08	0.69	6211.1	81.63	0.65	6614.1	1481145	185609
528.0	6558.056	-65.5060	31.5433	81.15	0.68	6237.4	81.69	0.64	6640.4	1493240	185763
530.0	6558.204	-65.3794	31.5600	81.23	0.68	6263.8	81.76	0.64	6666.8	1505386	185917
532.0	6558.352	-65.2521	31.5767	81.30	0.67	6290.5	81.83	0.63	6693.5	1517583	186071
534.0	6558.500	-65.1243	31.5933	81.38	0.67	6317.3	81.90	0.63	6720.3	1529831	186224
536.0	6558.648	-64.9959	31.6098	81.45	0.67	6344.2	81.97	0.63	6747.3	1542132	186377
538.0	6558.795	-64.8669	31.6262	81.53	0.66	6371.4	82.04	0.62	6774.5	1554485	186530
540.0	6558.943	-64.7373	31.6426	81.61	0.66	6398.8	82.11	0.62	6801.8	1566890	186683
542.0	6559.091	-64.6071	31.6588	81.68	0.66	6426.2	82.18	0.62	6829.3	1579349	186837
544.0	6559.239	-64.4763	31.6750	81.76	0.66	6453.9	82.25	0.62	6857.0	1591861	186990
546.0	6559.388	-64.3449	31.6911	81.84	0.66	6481.8	82.32	0.62	6884.9	1604427	187144
548.0	6559.537	-64.2129	31.7072	81.91	0.66	6509.8	82.39	0.62	6912.9	1617046	187299
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
548.220	6559.553	-64.1983	31.7089	81.92	0.66	6513.0	82.40	0.62	6916.1	1618437	187316
	S-II/S-IVB SEPARATION COMMAND										
549.000	6559.612	-64.1467	31.7152	81.95	0.65	6515.7	82.43	0.61	6918.8	1623370	187377
550.0	6559.687	-64.0805	31.7231	81.99	0.63	6515.8	82.46	0.59	6918.9	1629697	187454
552.0	6559.823	-63.9479	31.7389	82.07	0.60	6516.1	82.54	0.56	6919.2	1642362	187596
554.0	6559.958	-63.8152	31.7545	82.15	0.57	6518.5	82.61	0.53	6921.7	1655024	187735
556.0	6560.084	-63.6825	31.7700	82.23	0.54	6527.4	82.69	0.51	6930.6	1667696	187867
558.0	6560.205	-63.5495	31.7853	82.31	0.52	6537.6	82.76	0.49	6940.7	1680385	187993
560.0	6560.323	-63.4162	31.8006	82.39	0.51	6548.1	82.83	0.48	6951.2	1693095	188116
562.0	6560.437	-63.2827	31.8156	82.47	0.49	6558.7	82.90	0.46	6961.9	1705825	188235
564.0	6560.548	-63.1489	31.8306	82.54	0.48	6569.3	82.98	0.45	6972.5	1718576	188351
566.0	6560.657	-63.0149	31.8454	82.62	0.47	6579.9	83.05	0.44	6983.2	1731346	188465
568.0	6560.763	-62.8806	31.8601	82.70	0.46	6590.8	83.12	0.43	6994.0	1744138	188576
570.0	6560.867	-62.7460	31.8747	82.78	0.44	6601.6	83.20	0.42	7004.9	1756950	188685
572.0	6560.968	-62.6112	31.8891	82.86	0.43	6612.5	83.27	0.41	7015.7	1769783	188791
574.0	6561.066	-62.4761	31.9034	82.94	0.42	6623.4	83.35	0.40	7026.6	1782637	188894
576.0	6561.162	-62.3407	31.9175	83.02	0.41	6634.3	83.42	0.38	7037.6	1795513	188994
578.0	6561.255	-62.2051	31.9315	83.10	0.40	6645.3	83.50	0.37	7048.6	1808409	189092
580.0	6561.345	-62.0692	31.9454	83.18	0.38	6656.3	83.57	0.36	7059.6	1821326	189187
582.0	6561.433	-61.9330	31.9592	83.26	0.37	6667.4	83.65	0.35	7070.7	1834265	189279
584.0	6561.517	-61.7966	31.9727	83.34	0.36	6678.5	83.72	0.34	7081.8	1847225	189368

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	6561.600	-61.6599	31.9862	83.42	0.35	6689.6	83.80	0.33	7092.9	1860206	189455
588.0	6561.679	-61.5229	31.9995	83.51	0.33	6700.7	83.88	0.32	7104.1	1873209	189539
590.0	6561.756	-61.3857	32.0127	83.59	0.32	6712.0	83.95	0.30	7115.3	1886234	189621
592.0	6561.831	-61.2482	32.0257	83.67	0.31	6723.3	84.03	0.29	7126.6	1899280	189700
594.0	6561.903	-61.1104	32.0386	83.75	0.30	6734.6	84.11	0.28	7137.9	1912348	189776
596.0	6561.972	-60.9724	32.0513	83.83	0.29	6745.9	84.18	0.27	7149.3	1925438	189849
598.0	6562.039	-60.8341	32.0639	83.92	0.28	6757.3	84.26	0.26	7160.7	1938549	189921
600.0	6562.103	-60.6955	32.0763	84.00	0.27	6768.7	84.34	0.25	7172.1	1951683	189989
602.0	6562.165	-60.5566	32.0886	84.08	0.26	6780.2	84.42	0.24	7183.6	1964839	190055
604.0	6562.224	-60.4175	32.1007	84.17	0.25	6791.7	84.49	0.23	7195.1	1978017	190118
606.0	6562.281	-60.2781	32.1127	84.25	0.24	6803.2	84.57	0.22	7206.6	1991218	190179
608.0	6562.336	-60.1384	32.1245	84.33	0.22	6814.8	84.65	0.21	7218.2	2004440	190238
610.0	6562.388	-59.9984	32.1362	84.42	0.21	6826.4	84.73	0.20	7229.8	2017685	190294
612.0	6562.439	-59.8582	32.1477	84.50	0.21	6838.1	84.81	0.19	7241.5	2030953	190348
614.0	6562.486	-59.7176	32.1591	84.59	0.20	6849.8	84.89	0.18	7253.2	2044243	190400
616.0	6562.532	-59.5768	32.1703	84.67	0.19	6861.6	84.97	0.18	7265.0	2057556	190449
618.0	6562.575	-59.4358	32.1813	84.76	0.18	6873.4	85.05	0.17	7276.8	2070892	190497
620.0	6562.617	-59.2944	32.1922	84.84	0.17	6885.3	85.13	0.16	7288.7	2084250	190542
622.0	6562.656	-59.1528	32.2029	84.92	0.16	6897.2	85.21	0.15	7300.6	2097632	190585
624.0	6562.693	-59.0109	32.2135	85.01	0.15	6909.1	85.29	0.14	7312.5	2111037	190625
626.0	6562.728	-58.8687	32.2239	85.10	0.14	6921.0	85.37	0.13	7324.5	2124464	190664
628.0	6562.762	-58.7262	32.2342	85.18	0.13	6933.0	85.45	0.13	7336.5	2137915	190701
630.0	6562.793	-58.5835	32.2443	85.27	0.13	6945.1	85.53	0.12	7348.5	2151389	190736
632.0	6562.823	-58.4405	32.2542	85.35	0.12	6957.1	85.61	0.11	7360.6	2164887	190768
634.0	6562.850	-58.2971	32.2640	85.44	0.11	6969.3	85.69	0.10	7372.7	2178408	190799
636.0	6562.876	-58.1536	32.2736	85.52	0.10	6981.4	85.77	0.10	7384.9	2191952	190829
638.0	6562.901	-58.0097	32.2830	85.61	0.10	6993.6	85.85	0.09	7397.1	2205520	190856
640.0	6562.923	-57.8655	32.2922	85.70	0.09	7005.8	85.93	0.08	7409.3	2219111	190882
642.0	6562.944	-57.7211	32.3013	85.78	0.08	7018.1	86.01	0.08	7421.5	2232727	190906
644.0	6562.964	-57.5764	32.3103	85.87	0.08	7030.4	86.09	0.07	7433.8	2246366	190929
646.0	6562.982	-57.4314	32.3190	85.96	0.07	7042.7	86.18	0.07	7446.2	2260029	190950
648.0	6562.999	-57.2861	32.3276	86.04	0.06	7055.1	86.26	0.06	7458.6	2273716	190969
650.0	6563.014	-57.1405	32.3360	86.13	0.06	7067.5	86.34	0.06	7471.0	2287427	190987
652.0	6563.028	-56.9946	32.3443	86.22	0.05	7080.0	86.42	0.05	7483.5	2301162	191004
654.0	6563.041	-56.8485	32.3523	86.30	0.05	7092.6	86.50	0.05	7496.1	2314921	191020
656.0	6563.052	-56.7021	32.3602	86.39	0.04	7105.2	86.59	0.04	7508.7	2328705	191034
658.0	6563.063	-56.5553	32.3680	86.48	0.04	7117.8	86.67	0.04	7521.3	2342513	191047
660.0	6563.072	-56.4093	32.3755	86.57	0.04	7130.5	86.75	0.03	7534.0	2356346	191059
662.0	6563.080	-56.2611	32.3829	86.66	0.03	7143.1	86.83	0.03	7546.7	2370204	191070
664.0	6563.088	-56.1135	32.3901	86.74	0.03	7155.9	86.92	0.03	7559.4	2384086	191079
666.0	6563.094	-55.9656	32.3971	86.83	0.02	7168.6	87.00	0.02	7572.2	2397992	191088
668.0	6563.100	-55.8175	32.4039	86.92	0.02	7181.5	87.08	0.02	7585.0	2411924	191096
670.0	6563.105	-55.6690	32.4105	87.01	0.02	7194.3	87.17	0.02	7597.8	2425880	191103

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	6563.108	-55.5203	32.4170	87.10	0.01	7207.2	87.25	0.01	7610.8	2439862	191109
674.0	6563.111	-55.3713	32.4233	87.19	0.01	7220.2	87.34	0.01	7623.7	2453868	191114
676.0	6563.112	-55.2219	32.4294	87.28	0.00	7233.2	87.42	0.00	7636.7	2467900	191117
678.0	6563.112	-55.0723	32.4353	87.37	-0.00	7246.2	87.50	-0.00	7649.8	2481957	191119
680.0	6563.111	-54.9225	32.4410	87.45	-0.00	7259.3	87.59	-0.00	7662.8	2496040	191120
682.0	6563.110	-54.7723	32.4465	87.54	-0.01	7272.4	87.67	-0.01	7676.0	2510147	191121
684.0	6563.108	-54.6218	32.4519	87.63	-0.01	7285.6	87.76	-0.01	7689.1	2524281	191121
686.0	6563.106	-54.4710	32.4570	87.72	-0.01	7298.8	87.84	-0.01	7702.3	2538440	191121
688.0	6563.105	-54.3200	32.4620	87.81	-0.01	7312.0	87.93	-0.01	7715.5	2552624	191121
690.0	6563.103	-54.1686	32.4668	87.90	-0.01	7325.3	88.01	-0.00	7728.8	2566835	191121
692.0	6563.102	-54.0170	32.4714	87.99	-0.00	7338.6	88.10	-0.00	7742.1	2581071	191121
694.0	6563.102	-53.8651	32.4757	88.09	-0.00	7351.9	88.18	-0.00	7755.5	2595333	191122
696.0	6563.102	-53.7129	32.4799	88.18	0.00	7365.3	88.27	0.00	7768.8	2609620	191124
698.0	6563.104	-53.5603	32.4839	88.27	0.01	7378.7	88.36	0.01	7782.2	2623934	191127
	S-IVB 1ST GUIDANCE CUTOFF										
699.330	6563.105	-53.4588	32.4865	88.33	0.01	7387.6	88.41	0.01	7791.2	2633468	191130
700.0	6563.107	-53.4075	32.4877	88.36	0.01	7389.3	88.44	0.01	7792.9	2638273	191131
702.0	6563.110	-53.2547	32.4913	88.45	0.01	7389.4	88.53	0.01	7792.9	2652621	191136
704.0	6563.113	-53.1017	32.4947	88.54	0.01	7389.4	88.62	0.01	7792.9	2666968	191140
706.0	6563.116	-52.9488	32.4979	88.63	0.01	7389.4	88.70	0.01	7792.9	2681316	191144
708.0	6563.119	-52.7959	32.5009	88.72	0.01	7389.4	88.79	0.01	7792.9	2695664	191149
	PARKING ORBIT INSERTION										
709.330	6563.052	-52.6941	32.5027	88.78	0.01	7389.5	88.85	0.01	7793.1	2705210	191082

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								
709.330	6563.052	-52.6941	32.5027	32.6722	88.85	0.01	7793.1	191.082
750.0	6563.458	-49.5836	32.5153	32.6849	90.62	0.01	7794.1	191.492
800.0	6563.499	-45.7619	32.4142	32.5835	92.79	0.01	7794.2	191.499
850.0	6563.543	-41.9550	32.1849	32.3535	94.94	0.01	7794.3	191.465
900.0	6563.590	-38.1738	31.8292	31.9968	97.06	0.01	7794.4	191.393
950.0	6563.640	-34.4285	31.3498	31.5161	99.14	0.01	7794.5	191.283
1000.0	6563.693	-30.7283	30.7503	30.9147	101.16	0.01	7794.6	191.138
1050.0	6563.749	-27.0811	30.0348	30.1970	103.11	0.01	7794.7	190.960
1100.0	6563.807	-23.4935	29.2084	29.3678	104.99	0.01	7794.8	190.752
1150.0	6563.866	-19.9705	28.2764	28.4325	106.79	0.01	7794.9	190.518
1200.0	6563.927	-16.5157	27.2445	27.3969	108.50	0.01	7795.1	190.260
1250.0	6563.989	-13.1312	26.1189	26.2669	110.12	0.01	7795.3	189.984
1300.0	6564.052	-9.8179	24.9057	25.0488	111.64	0.01	7795.4	189.694
1350.0	6564.116	-6.5755	23.6113	23.7488	113.07	0.01	7795.6	189.395
1400.0	6564.180	-3.4026	22.2419	22.3731	114.39	0.01	7795.8	189.091
1450.0	6564.243	-0.2967	20.8038	20.9282	115.61	0.01	7796.0	188.786
1500.0	6564.304	2.7451	19.3030	19.4199	116.72	0.01	7796.1	188.485
1550.0	6564.364	5.7267	17.7456	17.8544	117.74	0.01	7796.3	188.193
1600.0	6564.421	8.6523	16.1374	16.2374	118.66	0.01	7796.5	187.914
1650.0	6564.475	11.5268	14.4840	14.5747	119.47	0.01	7796.7	187.653
1700.0	6564.526	14.3550	12.7908	12.8718	120.19	0.01	7796.8	187.413
1750.0	6564.574	17.1424	11.0633	11.1339	120.81	0.01	7797.0	187.199
1800.0	6564.618	19.8943	9.3065	9.3663	121.34	0.01	7797.1	187.014
1850.0	6564.658	22.6164	7.5254	7.5741	121.77	0.01	7797.2	186.860
1900.0	6564.694	25.3144	5.7250	5.7622	122.11	0.01	7797.4	186.742
1950.0	6564.726	27.9941	3.9100	3.9355	122.35	0.00	7797.4	186.660
2000.0	6564.754	30.6612	2.0850	2.0987	122.50	0.00	7797.5	186.616
2050.0	6564.778	33.3216	0.2548	0.2565	122.56	0.00	7797.6	186.612
2100.0	6564.799	35.9813	-1.5760	-1.5863	122.53	0.00	7797.6	186.649
2150.0	6564.816	38.6460	-3.4029	-3.4251	122.40	0.00	7797.6	186.725
2200.0	6564.830	41.3216	-5.2211	-5.2551	122.18	0.00	7797.6	186.842
2250.0	6564.842	44.0139	-7.0261	-7.0717	121.87	0.00	7797.5	186.997
2300.0	6564.852	46.7287	-8.8131	-8.8699	121.47	0.00	7797.5	187.190
2350.0	6564.860	49.4718	-10.5771	-10.6448	120.97	0.00	7797.4	187.418
2400.0	6564.868	52.2487	-12.3133	-12.3915	120.38	0.00	7797.3	187.679
2450.0	6564.876	55.0651	-14.0166	-14.1047	119.68	0.00	7797.2	187.970
2500.0	6564.885	57.9261	-15.6816	-15.7791	118.90	0.00	7797.0	188.288
2550.0	6564.896	60.8370	-17.3030	-17.4094	118.01	0.00	7796.9	188.630
2600.0	6564.909	63.8026	-18.8751	-18.9898	117.02	0.00	7796.7	188.991
2650.0	6564.925	66.8271	-20.3922	-20.5146	115.93	0.00	7796.6	189.367

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	6564.946	69.9147	-21.8483	-21.9777	114.74	0.00	7796.4	189.754
2750.0	6564.971	73.0685	-23.2374	-23.3732	113.44	0.00	7796.2	190.148
2800.0	6565.002	76.2911	-24.5533	-24.6948	112.05	0.01	7796.0	190.544
2850.0	6565.040	79.5843	-25.7897	-25.9363	110.56	0.01	7795.8	190.938
2900.0	6565.085	82.9486	-26.9402	-27.0914	108.97	0.01	7795.6	191.325
2950.0	6565.137	86.3835	-27.9987	-28.1538	107.28	0.01	7795.4	191.702
3000.0	6565.198	89.8872	-28.9590	-29.1175	105.50	0.01	7795.2	192.064
3050.0	6565.268	93.4566	-29.8153	-29.9767	103.65	0.01	7795.0	192.408
3100.0	6565.347	97.0869	-30.5621	-30.7259	101.71	0.01	7794.8	192.730
3150.0	6565.436	100.7721	-31.1944	-31.3601	99.71	0.01	7794.6	193.027
3200.0	6565.535	104.5045	-31.7077	-31.8749	97.64	0.02	7794.4	193.297
3250.0	6565.643	108.2754	-32.0982	-32.2665	95.54	0.02	7794.3	193.536
3300.0	6565.762	112.0748	-32.3631	-32.5321	93.39	0.02	7794.1	193.744
3350.0	6565.890	115.8920	-32.5003	-32.6697	91.23	0.02	7794.0	193.919
3400.0	6566.028	119.7155	-32.5087	-32.6782	89.06	0.02	7793.8	194.060
3450.0	6566.176	123.5338	-32.3884	-32.5576	86.89	0.02	7793.7	194.167
3500.0	6566.332	127.3356	-32.1403	-32.3088	84.74	0.02	7793.6	194.240
3550.0	6566.497	131.1100	-31.7663	-31.9337	82.63	0.02	7793.5	194.279
3600.0	6566.670	134.8469	-31.2692	-31.4351	80.56	0.03	7793.4	194.286
3650.0	6566.849	138.5373	-30.6527	-30.8167	78.55	0.03	7793.3	194.262
3700.0	6567.035	142.1736	-29.9211	-30.0828	76.61	0.03	7793.3	194.210
3750.0	6567.227	145.7494	-29.0795	-29.2384	74.74	0.03	7793.2	194.131
3800.0	6567.422	149.2600	-28.1334	-28.2889	72.95	0.03	7793.2	194.029
3850.0	6567.621	152.7019	-27.0884	-27.2401	71.26	0.03	7793.2	193.907
3900.0	6567.823	156.0732	-25.9508	-26.0980	69.65	0.03	7793.1	193.768
3950.0	6568.026	159.3732	-24.7267	-24.8689	68.15	0.03	7793.1	193.616
4000.0	6568.228	162.6025	-23.4225	-23.5590	66.74	0.03	7793.1	193.455
4050.0	6568.430	165.7625	-22.0443	-22.1746	65.44	0.03	7793.1	193.289
4100.0	6568.630	168.8559	-20.5985	-20.7218	64.23	0.03	7793.1	193.122
4150.0	6568.826	171.8857	-19.0911	-19.2069	63.13	0.03	7793.1	192.957
4200.0	6569.017	174.8558	-17.5281	-17.6356	62.13	0.03	7793.1	192.800
4250.0	6569.204	177.7706	-15.9152	-16.0140	61.23	0.03	7793.1	192.653
4300.0	6569.383	-179.3652	-14.2580	-14.3475	60.42	0.03	7793.1	192.521
4350.0	6569.556	-176.5464	-12.5621	-12.6416	59.72	0.02	7793.1	192.406
4400.0	6569.719	-173.7679	-10.8325	-10.9017	59.11	0.02	7793.0	192.312
4450.0	6569.874	-171.0241	-9.0746	-9.1329	58.60	0.02	7793.0	192.242
4500.0	6570.018	-168.3094	-7.2931	-7.3403	58.18	0.02	7793.0	192.199
4550.0	6570.152	-165.6182	-5.4930	-5.5287	57.86	0.02	7792.9	192.183
4600.0	6570.275	-162.9445	-3.6790	-3.7030	57.63	0.02	7792.9	192.198
4650.0	6570.386	-160.2827	-1.8558	-1.8679	57.49	0.02	7792.8	192.243
4700.0	6570.485	-157.6269	-0.0280	-0.0282	57.44	0.01	7792.7	192.319
4750.0	6570.573	-154.9713	1.7999	1.8116	57.48	0.01	7792.6	192.428
4800.0	6570.648	-152.3099	3.6232	3.6468	57.62	0.01	7792.5	192.567

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	6570.710	-149.6371	5.4373	5.4726	57.85	0.01	7792.4	192.737
4900.0	6570.761	-146.9469	7.2376	7.2844	58.17	0.01	7792.3	192.936
4950.0	6570.800	-144.2337	9.0193	9.0773	58.58	0.00	7792.2	193.162
5000.0	6570.827	-141.4917	10.7776	10.8464	59.09	0.00	7792.0	193.412
5050.0	6570.843	-138.7153	12.5075	12.5867	59.70	0.00	7791.9	193.685
5100.0	6570.848	-135.8991	14.2040	14.2931	60.40	0.00	7791.8	193.976
5150.0	6570.844	-133.0377	15.8618	15.9603	61.20	-0.00	7791.6	194.283
5200.0	6570.830	-130.1261	17.4755	17.5827	62.10	-0.00	7791.5	194.601
5250.0	6570.807	-127.1594	19.0395	19.1549	63.09	-0.00	7791.3	194.927
5300.0	6570.777	-124.1335	20.5480	20.6710	64.19	-0.00	7791.2	195.257
5350.0	6570.740	-121.0444	21.9952	22.1251	65.39	-0.01	7791.1	195.586
5400.0	6570.697	-117.8888	23.3749	23.5111	66.69	-0.01	7790.9	195.911
5450.0	6570.648	-114.6644	24.6810	24.8229	68.10	-0.01	7790.8	196.226
5500.0	6570.595	-111.3695	25.9072	26.0542	69.60	-0.01	7790.7	196.528
5550.0	6570.539	-108.0035	27.0472	27.1987	71.20	-0.01	7790.6	196.812
5600.0	6570.480	-104.5571	28.0950	28.2503	72.89	-0.01	7790.5	197.075
5650.0	6570.419	-101.0623	29.0443	29.2030	74.67	-0.01	7790.4	197.313
5700.0	6570.358	-97.4922	29.8894	30.0509	76.53	-0.01	7790.4	197.522
5750.0	6570.296	-93.8617	30.6248	30.7887	78.47	-0.01	7790.3	197.700
5800.0	6570.236	-90.1770	31.2456	31.4113	80.48	-0.01	7790.3	197.844
5850.0	6570.176	-86.4456	31.7473	31.9145	82.54	-0.01	7790.3	197.951
5900.0	6570.118	-82.6766	32.1263	32.2946	84.65	-0.01	7790.3	198.021
5950.0	6570.063	-78.8798	32.3798	32.5488	86.79	-0.01	7790.4	198.051
6000.0	6570.011	-75.0661	32.5058	32.6751	88.96	-0.01	7790.4	198.042
6050.0	6569.962	-71.2468	32.5032	32.6726	91.13	-0.01	7790.5	197.992
6100.0	6569.917	-67.4334	32.3722	32.5412	93.29	-0.01	7790.6	197.902
6150.0	6569.875	-63.6373	32.1138	32.2821	95.43	-0.01	7790.7	197.773
6200.0	6569.837	-59.8691	31.7298	31.8970	97.54	-0.01	7790.9	197.607
6250.0	6569.804	-56.1389	31.2233	31.3890	99.60	-0.00	7791.0	197.405
6300.0	6569.774	-52.4555	30.5978	30.7616	101.61	-0.00	7791.2	197.169
6350.0	6569.748	-48.8265	29.8577	30.0192	103.54	-0.00	7791.4	196.902
6400.0	6569.727	-45.2580	29.0082	29.1667	105.41	-0.00	7791.6	196.608
6450.0	6569.708	-41.7549	28.0545	28.2097	107.18	-0.00	7791.8	196.290
6500.0	6569.693	-38.3202	27.0026	27.1539	108.87	-0.00	7792.0	195.952
6550.0	6569.681	-34.9560	25.8585	26.0053	110.47	-0.00	7792.3	195.599
6600.0	6569.671	-31.6628	24.6285	24.7702	111.96	-0.00	7792.5	195.234
6650.0	6569.664	-28.4399	23.3187	23.4547	113.36	-0.00	7792.7	194.862
6700.0	6569.658	-25.2859	21.9355	22.0652	114.66	-0.00	7793.0	194.489
6750.0	6569.654	-22.1981	20.4850	20.6077	115.86	-0.00	7793.2	194.118
6800.0	6569.650	-19.1734	18.9733	19.0984	116.95	-0.00	7793.4	193.755
6850.0	6569.647	-16.2078	17.4063	17.5132	117.95	-0.00	7793.7	193.403
6900.0	6569.644	-13.2970	15.7899	15.8879	118.84	-0.00	7793.9	193.069
6950.0	6569.641	-10.4362	14.1294	14.2181	119.63	-0.00	7794.1	192.755

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	6569.637	-7.6204	12.4305	12.5093	120.33	-0.00	7794.3	192.467
7050.0	6569.633	-4.8443	10.6983	10.7667	120.93	-0.00	7794.4	192.207
7100.0	6569.627	-2.1022	8.9380	8.9955	121.44	-0.00	7794.6	191.980
7150.0	6569.620	0.6112	7.1545	7.2008	121.85	-0.00	7794.7	191.787
7200.0	6569.611	3.3018	5.3525	5.3374	122.16	-0.00	7794.9	191.632
7250.0	6569.601	5.9753	3.5370	3.5601	122.39	-0.00	7795.0	191.517
7300.0	6569.590	8.6376	1.7126	1.7238	122.52	-0.00	7795.0	191.443
7350.0	6569.577	11.2944	-0.1162	-0.1170	122.56	-0.00	7795.1	191.411
7400.0	6569.562	13.9516	-1.9447	-1.9574	122.51	-0.00	7795.1	191.421
7450.0	6569.547	16.6150	-3.7684	-3.7929	122.37	-0.00	7795.1	191.474
7500.0	6569.531	19.2905	-5.5825	-5.6188	122.13	-0.00	7795.1	191.569
7550.0	6569.515	21.9839	-7.3824	-7.4302	121.80	-0.00	7795.1	191.704
7600.0	6569.499	24.7008	-9.1634	-9.2223	121.38	-0.00	7795.0	191.878
7650.0	6569.484	27.4471	-10.9206	-10.9903	120.86	-0.00	7794.9	192.089
7700.0	6569.470	30.2283	-12.6490	-12.7290	120.25	-0.00	7794.8	192.334
7750.0	6569.458	33.0498	-14.3435	-14.4334	119.54	-0.00	7794.7	192.610
7800.0	6569.448	35.9170	-15.9988	-16.0981	118.73	-0.00	7794.6	192.914
7850.0	6569.442	38.8350	-17.6095	-17.7175	117.82	-0.00	7794.4	193.242
7900.0	6569.440	41.8083	-19.1700	-19.2861	116.82	-0.00	7794.2	193.590
7950.0	6569.442	44.8413	-20.6744	-20.7981	115.71	0.00	7794.1	193.953
8000.0	6569.450	47.9379	-22.1169	-22.2474	114.50	0.00	7793.9	194.328
8050.0	6569.464	51.1012	-23.4913	-23.6281	113.19	0.00	7793.7	194.709
8100.0	6569.484	54.3335	-24.7914	-24.9338	111.78	0.00	7793.5	195.094
8150.0	6569.513	57.6364	-26.0110	-26.1584	110.27	0.00	7793.3	195.476
8200.0	6569.549	61.0104	-27.1437	-27.2956	108.66	0.01	7793.1	195.852
8250.0	6569.595	64.4545	-28.1835	-28.3392	106.96	0.01	7792.9	196.217
8300.0	6569.649	67.9669	-29.1242	-29.2832	105.17	0.01	7792.7	196.568
8350.0	6569.713	71.5441	-29.9601	-30.1219	103.30	0.01	7792.5	196.900
8400.0	6569.788	75.1811	-30.6857	-30.8498	101.35	0.01	7792.3	197.211
8450.0	6569.872	78.8715	-31.2962	-31.4621	99.34	0.01	7792.1	197.497
8500.0	6569.968	82.6077	-31.7872	-31.9545	97.27	0.01	7791.9	197.757
8550.0	6570.074	86.3805	-32.1550	-32.3234	95.16	0.02	7791.7	197.986
8600.0	6570.191	90.1799	-32.3971	-32.5661	93.01	0.02	7791.6	198.185
8650.0	6570.318	93.9951	-32.5115	-32.6808	90.85	0.02	7791.4	198.351
8700.0	6570.456	97.8145	-32.4973	-32.6666	88.68	0.02	7791.3	198.484
8750.0	6570.603	101.6268	-32.3547	-32.5236	86.51	0.02	7791.2	198.583
8800.0	6570.761	105.4207	-32.0848	-32.2529	84.38	0.02	7791.1	198.649
8850.0	6570.927	109.1853	-31.6896	-31.8567	82.27	0.03	7791.0	198.683
8900.0	6571.102	112.9109	-31.1722	-31.3378	80.21	0.03	7790.9	198.686
8950.0	6571.284	116.5888	-30.5364	-30.6999	78.22	0.03	7790.8	198.658
9000.0	6571.473	120.2114	-29.7865	-29.9477	76.29	0.03	7790.7	198.604
9050.0	6571.668	123.7728	-28.9277	-29.0860	74.43	0.03	7790.7	198.524
9100.0	6571.867	127.2683	-27.9655	-28.1203	72.66	0.03	7790.6	198.422

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
9150.0	6572.071	130.6949	-26.9057	-27.0566	70.98	0.03	7790.6	198.301
9200.0	6572.276	134.0508	-25.7544	-25.9008	69.40	0.03	7790.6	198.164
9250.0	6572.483	137.3356	-24.5179	-24.6591	67.91	0.03	7790.5	198.014
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6								
9278.200	6572.600	139.1570	-23.7853	-23.9234	67.11	0.03	7790.5	197.926

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								
9278.200	-11701407	-1094171	-3699046	4283.3	-2617.3	-5421.5	6.70	0.94	4.84
9280.0	-11693686	-1098881	-3698797	4295.3	-2615.6	-5412.8	6.69	0.94	4.85
9290.0	-11650399	-1124989	-3752681	4362.0	-2606.0	-5363.9	6.64	0.98	4.91
9300.0	-11606448	-1150999	-3806074	4428.1	-2595.9	-5314.5	6.58	1.02	4.98
9310.0	-11561838	-1176907	-3858968	4493.7	-2585.6	-5264.3	6.53	1.06	5.05
9320.0	-11516576	-1202709	-3911358	4558.7	-2574.8	-5213.5	6.47	1.09	5.11
9330.0	-11470667	-1228401	-3963237	4623.1	-2563.7	-5162.1	6.41	1.13	5.17
9340.0	-11424117	-1253981	-4014598	4686.9	-2552.2	-5110.1	6.35	1.17	5.24
9350.0	-11376930	-1279444	-4065436	4750.2	-2540.3	-5057.4	6.30	1.21	5.30
9360.0	-11329115	-1304786	-4115744	4812.8	-2528.0	-5004.0	6.24	1.24	5.36
9370.0	-11280676	-1330003	-4165515	4874.9	-2515.4	-4950.1	6.17	1.28	5.42
9380.0	-11231619	-1355093	-4214744	4936.3	-2502.5	-4895.6	6.11	1.32	5.48
9390.0	-11181951	-1380051	-4263424	4997.2	-2489.1	-4840.4	6.05	1.35	5.54
9400.0	-11131678	-1404874	-4311551	5057.3	-2475.4	-4784.7	5.99	1.39	5.60
9410.0	-11080807	-1429558	-4359117	5116.9	-2461.3	-4728.4	5.92	1.43	5.66
9420.0	-11029342	-1454099	-4406116	5175.8	-2446.9	-4671.5	5.86	1.46	5.72
9430.0	-10977292	-1478494	-4452544	5234.1	-2432.1	-4614.0	5.79	1.50	5.78
9440.0	-10924663	-1502739	-4498395	5291.7	-2416.9	-4556.0	5.73	1.53	5.83
9450.0	-10871460	-1526831	-4543662	5348.6	-2401.4	-4497.4	5.66	1.57	5.89
9460.0	-10817692	-1550766	-4588341	5404.9	-2385.5	-4438.3	5.59	1.61	5.94
9470.0	-10763364	-1574540	-4632425	5460.5	-2369.3	-4378.6	5.53	1.64	6.00
9480.0	-10708484	-1598149	-4675910	5515.4	-2352.7	-4318.4	5.46	1.68	6.05
9490.0	-10653058	-1621592	-4718791	5569.6	-2335.7	-4257.6	5.39	1.71	6.10
9500.0	-10597093	-1644863	-4761061	5623.2	-2318.4	-4196.4	5.32	1.75	6.15
9510.0	-10540597	-1667959	-4802716	5676.0	-2300.8	-4134.6	5.25	1.78	6.20
9520.0	-10483576	-1690877	-4843751	5728.1	-2282.8	-4072.3	5.17	1.82	6.25
9530.0	-10426038	-1713614	-4884161	5779.5	-2264.4	-4009.5	5.10	1.85	6.30
9540.0	-10367989	-1736165	-4923940	5830.1	-2245.8	-3946.3	5.03	1.89	6.35
9550.0	-10309438	-1758528	-4963085	5880.0	-2226.7	-3882.6	4.95	1.92	6.40
9560.0	-10250391	-1780698	-5001590	5929.2	-2207.4	-3818.4	4.88	1.95	6.44
9570.0	-10190857	-1802674	-5039451	5977.6	-2187.7	-3753.7	4.81	1.99	6.49
9580.0	-10130841	-1824451	-5076663	6025.3	-2167.6	-3688.6	4.73	2.02	6.53
9590.0	-10070352	-1846026	-5113222	6072.3	-2147.3	-3623.1	4.66	2.05	6.58
9600.0	-10009398	-1867395	-5149123	6118.4	-2126.6	-3557.1	4.58	2.09	6.62
9610.0	-9947986	-1888556	-5184363	6163.9	-2105.5	-3490.7	4.50	2.12	6.66
9620.0	-9886124	-1909505	-5218936	6208.5	-2084.2	-3423.9	4.42	2.15	6.70
9630.0	-9823819	-1930239	-5252838	6252.3	-2062.5	-3356.6	4.35	2.18	6.74
9640.0	-9761080	-1950754	-5286067	6295.4	-2040.5	-3289.0	4.27	2.22	6.78
9650.0	-9697913	-1971048	-5318617	6337.7	-2018.2	-3221.0	4.19	2.25	6.82
9660.0	-9634329	-1991117	-5350485	6379.2	-1995.6	-3152.5	4.11	2.28	6.86

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
9670.0	-9570333	-2010958	-5381667	6419.8	-1972.6	-3083.8	4.03	2.31	6.90
9680.0	-9505935	-2030568	-5412159	6459.7	-1949.3	-3014.6	3.95	2.34	6.93
9690.0	-9441142	-2049944	-5441957	6498.7	-1925.8	-2945.1	3.86	2.37	6.97
9700.0	-9375963	-2069082	-5471059	6537.0	-1901.9	-2875.2	3.78	2.40	7.00
9710.0	-9310405	-2087980	-5499461	6574.4	-1877.7	-2805.0	3.70	2.43	7.04
9720.0	-9244477	-2106635	-5527159	6611.0	-1853.2	-2734.5	3.62	2.46	7.07
9730.0	-9178188	-2125044	-5554150	6646.7	-1828.5	-2663.7	3.53	2.49	7.10
9740.0	-9111545	-2143204	-5580431	6681.7	-1803.4	-2592.5	3.45	2.52	7.13
9750.0	-9044558	-2161111	-5605999	6715.7	-1778.0	-2521.0	3.37	2.55	7.16
9760.0	-8977233	-2178763	-5630851	6749.0	-1752.3	-2449.3	3.28	2.59	7.19
9770.0	-8909581	-2196156	-5654984	6781.3	-1726.4	-2377.3	3.20	2.61	7.22
9780.0	-8841609	-2213289	-5678396	6812.9	-1700.1	-2304.9	3.12	2.64	7.25
9790.0	-8773325	-2230158	-5701082	6843.7	-1673.6	-2232.4	3.02	2.66	7.27
9800.0	-8704739	-2246761	-5723042	6873.5	-1646.9	-2159.6	2.94	2.69	7.30
9810.0	-8635858	-2263095	-5744273	6902.5	-1619.8	-2086.5	2.85	2.72	7.32
9820.0	-8566692	-2279157	-5764771	6930.6	-1592.5	-2013.2	2.77	2.74	7.34
9830.0	-8497248	-2294945	-5784536	6957.9	-1564.9	-1939.6	2.69	2.77	7.36
9840.0	-8427537	-2310455	-5803564	6984.3	-1537.1	-1865.9	2.60	2.80	7.38
9850.0	-8357566	-2325686	-5821853	7009.8	-1509.0	-1792.0	2.52	2.82	7.40
	S-IVB RE-IGNITION (STDV OPEN)								
9856.200	-8314057	-2334987	-5832821	7025.3	-1491.5	-1746.0	2.50	2.81	7.39
9858.0	-8301407	-2337668	-5835952	7032.3	-1486.9	-1733.4	5.97	2.07	6.42
9860.0	-8287328	-2340637	-5839407	7046.7	-1483.1	-1721.1	7.78	1.81	6.03
9862.0	-8273219	-2343600	-5842837	7062.5	-1479.4	-1709.0	7.92	1.82	6.01
9864.0	-8259079	-2346555	-5846243	7078.3	-1475.8	-1697.0	7.96	1.78	6.01
9866.0	-8244906	-2349503	-5849625	7094.3	-1472.2	-1685.0	8.01	1.77	6.00
9868.0	-8230702	-2352444	-5852983	7110.4	-1468.7	-1672.9	8.05	1.76	6.12
9870.0	-8216465	-2355378	-5856316	7126.5	-1465.2	-1660.3	8.10	1.78	6.37
9872.0	-8202196	-2358305	-5859624	7142.7	-1461.6	-1647.4	8.14	1.82	6.49
9874.0	-8187895	-2361224	-5862905	7159.0	-1457.9	-1634.4	8.16	1.85	6.50
9876.0	-8173560	-2364136	-5866161	7175.3	-1454.2	-1621.4	8.18	1.85	6.47
9878.0	-8159193	-2367041	-5869391	7191.7	-1450.5	-1608.5	8.18	1.86	6.48
9880.0	-8144794	-2369938	-5872595	7208.0	-1446.7	-1595.5	8.18	1.89	6.50
9882.0	-8130361	-2372828	-5875773	7224.4	-1442.9	-1582.5	8.18	1.93	6.52
9884.0	-8115896	-2375710	-5878925	7240.8	-1439.0	-1569.4	8.19	1.96	6.53
9886.0	-8101398	-2378584	-5882051	7257.2	-1435.1	-1556.4	8.21	1.97	6.53
9888.0	-8086868	-2381450	-5885150	7273.6	-1431.2	-1543.3	8.22	1.98	6.53
9890.0	-8072304	-2384309	-5888224	7290.0	-1427.2	-1530.2	8.22	1.99	6.54
9892.0	-8057708	-2387159	-5891271	7306.5	-1423.2	-1517.1	8.21	2.02	6.55
9894.0	-8043078	-2390001	-5894293	7322.9	-1419.1	-1504.0	8.19	2.04	6.57
9896.0	-8028416	-2392835	-5897287	7339.2	-1415.0	-1490.9	8.18	2.06	6.58

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
9898.0	-8013721	-2395661	-5900256	7355.6	-1410.9	-1477.7	8.18	2.07	6.58
9900.0	-7998994	-2398479	-5903198	7372.0	-1406.7	-1464.6	8.19	2.09	6.57
9902.0	-7984233	-2401288	-5906114	7388.3	-1402.5	-1451.4	8.20	2.10	6.57
9904.0	-7969440	-2404089	-5909004	7404.7	-1398.3	-1438.3	8.20	2.11	6.58
9906.0	-7954614	-2406881	-5911868	7421.2	-1394.1	-1425.1	8.21	2.12	6.59
9908.0	-7939756	-2409665	-5914705	7437.6	-1389.8	-1411.9	8.22	2.13	6.60
9910.0	-7924864	-2412441	-5917515	7454.0	-1385.6	-1398.7	8.22	2.15	6.61
9912.0	-7909940	-2415208	-5920299	7470.5	-1381.3	-1385.5	8.21	2.16	6.61
9914.0	-7894982	-2417966	-5923057	7486.9	-1376.9	-1372.3	8.21	2.17	6.61
9916.0	-7879992	-2420715	-5925788	7503.3	-1372.6	-1359.0	8.20	2.19	6.62
9918.0	-7864969	-2423456	-5928493	7519.7	-1368.2	-1345.8	8.20	2.20	6.62
9920.0	-7849913	-2426188	-5931172	7536.1	-1363.7	-1332.6	8.20	2.22	6.62
9922.0	-7834824	-2428911	-5933824	7552.5	-1359.3	-1319.3	8.19	2.24	6.63
9924.0	-7819703	-2431625	-5936449	7568.9	-1354.8	-1306.1	8.20	2.25	6.63
9926.0	-7804549	-2434330	-5939048	7585.3	-1350.3	-1292.8	8.21	2.25	6.63
9928.0	-7789362	-2437026	-5941620	7601.7	-1345.8	-1279.5	8.22	2.26	6.64
9930.0	-7774142	-2439713	-5944166	7618.2	-1341.3	-1266.2	8.23	2.27	6.64
9932.0	-7758889	-2442391	-5946685	7634.7	-1336.7	-1253.0	8.24	2.29	6.64
9934.0	-7743603	-2445060	-5949178	7651.1	-1332.1	-1239.7	8.24	2.30	6.65
9936.0	-7728284	-2447720	-5951644	7667.6	-1327.5	-1226.4	8.24	2.31	6.66
9938.0	-7712933	-2450370	-5954083	7684.1	-1322.9	-1213.1	8.24	2.32	6.66
9940.0	-7697548	-2453011	-5956496	7700.6	-1318.2	-1199.7	8.24	2.33	6.66
9942.0	-7682130	-2455643	-5958882	7717.1	-1313.5	-1186.4	8.25	2.34	6.66
9944.0	-7666680	-2458265	-5961242	7733.6	-1308.8	-1173.1	8.25	2.36	6.66
9946.0	-7651196	-2460878	-5963574	7750.1	-1304.1	-1159.8	8.25	2.36	6.67
9948.0	-7635679	-2463482	-5965881	7766.6	-1299.4	-1146.4	8.24	2.37	6.67
9950.0	-7620130	-2466076	-5968160	7783.1	-1294.6	-1133.1	8.26	2.39	6.68
9952.0	-7604547	-2468660	-5970413	7799.6	-1289.8	-1119.7	8.27	2.41	6.68
9954.0	-7588932	-2471235	-5972639	7816.1	-1285.0	-1106.3	8.27	2.41	6.68
9956.0	-7573283	-2473800	-5974838	7832.7	-1280.2	-1093.0	8.28	2.42	6.68
9958.0	-7557601	-2476356	-5977011	7849.2	-1275.3	-1079.6	8.28	2.43	6.68
9960.0	-7541886	-2478901	-5979157	7865.8	-1270.4	-1066.2	8.28	2.44	6.68
9962.0	-7526138	-2481437	-5981276	7882.3	-1265.5	-1052.9	8.27	2.45	6.69
9964.0	-7510356	-2483964	-5983368	7898.9	-1260.6	-1039.5	8.27	2.47	6.70
9966.0	-7494542	-2486480	-5985434	7915.4	-1255.7	-1026.1	8.27	2.48	6.70
9968.0	-7478695	-2488986	-5987472	7931.9	-1250.7	-1012.7	8.26	2.49	6.69
9970.0	-7462814	-2491483	-5989484	7948.4	-1245.7	-999.3	8.26	2.50	6.72
9972.0	-7446901	-2493969	-5991469	7964.9	-1240.7	-985.9	8.25	2.52	6.70
9974.0	-7430954	-2496445	-5993428	7981.4	-1235.7	-972.4	8.28	2.51	6.70
9976.0	-7414974	-2498912	-5995359	7999.4	-1230.7	-959.2	9.28	2.46	6.60
9978.0	-7398956	-2501368	-5997265	8018.0	-1225.8	-946.0	9.30	2.46	6.60
9980.0	-7382902	-2503815	-5999143	8036.6	-1220.9	-932.8	9.32	2.47	6.58
9982.0	-7366810	-2506252	-6000996	8055.3	-1215.9	-919.7	9.34	2.47	6.58

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
9984.0	-7350681	-2508679	-6002822	8074.0	-1210.9	-906.5	9.37	2.52	6.57
9986.0	-7334514	-2511096	-6004622	8092.8	-1205.8	-893.4	9.39	2.57	6.57
9988.0	-7318309	-2513502	-6006396	8111.6	-1200.7	-880.2	9.41	2.58	6.58
9990.0	-7302067	-2515898	-6008143	8130.4	-1195.6	-867.1	9.42	2.53	6.60
9992.0	-7285788	-2518284	-6009864	8149.2	-1190.5	-853.8	9.42	2.49	6.61
9994.0	-7269471	-2520661	-6011558	8168.1	-1185.6	-840.6	9.43	2.49	6.60
9996.0	-7253116	-2523027	-6013226	8186.9	-1180.6	-827.4	9.44	2.51	6.60
9998.0	-7236723	-2525383	-6014868	8205.8	-1175.5	-814.2	9.46	2.52	6.60
10000.0	-7220292	-2527729	-6016483	8224.8	-1170.5	-801.0	9.47	2.53	6.60
10002.0	-7203824	-2530065	-6018072	8243.7	-1165.4	-787.9	9.48	2.55	6.59
10004.0	-7187317	-2532390	-6019635	8262.7	-1160.3	-774.7	9.49	2.57	6.58
10006.0	-7170773	-2534706	-6021171	8281.7	-1155.1	-761.5	9.52	2.60	6.58
10008.0	-7154191	-2537011	-6022681	8300.7	-1149.9	-748.4	9.53	2.62	6.58
10010.0	-7137570	-2539305	-6024164	8319.9	-1144.6	-735.2	9.54	2.64	6.59
10012.0	-7120911	-2541589	-6025622	8338.9	-1139.4	-722.0	9.56	2.65	6.59
10014.0	-7104215	-2543863	-6027052	8358.0	-1134.0	-708.8	9.58	2.67	6.58
10016.0	-7087479	-2546126	-6028457	8377.2	-1128.7	-695.7	9.60	2.69	6.58
10018.0	-7070706	-2548379	-6029835	8396.4	-1123.3	-682.5	9.61	2.71	6.58
10020.0	-7053894	-2550619	-6031187	8415.7	-1117.9	-669.3	9.62	2.72	6.58
10022.0	-7037043	-2552849	-6032513	8434.9	-1112.4	-656.2	9.62	2.73	6.57
10024.0	-7020154	-2555068	-6033812	8454.2	-1106.9	-643.1	9.64	2.74	6.56
10026.0	-7003226	-2557277	-6035085	8473.5	-1101.4	-629.9	9.66	2.76	6.56
10028.0	-6986260	-2559474	-6036332	8492.8	-1095.9	-616.8	9.69	2.78	6.57
10030.0	-6969255	-2561660	-6037552	8512.2	-1090.3	-603.7	9.70	2.79	6.57
10032.0	-6952211	-2563835	-6038746	8531.6	-1084.8	-590.5	9.72	2.80	6.57
10034.0	-6935129	-2565999	-6039914	8551.1	-1079.1	-577.4	9.73	2.81	6.57
10036.0	-6918007	-2568152	-6041056	8570.5	-1073.5	-564.2	9.74	2.83	6.58
10038.0	-6900846	-2570293	-6042171	8590.0	-1067.8	-551.1	9.76	2.84	6.58
10040.0	-6883647	-2572423	-6043260	8609.6	-1062.2	-537.9	9.79	2.85	6.57
10042.0	-6866408	-2574542	-6044323	8629.2	-1056.5	-524.8	9.81	2.86	6.56
10044.0	-6849130	-2576649	-6045359	8648.8	-1050.7	-511.7	9.82	2.87	6.55
10046.0	-6831813	-2578745	-6046369	8668.5	-1045.0	-498.6	9.84	2.89	6.56
10048.0	-6814456	-2580829	-6047353	8688.2	-1039.2	-485.4	9.86	2.91	6.55
10050.0	-6797060	-2582902	-6048311	8707.9	-1033.3	-472.3	9.89	2.92	6.55
10052.0	-6779624	-2584962	-6049243	8727.7	-1027.5	-459.2	9.91	2.93	6.55
10054.0	-6762149	-2587011	-6050148	8747.6	-1021.6	-446.1	9.94	2.94	6.56
10056.0	-6744634	-2589049	-6051027	8767.5	-1015.7	-433.0	9.96	2.96	6.55
10058.0	-6727079	-2591074	-6051880	8787.4	-1009.8	-419.9	9.97	2.97	6.55
10060.0	-6709484	-2593088	-6052707	8807.4	-1003.8	-406.8	9.99	2.99	6.55
10062.0	-6691850	-2595089	-6053507	8827.4	-997.9	-393.7	10.01	3.00	6.55
10064.0	-6674175	-2597079	-6054282	8847.4	-991.8	-380.6	10.04	3.01	6.55
10066.0	-6656462	-2599057	-6055030	8867.5	-985.8	-367.5	10.06	3.02	6.54
10068.0	-6638705	-2601022	-6055752	8887.7	-979.7	-354.4	10.08	3.04	6.54

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
10070.0	-6620909	-2602975	-6056448	8907.8	-973.6	-341.4	10.10	3.05	6.54
10072.0	-6603073	-2604917	-6057117	8928.1	-967.5	-328.3	10.14	3.07	6.54
10074.0	-6585197	-2606845	-6057761	8948.4	-961.3	-315.2	10.16	3.09	6.53
10076.0	-6567280	-2608762	-6058378	8968.7	-955.1	-302.2	10.18	3.11	6.53
10078.0	-6549322	-2610666	-6058969	8989.1	-948.9	-289.1	10.20	3.12	6.53
10080.0	-6531324	-2612557	-6059534	9009.5	-942.6	-276.0	10.22	3.13	6.53
10082.0	-6513284	-2614436	-6060073	9030.0	-936.4	-263.0	10.26	3.14	6.53
10084.0	-6495204	-2616303	-6060586	9050.5	-930.1	-249.9	10.28	3.15	6.53
10086.0	-6477082	-2618157	-6061073	9071.1	-923.8	-236.9	10.31	3.17	6.52
10088.0	-6458919	-2619998	-6061534	9091.8	-917.4	-223.8	10.34	3.19	6.52
10090.0	-6440715	-2621826	-6061969	9112.5	-911.0	-210.8	10.36	3.21	6.51
10092.0	-6422469	-2623642	-6062377	9133.2	-904.6	-197.8	10.39	3.22	6.51
10094.0	-6404182	-2625445	-6062760	9154.0	-898.1	-184.8	10.42	3.23	6.50
10096.0	-6385853	-2627234	-6063116	9174.9	-891.7	-171.8	10.45	3.25	6.50
10098.0	-6367482	-2629011	-6063447	9195.8	-885.1	-158.8	10.47	3.27	6.51
10100.0	-6349070	-2630775	-6063751	9216.8	-878.6	-145.7	10.50	3.29	6.52
10102.0	-6330615	-2632525	-6064030	9237.8	-872.0	-132.7	10.53	3.30	6.52
10104.0	-6312119	-2634263	-6064282	9258.9	-865.4	-119.7	10.56	3.32	6.51
10106.0	-6293580	-2635987	-6064508	9280.1	-858.7	-106.7	10.59	3.34	6.51
10108.0	-6274998	-2637698	-6064709	9301.3	-852.0	-93.7	10.62	3.36	6.51
10110.0	-6256374	-2639395	-6064883	9322.6	-845.3	-80.6	10.66	3.37	6.51
10112.0	-6237708	-2641079	-6065031	9343.9	-838.5	-67.6	10.69	3.39	6.51
10114.0	-6218999	-2642749	-6065154	9365.3	-831.7	-54.6	10.72	3.41	6.51
10116.0	-6200247	-2644406	-6065250	9386.8	-824.9	-41.6	10.75	3.43	6.51
10118.0	-6181451	-2646049	-6065320	9408.3	-818.0	-28.5	10.78	3.45	6.51
10120.0	-6162613	-2647678	-6065364	9429.9	-811.1	-15.5	10.82	3.46	6.51
10122.0	-6143732	-2649293	-6065382	9451.6	-804.2	-2.5	10.85	3.48	6.51
10124.0	-6124807	-2650894	-6065374	9473.3	-797.2	10.5	10.89	3.50	6.51
10126.0	-6105838	-2652482	-6065340	9495.1	-790.1	23.6	10.92	3.53	6.52
10128.0	-6086826	-2654055	-6065279	9517.0	-783.1	36.6	10.96	3.55	6.53
10130.0	-6067770	-2655614	-6065193	9539.0	-776.0	49.7	11.00	3.56	6.53
10132.0	-6048670	-2657159	-6065081	9561.0	-768.8	62.7	11.03	3.57	6.53
10134.0	-6029526	-2658689	-6064942	9583.1	-761.7	75.8	11.07	3.59	6.53
10136.0	-6010339	-2660205	-6064777	9605.3	-754.5	88.9	11.11	3.62	6.54
10138.0	-5991105	-2661707	-6064587	9627.6	-747.2	102.0	11.15	3.64	6.55
10140.0	-5971827	-2663194	-6064370	9649.9	-739.9	115.1	11.19	3.67	6.56
10142.0	-5952505	-2664667	-6064126	9672.3	-732.5	128.2	11.23	3.69	6.56
10144.0	-5933138	-2666124	-6063857	9694.8	-725.1	141.3	11.27	3.71	6.56
10146.0	-5913726	-2667567	-6063561	9717.4	-717.7	154.4	11.32	3.73	6.56
10148.0	-5894268	-2668995	-6063239	9740.1	-710.2	167.6	11.36	3.75	6.57
10150.0	-5874766	-2670408	-6062891	9762.8	-702.7	180.7	11.40	3.77	6.59
10152.0	-5855217	-2671806	-6062516	9785.7	-695.1	193.9	11.44	3.80	6.60
10154.0	-5835623	-2673189	-6062115	9808.6	-687.5	207.1	11.49	3.82	6.62

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
10156.0	-5815982	-2674556	-6061688	9831.7	-679.9	220.4	11.54	3.85	6.63
10158.0	-5796296	-2675908	-6061234	9854.8	-672.1	233.6	11.59	3.89	6.64
10160.0	-5776563	-2677245	-6060753	9878.0	-664.3	246.9	11.64	3.91	6.65
10162.0	-5756784	-2678565	-6060246	9901.4	-656.5	260.2	11.70	3.93	6.66
10164.0	-5736959	-2679870	-6059712	9924.8	-648.6	273.6	11.75	3.95	6.69
10166.0	-5717085	-2681160	-6059151	9948.4	-640.7	287.0	11.80	3.97	6.70
10168.0	-5697164	-2682433	-6058564	9972.0	-632.7	300.4	11.85	3.99	6.72
10170.0	-5677196	-2683691	-6057950	9995.7	-624.7	313.8	11.89	4.01	6.73
10172.0	-5657181	-2684932	-6057309	10019.6	-616.7	327.3	11.94	4.03	6.75
10174.0	-5637118	-2686157	-6056641	10043.5	-608.6	340.8	12.00	4.07	6.77
10176.0	-5617007	-2687366	-6055945	10067.6	-600.4	354.5	12.06	4.15	6.86
10178.0	-5596848	-2688559	-6055222	10091.7	-592.0	368.4	12.11	4.26	7.02
10180.0	-5576640	-2689734	-6054472	10116.0	-583.4	382.5	12.17	4.35	7.16
10182.0	-5556384	-2690892	-6053692	10140.4	-574.6	396.9	12.24	4.39	7.21
10184.0	-5536078	-2692032	-6052884	10164.9	-565.9	411.3	12.29	4.37	7.16
10186.0	-5515724	-2693155	-6052047	10189.6	-557.1	425.6	12.35	4.36	7.11
10188.0	-5495320	-2694261	-6051182	10214.4	-548.4	439.8	12.42	4.37	7.11
10190.0	-5474866	-2695349	-6050288	10239.3	-539.6	454.0	12.50	4.39	7.12
10192.0	-5454363	-2696420	-6049366	10264.4	-530.9	468.2	12.58	4.37	7.11
10194.0	-5433809	-2697473	-6048415	10289.6	-522.2	482.4	12.63	4.36	7.07
10196.0	-5413204	-2698508	-6047436	10314.9	-513.4	496.5	12.69	4.36	7.05
10198.0	-5392549	-2699526	-6046429	10340.3	-504.7	510.6	12.74	4.36	7.03
10200.0	-5371843	-2700527	-6045394	10365.8	-496.0	524.7	12.80	4.34	7.02
10202.0	-5351085	-2701510	-6044330	10391.5	-487.4	538.7	12.85	4.31	6.99
	S-IVB 2ND GUIDANCE CUTOFF								
10203.030	-5340375	-2702010	-6043772	10404.7	-483.1	545.8	12.88	3.98	6.90
10204.0	-5330280	-2702477	-6043239	10407.6	-479.5	552.5	-1.35	3.27	6.76
10206.0	-5309471	-2703430	-6042121	10404.9	-473.1	566.0	-1.37	3.18	6.75
10208.0	-5288663	-2704369	-6040975	10402.1	-466.8	579.5	-1.38	3.18	6.74
10210.0	-5267861	-2705297	-6039803	10399.3	-460.4	592.9	-1.41	3.18	6.72
10212.0	-5247066	-2706211	-6038603	10396.5	-454.0	606.4	-1.43	3.18	6.71
	TRANSLUNAR INJECTION (TLI)								
10213.030	-5236358	-2706677	-6037975	10395.0	-450.8	613.3	-1.44	3.18	6.71
10250.0	-4853136	-2721191	-6010771	10333.9	-334.2	857.0	-1.86	3.13	6.47
10300.0	-4338984	-2734018	-5959985	10227.9	-180.1	1171.3	-2.37	3.03	6.09
10350.0	-3830741	-2739298	-5893977	10098.2	-31.8	1465.5	-2.80	2.90	5.67
10400.0	-3329490	-2737312	-5813809	9948.9	109.6	1737.4	-3.16	2.75	5.21
10450.0	-2836112	-2729463	-5720627	9783.9	243.0	1986.0	-3.43	2.58	4.73
10500.0	-2351297	-2713154	-5615611	9607.0	367.9	2210.7	-3.63	2.41	4.26

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
10550.0	-1875547	-2691818	-5499949	9421.8	494.0	2411.9	-3.77	2.23	3.79
10600.0	-1409198	-2664897	-5374800	9231.5	591.4	2590.3	-3.84	2.06	3.35
10650.0	-952440	-2632826	-5241280	9038.7	690.0	2747.0	-3.87	1.89	2.93
10700.0	-505336	-2596031	-5100440	8845.7	780.4	2883.3	-3.85	1.73	2.53
10750.0	-67846	-2554916	-4953262	8654.4	862.9	3000.8	-3.80	1.57	2.17
10800.0	360153	-2509865	-4800649	8466.2	938.0	3101.0	-3.72	1.43	1.84
10850.0	778850	-2461232	-4643428	8282.4	1006.2	3185.4	-3.63	1.30	1.54
10900.0	1188484	-2409350	-4482349	8103.8	1068.1	3255.6	-3.52	1.18	1.27
10950.0	1589330	-2354522	-4318087	7931.0	1124.1	3312.9	-3.40	1.07	1.03
11000.0	1981686	-2297026	-4151249	7764.3	1174.9	3358.8	-3.27	0.96	0.81
11050.0	2365869	-2237116	-3982378	7604.1	1220.8	3394.4	-3.14	0.87	0.62
11100.0	2742203	-2175021	-3811959	7450.4	1262.3	3420.9	-3.01	0.79	0.45
11150.0	3111014	-2110952	-3640420	7303.2	1299.9	3439.3	-2.88	0.71	0.29
11200.0	3472626	-2045096	-3468145	7162.4	1333.8	3450.5	-2.75	0.65	0.16
11250.0	3827361	-1977625	-3295471	7028.0	1364.5	3455.4	-2.63	0.58	0.04
11300.0	4175529	-1908694	-3122699	6899.7	1392.3	3454.6	-2.50	0.53	-0.07
11350.0	4517435	-1838442	-2950091	6777.4	1417.4	3448.9	-2.39	0.48	-0.16
11400.0	4853369	-1766994	-2777883	6660.9	1440.1	3438.8	-2.28	0.43	-0.24
11450.0	5183613	-1694466	-2606280	6549.8	1460.7	3424.8	-2.17	0.39	-0.32
11500.0	5508436	-1620960	-2435464	6444.0	1479.3	3407.3	-2.07	0.35	-0.38
11550.0	5828094	-1546570	-2265595	6343.2	1496.1	3386.9	-1.97	0.32	-0.44
11600.0	6142832	-1471379	-2096816	6247.1	1511.3	3363.9	-1.87	0.29	-0.49
11650.0	6452884	-1395465	-1929248	6155.7	1525.0	3338.5	-1.79	0.26	-0.53
11700.0	6758470	-1318897	-1763003	6068.5	1537.5	3311.0	-1.70	0.24	-0.57
	CSM SEPARATION								
11723.000	6897582	-1283472	-1686998	6029.8	1542.8	3297.8	-1.66	0.23	-0.58

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									
9278.200	-2313.167	-143.841	-6150.418	7290.6	-26.8	-2745.8	3.25	0.19	8.64
9280.0	-2300.038	-143.889	-6155.346	7296.4	-26.5	-2730.2	3.23	0.19	8.65
9290.0	-2226.914	-144.145	-6182.215	7328.2	-24.6	-2643.5	3.13	0.19	8.69
9300.0	-2153.477	-144.381	-6208.216	7359.1	-22.6	-2556.5	3.03	0.19	8.72
9310.0	-2079.736	-144.597	-6233.344	7388.8	-20.7	-2469.1	2.92	0.19	8.76
9320.0	-2005.703	-144.795	-6257.597	7417.6	-18.8	-2381.4	2.82	0.19	8.79
9330.0	-1931.388	-144.973	-6280.971	7445.3	-16.8	-2293.3	2.71	0.19	8.82
9340.0	-1856.801	-145.131	-6303.462	7471.9	-14.9	-2204.9	2.61	0.19	8.86
9350.0	-1781.953	-145.270	-6325.068	7497.5	-12.9	-2116.2	2.50	0.19	8.89
9360.0	-1706.854	-145.389	-6345.786	7522.1	-11.0	-2027.2	2.40	0.19	8.92
9370.0	-1631.515	-145.489	-6365.612	7545.6	-9.0	-1937.9	2.29	0.19	8.94
9380.0	-1555.946	-145.569	-6384.543	7568.0	-7.0	-1848.4	2.19	0.19	8.97
9390.0	-1480.158	-145.630	-6402.578	7589.4	-5.1	-1758.5	2.08	0.19	9.00
9400.0	-1404.161	-145.671	-6419.713	7609.7	-3.1	-1668.5	1.97	0.19	9.02
9410.0	-1327.967	-145.693	-6435.947	7628.9	-1.2	-1578.2	1.87	0.20	9.04
9420.0	-1251.586	-145.694	-6451.276	7647.1	0.8	-1487.7	1.76	0.20	9.06
9430.0	-1175.029	-145.676	-6465.699	7664.2	2.8	-1396.9	1.65	0.20	9.08
9440.0	-1098.306	-145.639	-6479.214	7680.2	4.7	-1306.0	1.54	0.20	9.10
9450.0	-1021.429	-145.582	-6491.819	7695.1	6.7	-1214.9	1.44	0.20	9.12
9460.0	-944.407	-145.505	-6503.511	7709.0	8.7	-1123.6	1.33	0.20	9.14
9470.0	-867.253	-145.408	-6514.290	7721.7	10.7	-1032.1	1.22	0.20	9.15
9480.0	-789.976	-145.292	-6524.153	7733.4	12.6	-940.6	1.11	0.20	9.17
9490.0	-712.588	-145.156	-6533.100	7744.0	14.6	-848.8	1.00	0.20	9.18
9500.0	-635.099	-145.000	-6541.130	7753.5	16.6	-757.0	0.89	0.20	9.19
9510.0	-557.521	-144.824	-6548.240	7761.9	18.5	-665.0	0.78	0.20	9.20
9520.0	-479.864	-144.629	-6554.430	7769.3	20.5	-573.0	0.67	0.19	9.21
9530.0	-402.139	-144.415	-6559.700	7775.5	22.5	-480.9	0.57	0.19	9.22
9540.0	-324.358	-144.180	-6564.048	7780.6	24.4	-388.7	0.46	0.19	9.22
9550.0	-246.530	-143.926	-6567.473	7784.7	26.4	-296.5	0.35	0.19	9.23
9560.0	-168.668	-143.653	-6569.977	7787.6	28.3	-204.2	0.24	0.19	9.23
9570.0	-90.781	-143.360	-6571.557	7789.5	30.3	-111.9	0.13	0.19	9.23
9580.0	-12.881	-143.047	-6572.214	7790.3	32.2	-19.5	0.02	0.19	9.23
9590.0	65.021	-142.715	-6571.947	7789.9	34.2	72.8	-0.09	0.19	9.23
9600.0	142.914	-142.364	-6570.758	7788.5	36.1	165.1	-0.20	0.19	9.23
9610.0	220.788	-141.993	-6568.645	7786.0	38.1	257.4	-0.31	0.19	9.23
9620.0	298.631	-141.602	-6565.609	7782.4	40.0	349.7	-0.42	0.19	9.23
9630.0	376.433	-141.193	-6561.651	7777.7	41.9	441.9	-0.53	0.19	9.22
9640.0	454.182	-140.764	-6556.771	7771.9	43.9	534.1	-0.64	0.19	9.21
9650.0	531.867	-140.315	-6550.971	7765.0	45.8	626.1	-0.75	0.19	9.20
9660.0	609.479	-139.848	-6544.249	7757.1	47.7	718.1	-0.86	0.19	9.20

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
9670.0	687.005	-139.361	-6536.609	7748.0	49.6	810.0	-0.96	0.19	9.18
9680.0	764.435	-138.855	-6528.050	7737.8	51.5	901.8	-1.07	0.19	9.17
9690.0	841.758	-138.330	-6518.574	7726.6	53.4	993.4	-1.18	0.19	9.16
9700.0	918.964	-137.787	-6508.182	7714.3	55.3	1084.9	-1.29	0.19	9.14
9710.0	996.040	-137.224	-6496.876	7700.8	57.2	1176.3	-1.40	0.19	9.13
9720.0	1072.977	-136.642	-6484.657	7686.3	59.1	1267.5	-1.51	0.19	9.11
9730.0	1149.763	-136.042	-6471.527	7670.8	61.0	1358.5	-1.62	0.19	9.09
9740.0	1226.388	-135.423	-6457.488	7654.1	62.8	1449.3	-1.72	0.19	9.07
9750.0	1302.841	-134.785	-6442.542	7636.3	64.7	1539.9	-1.83	0.18	9.05
9760.0	1379.112	-134.129	-6426.691	7617.5	66.6	1630.3	-1.94	0.19	9.03
9770.0	1455.188	-133.454	-6409.937	7597.6	68.5	1720.5	-2.05	0.18	9.01
9780.0	1531.061	-132.760	-6392.282	7576.7	70.3	1810.4	-2.15	0.18	8.99
9790.0	1606.719	-132.048	-6373.729	7554.8	72.1	1900.1	-2.26	0.18	8.96
9800.0	1682.153	-131.317	-6354.281	7531.7	73.9	1989.5	-2.37	0.18	8.93
9810.0	1757.350	-130.569	-6333.940	7507.6	75.8	2078.6	-2.47	0.18	8.90
9820.0	1832.302	-129.802	-6312.709	7482.5	77.6	2167.5	-2.57	0.18	8.87
9830.0	1906.996	-129.018	-6290.591	7456.3	79.3	2256.1	-2.67	0.18	8.84
9840.0	1981.424	-128.216	-6267.589	7429.0	81.1	2344.3	-2.77	0.18	8.81
9850.0	2055.573	-127.395	-6243.707	7400.7	82.9	2432.1	-2.87	0.18	8.78
	S-IVB RE-IGNITION (STDV OPEN)								
9856.200	2101.402	-126.878	-6228.459	7382.8	84.0	2486.5	-2.88	0.17	8.75
9858.0	2114.688	-126.727	-6223.969	7380.1	84.2	2503.1	0.62	0.11	9.83
9860.0	2129.451	-126.558	-6218.942	7383.8	84.6	2523.7	2.35	0.16	10.52
9862.0	2144.223	-126.388	-6213.874	7388.6	85.0	2544.9	2.48	0.19	10.59
9864.0	2159.005	-126.218	-6208.763	7393.6	85.3	2566.1	2.52	0.15	10.61
9866.0	2173.797	-126.047	-6203.610	7398.7	85.6	2587.3	2.56	0.14	10.63
9868.0	2188.600	-125.875	-6198.414	7403.8	85.9	2608.7	2.54	0.09	10.74
9870.0	2203.412	-125.704	-6193.175	7408.7	85.9	2630.5	2.43	0.02	10.97
9872.0	2218.234	-125.532	-6187.892	7413.5	86.0	2652.5	2.38	0.01	11.09
9874.0	2233.066	-125.360	-6182.565	7418.2	86.0	2674.7	2.39	0.03	11.13
9876.0	2247.907	-125.188	-6177.194	7423.0	86.1	2696.9	2.41	0.05	11.11
9878.0	2262.758	-125.015	-6171.777	7427.8	86.2	2719.2	2.40	0.05	11.13
9880.0	2277.619	-124.843	-6166.317	7432.6	86.3	2741.4	2.38	0.07	11.15
9882.0	2292.488	-124.670	-6160.812	7437.3	86.5	2763.9	2.35	0.10	11.18
9884.0	2307.368	-124.497	-6155.262	7442.0	86.7	2786.1	2.35	0.12	11.19
9886.0	2322.256	-124.323	-6149.667	7446.7	87.0	2808.5	2.35	0.13	11.21
9888.0	2337.154	-124.149	-6144.028	7451.5	87.2	2831.0	2.36	0.13	11.22
9890.0	2352.062	-123.974	-6138.343	7456.2	87.5	2853.4	2.35	0.14	11.23
9892.0	2366.979	-123.799	-6132.614	7460.8	87.8	2875.9	2.32	0.16	11.24
9894.0	2381.905	-123.623	-6126.840	7465.4	88.1	2898.4	2.28	0.17	11.25
9896.0	2396.841	-123.446	-6121.020	7470.0	88.5	2920.9	2.26	0.18	11.26

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
9898.0	2411.785	-123.269	-6115.156	7474.5	88.9	2943.4	2.25	0.19	11.26
9900.0	2426.739	-123.091	-6109.247	7479.0	89.3	2965.9	2.25	0.21	11.27
9902.0	2441.701	-122.912	-6103.292	7483.5	89.7	2988.5	2.25	0.22	11.28
9904.0	2456.673	-122.732	-6097.293	7488.0	90.1	3011.0	2.25	0.22	11.29
9906.0	2471.653	-122.552	-6091.248	7492.5	90.6	3033.6	2.24	0.22	11.31
9908.0	2486.643	-122.370	-6085.158	7497.0	91.0	3056.3	2.24	0.23	11.33
9910.0	2501.642	-122.187	-6079.023	7501.5	91.5	3078.9	2.22	0.24	11.34
9912.0	2516.649	-122.004	-6072.842	7505.9	92.0	3101.6	2.21	0.25	11.34
9914.0	2531.665	-121.819	-6066.617	7510.3	92.5	3124.3	2.20	0.26	11.34
9916.0	2546.690	-121.634	-6060.345	7514.7	93.0	3147.0	2.18	0.27	11.35
9918.0	2561.724	-121.447	-6054.029	7519.1	93.6	3169.7	2.17	0.28	11.35
9920.0	2576.767	-121.260	-6047.667	7523.4	94.2	3192.4	2.16	0.29	11.36
9922.0	2591.818	-121.071	-6041.259	7527.7	94.7	3215.1	2.14	0.30	11.36
9924.0	2606.877	-120.881	-6034.806	7532.0	95.4	3237.8	2.14	0.31	11.37
9926.0	2621.946	-120.689	-6028.308	7536.3	96.0	3260.6	2.14	0.31	11.38
9928.0	2637.023	-120.497	-6021.764	7540.6	96.6	3283.3	2.14	0.31	11.39
9930.0	2652.108	-120.303	-6015.174	7544.9	97.2	3306.1	2.14	0.33	11.41
9932.0	2667.202	-120.108	-6008.539	7549.1	97.9	3329.0	2.14	0.34	11.42
9934.0	2682.304	-119.911	-6001.859	7553.4	98.6	3351.8	2.13	0.35	11.43
9936.0	2697.416	-119.713	-5995.132	7557.7	99.3	3374.7	2.11	0.35	11.44
9938.0	2712.535	-119.514	-5988.360	7561.9	100.0	3397.6	2.10	0.35	11.44
9940.0	2727.663	-119.313	-5981.542	7566.1	100.7	3420.4	2.10	0.36	11.45
9942.0	2742.799	-119.111	-5974.678	7570.3	101.4	3443.4	2.10	0.37	11.46
9944.0	2757.944	-118.908	-5967.768	7574.5	102.2	3466.3	2.10	0.38	11.46
9946.0	2773.098	-118.702	-5960.813	7578.7	103.0	3489.2	2.08	0.38	11.47
9948.0	2788.259	-118.496	-5953.812	7582.8	103.7	3512.1	2.07	0.39	11.48
9950.0	2803.429	-118.287	-5946.764	7587.0	104.5	3535.1	2.06	0.40	11.49
9952.0	2818.607	-118.078	-5939.671	7591.1	105.3	3558.1	2.06	0.41	11.51
9954.0	2833.793	-117.866	-5932.532	7595.3	106.2	3581.1	2.06	0.42	11.51
9956.0	2848.988	-117.653	-5925.347	7599.4	107.0	3604.2	2.06	0.42	11.52
9958.0	2864.191	-117.438	-5918.115	7603.5	107.9	3627.2	2.06	0.43	11.52
9960.0	2879.402	-117.221	-5910.838	7607.6	108.8	3650.2	2.05	0.44	11.53
9962.0	2894.621	-117.003	-5903.514	7611.7	109.6	3673.3	2.03	0.44	11.53
9964.0	2909.849	-116.783	-5896.145	7615.8	110.5	3696.4	2.02	0.45	11.54
9966.0	2925.084	-116.561	-5888.729	7619.8	111.5	3719.4	2.00	0.46	11.55
9968.0	2940.328	-116.337	-5881.267	7623.8	112.4	3742.5	2.00	0.47	11.53
9970.0	2955.580	-116.111	-5873.759	7627.7	113.3	3765.6	1.98	0.46	11.56
9972.0	2970.839	-115.884	-5866.204	7631.7	114.3	3788.7	1.97	0.49	11.55
9974.0	2986.106	-115.654	-5858.604	7635.6	115.2	3811.9	1.99	0.48	11.57
9976.0	3001.383	-115.423	-5850.956	7640.9	116.3	3835.7	2.86	0.55	12.06
9978.0	3016.670	-115.189	-5843.261	7646.6	117.4	3859.8	2.87	0.55	12.08
9980.0	3031.969	-114.953	-5835.517	7652.4	118.5	3884.0	2.89	0.57	12.08
9982.0	3047.280	-114.715	-5827.725	7658.2	119.6	3908.1	2.91	0.56	12.09

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
9984.0	3062.602	-114.474	-5819.884	7664.0	120.8	3932.3	2.91	0.62	12.11
9986.0	3077.936	-114.231	-5811.995	7669.8	122.1	3956.6	2.91	0.66	12.14
9988.0	3093.281	-113.986	-5804.058	7675.7	123.4	3980.9	2.91	0.66	12.17
9990.0	3108.638	-113.738	-5796.072	7681.5	124.7	4005.2	2.92	0.61	12.18
9992.0	3124.007	-113.487	-5788.037	7687.3	125.9	4029.6	2.92	0.57	12.17
9994.0	3139.388	-113.234	-5779.954	7693.2	127.0	4053.9	2.93	0.57	12.17
9996.0	3154.780	-112.979	-5771.821	7699.1	128.2	4078.3	2.93	0.59	12.18
9998.0	3170.184	-112.721	-5763.641	7704.9	129.4	4102.6	2.94	0.60	12.20
10000.0	3185.600	-112.461	-5755.411	7710.8	130.6	4127.0	2.94	0.61	12.21
10002.0	3201.027	-112.199	-5747.132	7716.7	131.8	4151.5	2.94	0.62	12.21
10004.0	3216.467	-111.934	-5738.805	7722.6	133.1	4175.9	2.95	0.65	12.22
10006.0	3231.918	-111.666	-5730.429	7728.5	134.4	4200.4	2.96	0.67	12.24
10008.0	3247.381	-111.396	-5722.004	7734.4	135.8	4224.9	2.96	0.69	12.26
10010.0	3262.855	-111.123	-5713.529	7740.3	137.2	4249.4	2.95	0.70	12.28
10012.0	3278.342	-110.848	-5705.006	7746.2	138.6	4274.0	2.95	0.71	12.30
10014.0	3293.840	-110.569	-5696.433	7752.2	140.0	4298.6	2.96	0.73	12.31
10016.0	3309.350	-110.287	-5687.812	7758.1	141.5	4323.2	2.97	0.75	12.32
10018.0	3324.873	-110.003	-5679.140	7764.1	143.0	4347.9	2.97	0.77	12.34
10020.0	3340.407	-109.715	-5670.420	7770.0	144.6	4372.5	2.97	0.78	12.35
10022.0	3355.953	-109.425	-5661.650	7776.0	146.1	4397.2	2.97	0.79	12.35
10024.0	3371.510	-109.131	-5652.831	7781.9	147.7	4421.9	2.98	0.80	12.35
10026.0	3387.080	-108.834	-5643.962	7787.9	149.3	4446.7	2.99	0.81	12.37
10028.0	3402.662	-108.533	-5635.044	7793.9	151.0	4471.4	3.00	0.83	12.40
10030.0	3418.256	-108.230	-5626.077	7799.9	152.7	4496.2	3.00	0.84	12.41
10032.0	3433.862	-107.923	-5617.059	7805.9	154.3	4521.1	3.01	0.85	12.42
10034.0	3449.480	-107.612	-5607.992	7811.9	156.1	4545.9	3.01	0.86	12.44
10036.0	3465.109	-107.299	-5598.876	7817.9	157.8	4570.8	3.01	0.87	12.46
10038.0	3480.751	-106.981	-5589.709	7824.0	159.5	4595.8	3.01	0.88	12.48
10040.0	3496.405	-106.660	-5580.493	7830.0	161.3	4620.7	3.03	0.89	12.49
10042.0	3512.071	-106.336	-5571.226	7836.1	163.1	4645.7	3.04	0.90	12.50
10044.0	3527.750	-106.008	-5561.910	7842.2	164.9	4670.7	3.05	0.92	12.50
10046.0	3543.440	-105.676	-5552.543	7848.3	166.8	4695.7	3.06	0.93	12.52
10048.0	3559.143	-105.341	-5543.127	7854.4	168.6	4720.8	3.07	0.95	12.54
10050.0	3574.858	-105.002	-5533.660	7860.6	170.6	4745.9	3.08	0.96	12.56
10052.0	3590.585	-104.659	-5524.143	7866.8	172.5	4771.0	3.09	0.97	12.58
10054.0	3606.325	-104.312	-5514.576	7873.0	174.5	4796.2	3.10	0.98	12.60
10056.0	3622.077	-103.961	-5504.958	7879.2	176.4	4821.4	3.11	0.99	12.61
10058.0	3637.842	-103.606	-5495.290	7885.4	178.4	4846.6	3.12	1.01	12.63
10060.0	3653.619	-103.247	-5485.572	7891.6	180.5	4871.9	3.12	1.02	12.64
10062.0	3669.408	-102.884	-5475.803	7897.9	182.5	4897.2	3.13	1.04	12.66
10064.0	3685.210	-102.517	-5465.983	7904.2	184.6	4922.5	3.15	1.05	12.68
10066.0	3701.025	-102.146	-5456.112	7910.5	186.7	4947.9	3.15	1.06	12.69
10068.0	3716.852	-101.770	-5446.191	7916.8	188.8	4973.3	3.16	1.07	12.70

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
10070.0	3732.692	-101.390	-5436.219	7923.1	191.0	4998.7	3.18	1.08	12.72
10072.0	3748.545	-101.006	-5426.196	7929.5	193.2	5024.2	3.19	1.11	12.75
10074.0	3764.410	-100.618	-5416.122	7935.9	195.4	5049.7	3.20	1.12	12.77
10076.0	3780.288	-100.224	-5405.997	7942.3	197.7	5075.3	3.21	1.14	12.78
10078.0	3796.180	-99.827	-5395.821	7948.7	200.0	5100.8	3.22	1.14	12.80
10080.0	3812.083	-99.425	-5385.594	7955.2	202.3	5126.5	3.23	1.16	12.82
10082.0	3828.000	-99.018	-5375.315	7961.7	204.6	5152.1	3.25	1.17	12.84
10084.0	3843.930	-98.606	-5364.986	7968.2	206.9	5177.8	3.27	1.18	12.86
10086.0	3859.873	-98.190	-5354.604	7974.8	209.3	5203.5	3.28	1.19	12.88
10088.0	3875.829	-97.769	-5344.171	7981.3	211.7	5229.3	3.29	1.21	12.90
10090.0	3891.799	-97.343	-5333.687	7987.9	214.2	5255.1	3.31	1.23	12.92
10092.0	3907.781	-96.912	-5323.151	7994.6	216.7	5281.0	3.32	1.25	12.94
10094.0	3923.777	-96.476	-5312.563	8001.2	219.2	5306.9	3.34	1.26	12.95
10096.0	3939.786	-96.035	-5301.923	8007.9	221.7	5332.8	3.35	1.28	12.97
10098.0	3955.809	-95.589	-5291.232	8014.7	224.3	5358.7	3.36	1.29	13.00
10100.0	3971.845	-95.138	-5280.488	8021.4	226.9	5384.8	3.37	1.31	13.03
10102.0	3987.894	-94.682	-5269.693	8028.1	229.5	5410.8	3.38	1.32	13.05
10104.0	4003.957	-94.220	-5258.845	8034.9	232.2	5437.0	3.40	1.34	13.07
10106.0	4020.034	-93.753	-5247.945	8041.8	234.9	5463.1	3.42	1.36	13.09
10108.0	4036.124	-93.280	-5236.992	8048.6	237.6	5489.3	3.43	1.37	13.12
10110.0	4052.229	-92.802	-5225.987	8055.5	240.4	5515.6	3.45	1.39	13.15
10112.0	4068.346	-92.319	-5214.930	8062.4	243.2	5541.9	3.46	1.40	13.18
10114.0	4084.478	-91.830	-5203.820	8069.4	246.0	5568.3	3.48	1.42	13.20
10116.0	4100.624	-91.335	-5192.657	8076.3	248.9	5594.7	3.49	1.44	13.23
10118.0	4116.784	-90.834	-5181.441	8083.3	251.8	5621.2	3.51	1.46	13.25
10120.0	4132.957	-90.328	-5170.172	8090.4	254.7	5647.8	3.53	1.47	13.28
10122.0	4149.145	-89.815	-5158.850	8097.4	257.7	5674.3	3.54	1.49	13.30
10124.0	4165.347	-89.297	-5147.474	8104.5	260.7	5701.0	3.56	1.51	13.33
10126.0	4181.563	-88.772	-5136.046	8111.7	263.7	5727.7	3.57	1.53	13.37
10128.0	4197.794	-88.242	-5124.564	8118.8	266.8	5754.5	3.59	1.55	13.41
10130.0	4214.039	-87.705	-5113.028	8126.0	269.9	5781.3	3.61	1.55	13.43
10132.0	4230.298	-87.162	-5101.438	8133.3	273.0	5808.2	3.62	1.57	13.45
10134.0	4246.572	-86.613	-5089.795	8140.6	276.2	5835.1	3.64	1.59	13.49
10136.0	4262.860	-86.057	-5078.098	8147.9	279.4	5862.1	3.66	1.61	13.53
10138.0	4279.163	-85.495	-5066.347	8155.2	282.6	5889.2	3.68	1.63	13.57
10140.0	4295.481	-84.927	-5054.541	8162.6	285.9	5916.4	3.69	1.65	13.61
10142.0	4311.814	-84.352	-5042.681	8170.0	289.2	5943.6	3.71	1.67	13.64
10144.0	4328.161	-83.770	-5030.766	8177.4	292.6	5970.9	3.73	1.69	13.67
10146.0	4344.523	-83.181	-5018.797	8184.9	296.0	5998.3	3.76	1.71	13.71
10148.0	4360.901	-82.586	-5006.773	8192.5	299.4	6025.8	3.78	1.72	13.75
10150.0	4377.293	-81.984	-4994.694	8200.0	302.9	6053.3	3.79	1.74	13.79
10152.0	4393.701	-81.374	-4982.560	8207.6	306.4	6080.9	3.80	1.76	13.84
10154.0	4410.124	-80.758	-4970.370	8215.3	309.9	6108.7	3.82	1.78	13.89

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
10156.0	4426.562	-80.135	-4958.125	8222.9	313.5	6136.5	3.84	1.80	13.93
10158.0	4443.015	-79.504	-4945.824	8230.6	317.1	6164.4	3.86	1.83	13.98
10160.0	4459.484	-78.866	-4933.467	8238.4	320.8	6192.4	3.88	1.86	14.03
10162.0	4475.969	-78.221	-4921.054	8246.2	324.6	6220.5	3.91	1.87	14.08
10164.0	4492.469	-77.568	-4908.585	8254.0	328.3	6248.7	3.93	1.88	14.14
10166.0	4508.985	-76.907	-4896.059	8261.9	332.1	6277.0	3.95	1.89	14.18
10168.0	4525.517	-76.239	-4883.477	8269.8	335.9	6305.5	3.97	1.90	14.23
10170.0	4542.064	-75.564	-4870.837	8277.8	339.7	6334.0	3.98	1.92	14.28
10172.0	4558.628	-74.881	-4858.141	8285.7	343.5	6362.6	4.00	1.94	14.33
10174.0	4575.207	-74.190	-4845.387	8293.8	347.4	6391.3	4.02	1.96	14.39
10176.0	4591.803	-73.491	-4832.576	8301.8	351.4	6420.2	3.99	2.00	14.52
10178.0	4608.414	-72.784	-4819.706	8309.7	355.5	6449.4	3.91	2.05	14.70
10180.0	4625.041	-72.069	-4806.778	8317.4	359.6	6479.0	3.85	2.08	14.87
10182.0	4641.684	-71.346	-4793.790	8325.2	363.8	6508.8	3.86	2.09	14.96
10184.0	4658.342	-70.614	-4780.743	8333.0	367.9	6538.7	3.93	2.10	14.95
10186.0	4675.016	-69.874	-4767.635	8340.9	372.2	6568.6	4.00	2.11	14.95
10188.0	4691.706	-69.125	-4754.468	8348.9	376.4	6598.6	4.05	2.12	14.99
10190.0	4708.412	-68.368	-4741.241	8357.1	380.7	6628.6	4.11	2.13	15.05
10192.0	4725.134	-67.603	-4727.954	8365.4	384.9	6658.7	4.16	2.14	15.10
10194.0	4741.873	-66.829	-4714.606	8373.8	389.2	6688.9	4.22	2.14	15.10
10196.0	4758.629	-66.046	-4701.198	8382.3	393.5	6719.1	4.27	2.15	15.12
10198.0	4775.402	-65.255	-4687.730	8390.9	397.8	6749.4	4.32	2.16	15.13
10200.0	4792.193	-64.455	-4674.200	8399.5	402.1	6779.7	4.37	2.15	15.15
10202.0	4809.001	-63.646	-4660.611	8408.4	406.4	6809.9	4.43	2.13	15.16
	S-IVB 2ND GUIDANCE CUTOFF								
10203.030	4817.664	-63.226	-4653.588	8413.0	408.5	6825.5	4.60	1.87	15.02
10204.0	4825.824	-62.830	-4646.963	8409.9	409.2	6834.2	-6.45	0.16	6.18
10206.0	4842.628	-62.011	-4633.284	8397.1	409.5	6846.5	-6.43	0.08	6.14
10208.0	4859.410	-61.192	-4619.579	8384.2	409.6	6858.7	-6.44	0.08	6.12
10210.0	4876.166	-60.373	-4605.849	8371.3	409.8	6870.9	-6.45	0.08	6.09
10212.0	4892.896	-59.553	-4592.095	8358.4	410.0	6883.1	-6.47	0.08	6.06
	TRANSLUNAR INJECTION (TLI)								
10213.030	4901.502	-59.131	-4585.002	8351.7	410.0	6889.3	-6.47	0.08	6.05
10250.0	5205.789	-43.920	-4326.277	8108.2	412.7	7104.2	-6.70	0.06	5.57
10300.0	5602.723	-23.222	-3964.391	7767.4	415.0	7365.7	-6.92	0.03	4.89
10350.0	5982.387	-2.440	-3590.276	7418.3	416.1	7593.3	-7.03	0.01	4.22
10400.0	6344.497	18.363	-3205.617	7066.0	415.9	7787.6	-7.05	-0.02	3.56
10450.0	6689.003	39.128	-2812.055	6714.8	414.6	7949.7	-6.99	-0.04	2.93
10500.0	7016.059	59.806	-2411.149	6368.6	412.4	8081.7	-6.85	-0.05	2.35

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
10550.0	7325.992	80.350	-2004.350	6030.3	409.3	8185.9	-6.67	-0.07	1.82
10600.0	7619.262	100.726	-1592.983	5702.4	405.6	8264.8	-6.44	-0.08	1.35
10650.0	7896.434	120.901	-1178.243	5386.6	401.3	8321.3	-6.19	-0.09	0.92
10700.0	8158.145	140.851	-761.188	5084.1	396.6	8357.8	-5.91	-0.10	0.55
10750.0	8405.079	160.557	-342.747	4795.6	391.6	8377.1	-5.63	-0.10	0.23
10800.0	8637.945	180.005	76.274	4521.4	386.3	8381.4	-5.34	-0.11	-0.05
10850.0	8857.462	199.185	495.183	4261.6	380.9	8373.0	-5.05	-0.11	-0.28
10900.0	9064.342	218.089	913.392	4015.9	375.3	8353.7	-4.78	-0.11	-0.48
10950.0	9259.281	236.713	1330.402	3783.9	369.7	8325.3	-4.51	-0.11	-0.65
11000.0	9442.954	255.058	1745.799	3565.2	364.1	8289.4	-4.25	-0.11	-0.79
11050.0	9616.008	273.122	2159.238	3359.1	358.5	8247.2	-4.00	-0.11	-0.90
11100.0	9779.060	290.908	2570.434	3164.9	353.0	8199.9	-3.77	-0.11	-0.99
11150.0	9932.692	308.419	2979.159	2982.2	347.5	8148.5	-3.55	-0.11	-1.06
11200.0	10077.456	325.660	3385.227	2810.1	342.2	8093.8	-3.34	-0.11	-1.12
11250.0	10213.870	342.636	3788.493	2648.1	336.9	8036.5	-3.14	-0.10	-1.17
11300.0	10342.419	359.353	4188.844	2495.4	331.8	7977.3	-2.96	-0.10	-1.20
11350.0	10463.558	375.816	4586.198	2351.6	326.8	7916.6	-2.79	-0.10	-1.22
11400.0	10577.713	392.031	4980.492	2215.9	321.9	7855.0	-2.63	-0.10	-1.24
11450.0	10685.281	408.006	5371.687	2088.0	317.1	7792.7	-2.49	-0.09	-1.25
11500.0	10786.632	423.746	5759.759	1967.2	312.5	7730.1	-2.35	-0.09	-1.25
11550.0	10882.112	439.258	6144.698	1853.1	308.0	7667.4	-2.22	-0.09	-1.25
11600.0	10972.044	454.548	6526.506	1745.2	303.6	7604.9	-2.10	-0.09	-1.25
11650.0	11056.729	469.624	6905.195	1643.1	299.4	7542.7	-1.99	-0.08	-1.24
11700.0	11136.449	484.491	7280.784	1546.5	295.3	7480.9	-1.88	-0.08	-1.23
	CSM SEPARATION								
11723.000	11171.510	491.260	7452.513	1503.7	293.4	7452.7	-1.84	-0.08	-1.22

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										
9278.200	6572.600	139.1570	-23.7853	65.79	0.03	7388.4	67.11	0.03	7790.5	197926
9280.0	6572.607	139.2726	-23.7377	65.74	0.03	7388.5	67.06	0.03	7790.5	197921
9290.0	6572.648	139.9126	-23.4716	65.45	0.03	7388.5	66.79	0.03	7790.5	197889
9300.0	6572.690	140.5499	-23.2025	65.16	0.03	7388.5	66.52	0.03	7790.5	197857
9310.0	6572.731	141.1845	-22.9305	64.88	0.03	7388.6	66.26	0.03	7790.5	197825
9320.0	6572.772	141.8163	-22.6556	64.60	0.03	7388.6	65.99	0.03	7790.5	197792
9330.0	6572.813	142.4454	-22.3779	64.32	0.03	7388.7	65.74	0.03	7790.5	197760
9340.0	6572.854	143.0718	-22.0975	64.05	0.03	7388.7	65.48	0.03	7790.5	197727
9350.0	6572.895	143.6956	-21.8143	63.79	0.03	7388.8	65.23	0.03	7790.5	197694
9360.0	6572.936	144.3166	-21.5285	63.53	0.03	7388.8	64.99	0.03	7790.5	197662
9370.0	6572.976	144.9351	-21.2401	63.27	0.03	7388.9	64.75	0.03	7790.5	197629
9380.0	6573.017	145.5510	-20.9491	63.01	0.03	7388.9	64.51	0.03	7790.5	197596
9390.0	6573.057	146.1643	-20.6556	62.77	0.03	7389.0	64.28	0.03	7790.5	197564
9400.0	6573.097	146.7750	-20.3596	62.52	0.03	7389.0	64.05	0.03	7790.5	197531
9410.0	6573.138	147.3833	-20.0612	62.28	0.03	7389.1	63.82	0.03	7790.5	197499
9420.0	6573.177	147.9890	-19.7604	62.04	0.03	7389.1	63.60	0.03	7790.5	197466
9430.0	6573.217	148.5923	-19.4573	61.81	0.03	7389.2	63.38	0.03	7790.4	197434
9440.0	6573.257	149.1932	-19.1520	61.59	0.03	7389.2	63.17	0.03	7790.4	197402
9450.0	6573.296	149.7917	-18.8444	61.36	0.03	7389.3	62.96	0.03	7790.4	197371
9460.0	6573.335	150.3878	-18.5346	61.14	0.03	7389.3	62.75	0.03	7790.4	197339
9470.0	6573.374	150.9816	-18.2227	60.93	0.03	7389.4	62.56	0.03	7790.4	197308
9480.0	6573.412	151.5731	-17.9087	60.72	0.03	7389.4	62.36	0.03	7790.4	197277
9490.0	6573.451	152.1624	-17.5926	60.51	0.03	7389.4	62.17	0.03	7790.4	197247
9500.0	6573.489	152.7494	-17.2746	60.31	0.03	7389.5	61.98	0.03	7790.4	197217
9510.0	6573.526	153.3343	-16.9546	60.11	0.03	7389.5	61.79	0.03	7790.4	197187
9520.0	6573.564	153.9170	-16.6327	59.92	0.03	7389.6	61.61	0.03	7790.4	197158
9530.0	6573.601	154.4976	-16.3089	59.73	0.03	7389.6	61.43	0.03	7790.4	197129
9540.0	6573.638	155.0762	-15.9833	59.54	0.03	7389.6	61.26	0.03	7790.4	197101
9550.0	6573.675	155.6527	-15.6559	59.36	0.03	7389.7	61.09	0.03	7790.4	197073
9560.0	6573.711	156.2272	-15.3268	59.18	0.03	7389.7	60.93	0.03	7790.4	197046
9570.0	6573.747	156.7998	-14.9960	59.01	0.03	7389.8	60.77	0.03	7790.4	197019
9580.0	6573.783	157.3705	-14.6636	58.84	0.03	7389.8	60.61	0.03	7790.4	196993
9590.0	6573.818	157.9393	-14.3296	58.68	0.03	7389.9	60.45	0.03	7790.4	196968
9600.0	6573.853	158.5063	-13.9940	58.52	0.03	7389.9	60.31	0.03	7790.4	196944
9610.0	6573.888	159.0715	-13.6569	58.36	0.03	7389.9	60.16	0.03	7790.4	196920
9620.0	6573.922	159.6349	-13.3183	58.21	0.03	7390.0	60.02	0.03	7790.4	196897
9630.0	6573.957	160.1967	-12.9783	58.06	0.03	7390.0	59.88	0.02	7790.4	196874
9640.0	6573.990	160.7568	-12.6369	57.92	0.03	7390.1	59.75	0.02	7790.4	196853
9650.0	6574.024	161.3152	-12.2942	57.78	0.03	7390.1	59.62	0.02	7790.4	196832
9660.0	6574.057	161.8721	-11.9501	57.64	0.03	7390.2	59.49	0.02	7790.4	196812

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-FL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
9670.0	6574.089	162.4275	-11.6048	57.51	0.03	7390.2	59.37	0.02	7790.4	196793
9680.0	6574.122	162.9814	-11.2582	57.39	0.02	7390.2	59.25	0.02	7790.4	196774
9690.0	6574.153	163.5339	-10.9105	57.26	0.02	7390.3	59.14	0.02	7790.4	196757
9700.0	6574.185	164.0849	-10.5616	57.14	0.02	7390.3	59.02	0.02	7790.4	196741
9710.0	6574.216	164.6347	-10.2116	57.03	0.02	7390.3	58.92	0.02	7790.4	196726
9720.0	6574.247	165.1831	-9.8606	56.92	0.02	7390.3	58.81	0.02	7790.4	196711
9730.0	6574.277	165.7302	-9.5085	56.81	0.02	7390.4	58.72	0.02	7790.4	196698
9740.0	6574.307	166.2761	-9.1555	56.71	0.02	7390.4	58.62	0.02	7790.3	196685
9750.0	6574.337	166.8209	-8.8015	56.61	0.02	7390.4	58.53	0.02	7790.3	196674
9760.0	6574.366	167.3645	-8.4466	56.52	0.02	7390.4	58.44	0.02	7790.3	196664
9770.0	6574.395	167.9070	-8.0908	56.43	0.02	7390.4	58.36	0.02	7790.3	196655
9780.0	6574.423	168.4485	-7.7342	56.34	0.02	7390.5	58.28	0.02	7790.3	196647
9790.0	6574.451	168.9890	-7.3768	56.26	0.02	7390.6	58.20	0.02	7790.4	196639
9800.0	6574.478	169.5286	-7.0187	56.18	0.02	7390.6	58.13	0.02	7790.4	196633
9810.0	6574.505	170.0673	-6.6598	56.10	0.02	7390.7	58.06	0.02	7790.5	196628
9820.0	6574.532	170.6051	-6.3002	56.03	0.02	7390.7	57.99	0.02	7790.5	196625
9830.0	6574.558	171.1422	-5.9401	55.97	0.02	7390.8	57.93	0.02	7790.5	196622
9840.0	6574.584	171.6784	-5.5793	55.90	0.02	7390.8	57.87	0.02	7790.5	196621
9850.0	6574.609	172.2140	-5.2179	55.84	0.02	7390.9	57.82	0.02	7790.6	196621
	S-IVB RE-IGNITION (STDV OPEN)									
9856.200	6574.625	172.5457	-4.9936	55.81	0.02	7391.1	57.79	0.02	7790.8	196622
9858.0	6574.630	172.6420	-4.9285	55.80	0.02	7393.8	57.77	0.02	7793.5	196622
9860.0	6574.635	172.7490	-4.8560	55.79	0.02	7403.9	57.76	0.02	7803.6	196623
9862.0	6574.640	172.8562	-4.7833	55.78	0.02	7415.4	57.75	0.02	7815.1	196624
9864.0	6574.646	172.9635	-4.7106	55.78	0.02	7427.0	57.74	0.02	7826.7	196625
9866.0	6574.653	173.0710	-4.6377	55.77	0.03	7438.8	57.73	0.02	7838.5	196627
9868.0	6574.660	173.1786	-4.5647	55.76	0.03	7450.7	57.72	0.03	7850.4	196630
9870.0	6574.667	173.2863	-4.4916	55.75	0.03	7462.6	57.71	0.03	7862.3	196633
9872.0	6574.674	173.3942	-4.4183	55.74	0.02	7474.5	57.70	0.02	7874.2	196635
9874.0	6574.679	173.5023	-4.3449	55.73	0.02	7486.5	57.68	0.02	7886.1	196637
9876.0	6574.685	173.6105	-4.2714	55.72	0.02	7498.6	57.67	0.02	7898.2	196638
9878.0	6574.689	173.7189	-4.1977	55.71	0.02	7510.7	57.66	0.02	7910.4	196638
9880.0	6574.693	173.8274	-4.1239	55.70	0.02	7522.9	57.65	0.01	7922.5	196639
9882.0	6574.697	173.9361	-4.0499	55.69	0.01	7535.1	57.64	0.01	7934.7	196639
9884.0	6574.701	174.0449	-3.9758	55.68	0.01	7547.3	57.63	0.01	7947.0	196638
9886.0	6574.704	174.1539	-3.9016	55.68	0.01	7559.6	57.62	0.01	7959.2	196638
9888.0	6574.708	174.2631	-3.8272	55.67	0.01	7572.0	57.61	0.01	7971.6	196637
9890.0	6574.711	174.3724	-3.7527	55.66	0.01	7584.4	57.60	0.01	7984.0	196637
9892.0	6574.714	174.4818	-3.6781	55.66	0.01	7596.8	57.59	0.01	7996.4	196637
9894.0	6574.718	174.5915	-3.6033	55.65	0.02	7609.2	57.58	0.01	8008.8	196637
9896.0	6574.722	174.7013	-3.5284	55.64	0.02	7621.6	57.57	0.02	8021.2	196638

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
9898.0	6574.727	174.8112	-3.4534	55.64	0.02	7634.1	57.57	0.02	8033.7	196639
9900.0	6574.733	174.9213	-3.3782	55.63	0.02	7646.5	57.56	0.02	8046.1	196641
9902.0	6574.739	175.0316	-3.3029	55.63	0.02	7659.1	57.55	0.02	8058.7	196644
9904.0	6574.746	175.1421	-3.2275	55.62	0.03	7671.6	57.54	0.03	8071.3	196648
9906.0	6574.754	175.2527	-3.1520	55.62	0.03	7684.3	57.54	0.03	8083.9	196653
9908.0	6574.764	175.3635	-3.0763	55.62	0.04	7697.0	57.53	0.04	8096.6	196660
9910.0	6574.775	175.4744	-3.0004	55.61	0.04	7709.7	57.52	0.04	8109.3	196667
9912.0	6574.787	175.5855	-2.9245	55.61	0.05	7722.4	57.52	0.05	8122.0	196677
9914.0	6574.801	175.6968	-2.8484	55.60	0.05	7735.2	57.51	0.05	8134.8	196688
9916.0	6574.816	175.8083	-2.7722	55.60	0.06	7747.9	57.50	0.06	8147.6	196701
9918.0	6574.834	175.9199	-2.6958	55.60	0.07	7760.8	57.50	0.07	8160.4	196716
9920.0	6574.854	176.0318	-2.6193	55.60	0.08	7773.6	57.49	0.07	8173.2	196733
9922.0	6574.876	176.1437	-2.5427	55.59	0.08	7786.4	57.49	0.08	8186.1	196752
9924.0	6574.900	176.2559	-2.4660	55.59	0.09	7799.3	57.49	0.09	8199.0	196774
9926.0	6574.927	176.3683	-2.3891	55.59	0.10	7812.3	57.48	0.10	8211.9	196798
9928.0	6574.956	176.4809	-2.3121	55.59	0.11	7825.3	57.48	0.11	8225.0	196825
9930.0	6574.988	176.5935	-2.2350	55.59	0.12	7838.3	57.47	0.12	8238.0	196855
9932.0	6575.024	176.7064	-2.1577	55.59	0.13	7851.4	57.47	0.13	8251.1	196888
9934.0	6575.062	176.8194	-2.0803	55.59	0.15	7864.6	57.47	0.14	8264.3	196924
9936.0	6575.104	176.9327	-2.0028	55.59	0.16	7877.7	57.46	0.15	8277.5	196964
9938.0	6575.149	177.0461	-1.9251	55.59	0.17	7890.9	57.46	0.16	8290.7	197007
9940.0	6575.198	177.1597	-1.8473	55.59	0.18	7904.2	57.46	0.17	8303.9	197054
9942.0	6575.250	177.2735	-1.7694	55.59	0.20	7917.5	57.46	0.19	8317.2	197105
9944.0	6575.306	177.3875	-1.6914	55.59	0.21	7930.8	57.45	0.20	8330.6	197159
9946.0	6575.367	177.5017	-1.6132	55.59	0.23	7944.1	57.45	0.21	8344.0	197218
9948.0	6575.432	177.6160	-1.5349	55.59	0.24	7957.5	57.45	0.23	8357.4	197281
9950.0	6575.501	177.7306	-1.4565	55.59	0.26	7970.9	57.45	0.24	8370.8	197349
9952.0	6575.575	177.8453	-1.3779	55.60	0.27	7984.4	57.45	0.26	8384.3	197421
9954.0	6575.653	177.9602	-1.2992	55.60	0.29	7997.9	57.45	0.28	8397.8	197498
9956.0	6575.736	178.0754	-1.2204	55.60	0.31	8011.5	57.45	0.29	8411.4	197580
9958.0	6575.825	178.1907	-1.1415	55.60	0.32	8025.1	57.45	0.31	8425.1	197667
9960.0	6575.918	178.3062	-1.0624	55.61	0.34	8038.7	57.45	0.33	8438.7	197760
9962.0	6576.017	178.4219	-0.9832	55.61	0.36	8052.4	57.45	0.35	8452.4	197858
9964.0	6576.122	178.5378	-0.9039	55.61	0.38	8066.1	57.45	0.36	8466.1	197961
9966.0	6576.232	178.6539	-0.8245	55.62	0.40	8079.8	57.45	0.38	8479.8	198071
9968.0	6576.349	178.7702	-0.7449	55.62	0.42	8093.5	57.45	0.40	8493.6	198186
9970.0	6576.471	178.8867	-0.6652	55.63	0.44	8107.3	57.45	0.42	8507.4	198308
9972.0	6576.600	179.0034	-0.5854	55.63	0.47	8121.1	57.45	0.44	8521.2	198436
9974.0	6576.735	179.1203	-0.5055	55.64	0.49	8134.9	57.45	0.46	8535.0	198571
9976.0	6576.877	179.2374	-0.4254	55.64	0.51	8150.2	57.46	0.49	8550.4	198712
9978.0	6577.025	179.3548	-0.3452	55.65	0.53	8166.2	57.46	0.51	8566.4	198860
9980.0	6577.181	179.4724	-0.2648	55.66	0.56	8182.2	57.46	0.53	8582.4	199015
9982.0	6577.344	179.5902	-0.1844	55.66	0.58	8198.3	57.47	0.55	8598.6	199178

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
9984.0	6577.514	179.7082	-0.1037	55.67	0.61	8214.5	57.47	0.58	8614.8	199348
9986.0	6577.692	179.8265	-0.0229	55.68	0.63	8230.7	57.47	0.60	8631.1	199526
9988.0	6577.877	179.9451	0.0580	55.69	0.66	8247.1	57.48	0.63	8647.5	199711
9990.0	6578.071	-179.9362	0.1390	55.70	0.69	8263.4	57.48	0.65	8663.9	199905
9992.0	6578.273	-179.8171	0.2202	55.70	0.71	8279.9	57.49	0.68	8680.3	200107
9994.0	6578.483	-179.6979	0.3015	55.71	0.74	8296.4	57.49	0.71	8696.9	200318
9996.0	6578.702	-179.5783	0.3830	55.72	0.77	8312.9	57.50	0.74	8713.4	200537
9998.0	6578.930	-179.4586	0.4646	55.73	0.80	8329.5	57.50	0.76	8730.1	200766
10000.0	6579.168	-179.3386	0.5464	55.74	0.83	8346.2	57.51	0.79	8746.8	201004
10002.0	6579.414	-179.2183	0.6283	55.75	0.86	8362.9	57.51	0.82	8763.5	201251
10004.0	6579.671	-179.0978	0.7103	55.76	0.89	8379.6	57.52	0.85	8780.3	201508
10006.0	6579.937	-178.9770	0.7925	55.77	0.93	8396.5	57.53	0.88	8797.2	201775
10008.0	6580.214	-178.8560	0.8748	55.78	0.96	8413.3	57.53	0.92	8814.1	202053
10010.0	6580.501	-178.7347	0.9573	55.79	0.99	8430.3	57.54	0.95	8831.1	202341
10012.0	6580.798	-178.6132	1.0399	55.80	1.03	8447.3	57.55	0.98	8848.2	202639
10014.0	6581.106	-178.4914	1.1226	55.81	1.06	8464.4	57.56	1.01	8865.3	202949
10016.0	6581.426	-178.3694	1.2055	55.82	1.10	8481.5	57.56	1.05	8882.5	203269
10018.0	6581.756	-178.2471	1.2885	55.84	1.13	8498.7	57.57	1.08	8899.7	203601
10020.0	6582.098	-178.1245	1.3716	55.85	1.17	8515.9	57.58	1.12	8917.0	203945
10022.0	6582.452	-178.0017	1.4549	55.86	1.21	8533.2	57.59	1.15	8934.3	204300
10024.0	6582.818	-177.8786	1.5383	55.88	1.25	8550.5	57.60	1.19	8951.7	204667
10026.0	6583.196	-177.7552	1.6219	55.89	1.29	8567.9	57.61	1.23	8969.2	205047
10028.0	6583.587	-177.6316	1.7056	55.91	1.32	8585.4	57.62	1.27	8986.7	205440
10030.0	6583.990	-177.5076	1.7894	55.92	1.37	8603.0	57.63	1.30	9004.3	205845
10032.0	6584.407	-177.3835	1.8733	55.94	1.41	8620.6	57.64	1.34	9022.0	206264
10034.0	6584.836	-177.2590	1.9574	55.95	1.45	8638.2	57.66	1.38	9039.7	206695
10036.0	6585.279	-177.1343	2.0416	55.97	1.49	8655.9	57.67	1.42	9057.5	207141
10038.0	6585.736	-177.0093	2.1259	55.98	1.53	8673.7	57.68	1.46	9075.3	207600
10040.0	6586.207	-176.8840	2.2104	56.00	1.58	8691.5	57.69	1.51	9093.2	208073
10042.0	6586.692	-176.7585	2.2950	56.02	1.62	8709.4	57.70	1.55	9111.2	208561
10044.0	6587.192	-176.6326	2.3797	56.03	1.66	8727.4	57.72	1.59	9129.2	209063
10046.0	6587.706	-176.5065	2.4646	56.05	1.71	8745.5	57.73	1.63	9147.3	209580
10048.0	6588.236	-176.3801	2.5495	56.07	1.76	8763.6	57.74	1.68	9165.5	210112
10050.0	6588.781	-176.2535	2.6347	56.09	1.80	8781.7	57.76	1.72	9183.8	210660
10052.0	6589.341	-176.1265	2.7199	56.10	1.85	8800.0	57.77	1.77	9202.1	211223
10054.0	6589.917	-175.9992	2.8053	56.12	1.90	8818.3	57.79	1.82	9220.5	211803
10056.0	6590.510	-175.8717	2.8907	56.14	1.95	8836.7	57.80	1.86	9239.0	212398
10058.0	6591.118	-175.7439	2.9764	56.16	2.00	8855.2	57.82	1.91	9257.5	213010
10060.0	6591.744	-175.6158	3.0621	56.18	2.05	8873.7	57.83	1.96	9276.1	213639
10062.0	6592.386	-175.4874	3.1480	56.20	2.10	8892.3	57.85	2.01	9294.8	214285
10064.0	6593.046	-175.3587	3.2340	56.22	2.15	8911.0	57.87	2.06	9313.5	214948
10066.0	6593.723	-175.2297	3.3201	56.24	2.20	8929.7	57.88	2.11	9332.3	215629
10068.0	6594.418	-175.1004	3.4063	56.26	2.25	8948.5	57.90	2.16	9351.2	216328

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
10070.0	6595.131	-174.9708	3.4926	56.29	2.31	8967.4	57.92	2.21	9370.2	217045
10072.0	6595.862	-174.8409	3.5791	56.31	2.36	8986.3	57.93	2.26	9389.2	217780
10074.0	6596.612	-174.7107	3.6657	56.33	2.42	9005.4	57.95	2.31	9408.3	218534
10076.0	6597.381	-174.5802	3.7524	56.35	2.47	9024.5	57.97	2.37	9427.5	219307
10078.0	6598.169	-174.4494	3.8393	56.38	2.53	9043.6	57.99	2.42	9446.8	220099
10080.0	6598.976	-174.3183	3.9262	56.40	2.58	9062.9	58.01	2.47	9466.1	220911
10082.0	6599.804	-174.1869	4.0133	56.42	2.64	9082.2	58.03	2.53	9485.5	221743
10084.0	6600.651	-174.0552	4.1004	56.45	2.70	9101.6	58.05	2.59	9505.0	222595
10086.0	6601.519	-173.9231	4.1877	56.47	2.76	9121.1	58.07	2.64	9524.6	223467
10088.0	6602.407	-173.7908	4.2751	56.50	2.82	9140.7	58.09	2.70	9544.2	224360
10090.0	6603.316	-173.6582	4.3627	56.52	2.88	9160.3	58.11	2.76	9564.0	225275
10092.0	6604.247	-173.5252	4.4503	56.55	2.94	9180.0	58.13	2.82	9583.8	226210
10094.0	6605.199	-173.3919	4.5381	56.57	3.00	9199.8	58.15	2.87	9603.7	227168
10096.0	6606.174	-173.2583	4.6259	56.60	3.06	9219.7	58.17	2.93	9623.7	228147
10098.0	6607.170	-173.1244	4.7139	56.63	3.13	9239.7	58.20	2.99	9643.7	229149
10100.0	6608.189	-172.9902	4.8020	56.65	3.19	9259.7	58.22	3.06	9663.8	230173
10102.0	6609.230	-172.8556	4.8901	56.68	3.25	9279.8	58.24	3.12	9684.1	231221
10104.0	6610.295	-172.7207	4.9784	56.71	3.32	9300.0	58.27	3.18	9704.4	232291
10106.0	6611.383	-172.5855	5.0668	56.74	3.38	9320.3	58.29	3.24	9724.8	233385
10108.0	6612.495	-172.4500	5.1553	56.76	3.45	9340.7	58.32	3.31	9745.2	234503
10110.0	6613.631	-172.3141	5.2439	56.79	3.52	9361.2	58.34	3.37	9765.8	235644
10112.0	6614.791	-172.1779	5.3327	56.82	3.58	9381.7	58.37	3.43	9786.5	236811
10114.0	6615.976	-172.0414	5.4215	56.85	3.65	9402.3	58.39	3.50	9807.2	238001
10116.0	6617.185	-171.9045	5.5104	56.88	3.72	9423.0	58.42	3.56	9828.0	239217
10118.0	6618.420	-171.7674	5.5994	56.91	3.79	9443.9	58.44	3.63	9848.9	240459
10120.0	6619.680	-171.6298	5.6885	56.95	3.86	9464.8	58.47	3.70	9870.0	241726
10122.0	6620.967	-171.4920	5.7777	56.98	3.93	9485.7	58.50	3.77	9891.1	243019
10124.0	6622.279	-171.3538	5.8670	57.01	4.00	9506.8	58.52	3.83	9912.2	244338
10126.0	6623.618	-171.2152	5.9564	57.04	4.07	9528.0	58.55	3.90	9933.5	245684
10128.0	6624.984	-171.0764	6.0459	57.07	4.14	9549.3	58.58	3.97	9954.9	247056
10130.0	6626.377	-170.9371	6.1355	57.11	4.21	9570.6	58.61	4.04	9976.4	248456
10132.0	6627.797	-170.7976	6.2252	57.14	4.29	9592.1	58.64	4.11	9998.0	249884
10134.0	6629.245	-170.6576	6.3150	57.17	4.36	9613.6	58.67	4.18	10019.7	251339
10136.0	6630.721	-170.5174	6.4049	57.21	4.44	9635.3	58.70	4.26	10041.4	252822
10138.0	6632.226	-170.3768	6.4948	57.24	4.51	9657.0	58.73	4.33	10063.3	254334
10140.0	6633.759	-170.2358	6.5849	57.28	4.59	9678.9	58.76	4.40	10085.3	255875
10142.0	6635.321	-170.0945	6.6750	57.31	4.66	9700.9	58.79	4.47	10107.4	257445
10144.0	6636.912	-169.9528	6.7652	57.35	4.74	9722.9	58.82	4.55	10129.6	259045
10146.0	6638.533	-169.8108	6.8555	57.39	4.82	9745.1	58.85	4.62	10151.9	260674
10148.0	6640.185	-169.6684	6.9459	57.42	4.89	9767.4	58.88	4.70	10174.3	262333
10150.0	6641.866	-169.5257	7.0364	57.46	4.97	9789.8	58.92	4.77	10196.8	264023
10152.0	6643.578	-169.3825	7.1269	57.50	5.05	9812.3	58.95	4.85	10219.4	265743
10154.0	6645.321	-169.2391	7.2176	57.54	5.13	9834.9	58.98	4.92	10242.2	267494

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
10156.0	6647.095	-169.0952	7.3083	57.57	5.21	9857.6	59.02	5.00	10265.0	269277
10158.0	6648.901	-168.9510	7.3991	57.61	5.29	9880.4	59.05	5.08	10288.0	271091
10160.0	6650.738	-168.8065	7.4899	57.65	5.37	9903.4	59.09	5.16	10311.1	272937
10162.0	6652.608	-168.6615	7.5809	57.69	5.45	9926.5	59.12	5.23	10334.4	274816
10164.0	6654.510	-168.5162	7.6719	57.73	5.53	9949.7	59.16	5.31	10357.7	276727
10166.0	6656.445	-168.3705	7.7629	57.77	5.61	9973.1	59.19	5.39	10381.3	278671
10168.0	6658.413	-168.2244	7.8541	57.81	5.70	9996.6	59.23	5.47	10404.9	280648
10170.0	6660.414	-168.0780	7.9453	57.85	5.78	10020.2	59.27	5.55	10428.6	282659
10172.0	6662.449	-167.9312	8.0366	57.90	5.86	10043.9	59.30	5.63	10452.5	284703
10174.0	6664.518	-167.7840	8.1280	57.94	5.95	10067.7	59.34	5.71	10476.4	286782
10176.0	6666.621	-167.6364	8.2194	57.98	6.03	10091.7	59.38	5.80	10500.6	288895
10178.0	6668.759	-167.4884	8.3109	58.02	6.11	10115.8	59.42	5.88	10524.8	291042
10180.0	6670.931	-167.3400	8.4025	58.07	6.20	10140.0	59.46	5.95	10549.2	293223
10182.0	6673.136	-167.1913	8.4941	58.11	6.28	10164.4	59.50	6.03	10573.8	295439
10184.0	6675.375	-167.0421	8.5858	58.16	6.36	10189.0	59.54	6.11	10598.5	297688
10186.0	6677.650	-166.8926	8.6775	58.20	6.44	10213.7	59.58	6.19	10623.3	299973
10188.0	6679.959	-166.7427	8.7693	58.25	6.53	10238.5	59.62	6.27	10648.3	302292
10190.0	6682.304	-166.5923	8.8612	58.29	6.61	10263.5	59.66	6.36	10673.5	304648
10192.0	6684.685	-166.4416	8.9531	58.34	6.70	10288.7	59.70	6.44	10698.9	307039
10194.0	6687.102	-166.2904	9.0450	58.39	6.78	10314.1	59.74	6.52	10724.4	309467
10196.0	6689.557	-166.1389	9.1371	58.43	6.87	10339.6	59.79	6.61	10750.1	311933
10198.0	6692.050	-165.9869	9.2291	58.48	6.96	10365.2	59.83	6.69	10775.8	314437
10200.0	6694.581	-165.8346	9.3213	58.53	7.05	10390.9	59.87	6.78	10801.7	316979
10202.0	6697.151	-165.6818	9.4135	58.57	7.14	10416.8	59.91	6.87	10827.8	319560
	S-IVB 2ND GUIDANCE CUTOFF									
10203.030	6698.490	-165.6030	9.4610	58.60	7.19	10430.2	59.93	6.91	10841.2	320904
10204.0	6699.760	-165.5287	9.5057	58.61	7.23	10433.3	59.95	6.96	10844.4	322180
10206.0	6702.404	-165.3755	9.5978	58.64	7.33	10431.0	59.98	7.05	10842.2	324835
10208.0	6705.081	-165.2223	9.6898	58.67	7.42	10428.7	60.00	7.14	10839.9	327524
10210.0	6707.793	-165.0692	9.7816	58.70	7.52	10426.4	60.03	7.23	10837.7	330247
10212.0	6710.537	-164.9161	9.8733	58.72	7.61	10424.0	60.06	7.32	10835.5	333003
	TRANSLUNAR INJECTION (TLI)									
10213.030	6711.964	-164.8373	9.9204	58.74	7.66	10422.8	60.07	7.37	10834.3	334435
10250.0	6768.962	-162.0166	11.5846	59.30	9.39	10374.8	60.63	9.03	10788.0	391662
10300.0	6863.486	-158.2347	13.7379	60.19	11.68	10296.3	61.51	11.22	10712.5	486531
10350.0	6977.037	-154.5024	15.7646	61.20	13.91	10204.0	62.51	13.35	10623.7	600457
10400.0	7108.373	-150.8321	17.6528	62.33	16.07	10100.1	63.63	15.41	10523.6	732182
10450.0	7256.166	-147.2353	19.3952	63.56	18.15	9986.4	64.84	17.38	10414.3	880369
10500.0	7419.050	-143.7227	20.9889	64.86	20.16	9865.0	66.13	19.28	10297.7	1043640

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-FL DEG	SF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
10550.0	7595.659	-140.3036	22.4341	66.22	22.08	9737.7	67.47	21.08	10175.5	1220620
10600.0	7784.657	-136.9861	23.7345	67.63	23.92	9606.2	68.86	22.81	10049.3	1409970
10650.0	7984.769	-133.7767	24.8959	69.07	25.68	9472.0	70.26	24.44	9920.7	1610408
10700.0	8194.789	-130.6804	25.9256	70.52	27.37	9336.4	71.68	26.00	9790.8	1820727
10750.0	8413.596	-127.7008	26.8323	71.97	28.98	9200.4	73.10	27.47	9660.6	2039804
10800.0	8640.157	-124.8400	27.6252	73.42	30.51	9064.9	74.51	28.87	9531.1	2266607
10850.0	8873.529	-122.0989	28.3136	74.84	31.98	8930.7	75.89	30.20	9402.8	2500192
10900.0	9112.856	-119.4768	28.9071	76.25	33.38	8798.4	77.25	31.46	9276.5	2739705
10950.0	9357.365	-116.9727	29.4145	77.63	34.72	8668.3	78.57	32.65	9152.4	2984376
11000.0	9606.365	-114.5841	29.8446	78.97	36.00	8540.9	79.86	33.78	9030.9	3233515
11050.0	9859.235	-112.3082	30.2053	80.28	37.23	8416.3	81.10	34.85	8912.2	3486502
11100.0	10115.422	-110.1415	30.5042	81.56	38.41	8294.8	82.31	35.86	8796.6	3742786
11150.0	10374.434	-108.0803	30.7481	82.79	39.54	8176.5	83.46	36.83	8684.0	4001878
11200.0	10635.833	-106.1202	30.9432	83.99	40.63	8061.4	84.58	37.75	8574.5	4263341
11250.0	10899.230	-104.2572	31.0951	85.15	41.67	7949.5	85.65	38.62	8468.2	4526788
11300.0	11164.281	-102.4966	31.2089	86.27	42.68	7840.9	86.67	39.45	8365.1	4791877
11350.0	11430.682	-100.8043	31.2891	87.35	43.65	7735.5	87.65	40.25	8265.0	5058305
11400.0	11698.162	-99.2058	31.3397	88.40	44.59	7633.2	88.59	41.00	8167.9	5325802
11450.0	11966.483	-97.6869	31.3644	89.42	45.50	7534.1	89.49	41.72	8073.8	5594131
11500.0	12235.432	-96.2433	31.3663	90.40	46.37	7437.9	90.35	42.41	7982.6	5863081
11550.0	12504.824	-94.8712	31.3483	91.36	47.22	7344.7	91.18	43.07	7894.2	6132466
11600.0	12774.492	-93.5667	31.3129	92.28	48.05	7254.4	91.96	43.70	7808.5	6402123
11650.0	13044.291	-92.3260	31.2623	93.18	48.85	7166.8	92.72	44.31	7725.4	6671905
11700.0	13314.091	-91.1459	31.1985	94.06	49.63	7081.9	93.44	44.89	7644.8	6941684
	CSM SEPARATION									
11723.000	13438.152	-90.6223	31.1652	94.45	49.98	7043.7	93.76	45.15	7609.6	7065733

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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 Tables 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									
-16.968	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	195	0	0	0.0	0.0	0.0	0.0	0.0	0.0
FIRST MOTION									
0.300	195	0	0	0.0	0.0	0.0	2.21	0.0	0.0
START OF TIME BASE 1									
0.600	196	0	0	1.5	0.0	0.0	5.69	-0.02	0.04
1.0	199	0	0	3.6	-0.0	0.0	6.89	-0.13	0.05
2.0	206	0	0	10.5	-0.3	0.1	7.16	-0.36	0.04
3.0	220	0	0	18.3	-0.7	0.1	7.33	-0.53	0.03
4.0	241	-2	0	25.6	-1.2	0.1	7.47	-0.39	0.02
5.0	270	-3	1	33.4	-1.3	0.2	7.68	0.07	0.01
6.0	308	-4	1	41.4	-1.1	0.2	7.91	0.42	0.03
7.0	354	-5	1	49.4	-0.5	0.2	8.17	0.63	0.04
8.0	406	-5	1	57.7	0.1	0.3	8.43	0.61	0.04
9.0	467	-5	1	65.7	0.6	0.3	8.68	0.55	0.04
10.0	538	-4	2	74.6	1.2	0.4	8.89	0.68	0.04
11.0	617	-2	2	83.6	2.0	0.4	9.10	0.71	0.04
12.0	705	0	3	92.6	2.5	0.5	9.30	0.47	0.03
13.0	803	3	3	102.1	2.9	0.5	9.49	0.16	0.01
14.0	909	6	3	111.9	2.9	0.5	9.67	-0.14	-0.02

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	1026	9	4	121.6	2.7	0.5	9.87	-0.12	-0.02
16.0	1153	11	5	131.6	2.7	0.5	10.07	0.04	0.14
17.0	1289	14	5	141.7	2.8	0.7	10.26	0.16	0.30
18.0	1436	17	6	152.1	3.0	1.1	10.47	0.24	0.44
19.0	1594	20	7	162.8	3.2	1.6	10.71	0.15	0.56
20.0	1762	23	9	173.7	3.3	2.2	10.97	-0.00	0.66
21.0	1941	27	12	184.8	3.3	3.0	11.20	-0.03	0.83
22.0	2132	30	15	196.1	3.3	3.9	11.43	-0.01	1.00
23.0	2334	33	20	207.7	3.3	4.9	11.66	-0.02	1.17
24.0	2547	37	25	219.4	3.3	6.2	11.91	-0.02	1.35
25.0	2773	40	32	231.5	3.3	7.6	12.15	-0.03	1.54
26.0	3010	43	40	243.7	3.2	9.3	12.40	-0.05	1.75
27.0	3260	46	51	256.3	3.2	11.2	12.65	-0.06	1.97
28.0	3523	50	63	269.0	3.1	13.2	12.90	-0.06	2.20
29.0	3798	53	77	282.1	3.1	15.6	13.17	-0.06	2.46
30.0	4087	56	94	295.4	3.0	18.2	13.44	-0.08	2.74
31.0	4389	59	114	309.0	2.9	21.1	13.71	-0.11	3.06
32.0	4705	62	136	322.8	2.8	24.3	13.98	-0.14	3.40
33.0	5035	64	162	336.9	2.6	27.9	14.25	-0.16	3.76
34.0	5379	67	192	351.3	2.5	31.8	14.53	-0.17	4.14
35.0	5738	69	226	366.0	2.3	36.2	14.79	-0.16	4.53
36.0	6111	71	265	380.9	2.1	40.9	15.03	-0.16	4.93
37.0	6499	73	308	396.0	2.0	46.0	15.29	-0.14	5.34
38.0	6903	75	357	411.5	1.9	51.6	15.56	-0.12	5.78
39.0	7322	77	411	427.2	1.7	57.6	15.84	-0.11	6.23
40.0	7757	79	472	443.1	1.6	64.0	16.12	-0.13	6.70
41.0	8209	80	540	459.4	1.5	71.0	16.39	-0.15	7.20
42.0	8676	82	614	475.9	1.3	78.5	16.69	-0.18	7.72
43.0	9161	83	697	492.7	1.1	86.4	16.96	-0.19	8.24
44.0	9662	84	787	509.8	0.9	94.9	17.22	-0.21	8.79
45.0	10180	85	887	527.2	0.7	104.0	17.47	-0.23	9.36
46.0	10716	85	996	544.8	0.5	113.7	17.73	-0.23	9.95
47.0	11270	86	1114	562.6	0.2	123.9	17.98	-0.23	10.56
48.0	11842	86	1244	580.7	0.0	134.8	18.23	-0.22	11.18
49.0	12432	86	1384	599.1	-0.2	146.3	18.47	-0.20	11.85
50.0	13040	86	1536	617.7	-0.4	158.5	18.71	-0.18	12.54
51.0	13667	85	1701	636.5	-0.6	171.4	18.93	-0.16	13.25
52.0	14313	84	1879	655.5	-0.7	185.0	19.14	-0.15	13.99
53.0	14978	84	2072	674.8	-0.9	199.4	19.35	-0.13	14.75
54.0	15663	83	2279	694.2	-1.0	214.5	19.56	-0.11	15.52
55.0	16367	82	2501	713.9	-1.1	230.4	19.76	-0.09	16.28
56.0	17091	81	2740	733.8	-1.2	247.1	19.96	-0.07	17.05
57.0	17834	79	2995	753.8	-1.3	264.5	20.14	-0.09	17.84

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

TIME SEC	XE FT	YE FT	ZF FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
58.0	18598	78	3269	774.0	-1.4	282.8	20.30	-0.12	18.64
59.0	19382	77	3561	794.4	-1.5	301.8	20.43	-0.10	19.40
60.0	20187	75	3873	814.9	-1.5	321.6	20.56	-0.05	20.16
61.0	21012	74	4205	835.6	-1.5	342.1	20.72	0.01	20.92
62.0	21858	72	4557	856.3	-1.5	363.4	20.83	0.10	21.67
63.0	22725	71	4932	877.2	-1.3	385.4	20.94	0.17	22.42
64.0	23613	69	5328	898.2	-1.2	408.3	21.02	0.22	23.22
65.0	24521	68	5748	919.2	-1.0	431.9	21.06	0.23	24.04
66.0	25451	68	6192	940.3	-0.8	456.4	21.06	0.24	24.88
MACH 1									
66.300	25735	67	6331	946.6	-0.7	463.9	21.05	0.23	25.14
67.0	26402	67	6661	961.3	-0.5	481.7	21.03	0.23	25.75
68.0	27374	67	7156	982.3	-0.2	507.9	21.00	0.23	26.63
69.0	28366	66	7677	1003.3	0.1	534.9	20.99	0.30	27.53
70.0	29380	67	8226	1024.4	0.4	562.9	21.03	0.41	28.41
71.0	30415	67	8803	1045.5	0.9	591.7	21.10	0.53	29.30
72.0	31471	68	9410	1066.6	1.4	621.5	21.19	0.62	30.24
73.0	32548	70	10047	1087.8	2.0	652.3	21.29	0.67	31.23
74.0	33647	73	10715	1109.1	2.8	684.0	21.37	0.71	32.25
75.0	34767	76	11415	1130.6	3.5	716.8	21.44	0.75	33.27
76.0	35908	79	12149	1152.0	4.2	750.6	21.53	0.73	34.33
77.0	37071	84	12917	1173.6	5.0	785.4	21.60	0.72	35.37
78.0	38255	89	13720	1195.2	5.7	821.3	21.65	0.69	36.37
79.0	39461	95	14560	1216.9	6.3	858.1	21.73	0.64	37.37
80.0	40689	102	15436	1238.7	6.9	896.0	21.83	0.55	38.37
81.0	41939	109	16352	1260.6	7.4	934.9	21.93	0.47	39.38
82.0	43210	117	17307	1282.5	7.8	974.8	22.03	0.39	40.40
MAXIMUM DYNAMIC PRESSURE									
83.000	44504	125	18302	1304.6	8.2	1015.7	22.14	0.31	41.45
84.0	45820	133	19338	1326.8	8.5	1057.7	22.24	0.28	42.48
85.0	47158	142	20417	1349.1	8.8	1100.6	22.36	0.29	43.44
86.0	48518	151	21540	1371.5	9.1	1144.5	22.48	0.29	44.36
87.0	49901	160	22707	1394.1	9.4	1189.3	22.62	0.26	45.27
88.0	51306	170	23919	1416.8	9.6	1235.0	22.77	0.20	46.14
89.0	52734	179	25177	1439.7	9.7	1281.6	22.92	0.10	47.02
90.0	54185	189	26482	1462.7	9.7	1329.1	23.07	-0.00	47.96
91.0	55660	199	27936	1485.8	9.7	1377.6	23.19	-0.13	49.00
92.0	57157	208	29238	1509.0	9.5	1427.2	23.28	-0.22	50.09
93.0	58678	218	30690	1532.3	9.3	1477.8	23.33	-0.26	51.20

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
94.0	60222	227	32194	1555.6	9.1	1529.6	23.32	-0.24	52.36
95.0	61789	236	33750	1578.9	8.8	1582.5	23.31	-0.20	53.51
96.0	63379	245	35359	1602.2	8.7	1636.6	23.27	-0.13	54.65
97.0	64993	253	37023	1625.5	8.6	1691.8	23.22	-0.06	55.78
98.0	66630	262	38743	1648.7	8.5	1748.1	23.16	-0.05	56.90
99.0	68291	270	40520	1671.8	8.5	1805.6	23.10	-0.04	58.06
100.0	69974	279	42355	1694.9	8.4	1864.2	23.04	-0.05	59.21
101.0	71680	287	44249	1717.9	8.3	1924.0	23.00	-0.07	60.37
102.0	73410	295	46203	1740.9	8.3	1985.0	22.95	-0.08	61.57
103.0	75162	304	48219	1763.8	8.2	2047.1	22.89	-0.06	62.76
104.0	76937	312	50298	1786.7	8.2	2110.5	22.84	-0.02	63.94
105.0	78735	320	52440	1809.5	8.2	2175.0	22.78	0.02	65.12
106.0	80556	328	54648	1832.2	8.2	2240.7	22.70	0.09	66.32
107.0	82400	336	56922	1854.8	8.3	2307.7	22.63	0.17	67.51
108.0	84266	345	59264	1877.4	8.6	2375.8	22.56	0.30	68.68
109.0	86155	354	61674	1900.0	9.0	2445.0	22.51	0.44	69.84
110.0	88066	363	64154	1922.5	9.5	2515.5	22.52	0.58	70.99
111.0	90000	373	66706	1945.1	10.2	2587.0	22.58	0.73	72.12
112.0	91956	383	69329	1967.7	10.9	2659.6	22.68	0.84	73.18
113.0	93935	395	72025	1990.5	11.8	2733.3	22.84	0.87	74.20
114.0	95937	407	74796	2013.4	12.6	2808.0	23.03	0.82	75.24
115.0	97962	420	77642	2036.6	13.3	2883.7	23.24	0.65	76.24
116.0	100010	433	80564	2059.9	13.8	2960.5	23.43	0.44	77.29
117.0	102082	447	83563	2083.4	14.2	3038.4	23.54	0.22	78.42
118.0	104177	462	86641	2106.9	14.3	3117.4	23.58	0.03	79.65
119.0	106296	476	89798	2130.4	14.3	3197.8	23.53	-0.10	80.96
120.0	108438	490	93037	2153.9	14.2	3279.4	23.39	-0.17	82.33
121.0	110603	504	96357	2177.2	14.0	3362.5	23.18	-0.17	83.77
122.0	112792	518	99762	2200.2	13.9	3447.0	22.94	-0.14	85.25
123.0	115004	532	103252	2223.1	13.8	3532.9	22.73	-0.08	86.72
124.0	117238	546	106828	2245.7	13.7	3620.4	22.56	-0.02	88.15
125.0	119495	559	110493	2268.3	13.7	3709.2	22.47	0.04	89.56
126.0	121775	573	114247	2290.8	13.8	3799.5	22.46	0.11	90.97
127.0	124077	587	118092	2313.2	13.9	3891.1	22.53	0.18	92.33
128.0	126402	601	122030	2335.9	14.1	3984.1	22.66	0.33	93.74
129.0	128749	615	126061	2358.6	14.5	4078.6	22.79	0.31	95.15
130.0	131118	630	130188	2381.4	14.8	4174.4	22.92	0.44	96.56
131.0	133511	645	134411	2404.4	15.3	4271.7	23.05	0.48	97.97
132.0	135927	660	138731	2427.5	15.8	4370.4	23.18	0.58	99.38
133.0	138366	677	143152	2450.9	16.4	4470.4	23.32	0.58	100.79
134.0	140829	693	147675	2474.1	16.9	4571.9	23.45	0.52	102.20
135.0	143315	710	152298	2497.6	17.4	4674.8	23.58	0.52	103.61
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
135.200	143815	714	153237	2502.4	17.6	4695.6	23.60	0.52	103.89

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	145821	728	157021	2515.9	18.0	4770.5	12.30	0.61	85.56
137.0	148342	746	161831	2528.2	18.7	4854.7	12.35	0.69	84.49
138.0	150874	765	166725	2540.6	19.4	4939.5	12.40	0.89	85.24
139.0	153424	785	171713	2553.0	20.4	5025.3	12.46	0.93	86.38
140.0	155983	806	176783	2565.5	21.3	5112.3	12.53	1.03	87.52
141.0	158554	828	181939	2578.0	22.4	5200.4	12.62	1.15	88.66
142.0	161139	851	187185	2590.7	23.5	5289.6	12.71	1.00	89.79
143.0	163736	875	192520	2603.5	24.5	5380.0	12.80	1.00	91.04
144.0	166347	900	197947	2616.1	25.4	5473.0	12.93	0.94	92.31
145.0	168970	926	203467	2629.1	26.3	5565.9	13.09	0.88	93.50
146.0	171607	953	209079	2642.2	27.2	5660.1	13.24	0.83	94.77
147.0	174257	980	214787	2655.5	28.0	5755.4	13.40	0.80	96.09
148.0	176921	1009	220591	2669.0	28.8	5852.1	13.55	0.79	97.34
149.0	179598	1038	226492	2682.6	29.6	5950.1	13.69	0.80	98.60
150.0	182288	1068	232491	2696.4	30.4	6049.4	13.85	0.82	99.90
151.0	184993	1099	238591	2710.3	31.3	6149.9	14.02	0.83	101.24
152.0	187712	1131	244792	2724.4	32.1	6251.9	14.17	0.84	102.61
153.0	190444	1163	251095	2738.7	32.9	6355.2	14.31	0.87	104.02
154.0	193191	1197	257502	2753.0	33.8	6459.9	14.48	0.89	105.47
155.0	195953	1231	264016	2767.6	34.7	6566.2	14.66	0.90	107.00
156.0	198729	1266	270636	2782.4	35.6	6673.9	14.85	0.96	108.52
157.0	201520	1302	277363	2797.3	36.6	6783.2	15.03	0.98	110.04
158.0	204326	1339	284202	2812.4	37.6	6894.0	15.21	1.12	111.57
159.0	207148	1377	291152	2827.7	38.8	7006.3	15.39	1.05	113.09
160.0	209984	1417	298215	2843.2	39.8	7120.2	15.57	1.03	114.61
161.0	212837	1457	305392	2858.8	40.8	7235.5	15.76	1.05	116.14
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
161.630	214653	1483	310004	2868.8	41.4	7309.0	15.87	0.89	117.05
162.0	215714	1498	312710	2863.6	41.8	7337.3	-11.97	0.67	44.76
	S-IC/S-II SEPARATION COMMAND								
162.300	216571	1511	314908	2862.8	41.9	7344.6	-29.97	0.53	4.03
164.0	221390	1583	327377	2812.3	42.6	7345.3	-29.87	0.52	0.57
166.0	226967	1669	342098	2756.1	43.4	7356.0	-23.30	0.31	17.35
168.0	232430	1756	356841	2710.8	44.3	7392.9	-22.44	0.49	18.72
170.0	237807	1846	371667	2666.8	45.1	7434.2	-21.18	0.42	22.36
172.0	243098	1938	386581	2624.6	46.1	7479.1	-21.03	0.36	22.57
174.0	248305	2030	401585	2582.7	47.0	7524.5	-20.91	0.53	22.82
176.0	253429	2126	416681	2541.0	48.0	7570.7	-20.79	0.49	23.03
178.0	258470	2223	431869	2499.5	49.0	7617.0	-20.67	0.50	23.18

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
180.0	263428	2322	447149	2458.4	50.0	7663.5	-20.57	0.52	23.30
182.0	268303	2423	462523	2417.4	51.1	7710.2	-20.48	0.52	23.41
184.0	273097	2526	477990	2376.5	52.1	7757.1	-20.41	0.53	23.53
186.0	277809	2631	493551	2335.7	53.2	7804.2	-20.36	0.55	23.62
188.0	282440	2738	509207	2295.0	54.3	7851.5	-20.29	0.55	23.69
190.0	286990	2848	524958	2254.5	55.4	7899.0	-20.22	0.56	23.79
192.0	291458	2960	540803	2214.2	56.5	7946.7	-20.14	0.56	23.91
194.0	295846	3074	556745	2174.0	57.6	7994.7	-20.06	0.57	24.05
196.0	300154	3191	572782	2133.9	58.8	8042.9	-19.98	0.58	24.19
198.0	304382	3309	588917	2094.2	60.0	8091.4	-19.78	0.59	24.32
200.0	308531	3431	605148	2054.6	61.2	8140.3	-19.81	0.62	24.53
202.0	312601	3554	621478	2014.7	62.4	8189.5	-19.95	0.63	24.72
204.0	316590	3680	637906	1975.0	63.7	8239.1	-19.85	0.60	24.80
206.0	320501	3809	654434	1935.8	64.8	8288.6	-19.30	0.55	24.69
208.0	324335	3939	671060	1898.4	65.9	8337.5	-18.18	0.50	24.30
210.0	328096	4072	687784	1863.1	66.8	8385.7	-17.11	0.46	23.90
212.0	331788	4207	704603	1829.5	67.7	8433.3	-16.41	0.44	23.66
214.0	335415	4343	721517	1797.1	68.6	8480.6	-16.03	0.44	23.58
216.0	338977	4481	738525	1765.3	69.5	8527.7	-15.88	0.47	23.59
218.0	342476	4621	755628	1733.7	70.5	8574.9	-15.72	0.49	23.63
220.0	345912	4763	772825	1702.3	71.5	8622.3	-15.67	0.51	23.75
222.0	349285	4907	790117	1671.0	72.5	8669.9	-15.68	0.52	23.89
224.0	352596	5053	807505	1639.6	73.5	8717.8	-15.71	0.52	24.02
226.0	355843	5201	824989	1608.1	74.5	8766.0	-15.73	0.49	24.16
228.0	359028	5351	842569	1576.7	75.5	8814.5	-15.75	0.48	24.31
230.0	362150	5503	860247	1545.1	76.5	8863.2	-15.77	0.51	24.45
232.0	365209	5657	878022	1513.6	77.6	8912.3	-15.78	0.56	24.58
234.0	368204	5813	895896	1482.0	78.7	8961.6	-15.79	0.58	24.70
236.0	371137	5972	913869	1450.4	79.9	9011.1	-15.78	0.57	24.81
238.0	374006	6133	931940	1418.9	81.0	9060.8	-15.80	0.57	24.95
240.0	376812	6296	950112	1387.2	82.2	9110.9	-15.82	0.58	25.11
242.0	379555	6461	968384	1355.6	83.3	9161.3	-15.83	0.59	25.27
244.0	382235	6629	986757	1323.9	84.5	9211.9	-15.83	0.60	25.41
246.0	384851	6799	1005232	1292.2	85.7	9262.9	-15.85	0.60	25.53
248.0	387403	6972	1023809	1260.5	86.9	9314.1	-15.88	0.62	25.68
250.0	389893	7147	1042489	1228.7	88.2	9365.6	-15.90	0.64	25.83
252.0	392318	7325	1061272	1196.9	89.5	9417.4	-15.91	0.66	26.00
254.0	394680	7505	1080159	1165.1	90.8	9469.6	-15.91	0.66	26.15
256.0	396979	7688	1099150	1133.3	92.1	9522.0	-15.92	0.67	26.28
258.0	399213	7874	1118247	1101.4	93.5	9574.7	-15.93	0.69	26.41
260.0	401384	8062	1137449	1069.5	94.9	9627.7	-15.96	0.69	26.55
262.0	403491	8253	1156758	1037.6	96.2	9681.0	-15.99	0.68	26.75
264.0	405534	8447	1176173	1005.6	97.6	9734.7	-16.02	0.69	26.95

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
266.0	407513	8644	1195697	973.5	99.0	9788.7	-16.05	0.72	27.12
268.0	409428	8843	1215329	941.4	100.5	9843.1	-16.05	0.72	27.23
270.0	411279	9045	1235069	909.3	101.9	9897.7	-16.05	0.72	27.38
272.0	413066	9251	1254920	877.2	103.4	9952.7	-16.07	0.74	27.61
274.0	414788	9459	1274880	845.0	104.9	10008.1	-16.12	0.75	27.83
276.0	416446	9670	1294952	812.7	106.4	10063.9	-16.15	0.76	27.97
278.0	418039	9885	1315136	780.4	107.9	10120.0	-16.17	0.76	28.09
280.0	419567	10102	1335433	748.0	109.4	10176.4	-16.20	0.79	28.28
282.0	421031	10322	1355842	715.6	111.0	10233.1	-16.24	0.81	28.49
284.0	422430	10546	1376365	683.1	112.7	10290.3	-16.27	0.82	28.68
286.0	423763	10773	1397003	650.5	114.3	10347.8	-16.30	0.83	28.83
288.0	425032	11003	1417757	617.9	116.0	10405.6	-16.31	0.87	28.97
290.0	426235	11237	1438626	585.3	117.7	10463.7	-16.34	0.87	29.13
292.0	427373	11474	1459612	552.5	119.5	10522.1	-16.38	0.87	29.31
294.0	428445	11715	1480715	519.7	121.2	10581.0	-16.42	0.87	29.52
296.0	429451	11959	1501936	486.9	123.0	10640.2	-16.46	0.92	29.73
298.0	430392	12207	1523276	453.9	124.9	10699.8	-16.48	0.94	29.90
300.0	431267	12459	1544735	420.9	126.7	10759.8	-16.50	0.92	30.04
302.0	432076	12714	1566315	387.9	128.6	10820.0	-16.53	0.90	30.20
304.0	432819	12973	1588016	354.8	130.4	10880.6	-16.56	0.92	30.40
306.0	433495	13236	1609838	321.6	132.3	10941.6	-16.62	0.95	30.61
308.0	434105	13502	1631782	288.3	134.2	11003.0	-16.68	0.95	30.81
310.0	434648	13772	1653850	254.9	136.1	11064.8	-16.73	0.94	31.00
312.0	435125	14046	1676042	221.4	138.0	11127.0	-16.76	0.95	31.19
314.0	435534	14324	1698358	187.9	139.9	11189.6	-16.80	0.98	31.37
316.0	435876	14606	1720800	154.3	141.8	11252.5	-16.84	0.99	31.58
318.0	436151	14892	1743369	120.5	143.8	11315.9	-16.89	1.00	31.81
320.0	436359	15181	1766064	86.7	145.9	11379.8	-16.93	1.02	32.03
322.0	436498	15475	1788888	52.8	147.9	11444.0	-16.98	1.04	32.21
324.0	436570	15773	1811941	18.8	150.0	11508.6	-17.03	1.04	32.38
326.0	436573	16075	1834923	-15.3	152.1	11573.5	-17.06	1.04	32.58
328.0	436508	16381	1858135	-49.5	154.2	11639.0	-17.12	1.06	32.83
330.0	436375	16692	1881479	-83.8	156.3	11704.8	-17.19	1.09	33.05
332.0	436173	17006	1904955	-118.2	158.5	11771.1	-17.25	1.11	33.23
334.0	435902	17326	1928564	-152.8	160.7	11837.8	-17.29	1.12	33.44
336.0	435562	17649	1952306	-187.4	163.0	11904.9	-17.33	1.13	33.68
338.0	435152	17978	1976183	-222.1	165.3	11972.5	-17.40	1.14	33.93
340.0	434673	18310	2000196	-257.0	167.6	12040.6	-17.47	1.16	34.12
342.0	434124	18648	2024346	-292.0	169.9	12109.0	-17.54	1.19	34.31
344.0	433505	18990	2048633	-327.2	172.3	12177.9	-17.62	1.21	34.55
346.0	432815	19337	2073058	-362.5	174.7	12247.2	-17.68	1.21	34.81
348.0	432055	19689	2097622	-397.9	177.1	12317.0	-17.71	1.21	35.04
350.0	431224	20046	2122326	-433.3	179.6	12387.4	-17.76	1.23	35.27

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
352.0	430322	20407	2147172	-469.0	182.1	12458.1	-17.85	1.27	35.51
354.0	429348	20774	2172159	-504.8	184.6	12529.4	-17.97	1.29	35.76
356.0	428302	21146	2197290	-540.8	187.2	12601.2	-18.03	1.28	36.02
358.0	427185	21523	2222564	-576.8	189.8	12673.5	-18.05	1.28	36.26
360.0	425995	21905	2247984	-613.0	192.3	12746.2	-18.11	1.29	36.49
362.0	424733	22292	2273549	-649.3	194.9	12819.4	-18.20	1.32	36.72
364.0	423398	22685	2299262	-685.8	197.6	12893.1	-18.31	1.33	36.97
366.0	421989	23082	2325122	-722.5	200.2	12967.3	-18.39	1.32	37.24
368.0	420507	23486	2351131	-759.4	202.9	13042.1	-18.48	1.32	37.52
370.0	418951	23894	2377291	-796.5	205.5	13117.4	-18.58	1.34	37.80
372.0	417321	24308	2403601	-833.7	208.2	13193.3	-18.64	1.36	38.05
374.0	415617	24727	2430064	-871.0	211.0	13269.5	-18.71	1.39	38.21
376.0	413837	25152	2456680	-908.6	213.9	13346.0	-18.81	1.41	38.30
378.0	411982	25582	2483448	-946.3	216.6	13423.0	-18.93	1.42	38.67
380.0	410052	26018	2510372	-984.3	219.5	13500.9	-19.05	1.44	39.21
382.0	408045	26460	2537453	-1022.5	222.4	13579.7	-19.14	1.47	39.66
384.0	405962	26908	2564691	-1060.8	225.4	13659.2	-19.20	1.51	39.84
386.0	403802	27362	2592090	-1099.3	228.4	13739.0	-19.26	1.53	39.92
388.0	401565	27822	2619648	-1137.9	231.5	13819.1	-19.34	1.56	40.19
390.0	399250	28288	2647366	-1176.7	234.7	13899.8	-19.46	1.57	40.49
392.0	396858	28761	2675247	-1215.8	237.8	13981.1	-19.61	1.55	40.79
394.0	394387	29239	2703291	-1255.1	240.8	14063.0	-19.74	1.48	41.11
396.0	391837	29724	2731499	-1294.7	243.8	14145.5	-19.87	1.49	41.44
398.0	389208	30214	2759873	-1334.6	246.9	14228.7	-20.00	1.59	41.79
400.0	386498	30711	2788415	-1374.7	250.1	14312.6	-20.11	1.69	42.08
402.0	383709	31215	2817124	-1415.0	253.5	14397.0	-20.20	1.71	42.36
404.0	380838	31725	2846003	-1455.5	256.9	14482.1	-20.31	1.69	42.66
406.0	377886	32243	2875053	-1496.3	260.3	14567.7	-20.45	1.69	42.98
408.0	374853	32767	2904274	-1537.4	263.7	14654.0	-20.61	1.69	43.32
410.0	371737	33297	2933669	-1578.7	267.1	14740.8	-20.76	1.69	43.51
412.0	368538	33835	2963238	-1620.4	270.5	14828.0	-20.88	1.72	43.73
414.0	365255	34379	2992982	-1662.2	274.0	14916.0	-20.98	1.77	44.22
416.0	361889	34931	3022903	-1704.3	277.5	15005.1	-21.08	1.82	44.82
418.0	358438	35495	3053003	-1746.6	281.2	15095.1	-21.20	1.83	45.28
420.0	354902	36055	3083283	-1789.2	284.8	15185.9	-21.38	1.83	45.51
422.0	351281	36629	3113746	-1832.1	288.5	15277.2	-21.56	1.83	45.72
424.0	347574	37209	3144392	-1875.3	292.2	15368.9	-21.70	1.85	46.05
426.0	343779	37798	3175222	-1918.9	295.9	15461.3	-21.82	1.87	46.39
428.0	339898	38393	3206238	-1962.7	299.6	15554.5	-21.96	1.88	46.78
430.0	335928	38996	3237441	-2006.8	303.4	15648.5	-22.12	1.91	47.18
432.0	331871	39607	3268832	-2051.2	307.3	15743.2	-22.28	1.94	47.56
434.0	327724	40225	3300414	-2095.9	311.2	15838.7	-22.45	1.98	47.92
436.0	323487	40852	3332188	-2141.0	315.2	15934.9	-22.63	2.01	48.32

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
438.0	319159	41486	3364155	-2186.4	319.2	16032.0	-22.79	2.04	48.73
440.0	314741	42129	3396316	-2232.1	323.3	16129.8	-22.93	2.05	49.12
442.0	310231	42779	3428674	-2278.1	327.4	16228.5	-23.09	2.05	49.53
444.0	305628	43438	3461231	-2324.5	331.5	16328.0	-23.28	2.03	49.95
446.0	300932	44105	3493987	-2371.2	335.6	16428.3	-23.47	2.04	50.39
448.0	296143	44780	3526945	-2418.4	339.7	16529.5	-23.66	2.08	50.81
450.0	291259	45464	3560105	-2465.9	343.9	16631.5	-23.84	2.13	51.21
452.0	286279	46156	3593471	-2513.8	348.2	16734.4	-24.03	2.15	51.65
454.0	281203	46857	3627044	-2562.2	352.5	16838.1	-24.24	2.14	52.08
456.0	276031	47566	3660824	-2610.8	356.8	16942.6	-24.50	2.25	52.50
458.0	270760	48284	3694816	-2659.9	361.4	17048.0	-24.67	2.27	52.93
460.0	265391	49012	3729018	-2709.5	365.8	17154.3	-25.00	2.17	53.35
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
460.620	263761	49232	3739320	-2724.5	367.2	17186.3	-25.03	2.17	53.48
462.0	259922	49748	3763423	-2759.9	370.1	17247.5	-25.53	2.04	42.13
464.0	254352	50492	3798006	-2811.1	373.9	17331.9	-25.75	1.78	42.31
466.0	248675	51243	3832754	-2862.7	377.6	17416.7	-25.77	1.89	42.51
468.0	242899	52002	3867674	-2914.1	381.4	17502.0	-25.66	1.90	42.77
470.0	237019	52769	3902766	-2964.5	385.4	17587.7	-24.90	2.02	43.04
472.0	231041	53544	3938029	-3013.7	389.5	17675.0	-24.37	2.04	43.32
474.0	224965	54327	3973466	-3061.8	393.6	17761.8	-23.75	2.04	43.54
476.0	218794	55118	4009077	-3109.1	397.7	17849.2	-23.55	2.05	43.82
478.0	212529	55918	4044863	-3156.3	401.8	17937.2	-23.62	2.08	44.15
480.0	206169	56726	4080826	-3203.7	406.0	18025.8	-23.82	2.14	44.51
482.0	199714	57542	4116967	-3251.5	410.4	18115.2	-24.06	2.19	44.87
484.0	193162	58367	4153287	-3299.9	414.8	18205.3	-24.35	2.24	45.24
486.0	186514	59201	4189788	-3349.0	419.3	18296.2	-24.67	2.27	45.60
488.0	179766	60045	4226472	-3398.6	423.9	18387.7	-24.99	2.31	45.94
490.0	172919	60897	4263340	-3448.9	428.5	18479.9	-25.29	2.33	46.27
492.0	165970	61759	4300392	-3499.9	433.3	18572.8	-25.52	2.38	46.62
494.0	158919	62630	4337631	-3551.4	437.9	18666.3	-25.94	2.31	46.96
496.0	151765	63511	4375058	-3603.5	442.8	18760.6	-26.10	2.50	47.31
498.0	144505	64401	4412674	-3656.3	447.7	18855.5	-26.60	2.42	47.65
500.0	137139	65301	4450471	-3710.3	452.2	18937.3	-27.22	2.18	36.45
502.0	129664	66210	4488417	-3765.0	456.8	19009.0	-27.45	2.33	35.57
504.0	122079	67129	4526506	-3820.2	461.4	19080.1	-27.58	2.29	35.59
506.0	114384	68056	4564739	-3875.2	466.1	19151.3	-27.63	2.41	35.66
508.0	106578	68993	4603114	-3930.8	470.9	19222.7	-27.85	2.38	35.77
510.0	98661	69939	4641633	-3986.6	475.6	19295.3	-27.97	2.37	35.96
512.0	90632	70895	4680296	-4042.5	480.4	19367.4	-27.97	2.37	36.09
514.0	82491	71861	4719103	-4098.4	485.1	19439.7	-27.94	2.38	36.26

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
516.0	74238	72836	4758055	-4154.4	489.9	19512.4	-27.99	2.41	36.43
518.0	65873	73820	4797153	-4210.5	494.7	19585.5	-28.14	2.44	36.61
520.0	57396	74815	4836397	-4267.0	499.6	19658.9	-28.35	2.46	36.82
522.0	48805	75819	4875789	-4323.9	504.6	19732.7	-28.59	2.46	37.03
524.0	40100	76833	4915329	-4381.3	509.5	19807.0	-28.84	2.46	37.23
526.0	31279	77857	4955017	-4439.2	514.4	19881.7	-29.07	2.48	37.44
528.0	22343	78891	4994856	-4497.6	519.4	19956.8	-29.30	2.50	37.65
530.0	13289	79935	5034845	-4556.5	524.4	20032.3	-29.56	2.52	37.85
532.0	4116	80988	5074985	-4615.8	529.5	20108.2	-29.81	2.52	38.06
534.0	-5175	82052	5115278	-4675.7	534.5	20184.5	-30.05	2.54	38.27
536.0	-14587	83127	5155723	-4736.0	539.6	20261.3	-30.27	2.58	38.49
538.0	-24119	84211	5196323	-4796.8	544.8	20338.5	-30.48	2.60	38.71
540.0	-33774	85306	5237078	-4858.0	550.0	20416.1	-30.69	2.61	38.91
542.0	-43552	86411	5277988	-4919.6	555.3	20493.8	-30.90	2.63	39.12
544.0	-53453	87527	5319054	-4981.6	560.6	20572.3	-31.10	2.68	39.32
546.0	-63478	88654	5360278	-5044.0	566.0	20651.0	-31.31	2.70	39.52
548.0	-73629	89791	5401660	-5106.8	570.9	20730.3	-31.51	2.35	39.72
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
548.220	-74753	89917	5406221	-5114.0	571.3	20739.4	-31.54	2.22	39.73
S-II/S-IVB SEPARATION COMMAND									
549.000	-78745	90363	5422391	-5135.5	573.2	20743.1	-26.72	1.86	-6.35
550.0	-83885	90937	5443125	-5162.2	574.9	20736.7	-26.73	1.66	-6.32
552.0	-94281	92091	5484604	-5215.7	578.1	20724.1	-26.76	1.57	-6.22
554.0	-104762	93250	5526054	-5270.0	581.3	20718.6	-27.97	1.70	3.65
556.0	-115361	94417	5567508	-5326.9	584.9	20734.0	-29.46	1.89	9.30
558.0	-126073	95590	5608992	-5383.6	588.7	20753.7	-28.24	1.91	10.24
560.0	-136898	96772	5650523	-5439.8	592.3	20774.6	-27.91	1.79	10.53
562.0	-147835	97960	5692093	-5496.1	595.8	20795.7	-27.59	1.69	10.62
564.0	-158882	99155	5733707	-5551.1	599.2	20817.0	-27.51	1.71	10.67
566.0	-170039	100357	5775362	-5606.2	602.7	20838.4	-27.63	1.78	10.73
568.0	-181307	101566	5817061	-5661.7	606.3	20860.2	-27.82	1.83	10.74
570.0	-192686	102782	5858803	-5717.4	610.0	20881.7	-27.95	1.84	10.75
572.0	-204177	104005	5900588	-5773.4	613.7	20903.2	-28.03	1.87	10.74
574.0	-215780	105237	5942416	-5829.6	617.5	20924.6	-28.14	1.93	10.70
576.0	-227496	106475	5984287	-5886.0	621.4	20946.0	-28.29	1.98	10.66
578.0	-239324	107722	6026200	-5942.7	625.4	20967.3	-28.44	2.02	10.64
580.0	-251267	108977	6068156	-5999.7	629.4	20988.5	-28.54	2.05	10.63
582.0	-263323	110240	6110154	-6056.9	633.6	21009.8	-28.61	2.06	10.60
584.0	-275494	111511	6152195	-6114.2	637.7	21030.9	-28.68	2.08	10.57

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	-287780	112791	6194278	-6171.6	641.9	21052.1	-28.77	2.09	10.55
588.0	-300181	114079	6236403	-6229.3	646.1	21073.2	-28.88	2.12	10.55
590.0	-312697	115375	6278570	-6287.1	650.3	21094.3	-29.00	2.13	10.57
592.0	-325329	116680	6320780	-6345.2	654.6	21115.4	-29.09	2.14	10.58
594.0	-338078	117994	6363032	-6403.5	658.9	21136.6	-29.17	2.15	10.54
596.0	-350943	119316	6405326	-6461.9	663.2	21157.6	-29.27	2.16	10.49
598.0	-363926	120646	6447662	-6520.6	667.5	21178.5	-29.38	2.16	10.46
600.0	-377026	121986	6490040	-6579.4	671.9	21199.4	-29.47	2.17	10.44
602.0	-390244	123334	6532460	-6638.4	676.2	21220.3	-29.55	2.19	10.44
604.0	-403580	124691	6574922	-6697.6	680.6	21241.2	-29.62	2.21	10.41
606.0	-417034	126056	6617425	-6756.9	685.0	21262.0	-29.69	2.22	10.38
608.0	-430607	127431	6659969	-6816.4	689.5	21282.7	-29.78	2.22	10.36
610.0	-444300	128814	6702556	-6876.0	693.9	21303.4	-29.87	2.22	10.36
612.0	-458112	130206	6745183	-6935.9	698.4	21324.2	-29.98	2.24	10.39
614.0	-472043	131608	6787852	-6995.9	702.9	21344.9	-30.08	2.26	10.39
616.0	-486096	133018	6830563	-7056.2	707.4	21365.7	-30.16	2.25	10.36
618.0	-500268	134437	6873315	-7116.6	711.9	21386.4	-30.24	2.23	10.32
620.0	-514562	135865	6916108	-7177.1	716.3	21407.0	-30.32	2.22	10.30
622.0	-528977	137303	6958943	-7237.9	720.8	21427.6	-30.41	2.25	10.27
624.0	-543514	138749	7001819	-7298.8	725.3	21448.1	-30.50	2.28	10.23
626.0	-558172	140204	7044735	-7359.9	729.9	21468.5	-30.58	2.30	10.20
628.0	-572953	141668	7087693	-7421.1	734.5	21488.9	-30.66	2.29	10.21
630.0	-587857	143142	7130691	-7482.5	739.1	21509.3	-30.75	2.28	10.19
632.0	-602883	144625	7173730	-7544.1	743.6	21529.7	-30.82	2.26	10.16
634.0	-618033	146116	7216809	-7605.8	748.1	21550.0	-30.88	2.25	10.13
636.0	-633307	147617	7259930	-7667.6	752.6	21570.2	-30.96	2.25	10.11
638.0	-648704	149127	7303090	-7729.6	757.1	21590.4	-31.05	2.28	10.09
640.0	-664225	150646	7346291	-7791.8	761.7	21610.5	-31.15	2.29	10.05
642.0	-679871	152173	7389532	-7854.2	766.3	21630.6	-31.22	2.28	10.01
644.0	-695642	153711	7432813	-7916.7	770.8	21650.6	-31.30	2.27	9.99
646.0	-711538	155257	7476135	-7979.4	775.4	21670.6	-31.38	2.27	9.98
648.0	-727560	156812	7519496	-8042.3	779.9	21690.5	-31.47	2.28	9.97
650.0	-743707	158376	7562897	-8105.3	784.5	21710.5	-31.56	2.29	9.98
652.0	-759981	159950	7606337	-8168.5	789.1	21730.4	-31.66	2.30	10.01
654.0	-776382	161533	7649818	-8231.9	793.7	21750.4	-31.74	2.32	9.99
656.0	-792909	163125	7693339	-8295.5	798.3	21770.4	-31.82	2.32	9.93
658.0	-809564	164726	7736900	-8359.2	803.0	21790.2	-31.91	2.31	9.89
660.0	-826346	166337	7780500	-8423.1	807.6	21809.9	-32.01	2.31	9.86
662.0	-843256	167956	7824139	-8487.2	812.2	21829.6	-32.08	2.31	9.82
664.0	-860295	169585	7867818	-8551.4	816.8	21849.3	-32.10	2.30	9.82
666.0	-877462	171224	7911536	-8615.6	821.4	21868.9	-32.16	2.29	9.81
668.0	-894758	172871	7955294	-8680.2	826.0	21888.4	-32.41	2.31	9.74
670.0	-912183	174528	7999090	-8745.4	830.6	21907.8	-32.76	2.34	9.61

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
672.0	-929740	176193	8042925	-8911.2	835.3	21926.9	-33.04	2.35	9.50
674.0	-947428	177869	8086797	-8877.3	840.0	21945.9	-33.09	2.34	9.50
676.0	-965249	179553	8130708	-8943.5	844.7	21964.9	-33.02	2.34	9.55
678.0	-983202	181248	8174657	-9009.5	849.4	21984.0	-32.97	2.35	9.56
680.0	-1001287	182951	8218644	-9075.4	854.1	22003.2	-32.97	2.37	9.56
682.0	-1019504	184664	8262670	-9141.3	858.8	22022.3	-32.96	2.38	9.57
684.0	-1037852	186386	8306734	-9207.2	863.6	22041.5	-32.93	2.37	9.60
686.0	-1056332	188118	8350836	-9273.0	868.3	22060.7	-32.90	2.36	9.61
688.0	-1074944	189860	8394976	-9338.8	873.1	22079.9	-32.88	2.37	9.61
690.0	-1093688	191610	8439155	-9404.6	877.8	22099.1	-32.87	2.37	9.63
692.0	-1112563	193371	8483373	-9470.3	882.6	22118.4	-32.85	2.37	9.64
694.0	-1131569	195141	8527629	-9536.0	887.3	22137.6	-32.83	2.37	9.65
696.0	-1150706	196920	8571924	-9601.6	892.1	22156.9	-32.82	2.37	9.65
698.0	-1169975	198709	8616257	-9667.2	896.8	22176.2	-32.81	2.37	9.66
	S-IVB 1ST GUIDANCE CUTOFF								
699.330	-1182862	199904	8645761	-9710.9	900.0	22189.0	-32.80	2.38	9.67
700.0	-1189374	200507	8660627	-9729.2	901.4	22187.0	-25.06	1.66	-10.96
702.0	-1208883	202312	8704978	-9779.2	904.5	22165.0	-24.96	1.66	-11.04
704.0	-1228491	204125	8749285	-9829.1	907.8	22142.8	-24.94	1.66	-11.11
706.0	-1248201	205944	8793550	-9878.9	911.1	22120.5	-24.92	1.67	-11.19
708.0	-1268009	207769	8837769	-9928.7	914.4	22098.1	-24.89	1.66	-11.26
	PARKING ORBIT INSERTION								
709.330	-1281452	208998	8867071	-9962.3	916.8	22083.4	-24.88	1.66	-11.30

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									
-16.968	3441.323	9.226	-2.987	0.0	413.0	1275.5	-0.07	-0.04	0.01
-16.0	3441.323	9.292	-2.784	-0.1	413.0	1275.5	-0.07	-0.04	0.01
-15.0	3441.323	9.360	-2.574	-0.2	412.9	1275.5	-0.07	-0.04	0.01
-14.0	3441.323	9.428	-2.364	-0.3	412.9	1275.5	-0.07	-0.04	0.01
-13.0	3441.322	9.496	-2.154	-0.3	412.8	1275.5	-0.07	-0.04	0.01
-12.0	3441.322	9.564	-1.945	-0.4	412.8	1275.5	-0.07	-0.04	0.01
-11.0	3441.322	9.632	-1.735	-0.5	412.7	1275.6	-0.07	-0.04	0.01
-10.0	3441.322	9.699	-1.525	-0.6	412.7	1275.6	-0.07	-0.04	0.01
-9.0	3441.322	9.767	-1.315	-0.7	412.6	1275.6	-0.07	-0.04	0.01
-8.0	3441.322	9.835	-1.105	-0.8	412.6	1275.6	-0.07	-0.04	0.01
-7.0	3441.322	9.903	-0.895	-0.9	412.6	1275.6	-0.07	-0.04	0.01
-6.0	3441.322	9.971	-0.685	-0.9	412.5	1275.6	-0.07	-0.04	0.01
-5.0	3441.322	10.039	-0.475	-1.0	412.5	1275.6	-0.07	-0.04	0.01
-4.0	3441.321	10.107	-0.265	-1.1	412.4	1275.7	-0.07	-0.04	0.01
-3.0	3441.321	10.175	-0.055	-1.2	412.4	1275.7	-0.07	-0.04	0.01
-2.0	3441.321	10.243	0.155	-1.3	412.3	1275.7	-0.07	-0.04	0.01
-1.0	3441.321	10.310	0.365	-1.4	412.3	1275.7	-0.07	-0.04	0.01
0.0	3441.321	10.378	0.575	-1.5	412.2	1275.7	-0.07	-0.04	0.01
FIRST MOTION									
0.300	3441.320	10.399	0.638	-1.5	412.2	1275.7	2.13	-0.04	0.01
START OF TIME BASE 1									
0.600	3441.321	10.419	0.701	-0.0	412.2	1275.7	5.62	-0.06	0.05
1.0	3441.321	10.446	0.785	2.0	412.2	1275.8	6.81	-0.17	0.07
2.0	3441.322	10.514	0.995	8.9	411.9	1275.8	7.09	-0.40	0.05
3.0	3441.324	10.582	1.205	16.5	411.4	1275.9	7.26	-0.56	0.05
4.0	3441.327	10.649	1.415	23.8	410.9	1275.9	7.40	-0.43	0.04
5.0	3441.332	10.717	1.625	31.6	410.7	1276.0	7.61	0.04	0.04
6.0	3441.337	10.785	1.835	39.4	410.9	1276.0	7.84	0.39	0.05
7.0	3441.345	10.852	2.045	47.3	411.4	1276.1	8.10	0.59	0.07
8.0	3441.353	10.920	2.255	55.6	412.0	1276.2	8.36	0.57	0.07
9.0	3441.363	10.988	2.465	63.5	412.5	1276.3	8.61	0.52	0.07
10.0	3441.374	11.056	2.675	72.3	413.1	1276.4	8.82	0.65	0.08
11.0	3441.387	11.124	2.885	81.2	413.9	1276.5	9.03	0.68	0.08
12.0	3441.401	11.192	3.095	90.1	414.3	1276.5	9.23	0.44	0.07
13.0	3441.416	11.260	3.305	99.6	414.6	1276.6	9.42	0.13	0.05
14.0	3441.433	11.328	3.515	109.2	414.6	1276.7	9.60	-0.16	0.02

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	3441.452	11.397	3.725	118.9	414.4	1276.7	9.79	-0.14	0.02
16.0	3441.473	11.465	3.935	128.8	414.3	1276.8	9.99	0.01	0.18
17.0	3441.495	11.533	4.146	138.8	414.4	1277.1	10.19	0.14	0.34
18.0	3441.518	11.601	4.356	149.1	414.6	1277.5	10.40	0.21	0.49
19.0	3441.544	11.670	4.566	159.7	414.8	1278.0	10.64	0.12	0.61
20.0	3441.571	11.738	4.777	170.5	414.8	1278.7	10.89	-0.03	0.72
21.0	3441.600	11.806	4.987	181.5	414.8	1279.5	11.13	-0.05	0.89
22.0	3441.631	11.874	5.198	192.7	414.8	1280.5	11.36	-0.03	1.07
23.0	3441.663	11.943	5.409	204.2	414.8	1281.6	11.59	-0.04	1.23
24.0	3441.698	12.011	5.620	215.9	414.7	1283.0	11.83	-0.04	1.42
25.0	3441.734	12.079	5.831	227.8	414.6	1284.5	12.08	-0.06	1.61
26.0	3441.773	12.147	6.042	240.0	414.6	1286.2	12.32	-0.07	1.82
27.0	3441.813	12.216	6.254	252.5	414.5	1288.1	12.57	-0.08	2.04
28.0	3441.856	12.284	6.466	265.1	414.4	1290.3	12.82	-0.08	2.28
29.0	3441.901	12.352	6.679	278.1	414.3	1292.7	13.08	-0.08	2.54
30.0	3441.948	12.420	6.892	291.3	414.2	1295.4	13.35	-0.10	2.83
31.0	3441.997	12.488	7.105	304.8	414.1	1298.4	13.63	-0.13	3.15
32.0	3442.048	12.556	7.319	318.5	413.9	1301.7	13.89	-0.16	3.49
33.0	3442.101	12.625	7.534	332.5	413.8	1305.4	14.17	-0.18	3.85
34.0	3442.157	12.693	7.749	346.8	413.6	1309.4	14.44	-0.19	4.24
35.0	3442.216	12.761	7.965	361.4	413.4	1313.9	14.70	-0.18	4.63
36.0	3442.276	12.829	8.181	376.2	413.2	1318.7	14.94	-0.18	5.04
37.0	3442.339	12.897	8.399	391.2	413.0	1324.0	15.19	-0.16	5.45
38.0	3442.405	12.965	8.617	406.5	412.9	1329.6	15.46	-0.14	5.89
39.0	3442.473	13.033	8.837	422.1	412.7	1335.8	15.74	-0.13	6.34
40.0	3442.544	13.101	9.057	438.0	412.6	1342.3	16.01	-0.15	6.82
41.0	3442.617	13.168	9.278	454.1	412.4	1349.4	16.29	-0.17	7.32
42.0	3442.694	13.236	9.501	470.5	412.2	1357.0	16.58	-0.20	7.85
43.0	3442.772	13.304	9.725	487.2	412.0	1365.1	16.84	-0.21	8.37
44.0	3442.854	13.372	9.951	504.2	411.8	1373.8	17.10	-0.24	8.92
45.0	3442.938	13.440	10.177	521.4	411.5	1383.0	17.35	-0.26	9.50
46.0	3443.026	13.507	10.406	538.9	411.3	1392.8	17.60	-0.26	10.09
47.0	3443.116	13.575	10.636	556.6	411.0	1403.2	17.85	-0.25	10.70
48.0	3443.209	13.643	10.868	574.6	410.7	1414.2	18.10	-0.24	11.34
49.0	3443.305	13.710	11.101	592.8	410.5	1425.9	18.34	-0.23	12.01
50.0	3443.404	13.778	11.337	611.2	410.3	1438.2	18.56	-0.21	12.70
51.0	3443.506	13.845	11.575	629.8	410.1	1451.3	18.78	-0.19	13.42
52.0	3443.611	13.913	11.815	648.7	409.9	1465.1	18.98	-0.18	14.16
53.0	3443.720	13.980	12.057	667.8	409.7	1479.6	19.19	-0.17	14.92
54.0	3443.831	14.048	12.302	687.1	409.5	1494.9	19.39	-0.15	15.70
55.0	3443.946	14.115	12.549	706.6	409.4	1511.0	19.59	-0.13	16.47
56.0	3444.064	14.182	12.799	726.2	409.2	1527.9	19.78	-0.11	17.24
57.0	3444.185	14.250	13.052	746.1	409.1	1545.5	19.96	-0.13	18.03

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	3444.309	14.317	13.308	766.1	408.9	1564.0	20.11	-0.16	18.83
59.0	3444.437	14.384	13.567	786.2	408.8	1583.2	20.24	-0.15	19.60
60.0	3444.568	14.452	13.829	806.5	408.7	1603.2	20.35	-0.10	20.37
61.0	3444.702	14.519	14.095	827.0	408.6	1623.9	20.50	-0.04	21.13
62.0	3444.840	14.586	14.364	847.5	408.6	1645.4	20.61	0.04	21.88
63.0	3444.981	14.653	14.636	868.2	408.7	1667.7	20.71	0.11	22.64
64.0	3445.126	14.721	14.913	888.9	408.8	1690.7	20.79	0.15	23.44
65.0	3445.274	14.788	15.193	909.7	408.9	1714.6	20.82	0.17	24.27
66.0	3445.425	14.855	15.477	930.4	409.0	1739.3	20.81	0.16	25.11
MACH 1									
66.300	3445.472	14.875	15.563	936.7	409.1	1746.9	20.80	0.16	25.37
67.0	3445.580	14.922	15.766	951.2	409.2	1764.8	20.77	0.15	25.98
68.0	3445.738	14.990	16.058	971.9	409.4	1791.3	20.73	0.15	26.87
69.0	3445.900	15.057	16.355	992.7	409.6	1818.6	20.71	0.21	27.77
70.0	3446.065	15.125	16.657	1013.4	409.9	1846.8	20.74	0.32	28.65
71.0	3446.234	15.192	16.963	1034.2	410.2	1875.9	20.80	0.44	29.55
72.0	3446.406	15.260	17.274	1055.0	410.7	1905.9	20.88	0.52	30.49
73.0	3446.581	15.327	17.591	1075.9	411.2	1936.9	20.96	0.56	31.49
74.0	3446.760	15.395	17.912	1096.9	411.8	1968.9	21.03	0.61	32.51
75.0	3446.942	15.463	18.239	1117.9	412.4	2002.0	21.09	0.64	33.54
76.0	3447.128	15.531	18.571	1139.0	413.0	2036.1	21.17	0.61	34.61
77.0	3447.317	15.599	18.909	1160.2	413.6	2071.2	21.23	0.60	35.65
78.0	3447.510	15.667	19.253	1181.4	414.2	2107.3	21.26	0.56	36.65
79.0	3447.706	15.735	19.603	1202.7	414.7	2144.5	21.33	0.50	37.66
80.0	3447.906	15.803	19.959	1224.1	415.1	2182.6	21.42	0.41	38.66
81.0	3448.109	15.872	20.321	1245.5	415.5	2221.8	21.50	0.33	39.67
82.0	3448.316	15.940	20.690	1267.1	415.8	2262.0	21.60	0.23	40.70
MAXIMUM DYNAMIC PRESSURE									
83.000	3448.526	16.009	21.066	1288.7	416.0	2303.3	21.68	0.15	41.75
84.0	3448.740	16.077	21.448	1310.4	416.1	2345.5	21.77	0.11	42.79
85.0	3448.957	16.146	21.838	1332.2	416.2	2388.8	21.88	0.11	43.75
86.0	3449.178	16.214	22.235	1354.1	416.3	2433.0	21.99	0.11	44.67
87.0	3449.403	16.283	22.639	1376.2	416.4	2478.1	22.12	0.07	45.59
88.0	3449.631	16.351	23.050	1398.4	416.4	2524.1	22.25	0.01	46.46
89.0	3449.863	16.420	23.470	1420.7	416.4	2571.0	22.39	-0.10	47.35
90.0	3450.099	16.488	23.897	1443.1	416.2	2618.9	22.53	-0.21	48.30
91.0	3450.338	16.557	24.332	1465.7	415.9	2667.8	22.62	-0.34	49.34
92.0	3450.581	16.625	24.775	1488.3	415.5	2717.6	22.70	-0.44	50.43
93.0	3450.828	16.693	25.226	1511.0	415.1	2768.7	22.73	-0.49	51.55

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
94.0	3451.079	16.762	25.686	1533.7	414.6	2820.8	22.71	-0.48	52.71
95.0	3451.333	16.830	26.155	1556.4	414.1	2874.0	22.68	-0.45	53.86
96.0	3451.591	16.898	26.632	1579.0	413.7	2928.5	22.62	-0.38	55.01
97.0	3451.853	16.966	27.119	1601.6	413.3	2984.0	22.55	-0.33	56.14
98.0	3452.118	17.034	27.615	1624.1	413.0	3040.8	22.48	-0.32	57.27
99.0	3452.387	17.102	28.120	1646.5	412.7	3098.6	22.40	-0.32	58.43
100.0	3452.660	17.170	28.635	1668.9	412.3	3157.6	22.32	-0.35	59.59
101.0	3452.937	17.238	29.159	1691.2	411.9	3217.8	22.26	-0.37	60.75
102.0	3453.217	17.305	29.694	1713.4	411.6	3279.2	22.18	-0.39	61.95
103.0	3453.501	17.373	30.239	1735.5	411.2	3341.7	22.11	-0.38	63.15
104.0	3453.788	17.441	30.794	1757.6	410.8	3405.5	22.04	-0.36	64.33
105.0	3454.079	17.508	31.360	1779.5	410.5	3470.4	21.96	-0.32	65.51
106.0	3454.374	17.576	31.936	1801.4	410.1	3536.5	21.85	-0.27	66.71
107.0	3454.672	17.643	32.524	1823.2	409.9	3603.8	21.76	-0.19	67.92
108.0	3454.974	17.711	33.122	1844.9	409.8	3672.3	21.67	-0.08	69.09
109.0	3455.279	17.778	33.733	1866.5	409.8	3742.0	21.60	0.05	70.25
110.0	3455.588	17.846	34.354	1888.1	409.9	3812.9	21.59	0.18	71.41
111.0	3455.901	17.913	34.988	1909.7	410.2	3884.8	21.62	0.32	72.54
112.0	3456.217	17.981	35.633	1931.4	410.5	3957.9	21.71	0.42	73.60
113.0	3456.536	18.048	36.290	1953.2	410.9	4032.0	21.85	0.44	74.63
114.0	3456.860	18.116	36.960	1975.1	411.3	4107.1	22.01	0.37	75.67
115.0	3457.187	18.184	37.642	1997.2	411.5	4183.3	22.20	0.20	76.68
116.0	3457.517	18.251	38.337	2019.5	411.6	4260.5	22.36	-0.02	77.73
117.0	3457.851	18.319	39.045	2041.8	411.4	4338.9	22.46	-0.26	78.87
118.0	3458.189	18.387	39.765	2064.3	411.1	4418.4	22.48	-0.46	80.10
119.0	3458.531	18.455	40.499	2086.7	410.6	4499.1	22.40	-0.60	81.41
120.0	3458.876	18.522	41.246	2108.9	410.0	4581.3	22.23	-0.68	82.79
121.0	3459.225	18.589	42.007	2131.0	409.3	4664.8	21.99	-0.70	84.24
122.0	3459.578	18.657	42.782	2152.9	408.6	4749.7	21.73	-0.69	85.71
123.0	3459.934	18.724	43.571	2174.5	407.9	4836.2	21.49	-0.65	87.18
124.0	3460.293	18.791	44.374	2195.9	407.2	4924.1	21.29	-0.60	88.62
125.0	3460.656	18.858	45.192	2217.1	406.7	5013.4	21.17	-0.55	90.03
126.0	3461.023	18.925	46.024	2238.3	406.1	5104.1	21.13	-0.50	91.45
127.0	3461.393	18.992	46.872	2259.4	405.7	5196.3	21.17	-0.44	92.81
128.0	3461.767	19.058	47.735	2280.6	405.2	5289.8	21.27	-0.31	94.22
129.0	3462.144	19.125	48.613	2301.9	404.9	5384.7	21.37	-0.35	95.64
130.0	3462.524	19.192	49.507	2323.3	404.6	5481.1	21.47	-0.23	97.05
131.0	3462.909	19.258	50.417	2344.8	404.4	5578.8	21.57	-0.21	98.47
132.0	3463.296	19.325	51.343	2366.4	404.2	5678.0	21.67	-0.12	99.89
133.0	3463.687	19.391	52.286	2388.1	404.1	5778.6	21.77	-0.14	101.30
134.0	3464.082	19.458	53.246	2409.9	403.9	5880.6	21.87	-0.22	102.71
135.0	3464.481	19.524	54.222	2431.8	403.6	5984.0	21.97	-0.24	104.13
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
135.200	3464.561	19.537	54.420	2436.2	403.6	6004.9	21.99	-0.23	104.41

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	3464.882	19.591	55.215	2448.5	403.5	6080.1	10.85	-0.09	85.98
137.0	3465.286	19.657	56.222	2459.4	403.4	6164.8	10.89	-0.01	84.92
138.0	3465.691	19.723	57.243	2470.2	403.5	6250.1	10.92	0.18	85.67
139.0	3466.099	19.790	58.280	2481.2	403.7	6336.3	10.95	0.21	86.81
140.0	3466.508	19.856	59.330	2492.1	403.9	6423.7	10.99	0.29	87.95
141.0	3466.919	19.923	60.395	2503.1	404.3	6512.2	11.06	0.40	89.09
142.0	3467.332	19.989	61.474	2514.2	404.6	6601.9	11.12	0.23	90.23
143.0	3467.747	20.056	62.568	2525.3	404.7	6692.7	11.18	0.21	91.49
144.0	3468.164	20.123	63.677	2536.3	404.9	6786.1	11.28	0.14	92.75
145.0	3468.582	20.189	64.802	2547.6	405.0	6879.6	11.41	0.07	93.95
146.0	3469.003	20.256	65.942	2559.0	405.0	6974.2	11.53	-0.00	95.22
147.0	3469.425	20.323	67.098	2570.6	405.0	7070.0	11.66	-0.05	96.54
148.0	3469.849	20.389	68.269	2582.3	404.9	7167.1	11.78	-0.07	97.80
149.0	3470.275	20.456	69.457	2594.1	404.9	7265.6	11.89	-0.08	99.07
150.0	3470.703	20.522	70.661	2606.1	404.8	7365.3	12.02	-0.08	100.37
151.0	3471.134	20.589	71.881	2618.1	404.7	7466.4	12.16	-0.08	101.71
152.0	3471.566	20.656	73.118	2630.3	404.6	7568.8	12.28	-0.09	103.09
153.0	3472.000	20.722	74.373	2642.7	404.5	7672.6	12.38	-0.08	104.50
154.0	3472.436	20.789	75.644	2655.1	404.4	7777.8	12.52	-0.08	105.96
155.0	3472.874	20.855	76.933	2667.7	404.3	7884.5	12.66	-0.09	107.48
156.0	3473.314	20.922	78.239	2680.4	404.2	7992.8	12.81	-0.05	109.01
157.0	3473.757	20.988	79.564	2693.2	404.2	8102.5	12.96	-0.05	110.54
158.0	3474.201	21.055	80.906	2706.2	404.2	8213.8	13.10	0.08	112.07
159.0	3474.648	21.121	82.267	2719.4	404.2	8326.7	13.25	-0.02	113.60
160.0	3475.097	21.188	83.647	2732.7	404.2	8441.0	13.39	-0.05	115.12
161.0	3475.548	21.254	85.046	2746.2	404.1	8556.9	13.54	-0.06	116.65
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
161.630	3475.835	21.296	85.942	2754.7	404.0	8630.7	13.62	-0.23	117.57
162.0	3476.003	21.321	86.468	2758.8	404.0	8659.1	-13.42	-0.10	44.98
	S-IC/S-II SEPARATION COMMAND								
162.300	3476.139	21.341	86.895	2747.7	403.9	8666.5	-30.98	-0.04	4.05
164.0	3476.899	21.454	89.317	2695.5	403.7	8667.3	-30.85	-0.03	0.58
166.0	3477.778	21.587	92.175	2637.2	403.3	8678.0	-24.46	-0.33	17.43
168.0	3478.637	21.719	95.036	2589.5	402.9	8715.0	-23.63	-0.16	18.80
170.0	3479.482	21.852	97.912	2543.1	402.4	8756.6	-22.42	-0.26	22.44
172.0	3480.312	21.984	100.801	2498.4	401.9	8801.6	-22.28	-0.33	22.65
174.0	3481.127	22.116	103.706	2453.9	401.5	8847.2	-22.17	-0.17	22.89
176.0	3491.927	22.249	106.626	2409.6	401.0	8893.5	-22.06	-0.22	23.09
178.0	3492.713	22.380	109.561	2365.6	400.6	8939.9	-21.94	-0.21	23.24

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
180.0	3483.484	22.512	112.511	2321.9	400.1	8986.5	-21.86	-0.21	23.35
182.0	3484.241	22.644	115.477	2278.2	399.7	9033.3	-21.78	-0.21	23.45
184.0	3484.984	22.775	118.458	2234.7	399.3	9080.3	-21.72	-0.21	23.56
186.0	3485.713	22.907	121.455	2191.2	398.8	9127.5	-21.68	-0.20	23.64
188.0	3486.427	23.038	124.467	2147.9	398.4	9174.9	-21.62	-0.20	23.71
190.0	3487.127	23.169	127.495	2104.7	398.0	9222.4	-21.56	-0.20	23.80
192.0	3487.812	23.300	130.538	2061.6	397.6	9270.2	-21.48	-0.21	23.92
194.0	3488.484	23.431	133.597	2018.7	397.2	9318.1	-21.41	-0.20	24.05
196.0	3489.141	23.561	136.672	1975.9	396.7	9366.4	-21.34	-0.21	24.19
198.0	3489.785	23.692	139.763	1933.4	396.3	9414.9	-21.16	-0.21	24.31
200.0	3490.414	23.822	142.870	1891.0	395.9	9463.7	-21.20	-0.18	24.51
202.0	3491.029	23.953	145.993	1848.3	395.5	9512.9	-21.35	-0.18	24.70
204.0	3491.631	24.083	149.133	1805.7	395.1	9562.4	-21.26	-0.22	24.77
206.0	3492.218	24.213	152.289	1763.7	394.6	9611.9	-20.72	-0.27	24.65
208.0	3492.792	24.342	155.460	1723.3	394.0	9660.8	-19.60	-0.32	24.27
210.0	3493.353	24.472	158.648	1685.2	393.3	9709.0	-18.53	-0.36	23.88
212.0	3493.902	24.601	161.852	1648.7	392.5	9756.5	-17.84	-0.39	23.65
214.0	3494.438	24.730	165.071	1613.4	391.7	9803.7	-17.46	-0.39	23.56
216.0	3494.964	24.859	168.306	1578.7	391.0	9850.8	-17.32	-0.37	23.57
218.0	3495.478	24.988	171.556	1544.1	390.2	9898.0	-17.18	-0.35	23.60
220.0	3495.980	25.116	174.822	1509.8	389.5	9945.4	-17.14	-0.34	23.72
222.0	3496.472	25.244	178.103	1475.5	388.8	9992.9	-17.16	-0.34	23.86
224.0	3496.952	25.372	181.400	1441.1	388.1	10040.8	-17.20	-0.35	23.98
226.0	3497.420	25.500	184.713	1406.6	387.3	10088.9	-17.23	-0.38	24.11
228.0	3497.878	25.627	188.042	1372.1	386.6	10137.3	-17.26	-0.40	24.26
230.0	3498.324	25.754	191.387	1337.5	385.8	10185.9	-17.29	-0.38	24.39
232.0	3498.758	25.881	194.748	1302.9	385.0	10234.8	-17.32	-0.34	24.51
234.0	3499.181	26.008	198.125	1268.2	384.3	10284.0	-17.33	-0.33	24.62
236.0	3499.593	26.134	201.518	1233.5	383.7	10333.4	-17.34	-0.35	24.73
238.0	3499.993	26.260	204.927	1198.8	382.9	10383.0	-17.37	-0.35	24.86
240.0	3500.382	26.386	208.353	1164.0	382.2	10432.9	-17.40	-0.35	25.01
242.0	3500.760	26.512	211.795	1129.1	381.5	10483.1	-17.41	-0.35	25.17
244.0	3501.126	26.637	215.254	1094.2	380.8	10533.5	-17.43	-0.35	25.30
246.0	3501.480	26.763	218.730	1059.3	390.1	10584.3	-17.46	-0.36	25.42
248.0	3501.823	26.887	222.222	1024.3	379.3	10635.3	-17.50	-0.35	25.56
250.0	3502.154	27.012	225.731	989.3	378.6	10686.5	-17.53	-0.33	25.71
252.0	3502.474	27.137	229.257	954.1	377.9	10738.1	-17.55	-0.33	25.87
254.0	3502.782	27.261	232.800	919.0	377.3	10790.0	-17.57	-0.33	26.01
256.0	3503.079	27.385	236.361	883.8	376.6	10842.2	-17.59	-0.33	26.14
258.0	3503.364	27.509	239.933	948.5	375.9	10894.6	-17.61	-0.33	26.26
260.0	3503.638	27.633	243.533	813.2	375.2	10947.3	-17.65	-0.33	26.40
262.0	3503.900	27.756	247.145	777.9	374.6	11000.3	-17.69	-0.35	26.58
264.0	3504.150	27.879	250.774	742.4	373.8	11053.7	-17.74	-0.35	26.78

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
266.0	3504.388	28.002	254.422	706.8	373.2	11107.4	-17.78	-0.33	26.94
268.0	3504.615	28.125	258.087	671.2	372.5	11161.4	-17.79	-0.34	27.05
270.0	3504.830	28.247	261.769	635.6	371.8	11215.6	-17.80	-0.34	27.20
272.0	3505.034	28.370	265.470	599.9	371.1	11270.3	-17.84	-0.34	27.41
274.0	3505.225	28.492	269.189	564.2	370.4	11325.3	-17.90	-0.34	27.63
276.0	3505.405	28.613	272.926	528.3	369.7	11380.7	-17.94	-0.34	27.76
278.0	3505.573	28.735	276.681	492.3	369.0	11436.4	-17.98	-0.34	27.87
280.0	3505.729	28.856	280.454	456.3	368.3	11492.3	-18.02	-0.33	28.05
282.0	3505.873	28.977	284.247	420.1	367.6	11548.6	-18.07	-0.32	28.26
284.0	3506.006	29.098	288.057	383.9	367.0	11605.3	-18.12	-0.32	28.44
286.0	3506.126	29.219	291.887	347.6	366.3	11662.4	-18.16	-0.31	28.58
288.0	3506.234	29.339	295.735	311.2	365.7	11719.7	-18.19	-0.29	28.72
290.0	3506.331	29.460	299.602	274.8	365.1	11777.3	-18.23	-0.29	28.88
292.0	3506.415	29.580	303.488	238.2	364.5	11835.2	-18.28	-0.30	29.04
294.0	3506.488	29.700	307.393	201.5	363.8	11893.5	-18.34	-0.31	29.24
296.0	3506.548	29.819	311.318	164.8	363.2	11952.2	-18.39	-0.28	29.45
298.0	3506.596	29.939	315.262	127.9	362.6	12011.3	-18.43	-0.27	29.61
300.0	3506.632	30.058	319.225	91.0	362.0	12070.7	-18.46	-0.30	29.75
302.0	3506.656	30.177	323.208	54.0	361.4	12130.4	-18.50	-0.32	29.90
304.0	3506.668	30.296	327.211	16.9	360.8	12190.4	-18.55	-0.32	30.09
306.0	3506.667	30.415	331.233	-20.3	360.1	12250.8	-18.62	-0.30	30.30
308.0	3506.654	30.533	335.275	-57.7	359.5	12311.6	-18.70	-0.31	30.49
310.0	3506.629	30.651	339.338	-95.2	358.8	12372.7	-18.76	-0.33	30.67
312.0	3506.592	30.769	343.421	-132.8	358.2	12434.3	-18.81	-0.33	30.85
314.0	3506.542	30.887	347.524	-170.5	357.5	12496.2	-18.86	-0.32	31.03
316.0	3506.479	31.005	351.647	-208.3	356.8	12558.4	-18.92	-0.32	31.23
318.0	3506.404	31.122	355.791	-246.3	356.2	12621.1	-18.98	-0.32	31.45
320.0	3506.317	31.239	359.956	-284.3	355.5	12684.3	-19.04	-0.31	31.66
322.0	3506.217	31.356	364.141	-322.5	354.9	12747.8	-19.11	-0.30	31.83
324.0	3506.105	31.473	368.348	-360.8	354.3	12811.6	-19.17	-0.31	32.00
326.0	3505.980	31.589	372.576	-399.3	353.6	12875.8	-19.22	-0.32	32.19
328.0	3505.842	31.706	376.824	-437.8	353.0	12940.5	-19.30	-0.31	32.43
330.0	3505.691	31.822	381.095	-476.5	352.3	13005.5	-19.38	-0.29	32.65
332.0	3505.528	31.937	385.386	-515.4	351.7	13071.0	-19.46	-0.29	32.82
334.0	3505.352	32.053	389.699	-554.4	351.1	13136.9	-19.51	-0.29	33.02
336.0	3505.163	32.169	394.034	-593.6	350.5	13203.2	-19.57	-0.29	33.26
338.0	3504.961	32.284	398.391	-632.8	349.9	13269.9	-19.66	-0.30	33.49
340.0	3504.747	32.399	402.770	-672.3	349.3	13337.1	-19.74	-0.29	33.67
342.0	3504.519	32.514	407.171	-711.9	348.7	13404.7	-19.83	-0.27	33.86
344.0	3504.278	32.629	411.595	-751.7	348.2	13472.6	-19.93	-0.26	34.09
346.0	3504.024	32.743	416.041	-791.7	347.6	13541.1	-20.01	-0.28	34.34
348.0	3503.757	32.857	420.509	-831.8	347.0	13610.0	-20.06	-0.29	34.57
350.0	3503.476	32.971	425.000	-872.0	346.4	13679.3	-20.13	-0.28	34.79

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
352.0	3503.183	33.085	429.515	-912.4	345.9	13749.2	-20.24	-0.25	35.02
354.0	3502.876	33.199	434.052	-953.1	345.3	13819.4	-20.37	-0.25	35.26
356.0	3502.555	33.313	438.612	-993.9	344.8	13890.2	-20.44	-0.27	35.51
358.0	3502.221	33.426	443.196	-1034.9	344.2	13961.5	-20.49	-0.29	35.74
360.0	3501.874	33.539	447.803	-1076.0	343.6	14033.2	-20.57	-0.29	35.96
362.0	3501.513	33.652	452.434	-1117.3	343.0	14105.4	-20.67	-0.27	36.18
364.0	3501.138	33.765	457.089	-1158.8	342.5	14178.0	-20.80	-0.28	36.42
366.0	3500.750	33.878	461.768	-1200.6	341.9	14251.1	-20.90	-0.30	36.68
368.0	3500.348	33.990	466.471	-1242.5	341.2	14324.8	-21.01	-0.31	36.95
370.0	3499.932	34.102	471.198	-1284.7	340.6	14399.0	-21.13	-0.31	37.22
372.0	3499.502	34.214	475.950	-1327.1	340.0	14473.7	-21.22	-0.30	37.47
374.0	3499.058	34.326	480.726	-1369.7	339.4	14548.8	-21.30	-0.28	37.62
376.0	3498.600	34.438	485.528	-1412.4	338.8	14624.0	-21.42	-0.28	37.70
378.0	3498.128	34.549	490.354	-1455.5	338.2	14699.9	-21.56	-0.28	38.05
380.0	3497.642	34.661	495.205	-1498.8	337.6	14776.5	-21.71	-0.28	38.58
382.0	3497.142	34.772	500.081	-1542.3	337.0	14854.1	-21.82	-0.27	39.02
384.0	3496.627	34.882	504.984	-1586.1	336.5	14932.3	-21.90	-0.25	39.20
386.0	3496.098	34.993	509.912	-1630.0	336.0	15010.9	-21.98	-0.23	39.27
388.0	3495.554	35.104	514.866	-1674.2	335.5	15089.7	-22.08	-0.22	39.53
390.0	3494.995	35.214	519.846	-1718.5	335.1	15169.0	-22.22	-0.22	39.82
392.0	3494.422	35.324	524.852	-1763.2	334.5	15249.0	-22.39	-0.27	40.10
394.0	3493.835	35.434	529.884	-1808.2	333.9	15329.5	-22.55	-0.35	40.41
396.0	3493.232	35.544	534.943	-1853.4	333.2	15410.7	-22.69	-0.36	40.73
398.0	3492.615	35.653	540.029	-1899.0	332.5	15492.5	-22.85	-0.28	41.07
400.0	3491.982	35.763	545.142	-1944.9	332.0	15574.9	-22.98	-0.20	41.36
402.0	3491.334	35.872	550.283	-1991.0	331.6	15657.9	-23.10	-0.19	41.63
404.0	3490.671	35.981	555.450	-2037.4	331.2	15741.5	-23.23	-0.23	41.91
406.0	3489.993	36.090	560.646	-2084.1	330.7	15825.6	-23.39	-0.24	42.22
408.0	3489.299	36.199	565.869	-2131.1	330.1	15910.4	-23.58	-0.26	42.55
410.0	3488.590	36.307	571.120	-2178.5	329.6	15995.7	-23.75	-0.27	42.72
412.0	3487.865	36.416	576.399	-2226.2	329.0	16081.3	-23.89	-0.27	42.93
414.0	3487.124	36.524	581.706	-2274.1	328.5	16167.8	-24.02	-0.23	43.41
416.0	3486.368	36.632	587.042	-2322.3	328.0	16255.2	-24.15	-0.21	44.00
418.0	3485.595	36.740	592.408	-2370.8	327.6	16343.6	-24.30	-0.22	44.45
420.0	3484.807	36.848	597.802	-2419.7	327.1	16432.8	-24.50	-0.23	44.67
422.0	3484.002	36.955	603.226	-2468.9	326.6	16522.3	-24.70	-0.25	44.86
424.0	3483.182	37.063	608.679	-2518.6	326.1	16612.4	-24.87	-0.25	45.18
426.0	3482.344	37.170	614.162	-2568.5	325.5	16703.1	-25.02	-0.25	45.51
428.0	3481.491	37.277	619.675	-2618.8	325.0	16794.5	-25.18	-0.25	45.88
430.0	3480.620	37.384	625.218	-2669.4	324.5	16886.7	-25.37	-0.25	46.28
432.0	3479.733	37.491	630.792	-2720.3	324.0	16979.6	-25.56	-0.23	46.64
434.0	3478.830	37.597	636.396	-2771.7	323.5	17073.3	-25.76	-0.22	46.99
436.0	3477.909	37.704	642.031	-2823.5	323.1	17167.7	-25.96	-0.20	47.38

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
438.0	3476.971	37.810	647.698	-2875.7	322.6	17262.9	-26.15	-0.20	47.77
440.0	3476.016	37.916	653.396	-2928.2	322.2	17358.8	-26.32	-0.21	48.15
442.0	3475.043	38.022	659.125	-2981.1	321.7	17455.5	-26.51	-0.23	48.55
444.0	3474.053	38.128	664.887	-3034.3	321.2	17553.0	-26.72	-0.26	48.95
446.0	3473.045	38.233	670.681	-3088.1	320.7	17651.3	-26.95	-0.28	49.38
448.0	3472.020	38.339	676.507	-3142.2	320.1	17750.5	-27.17	-0.26	49.78
450.0	3470.977	38.444	682.366	-3196.8	319.6	17850.5	-27.38	-0.24	50.17
452.0	3469.916	38.549	688.259	-3251.9	319.0	17951.3	-27.60	-0.24	50.60
454.0	3468.836	38.654	694.184	-3307.5	318.6	18052.9	-27.84	-0.27	51.00
456.0	3467.738	38.759	700.143	-3363.4	318.0	18155.3	-28.13	-0.18	51.41
458.0	3466.622	38.864	706.136	-3419.9	317.6	18258.5	-28.33	-0.19	51.82
460.0	3465.487	38.968	712.163	-3476.8	317.2	18362.5	-28.69	-0.31	52.23
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
460.620	3465.142	39.000	713.982	-3494.1	317.0	18393.9	-28.73	-0.32	52.35
462.0	3464.333	39.072	718.223	-3534.3	316.6	18453.5	-28.91	-0.27	40.98
464.0	3463.160	39.176	724.311	-3592.4	315.8	18535.6	-29.15	-0.54	41.14
466.0	3461.968	39.280	730.426	-3650.8	314.8	18618.1	-29.19	-0.46	41.33
468.0	3460.756	39.384	736.568	-3709.1	313.8	18701.0	-29.11	-0.45	41.59
470.0	3459.526	39.487	742.739	-3766.6	313.1	18784.4	-28.37	-0.34	41.87
472.0	3458.277	39.590	748.935	-3822.8	312.4	18869.3	-27.86	-0.33	42.16
474.0	3457.009	39.693	755.160	-3878.0	311.7	18953.9	-27.27	-0.35	42.39
476.0	3455.724	39.795	761.412	-3932.4	311.0	19039.0	-27.09	-0.36	42.66
478.0	3454.421	39.897	767.693	-3986.7	310.3	19124.7	-27.19	-0.34	42.98
480.0	3453.099	39.999	774.003	-4041.3	309.6	19211.0	-27.41	-0.31	43.33
482.0	3451.760	40.101	780.340	-4096.4	309.0	19298.0	-27.68	-0.27	43.67
484.0	3450.403	40.203	786.707	-4152.2	308.4	19385.7	-27.99	-0.25	44.02
486.0	3449.027	40.304	793.102	-4208.6	307.9	19474.1	-28.35	-0.23	44.36
488.0	3447.632	40.405	799.527	-4265.7	307.4	19563.2	-28.69	-0.22	44.68
490.0	3446.218	40.507	805.981	-4323.4	307.0	19652.8	-29.02	-0.22	45.00
492.0	3444.786	40.607	812.465	-4382.0	306.6	19743.2	-29.27	-0.19	45.33
494.0	3443.334	40.708	818.978	-4441.1	306.0	19834.1	-29.72	-0.28	45.64
496.0	3441.862	40.809	825.522	-4500.8	305.6	19925.8	-29.92	-0.11	45.98
498.0	3440.371	40.910	832.096	-4561.3	305.3	20018.0	-30.43	-0.22	46.29
500.0	3438.859	41.010	838.699	-4622.6	304.7	20097.0	-30.72	-0.27	35.06
502.0	3437.328	41.110	845.325	-4684.4	304.4	20166.0	-30.93	-0.12	34.16
504.0	3435.775	41.210	851.974	-4746.6	304.0	20234.3	-31.08	-0.17	34.17
506.0	3434.203	41.310	858.646	-4808.8	303.7	20302.7	-31.15	-0.06	34.24
508.0	3432.610	41.410	865.340	-4871.4	303.5	20371.3	-31.37	-0.11	34.33
510.0	3430.996	41.510	872.057	-4934.4	303.2	20441.0	-31.51	-0.14	34.50
512.0	3429.361	41.610	878.797	-4997.5	302.9	20510.2	-31.53	-0.15	34.62
514.0	3427.706	41.710	885.559	-5060.6	302.6	20579.6	-31.52	-0.15	34.78

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
516.0	3426.030	41.809	892.345	-5123.8	302.3	20649.3	-31.60	-0.14	34.94
518.0	3424.333	41.908	899.153	-5187.2	302.0	20719.4	-31.76	-0.12	35.10
520.0	3422.615	42.008	905.985	-5251.0	301.7	20789.8	-31.99	-0.12	35.29
522.0	3420.876	42.107	912.840	-5315.3	301.4	20860.6	-32.25	-0.14	35.48
524.0	3419.116	42.206	919.718	-5380.1	301.1	20931.7	-32.51	-0.16	35.67
526.0	3417.334	42.305	926.619	-5445.5	300.7	21003.3	-32.77	-0.16	35.86
528.0	3415.531	42.404	933.544	-5511.4	300.4	21075.2	-33.02	-0.15	36.05
530.0	3413.706	42.503	940.493	-5577.7	300.1	21147.5	-33.30	-0.15	36.23
532.0	3411.859	42.602	947.466	-5644.7	299.7	21220.2	-33.57	-0.17	36.41
534.0	3409.990	42.700	954.463	-5712.2	299.3	21293.3	-33.83	-0.16	36.61
536.0	3408.099	42.799	961.484	-5780.1	299.0	21366.7	-34.07	-0.14	36.81
538.0	3406.185	42.897	968.529	-5848.6	298.7	21440.5	-34.31	-0.14	37.00
540.0	3404.248	42.995	975.599	-5917.5	298.4	21514.7	-34.53	-0.15	37.19
542.0	3402.289	43.094	982.693	-5986.8	298.1	21589.0	-34.76	-0.15	37.38
544.0	3400.307	43.192	989.811	-6056.6	297.7	21664.0	-34.99	-0.11	37.56
546.0	3398.302	43.290	996.955	-6126.9	297.6	21739.3	-35.21	-0.11	37.74
548.0	3396.273	43.388	1004.123	-6197.6	296.7	21814.9	-35.43	-0.48	37.91
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
548.220	3396.049	43.398	1004.913	-6205.8	296.5	21823.6	-35.46	-0.62	37.93
	S-II/S-IVB SEPARATION COMMAND								
549.000	3395.252	43.436	1007.713	-6229.4	296.8	21826.1	-29.06	-0.00	-7.97
550.0	3394.226	43.485	1011.304	-6258.5	296.6	21818.1	-29.07	-0.21	-7.94
552.0	3392.153	43.583	1018.486	-6316.7	296.0	21802.3	-29.10	-0.30	-7.86
554.0	3390.065	43.680	1025.662	-6376.0	295.3	21793.5	-30.65	-0.39	1.96
556.0	3387.955	43.777	1032.837	-6438.6	294.5	21805.5	-31.33	-0.32	7.58
558.0	3385.825	43.874	1040.017	-6501.2	293.8	21821.7	-31.15	-0.32	8.51
560.0	3383.675	43.971	1047.203	-6563.3	293.0	21839.1	-30.84	-0.45	8.80
562.0	3381.504	44.067	1054.394	-6625.5	291.9	21856.9	-30.53	-0.55	8.89
564.0	3379.313	44.163	1061.592	-6686.4	290.8	21874.6	-30.45	-0.54	8.93
566.0	3377.103	44.258	1068.795	-6747.5	289.8	21892.5	-30.57	-0.48	8.98
568.0	3374.871	44.354	1076.004	-6808.9	288.8	21910.9	-30.76	-0.44	8.97
570.0	3372.620	44.448	1083.219	-6870.7	287.9	21928.9	-30.90	-0.43	8.96
572.0	3370.348	44.543	1090.440	-6932.6	287.0	21946.8	-30.98	-0.40	8.94
574.0	3368.056	44.637	1097.667	-6994.8	286.2	21964.6	-31.09	-0.35	8.89
576.0	3365.744	44.732	1104.900	-7057.2	285.5	21982.4	-31.25	-0.31	8.84
578.0	3363.410	44.825	1112.138	-7119.9	284.9	22000.0	-31.40	-0.28	8.80
580.0	3361.056	44.919	1119.383	-7182.9	284.4	22017.6	-31.51	-0.25	8.77
582.0	3358.682	45.013	1126.633	-7246.1	283.8	22035.2	-31.58	-0.24	8.73
584.0	3356.286	45.106	1133.889	-7309.4	283.3	22052.6	-31.65	-0.24	8.68

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	3353.870	45.199	1141.151	-7372.8	282.8	22070.0	-31.74	-0.23	8.65
588.0	3351.432	45.292	1148.418	-7436.5	282.3	22087.3	-31.85	-0.21	8.64
590.0	3348.974	45.385	1155.691	-7500.4	281.9	22104.6	-31.98	-0.20	8.65
592.0	3346.495	45.478	1162.970	-7564.5	281.5	22121.9	-32.08	-0.20	8.64
594.0	3343.994	45.570	1170.254	-7628.9	281.0	22139.2	-32.16	-0.19	8.59
596.0	3341.473	45.663	1177.544	-7693.4	280.6	22156.3	-32.25	-0.19	8.52
598.0	3338.930	45.755	1184.840	-7758.0	280.2	22173.3	-32.36	-0.19	8.47
600.0	3336.365	45.847	1192.141	-7822.9	279.8	22190.3	-32.46	-0.19	8.44
602.0	3333.780	45.939	1199.448	-7888.0	279.4	22207.2	-32.54	-0.18	8.42
604.0	3331.173	46.031	1206.761	-7953.3	279.0	22224.0	-32.62	-0.16	8.39
606.0	3328.544	46.123	1214.079	-8018.7	278.6	22240.8	-32.69	-0.16	8.34
608.0	3325.894	46.215	1221.402	-8084.2	278.3	22257.4	-32.78	-0.17	8.30
610.0	3323.222	46.306	1228.731	-8149.9	277.9	22274.0	-32.88	-0.17	8.29
612.0	3320.528	46.397	1236.065	-8215.9	277.5	22290.7	-32.99	-0.16	8.30
614.0	3317.813	46.489	1243.405	-8282.0	277.2	22307.3	-33.09	-0.15	8.29
616.0	3315.076	46.580	1250.751	-8348.4	276.8	22323.8	-33.18	-0.16	8.24
618.0	3312.317	46.671	1258.101	-8414.9	276.4	22340.3	-33.25	-0.19	8.19
620.0	3309.537	46.762	1265.457	-8481.6	276.0	22356.7	-33.34	-0.20	8.16
622.0	3306.734	46.853	1272.819	-8548.4	275.6	22373.0	-33.43	-0.18	8.11
624.0	3303.909	46.943	1280.186	-8615.5	275.2	22389.2	-33.53	-0.16	8.05
626.0	3301.062	47.034	1287.558	-8682.7	274.9	22405.3	-33.60	-0.15	8.01
628.0	3298.193	47.124	1294.936	-8750.0	274.5	22421.3	-33.69	-0.16	8.00
630.0	3295.302	47.215	1302.318	-8817.6	274.2	22437.3	-33.78	-0.18	7.97
632.0	3292.388	47.305	1309.707	-8885.3	273.8	22453.2	-33.85	-0.20	7.93
634.0	3289.452	47.395	1317.100	-8953.1	273.3	22469.1	-33.91	-0.22	7.88
636.0	3286.494	47.485	1324.498	-9021.1	272.9	22484.8	-33.99	-0.22	7.85
638.0	3283.514	47.574	1331.902	-9089.3	272.4	22500.5	-34.09	-0.20	7.81
640.0	3280.511	47.664	1339.311	-9157.7	271.9	22516.1	-34.19	-0.19	7.75
642.0	3277.485	47.753	1346.725	-9226.2	271.5	22531.6	-34.26	-0.21	7.70
644.0	3274.437	47.843	1354.144	-9294.9	271.0	22547.0	-34.34	-0.22	7.67
646.0	3271.366	47.932	1361.568	-9363.7	270.5	22562.3	-34.42	-0.23	7.64
648.0	3268.273	48.021	1368.997	-9432.8	270.0	22577.6	-34.51	-0.23	7.61
650.0	3265.156	48.110	1376.431	-9502.0	269.5	22592.9	-34.61	-0.23	7.61
652.0	3262.017	48.198	1383.870	-9571.4	269.0	22608.1	-34.72	-0.22	7.62
654.0	3258.855	48.287	1391.314	-9641.0	268.6	22623.4	-34.80	-0.20	7.59
656.0	3255.670	48.375	1398.763	-9710.7	268.1	22638.5	-34.87	-0.22	7.52
658.0	3252.463	48.463	1406.217	-9780.7	267.6	22653.5	-34.97	-0.23	7.46
660.0	3249.232	48.551	1413.676	-9850.8	267.1	22668.4	-35.07	-0.24	7.41
662.0	3245.978	48.639	1421.140	-9921.1	266.6	22683.2	-35.14	-0.24	7.36
664.0	3242.700	48.727	1428.609	-9991.5	266.0	22697.9	-35.16	-0.26	7.34
666.0	3239.400	48.814	1436.083	-10061.9	265.4	22712.6	-35.23	-0.28	7.32
668.0	3236.076	48.901	1443.561	-10132.8	264.9	22727.2	-35.47	-0.26	7.23
670.0	3232.729	48.989	1451.044	-10204.1	264.3	22741.5	-35.82	-0.24	7.07

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
672.0	3229.359	49.075	1458.532	-10276.2	263.8	22755.6	-36.10	-0.23	6.93
674.0	3225.964	49.162	1466.025	-10348.5	263.3	22769.5	-36.16	-0.25	6.92
676.0	3222.546	49.249	1473.522	-10420.8	262.7	22783.4	-36.08	-0.26	6.96
678.0	3219.104	49.335	1481.023	-10493.1	262.2	22797.3	-36.04	-0.25	6.96
680.0	3215.638	49.421	1488.530	-10565.2	261.6	22811.3	-36.04	-0.24	6.95
682.0	3212.149	49.507	1496.040	-10637.4	261.1	22825.2	-36.04	-0.23	6.95
684.0	3208.636	49.593	1503.556	-10709.6	260.6	22839.1	-36.01	-0.25	6.96
686.0	3205.099	49.679	1511.076	-10781.6	260.0	22853.1	-35.98	-0.27	6.96
688.0	3201.538	49.764	1518.600	-10853.7	259.5	22867.0	-35.97	-0.26	6.95
690.0	3197.954	49.850	1526.129	-10925.7	258.9	22881.0	-35.96	-0.26	6.96
692.0	3194.345	49.935	1533.663	-10997.7	258.4	22894.9	-35.94	-0.27	6.96
694.0	3190.714	50.020	1541.201	-11069.7	257.8	22908.8	-35.93	-0.27	6.95
696.0	3187.058	50.105	1548.744	-11141.6	257.2	22922.7	-35.92	-0.28	6.95
698.0	3183.379	50.189	1556.292	-11213.5	256.6	22936.6	-35.91	-0.28	6.94
S-IVB 1ST GUIDANCE CUTOFF									
699.330	3180.919	50.245	1561.314	-11261.3	256.2	22945.8	-35.90	-0.29	6.94
700.0	3179.676	50.273	1563.844	-11281.4	256.0	22942.2	-27.27	-0.37	-13.34
702.0	3175.954	50.357	1571.391	-11335.9	255.0	22915.4	-27.16	-0.37	-13.42
704.0	3172.214	50.441	1578.929	-11390.3	254.2	22888.5	-27.13	-0.37	-13.51
706.0	3168.455	50.525	1586.459	-11444.6	253.5	22861.4	-27.10	-0.36	-13.59
708.0	3164.679	50.608	1593.979	-11498.8	252.7	22834.2	-27.07	-0.37	-13.67
PARKING ORBIT INSERTION									
709.330	3162.123	50.665	1598.961	-11535.3	252.3	22816.3	-27.05	-0.37	-13.72

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	FF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
GUIDANCE REFERENCE RELEASE											
-16.968	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-16.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-15.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-14.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-13.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-12.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-11.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-10.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-9.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-8.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-7.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-6.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-5.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-4.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-3.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-2.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
-1.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
0.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
FIRST MOTION											
0.300	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	195
START OF TIME BASE 1											
0.600	3441.336	-80.6041	28.4470	106.50	89.40	1.5	90.00	0.06	1340.7	-0.000	196
1.0	3441.337	-80.6041	28.4470	30.52	89.27	3.6	90.00	0.15	1340.7	0.000	199
2.0	3441.338	-80.6041	28.4470	358.16	88.30	10.5	89.99	0.45	1340.7	0.000	206
3.0	3441.340	-80.6041	28.4470	351.17	87.58	18.3	89.97	0.78	1340.7	0.000	220
4.0	3441.344	-80.6041	28.4470	349.26	87.25	25.6	89.95	1.09	1340.7	0.000	241
5.0	3441.349	-80.6041	28.4470	349.42	87.53	33.5	89.94	1.43	1340.8	0.001	270
6.0	3441.355	-80.6041	28.4470	352.28	88.34	41.4	89.95	1.77	1341.2	0.001	308
7.0	3441.362	-80.6041	28.4470	3.00	89.16	49.4	89.97	2.11	1341.6	0.001	354
8.0	3441.371	-80.6041	28.4470	57.20	89.63	57.7	89.99	2.46	1342.2	0.001	406
9.0	3441.381	-80.6041	28.4470	123.49	89.49	65.7	90.01	2.80	1342.8	0.001	467
10.0	3441.393	-80.6041	28.4470	139.97	89.13	74.6	90.04	3.18	1343.5	0.001	538
11.0	3441.406	-80.6041	28.4470	146.54	88.77	83.6	90.06	3.56	1344.3	0.001	617
12.0	3441.420	-80.6041	28.4470	148.89	88.54	92.6	90.09	3.95	1345.1	0.001	705
13.0	3441.436	-80.6041	28.4470	149.71	88.52	102.2	90.10	4.35	1345.9	0.001	803
14.0	3441.454	-80.6041	28.4470	149.25	88.65	111.9	90.10	4.77	1346.7	0.001	909

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	3441.473	-80.6041	28.4470	148.23	88.83	121.7	90.09	5.18	1347.5	0.001	1026
16.0	3441.494	-80.6041	28.4469	146.80	88.94	131.6	90.09	5.60	1348.5	0.002	1153
17.0	3441.516	-80.6041	28.4469	142.86	88.95	141.8	90.09	6.03	1349.8	0.002	1289
18.0	3441.541	-80.6041	28.4469	136.71	88.90	152.2	90.09	6.46	1351.3	0.002	1436
19.0	3441.567	-80.6041	28.4469	130.20	88.84	162.9	90.09	6.91	1353.1	0.003	1594
20.0	3441.594	-80.6041	28.4469	122.71	88.78	173.7	90.09	7.36	1355.1	0.003	1762
21.0	3441.624	-80.6041	28.4469	114.44	88.69	184.8	90.07	7.82	1357.3	0.004	1941
22.0	3441.655	-80.6041	28.4469	107.07	88.57	196.2	90.06	8.29	1359.7	0.005	2132
23.0	3441.688	-80.6040	28.4469	100.52	88.39	207.7	90.05	8.77	1362.5	0.006	2334
24.0	3441.723	-80.6040	28.4469	95.05	88.19	219.6	90.03	9.25	1365.5	0.007	2547
25.0	3441.761	-80.6040	28.4469	90.74	87.95	231.6	90.00	9.74	1368.8	0.008	2773
26.0	3441.800	-80.6040	28.4469	87.27	87.68	243.9	89.98	10.23	1372.5	0.009	3010
27.0	3441.841	-80.6039	28.4469	84.49	87.40	256.5	89.95	10.73	1376.5	0.011	3260
28.0	3441.884	-80.6039	28.4469	82.27	87.09	269.4	89.92	11.23	1380.9	0.013	3523
29.0	3441.929	-80.6039	28.4469	80.41	86.76	282.5	89.89	11.75	1385.7	0.015	3798
30.0	3441.977	-80.6038	28.4469	78.85	86.41	296.0	89.85	12.26	1390.9	0.018	4087
31.0	3442.027	-80.6037	28.4469	77.56	86.03	309.7	89.81	12.78	1396.5	0.021	4389
32.0	3442.079	-80.6037	28.4470	76.45	85.63	323.7	89.76	13.31	1402.6	0.024	4705
33.0	3442.133	-80.6036	28.4470	75.54	85.21	338.1	89.70	13.83	1409.2	0.029	5035
34.0	3442.189	-80.6035	28.4470	74.77	84.77	352.7	89.65	14.36	1416.3	0.033	5379
35.0	3442.248	-80.6034	28.4470	74.14	84.30	367.7	89.58	14.89	1424.0	0.039	5738
36.0	3442.310	-80.6033	28.4470	73.62	83.82	383.1	89.52	15.42	1432.2	0.045	6111
37.0	3442.374	-80.6031	28.4471	73.21	83.32	398.7	89.45	15.95	1441.0	0.052	6499
38.0	3442.440	-80.6030	28.4471	72.89	82.80	414.7	89.37	16.48	1450.4	0.060	6903
39.0	3442.509	-80.6028	28.4472	72.64	82.27	431.0	89.29	17.01	1460.4	0.069	7322
40.0	3442.581	-80.6027	28.4472	72.43	81.73	447.7	89.21	17.53	1471.0	0.079	7757
41.0	3442.655	-80.6025	28.4473	72.25	81.17	464.9	89.12	18.05	1482.3	0.090	8209
42.0	3442.732	-80.6022	28.4473	72.08	80.59	482.4	89.02	18.57	1494.3	0.103	8676
43.0	3442.812	-80.6020	28.4474	71.92	80.00	500.3	88.92	19.08	1506.9	0.116	9161
44.0	3442.894	-80.6017	28.4475	71.79	79.40	518.6	88.81	19.59	1520.2	0.131	9662
45.0	3442.980	-80.6014	28.4476	71.66	78.79	537.3	88.69	20.09	1534.2	0.148	10180
46.0	3443.068	-80.6011	28.4477	71.56	78.17	556.5	88.57	20.59	1549.0	0.165	10716
47.0	3443.159	-80.6007	28.4478	71.48	77.53	576.1	88.45	21.07	1564.5	0.185	11270
48.0	3443.253	-80.6004	28.4479	71.41	76.89	596.2	88.32	21.55	1580.7	0.206	11842
49.0	3443.350	-80.5999	28.4480	71.36	76.23	616.7	88.18	22.02	1597.8	0.230	12432
50.0	3443.450	-80.5995	28.4481	71.33	75.56	637.7	88.05	22.47	1615.7	0.255	13040
51.0	3443.553	-80.5990	28.4483	71.31	74.88	659.2	87.90	22.91	1634.4	0.282	13667
52.0	3443.660	-80.5985	28.4484	71.30	74.19	681.1	87.75	23.35	1653.9	0.311	14313
53.0	3443.769	-80.5979	28.4486	71.30	73.49	703.6	87.60	23.76	1674.2	0.343	14978
54.0	3443.882	-80.5973	28.4488	71.31	72.78	726.6	87.45	24.17	1695.5	0.377	15663
55.0	3443.997	-80.5966	28.4490	71.32	72.07	750.2	87.29	24.55	1717.6	0.414	16367
56.0	3444.117	-80.5959	28.4492	71.34	71.35	774.3	87.12	24.93	1740.5	0.453	17091
57.0	3444.239	-80.5952	28.4494	71.35	70.62	798.9	86.95	25.29	1764.3	0.495	17835

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-FL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
58.0	3444.365	-80.5944	28.4497	71.36	69.89	824.1	86.78	25.63	1788.9	0.540	18599
59.0	3444.494	-80.5935	28.4499	71.38	69.16	849.8	86.61	25.96	1814.3	0.588	19383
60.0	3444.626	-80.5926	28.4502	71.41	68.43	876.0	86.43	26.27	1840.5	0.640	20187
61.0	3444.762	-80.5916	28.4505	71.43	67.69	902.9	86.25	26.57	1867.6	0.694	21013
62.0	3444.901	-80.5906	28.4508	71.47	66.97	930.2	86.08	26.85	1895.4	0.752	21859
63.0	3445.044	-80.5895	28.4511	71.52	66.24	958.2	85.90	27.12	1924.0	0.814	22726
64.0	3445.190	-80.5883	28.4515	71.57	65.52	986.6	85.73	27.37	1953.4	0.879	23613
65.0	3445.339	-80.5870	28.4518	71.61	64.80	1015.6	85.55	27.60	1983.6	0.948	24522
66.0	3445.492	-80.5857	28.4522	71.66	64.08	1045.2	85.37	27.81	2014.5	1.021	25452
	MACH 1										
66.300	3445.539	-80.5853	28.4523	71.67	63.86	1054.1	85.32	27.88	2023.9	1.044	25736
67.0	3445.649	-80.5843	28.4526	71.70	63.35	1075.2	85.19	28.01	2046.2	1.099	26403
68.0	3445.809	-80.5829	28.4530	71.74	62.63	1105.8	85.01	28.19	2078.7	1.180	27375
69.0	3445.972	-80.5813	28.4535	71.79	61.91	1137.0	84.83	28.36	2112.0	1.266	28368
70.0	3446.139	-80.5797	28.4539	71.83	61.19	1168.8	84.66	28.50	2146.0	1.356	29382
71.0	3446.309	-80.5780	28.4544	71.88	60.46	1201.3	84.48	28.64	2181.0	1.451	30417
72.0	3446.483	-80.5762	28.4550	71.94	59.75	1234.5	84.31	28.75	2216.8	1.551	31474
73.0	3446.660	-80.5743	28.4555	72.00	59.03	1268.4	84.13	28.86	2253.5	1.655	32551
74.0	3446.841	-80.5723	28.4561	72.05	58.32	1303.1	83.96	28.95	2291.2	1.765	33650
75.0	3447.025	-80.5703	28.4566	72.11	57.61	1338.6	83.79	29.02	2329.8	1.880	34770
76.0	3447.213	-80.5681	28.4573	72.16	56.90	1375.0	83.62	29.09	2369.3	2.001	35912
77.0	3447.404	-80.5658	28.4579	72.21	56.19	1412.2	83.45	29.14	2409.8	2.127	37075
78.0	3447.599	-80.5634	28.4586	72.25	55.49	1450.2	83.28	29.18	2451.1	2.259	38260
79.0	3447.797	-80.5610	28.4593	72.28	54.80	1489.1	83.11	29.21	2493.4	2.397	39467
80.0	3448.000	-80.5584	28.4600	72.31	54.11	1528.8	82.93	29.23	2536.6	2.541	40695
81.0	3448.205	-80.5556	28.4608	72.33	53.43	1569.4	82.76	29.24	2580.8	2.692	41945
82.0	3448.414	-80.5528	28.4616	72.34	52.76	1611.0	82.58	29.24	2625.9	2.848	43218
	MAXIMUM DYNAMIC PRESSURE										
83.000	3448.627	-80.5499	28.4624	72.35	52.10	1653.4	82.41	29.23	2671.9	3.012	44512
84.0	3448.844	-80.5468	28.4632	72.35	51.44	1696.8	82.24	29.21	2718.9	3.182	45829
85.0	3449.064	-80.5436	28.4641	72.36	50.80	1741.1	82.06	29.19	2766.6	3.359	47168
86.0	3449.288	-80.5403	28.4651	72.36	50.17	1786.3	81.89	29.16	2815.4	3.544	48529
87.0	3449.516	-80.5368	28.4660	72.36	49.55	1832.5	81.72	29.12	2865.0	3.735	49913
88.0	3449.747	-80.5332	28.4670	72.36	48.94	1879.5	81.56	29.08	2915.5	3.934	51320
89.0	3449.982	-80.5295	28.4681	72.35	48.34	1927.5	81.39	29.04	2966.8	4.141	52750
90.0	3450.221	-80.5256	28.4692	72.35	47.76	1976.4	81.22	28.99	3019.0	4.355	54202
91.0	3450.464	-80.5216	28.4703	72.33	47.19	2026.2	81.06	28.94	3072.1	4.577	55678
92.0	3450.710	-80.5175	28.4714	72.32	46.63	2077.0	80.89	28.88	3126.2	4.807	57178
93.0	3450.961	-80.5132	28.4727	72.30	46.07	2129.8	80.73	28.81	3181.3	5.045	58700

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
94.0	3451.215	-80.5087	28.4739	72.29	45.52	2181.6	80.57	28.74	3237.4	5.292	60246
95.0	3451.473	-80.5041	28.4752	72.27	44.98	2235.5	80.41	28.66	3294.5	5.547	61816
96.0	3451.735	-80.4994	28.4765	72.26	44.44	2290.3	80.26	28.57	3352.7	5.811	63409
97.0	3452.001	-80.4944	28.4779	72.25	43.91	2346.1	80.11	28.48	3411.8	6.084	65026
98.0	3452.271	-80.4893	28.4793	72.25	43.38	2402.9	79.96	28.38	3472.0	6.365	66666
99.0	3452.544	-80.4841	28.4808	72.24	42.86	2460.7	79.82	28.28	3533.1	6.657	68330
100.0	3452.822	-80.4787	28.4824	72.24	42.34	2519.5	79.67	28.17	3595.3	6.957	70017
101.0	3453.103	-80.4731	28.4839	72.23	41.83	2579.4	79.53	28.05	3658.4	7.268	71727
102.0	3453.388	-80.4673	28.4856	72.23	41.33	2640.3	79.40	27.93	3722.6	7.588	73461
103.0	3453.677	-80.4613	28.4872	72.22	40.83	2702.2	79.26	27.80	3787.9	7.918	75218
104.0	3453.969	-80.4552	28.4890	72.22	40.34	2765.2	79.13	27.67	3854.2	8.258	76998
105.0	3454.266	-80.4489	28.4907	72.22	39.85	2829.3	79.00	27.54	3921.6	8.609	78801
106.0	3454.566	-80.4423	28.4926	72.22	39.37	2894.5	78.88	27.40	3990.0	8.971	80628
107.0	3454.870	-80.4356	28.4945	72.22	38.90	2960.7	78.76	27.26	4059.5	9.343	82477
108.0	3455.178	-80.4287	28.4964	72.23	38.43	3028.1	78.64	27.11	4130.1	9.726	84350
109.0	3455.490	-80.4216	28.4984	72.24	37.97	3096.5	78.53	26.96	4201.7	10.121	86245
110.0	3455.805	-80.4143	28.5005	72.25	37.52	3166.0	78.42	26.81	4274.5	10.527	88164
111.0	3456.124	-80.4067	28.5026	72.26	37.07	3236.6	78.32	26.66	4348.2	10.944	90106
112.0	3456.447	-80.3990	28.5048	72.28	36.64	3308.4	78.22	26.51	4423.1	11.373	92071
113.0	3456.774	-80.3910	28.5070	72.29	36.21	3381.3	78.12	26.36	4499.0	11.814	94059
114.0	3457.105	-80.3829	28.5093	72.31	35.80	3455.3	78.03	26.21	4575.9	12.267	96070
115.0	3457.439	-80.3745	28.5117	72.32	35.39	3530.4	77.93	26.06	4653.8	12.732	98106
116.0	3457.778	-80.3658	28.5141	72.33	35.00	3606.7	77.84	25.92	4732.8	13.210	100165
117.0	3458.120	-80.3570	28.5166	72.34	34.62	3684.1	77.75	25.78	4812.9	13.700	102248
118.0	3458.467	-80.3479	28.5191	72.34	34.24	3762.7	77.65	25.63	4894.1	14.203	104356
119.0	3458.817	-80.3386	28.5217	72.34	33.87	3842.5	77.56	25.49	4976.4	14.719	106488
120.0	3459.172	-80.3290	28.5244	72.34	33.50	3923.5	77.46	25.34	5060.0	15.248	108644
121.0	3459.530	-80.3193	28.5271	72.33	33.14	4005.8	77.37	25.19	5144.8	15.791	110824
122.0	3459.892	-80.3092	28.5299	72.33	32.77	4089.3	77.28	25.04	5230.9	16.347	113029
123.0	3460.259	-80.2989	28.5328	72.33	32.41	4174.2	77.19	24.88	5318.2	16.916	115258
124.0	3460.629	-80.2884	28.5358	72.33	32.05	4260.3	77.11	24.72	5406.9	17.500	117510
125.0	3461.003	-80.2776	28.5388	72.33	31.70	4347.8	77.02	24.56	5496.8	18.098	119786
126.0	3461.381	-80.2665	28.5419	72.33	31.35	4436.6	76.94	24.40	5588.1	18.711	122085
127.0	3461.763	-80.2552	28.5450	72.34	31.00	4526.8	76.86	24.23	5680.7	19.338	124408
128.0	3462.148	-80.2436	28.5483	72.34	30.67	4618.4	76.79	24.07	5774.7	19.991	126756
129.0	3462.538	-80.2317	28.5516	72.35	30.33	4711.5	76.72	23.91	5870.1	20.638	129126
130.0	3462.931	-80.2196	28.5550	72.36	30.01	4806.0	76.65	23.76	5966.9	21.311	131521
131.0	3463.329	-80.2071	28.5585	72.37	29.69	4901.9	76.58	23.60	6065.1	21.999	133941
132.0	3463.731	-80.1944	28.5620	72.38	29.38	4999.3	76.51	23.44	6164.7	22.704	136384
133.0	3464.136	-80.1814	28.5657	72.39	29.07	5098.2	76.45	23.29	6265.7	23.424	138853
134.0	3464.546	-80.1681	28.5694	72.40	28.77	5198.5	76.39	23.14	6368.1	24.161	141347
135.0	3464.960	-80.1545	28.5732	72.40	28.48	5300.2	76.33	22.99	6471.9	24.914	143866
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
135.200	3465.043	-80.1517	28.5739	72.41	28.42	5320.8	76.32	22.96	6492.8	25.067	144373

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	3465.378	-80.1406	28.5770	72.41	28.18	5393.3	76.27	22.82	6567.0	25.684	146407
137.0	3465.798	-80.1264	28.5810	72.43	27.90	5473.6	76.23	22.66	6649.5	26.467	148964
138.0	3466.220	-80.1120	28.5850	72.44	27.62	5554.6	76.19	22.49	6732.6	27.264	151534
139.0	3466.646	-80.0973	28.5891	72.45	27.35	5636.7	76.15	22.33	6816.7	28.076	154123
140.0	3467.073	-80.0824	28.5932	72.47	27.08	5719.9	76.11	22.16	6902.0	28.901	156724
141.0	3467.503	-80.0672	28.5974	72.49	26.82	5804.4	76.08	22.00	6988.4	29.740	159339
142.0	3467.935	-80.0518	28.6017	72.50	26.55	5890.0	76.04	21.85	7076.0	30.593	161970
143.0	3468.369	-80.0361	28.6060	72.52	26.30	5976.9	76.01	21.69	7164.8	31.461	164615
144.0	3468.807	-80.0201	28.6104	72.53	26.04	6066.1	75.97	21.53	7255.9	32.344	167276
145.0	3469.246	-80.0039	28.6149	72.54	25.79	6155.7	75.94	21.38	7347.3	33.241	169952
146.0	3469.688	-79.9874	28.6195	72.56	25.54	6246.5	75.90	21.22	7439.9	34.153	172644
147.0	3470.133	-79.9706	28.6241	72.57	25.30	6338.6	75.87	21.08	7533.7	35.081	175351
148.0	3470.581	-79.9535	28.6289	72.58	25.07	6432.1	75.83	20.93	7628.9	36.024	178074
149.0	3471.031	-79.9362	28.6336	72.59	24.83	6526.9	75.80	20.78	7725.4	36.983	180813
150.0	3471.483	-79.9185	28.6384	72.61	24.61	6623.1	75.77	20.64	7823.2	37.957	183569
151.0	3471.939	-79.9006	28.6434	72.62	24.38	6720.8	75.73	20.50	7922.4	38.947	186342
152.0	3472.397	-79.8824	28.6484	72.63	24.16	6819.8	75.70	20.36	8023.0	39.954	189131
153.0	3472.858	-79.8639	28.6534	72.64	23.95	6920.2	75.67	20.22	8125.0	40.977	191937
154.0	3473.322	-79.8450	28.6586	72.66	23.73	7022.2	75.64	20.09	8228.4	42.017	194761
155.0	3473.789	-79.8259	28.6638	72.67	23.52	7125.7	75.61	19.95	8333.4	43.074	197603
156.0	3474.259	-79.8064	28.6692	72.68	23.32	7230.8	75.58	19.82	8439.9	44.148	200463
157.0	3474.731	-79.7867	28.6746	72.70	23.11	7337.4	75.56	19.69	8548.0	45.239	203341
158.0	3475.207	-79.7666	28.6801	72.71	22.92	7445.7	75.53	19.56	8657.6	46.347	206238
159.0	3475.686	-79.7462	28.6856	72.72	22.72	7555.5	75.50	19.44	8768.8	47.474	209153
160.0	3476.168	-79.7254	28.6913	72.74	22.53	7666.9	75.48	19.31	8881.6	48.619	212088
161.0	3476.653	-79.7043	28.6970	72.75	22.34	7780.0	75.45	19.19	8995.9	49.782	215043
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
161.630	3476.963	-79.6908	28.7007	72.76	22.22	7851.9	75.44	19.11	9068.7	50.529	216926
162.0	3477.143	-79.6828	28.7029	72.77	22.15	7878.2	75.43	19.06	9095.5	50.967	218027
	S-IC/S-II SEPARATION COMMAND										
162.300	3477.290	-79.6764	28.7046	72.77	22.10	7882.9	75.44	19.02	9100.6	51.323	218917
164.0	3478.112	-79.6398	28.7146	72.79	21.79	7865.4	75.46	18.74	9085.7	53.342	223924
166.0	3479.066	-79.5966	28.7263	72.82	21.42	7855.5	75.48	18.42	9078.8	55.725	229733
168.0	3480.003	-79.5533	28.7380	72.85	21.06	7874.3	75.49	18.11	9100.5	58.111	235439
170.0	3480.928	-79.5098	28.7498	72.88	20.69	7898.2	75.50	17.80	9127.2	60.509	241070
172.0	3481.840	-79.4660	28.7616	72.90	20.34	7926.4	75.51	17.50	9158.2	62.920	246627
174.0	3482.741	-79.4220	28.7735	72.93	19.98	7955.6	75.52	17.21	9190.0	65.345	252113
176.0	3483.630	-79.3777	28.7854	72.96	19.63	7985.9	75.53	16.91	9222.9	67.784	257527
178.0	3484.508	-79.3331	28.7974	72.99	19.29	8016.7	75.54	16.62	9256.2	70.236	262871

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
180.0	3485.374	-79.2883	28.8094	73.01	18.95	8048.3	75.56	16.34	9290.2	72.703	268145
182.0	3486.228	-79.2432	28.8214	73.04	18.61	8080.4	75.57	16.05	9324.7	75.184	273349
184.0	3487.071	-79.1978	28.8335	73.07	18.28	8113.1	75.58	15.77	9359.8	77.679	278485
186.0	3487.903	-79.1522	28.8457	73.10	17.95	8146.4	75.59	15.50	9395.3	80.189	283552
188.0	3488.724	-79.1063	28.8579	73.13	17.62	8180.3	75.60	15.22	9431.4	82.713	288552
190.0	3489.533	-79.0601	28.8701	73.16	17.30	8214.7	75.62	14.95	9467.9	85.252	293484
192.0	3490.332	-79.0136	28.8825	73.19	16.98	8249.6	75.63	14.68	9505.0	87.805	298349
194.0	3491.120	-78.9669	28.8948	73.22	16.67	8285.2	75.64	14.42	9542.5	90.373	303147
196.0	3491.896	-78.9199	28.9072	73.25	16.36	8321.4	75.65	14.16	9580.7	92.955	307880
198.0	3492.663	-78.8726	28.9197	73.28	16.05	8358.3	75.67	13.90	9619.5	95.553	312548
200.0	3493.418	-78.8250	28.9322	73.31	15.75	8395.8	75.68	13.65	9658.9	98.165	317151
202.0	3494.163	-78.7771	28.9447	73.34	15.45	8434.0	75.70	13.39	9698.9	100.793	321690
204.0	3494.897	-78.7289	28.9573	73.37	15.15	8472.7	75.71	13.14	9739.4	103.436	326165
206.0	3495.621	-78.6804	28.9700	73.40	14.86	8511.9	75.72	12.90	9780.3	106.094	330576
208.0	3496.335	-78.6317	28.9827	73.42	14.59	8551.2	75.74	12.67	9821.2	108.767	334926
210.0	3497.039	-78.5826	28.9955	73.45	14.33	8590.5	75.75	12.45	9862.0	111.456	339220
212.0	3497.735	-78.5333	29.0083	73.48	14.09	8629.9	75.76	12.25	9902.6	114.159	343461
214.0	3498.423	-78.4837	29.0211	73.51	13.86	8669.1	75.78	12.06	9943.3	116.877	347652
216.0	3499.102	-78.4338	29.0340	73.54	13.64	8708.8	75.79	11.87	9984.2	119.609	351795
218.0	3499.774	-78.3836	29.0470	73.57	13.42	8748.7	75.81	11.68	10025.3	122.356	355893
220.0	3500.439	-78.3331	29.0600	73.60	13.20	8789.0	75.82	11.50	10066.8	125.118	359944
222.0	3501.096	-78.2824	29.0730	73.63	12.99	8829.8	75.84	11.32	10108.7	127.894	363949
224.0	3501.745	-78.2314	29.0861	73.66	12.78	8871.0	75.85	11.14	10151.1	130.685	367910
226.0	3502.387	-78.1801	29.0992	73.69	12.57	8912.6	75.87	10.97	10193.8	133.491	371825
228.0	3503.022	-78.1285	29.1124	73.71	12.36	8954.7	75.88	10.79	10237.0	136.311	375695
230.0	3503.650	-78.0766	29.1257	73.74	12.16	8997.2	75.90	10.62	10280.6	139.147	379521
232.0	3504.270	-78.0244	29.1389	73.77	11.95	9040.2	75.91	10.45	10324.6	141.998	383302
234.0	3504.882	-77.9719	29.1523	73.81	11.75	9083.6	75.93	10.28	10369.0	144.865	387039
236.0	3505.488	-77.9192	29.1656	73.84	11.56	9127.4	75.95	10.11	10413.8	147.746	390731
238.0	3506.086	-77.8661	29.1790	73.87	11.36	9171.6	75.96	9.95	10459.0	150.644	394380
240.0	3506.677	-77.8127	29.1925	73.90	11.17	9216.3	75.98	9.78	10504.5	153.556	397985
242.0	3507.261	-77.7591	29.2060	73.93	10.97	9261.4	76.00	9.62	10550.6	156.485	401547
244.0	3507.837	-77.7051	29.2196	73.96	10.78	9307.0	76.02	9.46	10597.1	159.429	405065
246.0	3508.407	-77.6508	29.2332	73.99	10.60	9353.0	76.03	9.30	10643.9	162.389	408541
248.0	3508.970	-77.5962	29.2468	74.02	10.41	9399.4	76.05	9.14	10691.2	165.365	411974
250.0	3509.525	-77.5413	29.2605	74.06	10.23	9446.3	76.07	8.99	10738.9	168.358	415364
252.0	3510.074	-77.4861	29.2743	74.09	10.05	9493.6	76.09	8.83	10787.1	171.366	418713
254.0	3510.616	-77.4306	29.2881	74.12	9.87	9541.4	76.11	8.68	10835.7	174.391	422019
256.0	3511.151	-77.3747	29.3019	74.16	9.69	9589.7	76.13	8.53	10884.7	177.432	425283
258.0	3511.679	-77.3186	29.3158	74.19	9.52	9638.3	76.15	8.38	10934.1	180.490	428506
260.0	3512.200	-77.2621	29.3297	74.22	9.35	9687.4	76.17	8.24	10983.9	183.564	431688
262.0	3512.714	-77.2052	29.3437	74.26	9.18	9736.9	76.19	8.09	11034.1	186.655	434829
264.0	3513.222	-77.1481	29.3577	74.29	9.01	9787.0	76.21	7.95	11084.9	189.763	437929

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
266.0	3513.723	-77.0906	29.3718	74.32	8.84	9837.5	76.23	7.80	11136.1	192.888	440988
268.0	3514.218	-77.0328	29.3859	74.36	8.68	9888.5	76.25	7.66	11187.7	196.030	444007
270.0	3514.706	-76.9747	29.4001	74.39	8.52	9939.9	76.27	7.53	11239.8	199.189	446986
272.0	3515.187	-76.9162	29.4143	74.43	8.36	9991.8	76.29	7.39	11292.3	202.366	449925
274.0	3515.662	-76.8574	29.4286	74.46	8.20	10044.3	76.31	7.25	11345.4	205.560	452825
276.0	3516.130	-76.7982	29.4429	74.50	8.04	10097.2	76.33	7.12	11398.9	208.772	455686
278.0	3516.592	-76.7387	29.4572	74.53	7.89	10150.6	76.35	6.99	11452.9	212.001	458508
280.0	3517.047	-76.6788	29.4717	74.57	7.74	10204.4	76.38	6.86	11507.2	215.249	461291
282.0	3517.497	-76.6186	29.4861	74.60	7.59	10258.7	76.40	6.73	11562.1	218.514	464035
284.0	3517.940	-76.5581	29.5006	74.64	7.44	10313.5	76.42	6.60	11617.5	221.798	466741
286.0	3518.376	-76.4971	29.5152	74.67	7.30	10368.9	76.44	6.48	11673.3	225.100	469410
288.0	3518.807	-76.4359	29.5298	74.71	7.15	10424.6	76.47	6.35	11729.5	228.420	472040
290.0	3519.231	-76.3742	29.5444	74.75	7.01	10480.7	76.49	6.23	11786.2	231.759	474633
292.0	3519.649	-76.3122	29.5591	74.78	6.87	10537.3	76.52	6.11	11843.2	235.116	477189
294.0	3520.061	-76.2499	29.5738	74.82	6.73	10594.4	76.54	5.99	11900.8	238.492	479708
296.0	3520.467	-76.1871	29.5886	74.86	6.60	10652.0	76.57	5.88	11958.9	241.887	482190
298.0	3520.867	-76.1240	29.6034	74.90	6.47	10710.2	76.59	5.76	12017.5	245.301	484635
300.0	3521.261	-76.0605	29.6183	74.93	6.33	10768.7	76.62	5.65	12076.5	248.734	487045
302.0	3521.649	-75.9967	29.6332	74.97	6.20	10827.7	76.64	5.53	12135.9	252.186	489419
304.0	3522.031	-75.9324	29.6482	75.01	6.08	10887.2	76.67	5.42	12195.7	255.658	491757
306.0	3522.407	-75.8678	29.6632	75.05	5.95	10947.1	76.69	5.31	12256.1	259.150	494060
308.0	3522.778	-75.8028	29.6783	75.09	5.83	11007.6	76.72	5.21	12317.0	262.661	496329
310.0	3523.143	-75.7374	29.6934	75.13	5.70	11068.6	76.74	5.10	12378.3	266.191	498562
312.0	3523.502	-75.6716	29.7086	75.17	5.58	11130.1	76.77	4.99	12440.1	269.742	500761
314.0	3523.856	-75.6054	29.7238	75.20	5.46	11192.0	76.80	4.89	12502.4	273.313	502926
316.0	3524.204	-75.5388	29.7390	75.24	5.35	11254.5	76.82	4.79	12565.2	276.904	505057
318.0	3524.547	-75.4718	29.7543	75.28	5.23	11317.5	76.85	4.69	12628.6	280.516	507154
320.0	3524.884	-75.4045	29.7696	75.32	5.12	11381.0	76.88	4.59	12692.4	284.148	509218
322.0	3525.215	-75.3367	29.7850	75.36	5.01	11445.1	76.91	4.49	12756.8	287.801	511249
324.0	3525.541	-75.2685	29.8005	75.40	4.90	11509.6	76.94	4.40	12821.6	291.475	513247
326.0	3525.862	-75.1998	29.8160	75.44	4.79	11574.6	76.96	4.30	12886.9	295.169	515213
328.0	3526.178	-75.1308	29.8315	75.49	4.69	11640.1	76.99	4.21	12952.7	298.885	517147
330.0	3526.488	-75.0613	29.8471	75.53	4.58	11706.2	77.02	4.12	13019.0	302.622	519050
332.0	3526.793	-74.9915	29.8627	75.57	4.48	11772.8	77.05	4.03	13085.9	306.381	520920
334.0	3527.093	-74.9212	29.8783	75.61	4.38	11839.9	77.08	3.94	13153.3	310.161	522760
336.0	3527.388	-74.8504	29.8940	75.65	4.28	11907.5	77.11	3.85	13221.2	313.963	524568
338.0	3527.678	-74.7793	29.9098	75.69	4.19	11975.7	77.14	3.77	13289.6	317.786	526346
340.0	3527.963	-74.7077	29.9256	75.74	4.08	12044.5	77.17	3.68	13358.6	321.632	528094
342.0	3528.243	-74.6356	29.9414	75.78	3.99	12113.7	77.20	3.60	13428.1	325.501	529812
344.0	3528.518	-74.5632	29.9573	75.82	3.90	12183.5	77.23	3.52	13498.1	329.391	531500
346.0	3528.788	-74.4902	29.9733	75.87	3.81	12253.8	77.27	3.44	13568.6	333.304	533158
348.0	3529.054	-74.4169	29.9893	75.91	3.72	12324.7	77.30	3.36	13639.8	337.240	534788
350.0	3529.314	-74.3430	30.0053	75.95	3.63	12396.2	77.33	3.28	13711.5	341.199	536389

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
352.0	3529.570	-74.2687	30.0213	76.00	3.54	12468.3	77.36	3.21	13783.7	345.180	537962
354.0	3529.822	-74.1940	30.0374	76.04	3.46	12540.9	77.40	3.13	13856.6	349.185	539506
356.0	3530.068	-74.1188	30.0536	76.09	3.38	12614.2	77.43	3.06	13930.0	353.214	541023
358.0	3530.311	-74.0431	30.0698	76.13	3.30	12688.0	77.46	2.99	14004.0	357.266	542513
360.0	3530.549	-73.9670	30.0860	76.18	3.22	12762.4	77.50	2.91	14078.6	361.342	543975
362.0	3530.782	-73.8903	30.1023	76.22	3.14	12837.3	77.53	2.85	14153.7	365.442	545411
364.0	3531.011	-73.8132	30.1186	76.27	3.06	12912.9	77.56	2.78	14229.4	369.566	546821
366.0	3531.236	-73.7356	30.1350	76.32	2.99	12989.0	77.60	2.71	14305.7	373.714	548204
368.0	3531.457	-73.6576	30.1514	76.36	2.91	13065.8	77.63	2.65	14382.6	377.887	549562
370.0	3531.673	-73.5790	30.1679	76.41	2.84	13143.2	77.67	2.58	14460.2	382.084	550895
372.0	3531.885	-73.5000	30.1844	76.45	2.77	13221.2	77.70	2.52	14538.4	386.306	552203
374.0	3532.094	-73.4204	30.2009	76.50	2.70	13299.7	77.74	2.46	14617.0	390.554	553486
376.0	3532.298	-73.3403	30.2175	76.55	2.63	13378.6	77.78	2.40	14696.0	394.827	554744
378.0	3532.498	-73.2598	30.2341	76.60	2.57	13458.1	77.81	2.34	14775.6	399.124	555979
380.0	3532.695	-73.1787	30.2508	76.64	2.50	13538.5	77.85	2.28	14856.2	403.448	557190
382.0	3532.887	-73.0971	30.2675	76.69	2.44	13620.0	77.89	2.22	14937.8	407.797	558378
384.0	3533.076	-73.0150	30.2842	76.74	2.38	13702.2	77.92	2.17	15020.1	412.173	559543
386.0	3533.261	-72.9324	30.3010	76.79	2.31	13784.8	77.96	2.11	15102.9	416.575	560685
388.0	3533.442	-72.8492	30.3178	76.84	2.25	13867.8	78.00	2.06	15186.0	421.003	561806
390.0	3533.620	-72.7655	30.3347	76.89	2.20	13951.5	78.04	2.01	15269.8	425.459	562905
392.0	3533.795	-72.6813	30.3516	76.94	2.14	14035.8	78.08	1.96	15354.2	429.940	563983
394.0	3533.966	-72.5965	30.3685	76.99	2.09	14120.9	78.12	1.91	15439.4	434.449	565040
396.0	3534.133	-72.5112	30.3855	77.04	2.03	14206.7	78.16	1.86	15525.3	438.986	566076
398.0	3534.298	-72.4253	30.4025	77.09	1.98	14293.3	78.20	1.81	15612.0	443.550	567092
400.0	3534.459	-72.3389	30.4195	77.14	1.93	14380.6	78.24	1.77	15699.4	448.141	568089
402.0	3534.616	-72.2519	30.4366	77.19	1.88	14468.6	78.28	1.72	15787.5	452.761	569065
404.0	3534.771	-72.1644	30.4538	77.24	1.83	14557.3	78.32	1.68	15876.2	457.409	570023
406.0	3534.922	-72.0763	30.4709	77.30	1.78	14646.7	78.36	1.64	15965.7	462.085	570962
408.0	3535.071	-71.9876	30.4881	77.35	1.74	14736.8	78.40	1.59	16055.9	466.790	571883
410.0	3535.216	-71.8983	30.5053	77.40	1.69	14827.5	78.45	1.55	16146.7	471.524	572786
412.0	3535.359	-71.8085	30.5226	77.45	1.65	14918.7	78.49	1.51	16238.0	476.286	573671
414.0	3535.499	-71.7180	30.5399	77.51	1.61	15010.9	78.53	1.48	16330.2	481.079	574539
416.0	3535.636	-71.6270	30.5572	77.56	1.56	15104.1	78.58	1.44	16423.5	485.900	575391
418.0	3535.770	-71.5354	30.5746	77.62	1.53	15198.4	78.62	1.40	16517.9	490.752	576226
420.0	3535.902	-71.4431	30.5920	77.67	1.49	15293.6	78.66	1.37	16613.2	495.634	577046
422.0	3536.032	-71.3503	30.6094	77.72	1.45	15389.3	78.71	1.34	16709.0	500.546	577851
424.0	3536.159	-71.2568	30.6269	77.78	1.41	15485.6	78.75	1.30	16805.4	505.489	578642
426.0	3536.283	-71.1627	30.6444	77.83	1.38	15582.8	78.80	1.27	16902.6	510.463	579417
428.0	3536.406	-71.0680	30.6619	77.89	1.35	15680.7	78.84	1.24	17000.6	515.468	580179
430.0	3536.526	-70.9727	30.6794	77.95	1.31	15779.5	78.89	1.21	17099.4	520.504	580928
432.0	3536.644	-70.8767	30.6970	78.00	1.28	15879.2	78.94	1.18	17199.2	525.572	581664
434.0	3536.760	-70.7801	30.7146	78.06	1.25	15979.8	78.98	1.16	17299.8	530.672	582387
436.0	3536.874	-70.6828	30.7323	78.12	1.22	16081.2	79.03	1.13	17401.3	535.804	583099

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
438.0	3536.986	-70.5849	30.7499	78.17	1.20	16183.5	79.08	1.11	17503.7	540.969	583799
440.0	3537.096	-70.4863	30.7676	78.23	1.17	16286.8	79.13	1.08	17607.0	546.166	584489
442.0	3537.205	-70.3870	30.7854	78.29	1.14	16390.9	79.18	1.06	17711.1	551.397	585168
444.0	3537.312	-70.2871	30.8031	78.35	1.12	16495.9	79.22	1.04	17816.2	556.660	585837
446.0	3537.417	-70.1865	30.8209	78.41	1.10	16601.9	79.27	1.02	17922.3	561.958	586497
448.0	3537.521	-70.0852	30.8387	78.47	1.08	16708.9	79.32	1.00	18029.3	567.289	587148
450.0	3537.624	-69.9832	30.8565	78.53	1.06	16816.9	79.37	0.98	18137.3	572.655	587792
452.0	3537.725	-69.8805	30.8743	78.59	1.04	16925.7	79.42	0.96	18246.2	578.055	588427
454.0	3537.825	-69.7772	30.8922	78.65	1.02	17035.6	79.47	0.95	18356.1	583.491	589056
456.0	3537.925	-69.6731	30.9101	78.71	1.00	17146.3	79.53	0.93	18466.9	588.961	589678
458.0	3538.023	-69.5683	30.9280	78.77	0.99	17258.1	79.58	0.92	18578.7	594.467	590294
460.0	3538.120	-69.4627	30.9459	78.83	0.97	17370.8	79.63	0.90	18691.5	600.009	590904
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
460.620	3538.149	-69.4309	30.9513	78.85	0.97	17404.8	79.65	0.90	18725.5	601.678	591086
462.0	3538.216	-69.3565	30.9638	78.89	0.95	17470.8	79.68	0.88	18791.6	605.585	591508
464.0	3538.310	-69.2496	30.9818	78.96	0.92	17562.4	79.74	0.85	18883.2	611.191	592099
466.0	3538.401	-69.1422	30.9997	79.02	0.89	17654.4	79.79	0.83	18975.3	616.827	592672
468.0	3538.491	-69.0341	31.0176	79.08	0.87	17747.0	79.84	0.81	19067.9	622.492	593235
470.0	3538.579	-68.9254	31.0355	79.14	0.85	17840.0	79.90	0.79	19160.9	628.187	593786
472.0	3538.665	-68.8162	31.0534	79.21	0.83	17934.3	79.95	0.78	19255.2	633.911	594331
474.0	3538.751	-68.7063	31.0713	79.27	0.83	18028.1	80.01	0.77	19349.1	639.665	594871
476.0	3538.836	-68.5958	31.0892	79.33	0.82	18122.3	80.07	0.77	19443.3	645.449	595410
478.0	3538.922	-68.4846	31.1071	79.40	0.82	18217.2	80.12	0.76	19538.2	651.264	595950
480.0	3539.008	-68.3729	31.1249	79.46	0.82	18312.8	80.18	0.76	19633.9	657.108	596491
482.0	3539.094	-68.2605	31.1427	79.53	0.82	18409.3	80.24	0.76	19730.4	662.983	597036
484.0	3539.181	-68.1475	31.1606	79.59	0.82	18506.6	80.29	0.76	19827.8	668.889	597583
486.0	3539.268	-68.0338	31.1784	79.66	0.82	18604.9	80.35	0.77	19926.1	674.827	598133
488.0	3539.356	-67.9195	31.1962	79.73	0.82	18703.9	80.41	0.77	20025.2	680.795	598686
490.0	3539.445	-67.8046	31.2139	79.79	0.82	18803.8	80.47	0.77	20125.1	686.795	599242
492.0	3539.533	-67.6889	31.2316	79.86	0.82	18904.6	80.53	0.77	20225.9	692.828	599802
494.0	3539.623	-67.5727	31.2494	79.93	0.82	19006.2	80.59	0.77	20327.6	698.892	600364
496.0	3539.713	-67.4557	31.2671	80.00	0.82	19108.6	80.65	0.77	20430.0	704.989	600930
498.0	3539.803	-67.3381	31.2847	80.07	0.82	19211.9	80.71	0.77	20533.4	711.119	601500
500.0	3539.894	-67.2198	31.3024	80.14	0.81	19302.6	80.78	0.76	20624.1	717.280	602071
502.0	3539.984	-67.1010	31.3199	80.21	0.80	19383.6	80.84	0.75	20705.2	723.467	602635
504.0	3540.072	-66.9816	31.3375	80.28	0.78	19464.2	80.90	0.73	20785.8	729.681	603191
506.0	3540.159	-66.8617	31.3550	80.35	0.77	19545.0	80.97	0.72	20866.7	735.921	603740
508.0	3540.246	-66.7412	31.3724	80.42	0.76	19626.1	81.03	0.71	20947.8	742.186	604282
510.0	3540.331	-66.6202	31.3898	80.49	0.75	19708.6	81.10	0.70	21030.3	748.477	604817
512.0	3540.415	-66.4986	31.4071	80.57	0.73	19790.6	81.16	0.69	21112.4	754.794	605346
514.0	3540.498	-66.3765	31.4243	80.64	0.73	19873.0	81.23	0.68	21194.8	761.137	605871

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
516.0	3540.580	-66.2538	31.4415	80.71	0.72	19955.8	81.29	0.67	21277.7	767.507	606391
518.0	3540.662	-66.1306	31.4586	80.78	0.71	20039.1	81.36	0.67	21361.0	773.903	606908
520.0	3540.744	-66.0068	31.4757	80.86	0.70	20122.9	81.42	0.66	21444.8	780.325	607422
522.0	3540.825	-65.8825	31.4927	80.93	0.70	20207.2	81.49	0.66	21529.2	786.775	607934
524.0	3540.906	-65.7576	31.5096	81.00	0.69	20292.2	81.56	0.65	21614.2	793.251	608444
526.0	3540.987	-65.6321	31.5265	81.08	0.69	20377.7	81.63	0.65	21699.8	799.754	608953
528.0	3541.067	-65.5060	31.5433	81.15	0.68	20463.9	81.69	0.64	21786.0	806.285	609459
530.0	3541.147	-65.3794	31.5600	81.23	0.68	20550.6	81.76	0.64	21872.8	812.843	609965
532.0	3541.227	-65.2521	31.5767	81.30	0.67	20638.0	81.83	0.63	21960.2	819.429	610469
534.0	3541.307	-65.1243	31.5933	81.38	0.67	20725.9	81.90	0.63	22048.1	826.043	610972
536.0	3541.387	-64.9959	31.6098	81.45	0.67	20814.4	81.97	0.63	22136.7	832.685	611474
538.0	3541.466	-64.8669	31.6262	81.53	0.66	20903.6	82.04	0.62	22225.9	839.355	611976
540.0	3541.546	-64.7373	31.6426	81.61	0.66	20993.3	82.11	0.62	22315.7	846.053	612478
542.0	3541.626	-64.6071	31.6588	81.68	0.66	21083.3	82.18	0.62	22405.7	852.780	612981
544.0	3541.706	-64.4763	31.6750	81.76	0.66	21174.2	82.25	0.62	22496.7	859.536	613485
546.0	3541.786	-64.3449	31.6911	81.84	0.66	21265.6	82.32	0.62	22588.1	866.321	613990
548.0	3541.867	-64.2129	31.7072	81.91	0.66	21357.6	82.39	0.62	22680.2	873.135	614497
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
548.220	3541.875	-64.1983	31.7089	81.92	0.66	21368.2	82.40	0.62	22690.8	873.986	614553
	S-II/S-IVB SEPARATION COMMAND										
549.000	3541.907	-64.1467	31.7152	81.95	0.65	21377.0	82.43	0.61	22699.6	876.550	614754
550.0	3541.948	-64.0805	31.7231	81.99	0.63	21377.3	82.46	0.59	22699.9	879.966	615008
552.0	3542.021	-63.9479	31.7389	82.07	0.60	21378.2	82.54	0.56	22700.8	886.804	615471
554.0	3542.094	-63.8152	31.7545	82.15	0.57	21386.3	82.61	0.53	22708.9	893.641	615930
556.0	3542.162	-63.6825	31.7700	82.23	0.54	21415.4	82.69	0.51	22738.1	900.484	616360
558.0	3542.227	-63.5495	31.7853	82.31	0.52	21448.7	82.76	0.49	22771.5	907.335	616775
560.0	3542.291	-63.4162	31.8006	82.39	0.51	21483.1	82.83	0.48	22805.9	914.198	617178
562.0	3542.352	-63.2827	31.8156	82.47	0.49	21518.0	82.90	0.46	22840.8	921.072	617569
564.0	3542.413	-63.1489	31.8306	82.54	0.48	21552.7	82.98	0.45	22875.6	927.957	617951
566.0	3542.471	-63.0149	31.8454	82.62	0.47	21587.7	83.05	0.44	22910.6	934.852	618324
568.0	3542.529	-62.8806	31.8601	82.70	0.46	21623.4	83.12	0.43	22946.3	941.759	618689
570.0	3542.585	-62.7460	31.8747	82.78	0.44	21658.9	83.20	0.42	22981.8	948.677	619045
572.0	3542.639	-62.6112	31.8891	82.86	0.43	21694.5	83.27	0.41	23017.5	955.607	619392
574.0	3542.692	-62.4761	31.9034	82.94	0.42	21730.3	83.35	0.40	23053.3	962.547	619730
576.0	3542.744	-62.3407	31.9175	83.02	0.41	21766.1	83.42	0.38	23089.2	969.499	620060
578.0	3542.794	-62.2051	31.9315	83.10	0.40	21802.1	83.50	0.37	23125.2	976.463	620380
580.0	3542.843	-62.0692	31.9454	83.18	0.38	21838.3	83.57	0.36	23161.4	983.437	620692
582.0	3542.890	-61.9330	31.9592	83.26	0.37	21874.6	83.65	0.35	23197.7	990.424	620994
584.0	3542.936	-61.7966	31.9727	83.34	0.36	21911.0	83.72	0.34	23234.1	997.422	621288

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	3542.980	-61.6599	31.9862	83.42	0.35	21947.4	83.80	0.33	23270.6	1004.431	621572
588.0	3543.023	-61.5229	31.9995	83.51	0.33	21984.1	83.88	0.32	23307.3	1011.452	621848
590.0	3543.065	-61.3857	32.0127	83.59	0.32	22020.9	83.95	0.30	23344.1	1018.485	622115
592.0	3543.105	-61.2482	32.0257	83.67	0.31	22057.9	84.03	0.29	23381.2	1025.529	622374
594.0	3543.144	-61.1104	32.0386	83.75	0.30	22095.1	84.11	0.28	23418.4	1032.585	622624
596.0	3543.181	-60.9724	32.0513	83.83	0.29	22132.3	84.18	0.27	23455.7	1039.653	622866
598.0	3543.218	-60.8341	32.0639	83.92	0.28	22169.7	84.26	0.26	23493.0	1046.733	623099
600.0	3543.252	-60.6955	32.0763	84.00	0.27	22207.1	84.34	0.25	23530.5	1053.825	623323
602.0	3543.286	-60.5566	32.0886	84.08	0.26	22244.7	84.42	0.24	23568.1	1060.928	623540
604.0	3543.318	-60.4175	32.1007	84.17	0.25	22282.5	84.49	0.23	23605.9	1068.044	623748
606.0	3543.348	-60.2781	32.1127	84.25	0.24	22320.3	84.57	0.22	23643.8	1075.172	623948
608.0	3543.378	-60.1384	32.1245	84.33	0.22	22358.3	84.65	0.21	23681.7	1082.311	624141
610.0	3543.406	-59.9984	32.1362	84.42	0.21	22396.4	84.73	0.20	23719.9	1089.463	624325
612.0	3543.433	-59.8582	32.1477	84.50	0.21	22434.7	84.81	0.19	23758.2	1096.627	624502
614.0	3543.459	-59.7176	32.1591	84.59	0.20	22473.2	84.89	0.18	23796.7	1103.803	624672
616.0	3543.484	-59.5768	32.1703	84.67	0.19	22511.8	84.97	0.18	23835.4	1110.991	624834
618.0	3543.507	-59.4358	32.1813	84.76	0.18	22550.6	85.05	0.17	23874.2	1118.192	624989
620.0	3543.530	-59.2944	32.1922	84.84	0.17	22589.5	85.13	0.16	23913.1	1125.405	625137
622.0	3543.551	-59.1528	32.2029	84.92	0.16	22628.5	85.21	0.15	23952.1	1132.631	625277
624.0	3543.571	-59.0109	32.2135	85.01	0.15	22667.6	85.29	0.14	23991.2	1139.869	625411
626.0	3543.590	-58.8687	32.2239	85.10	0.14	22706.8	85.37	0.13	24030.4	1147.119	625538
628.0	3543.608	-58.7262	32.2342	85.18	0.13	22746.1	85.45	0.13	24069.8	1154.382	625659
630.0	3543.625	-58.5835	32.2443	85.27	0.13	22785.6	85.53	0.12	24109.3	1161.657	625773
632.0	3543.641	-58.4405	32.2542	85.35	0.12	22825.3	85.61	0.11	24149.0	1168.945	625880
634.0	3543.656	-58.2971	32.2640	85.44	0.11	22865.0	85.69	0.10	24188.7	1176.246	625982
636.0	3543.670	-58.1536	32.2736	85.52	0.10	22904.9	85.77	0.10	24228.6	1183.559	626078
638.0	3543.683	-58.0097	32.2830	85.61	0.10	22944.8	85.85	0.09	24268.6	1190.885	626168
640.0	3543.695	-57.8655	32.2922	85.70	0.09	22984.9	85.93	0.08	24308.7	1198.224	626253
642.0	3543.706	-57.7211	32.3013	85.78	0.08	23025.2	86.01	0.08	24348.9	1205.576	626332
644.0	3543.717	-57.5764	32.3103	85.87	0.08	23065.5	86.09	0.07	24389.3	1212.941	626406
646.0	3543.727	-57.4314	32.3190	85.96	0.07	23106.0	86.18	0.07	24429.7	1220.318	626475
648.0	3543.736	-57.2861	32.3276	86.04	0.06	23146.6	86.26	0.06	24470.4	1227.708	626540
650.0	3543.744	-57.1405	32.3360	86.13	0.06	23187.4	86.34	0.06	24511.2	1235.112	626599
652.0	3543.752	-56.9946	32.3443	86.22	0.05	23228.4	86.42	0.05	24552.2	1242.528	626654
654.0	3543.758	-56.8485	32.3523	86.30	0.05	23269.6	86.50	0.05	24593.4	1249.957	626705
656.0	3543.765	-56.7021	32.3602	86.39	0.04	23311.0	86.59	0.04	24634.8	1257.400	626752
658.0	3543.770	-56.5553	32.3680	86.48	0.04	23352.4	86.67	0.04	24676.2	1264.856	626794
660.0	3543.775	-56.4083	32.3755	86.57	0.04	23393.9	86.75	0.03	24717.7	1272.325	626833
662.0	3543.780	-56.2611	32.3829	86.66	0.03	23435.5	86.83	0.03	24759.4	1279.807	626869
664.0	3543.784	-56.1135	32.3901	86.74	0.03	23477.3	86.92	0.03	24801.1	1287.303	626901
666.0	3543.787	-55.9656	32.3971	86.83	0.02	23519.2	87.00	0.02	24843.1	1294.812	626930
668.0	3543.790	-55.8175	32.4039	86.92	0.02	23561.2	87.08	0.02	24885.1	1302.335	626956
670.0	3543.793	-55.6690	32.4105	87.01	0.02	23603.4	87.17	0.02	24927.3	1309.871	626979

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	3543.795	-55.5203	32.4170	87.10	0.01	23645.8	87.25	0.01	24969.7	1317.420	626998
674.0	3543.796	-55.3713	32.4233	87.19	0.01	23688.3	87.34	0.01	25012.2	1324.983	627013
676.0	3543.797	-55.2219	32.4294	87.28	0.00	23730.9	87.42	0.00	25054.8	1332.560	627023
678.0	3543.797	-55.0723	32.4353	87.37	-0.00	23773.7	87.50	-0.00	25097.6	1340.150	627030
680.0	3543.796	-54.9225	32.4410	87.45	-0.00	23816.6	87.59	-0.00	25140.5	1347.754	627034
682.0	3543.796	-54.7723	32.4465	87.54	-0.01	23859.7	87.67	-0.01	25183.6	1355.371	627036
684.0	3543.795	-54.6218	32.4519	87.63	-0.01	23902.8	87.76	-0.01	25226.7	1363.003	627037
686.0	3543.794	-54.4710	32.4570	87.72	-0.01	23946.1	87.84	-0.01	25270.0	1370.648	627037
688.0	3543.793	-54.3200	32.4620	87.81	-0.01	23989.5	87.93	-0.01	25313.5	1378.307	627036
690.0	3543.792	-54.1686	32.4668	87.90	-0.01	24033.1	88.01	-0.00	25357.0	1385.980	627037
692.0	3543.792	-54.0170	32.4714	87.99	-0.00	24076.7	88.10	-0.00	25400.6	1393.667	627038
694.0	3543.791	-53.8651	32.4757	88.09	-0.00	24120.5	88.18	-0.00	25444.4	1401.367	627042
696.0	3543.792	-53.7129	32.4799	88.18	0.00	24164.3	88.27	0.00	25488.3	1409.082	627048
698.0	3543.792	-53.5603	32.4839	88.27	0.01	24208.3	88.36	0.01	25532.3	1416.811	627058
	S-IVB 1ST GUIDANCE CUTOFF										
699.330	3543.793	-53.4588	32.4865	88.33	0.01	24237.6	88.41	0.01	25561.6	1421.959	627065
700.0	3543.794	-53.4075	32.4877	88.36	0.01	24243.2	88.44	0.01	25567.2	1424.554	627071
702.0	3543.796	-53.2547	32.4913	88.45	0.01	24243.3	88.53	0.01	25567.2	1432.301	627086
704.0	3543.797	-53.1017	32.4947	88.54	0.01	24243.3	88.62	0.01	25567.3	1440.048	627100
706.0	3543.799	-52.9488	32.4979	88.63	0.01	24243.4	88.70	0.01	25567.3	1447.795	627114
708.0	3543.801	-52.7959	32.5009	88.72	0.01	24243.4	88.79	0.01	25567.3	1455.542	627128
	PARKING ORBIT INSERTION										
709.330	3543.765	-52.6941	32.5027	88.78	0.01	24243.9	88.85	0.01	25567.8	1460.697	626909

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								
709.330	3543.765	-52.6941	32.5027	32.6722	88.85	0.01	25567.8	103.176
750.0	3543.984	-49.5836	32.5153	32.6849	90.62	0.01	25571.1	103.397
800.0	3544.006	-45.7619	32.4142	32.5835	92.79	0.01	25571.6	103.401
850.0	3544.029	-41.9550	32.1849	32.3535	94.94	0.01	25572.0	103.383
900.0	3544.055	-38.1738	31.8292	31.9968	97.06	0.01	25572.3	103.344
950.0	3544.082	-34.4285	31.3498	31.5161	99.14	0.01	25572.5	103.285
1000.0	3544.111	-30.7283	30.7503	30.9147	101.16	0.01	25572.8	103.206
1050.0	3544.141	-27.0811	30.0348	30.1970	103.11	0.01	25573.1	103.110
1100.0	3544.172	-23.4935	29.2084	29.3678	104.99	0.01	25573.5	102.998
1150.0	3544.204	-19.9705	28.2764	28.4325	106.79	0.01	25573.9	102.871
1200.0	3544.237	-16.5157	27.2445	27.3969	108.50	0.01	25574.4	102.732
1250.0	3544.271	-13.1312	26.1189	26.2669	110.12	0.01	25575.0	102.583
1300.0	3544.305	-9.8179	24.9057	25.0488	111.64	0.01	25575.6	102.426
1350.0	3544.339	-6.5755	23.6113	23.7488	113.07	0.01	25576.2	102.265
1400.0	3544.374	-3.4026	22.2419	22.3731	114.39	0.01	25576.8	102.101
1450.0	3544.408	-0.2967	20.8038	20.9282	115.61	0.01	25577.3	101.936
1500.0	3544.441	2.7451	19.3030	19.4199	116.72	0.01	25577.8	101.774
1550.0	3544.473	5.7267	17.7456	17.8544	117.74	0.01	25578.4	101.616
1600.0	3544.504	8.6523	16.1374	16.2374	118.66	0.01	25579.1	101.465
1650.0	3544.533	11.5268	14.4840	14.5747	119.47	0.01	25579.6	101.324
1700.0	3544.560	14.3550	12.7908	12.8718	120.19	0.01	25580.2	101.195
1750.0	3544.586	17.1424	11.0633	11.1339	120.81	0.01	25580.7	101.079
1800.0	3544.610	19.8943	9.3065	9.3663	121.34	0.01	25581.1	100.979
1850.0	3544.632	22.6164	7.5254	7.5741	121.77	0.01	25581.5	100.897
1900.0	3544.651	25.3144	5.7250	5.7622	122.11	0.01	25581.9	100.832
1950.0	3544.668	27.9941	3.9100	3.9355	122.35	0.00	25582.2	100.788
2000.0	3544.684	30.6612	2.0850	2.0987	122.50	0.00	25582.4	100.765
2050.0	3544.697	33.3216	0.2548	0.2565	122.56	0.00	25582.5	100.763
2100.0	3544.708	35.9813	-1.5760	-1.5863	122.53	0.00	25582.6	100.782
2150.0	3544.717	38.6460	-3.4029	-3.4251	122.40	0.00	25582.6	100.824
2200.0	3544.725	41.3216	-5.2211	-5.2551	122.19	0.00	25582.6	100.887
2250.0	3544.731	44.0139	-7.0261	-7.0717	121.87	0.00	25582.4	100.970
2300.0	3544.736	46.7287	-8.8131	-8.8699	121.47	0.00	25582.3	101.074
2350.0	3544.741	49.4718	-10.5771	-10.6448	120.97	0.00	25582.0	101.198
2400.0	3544.745	52.2487	-12.3133	-12.3915	120.39	0.00	25581.7	101.339
2450.0	3544.749	55.0651	-14.0166	-14.1047	119.68	0.00	25581.3	101.496
2500.0	3544.754	57.9261	-15.6816	-15.7791	118.90	0.00	25580.9	101.668
2550.0	3544.760	60.8370	-17.3030	-17.4094	118.01	0.00	25580.4	101.852
2600.0	3544.767	63.8026	-18.8751	-18.9899	117.02	0.00	25579.9	102.047
2650.0	3544.776	66.8271	-20.3922	-20.5146	115.93	0.00	25579.3	102.250

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	3544.787	69.9147	-21.8483	-21.9777	114.74	0.00	25578.7	102.459
2750.0	3544.801	73.0685	-23.2374	-23.3732	113.44	0.00	25578.1	102.671
2800.0	3544.818	76.2911	-24.5533	-24.6948	112.05	0.01	25577.4	102.885
2850.0	3544.838	79.5843	-25.7897	-25.9363	110.56	0.01	25576.7	103.098
2900.0	3544.862	82.9486	-26.9402	-27.0914	108.97	0.01	25576.1	103.307
2950.0	3544.890	86.3835	-27.9987	-28.1538	107.28	0.01	25575.4	103.511
3000.0	3544.923	89.8872	-28.9590	-29.1175	105.50	0.01	25574.7	103.706
3050.0	3544.961	93.4566	-29.8153	-29.9767	103.65	0.01	25574.1	103.892
3100.0	3545.004	97.0869	-30.5621	-30.7259	101.71	0.01	25573.4	104.066
3150.0	3545.052	100.7721	-31.1944	-31.3601	99.71	0.01	25572.8	104.226
3200.0	3545.105	104.5045	-31.7077	-31.8749	97.64	0.02	25572.3	104.372
3250.0	3545.164	108.2754	-32.0982	-32.2665	95.54	0.02	25571.7	104.501
3300.0	3545.228	112.0748	-32.3631	-32.5321	93.39	0.02	25571.2	104.614
3350.0	3545.297	115.8920	-32.5003	-32.6697	91.23	0.02	25570.7	104.708
3400.0	3545.372	119.7155	-32.5087	-32.6782	89.06	0.02	25570.3	104.784
3450.0	3545.451	123.5338	-32.3884	-32.5576	86.89	0.02	25569.9	104.842
3500.0	3545.536	127.3356	-32.1403	-32.3088	84.74	0.02	25569.5	104.881
3550.0	3545.625	131.1100	-31.7663	-31.9337	82.63	0.02	25569.2	104.902
3600.0	3545.718	134.8469	-31.2692	-31.4351	80.56	0.03	25568.9	104.906
3650.0	3545.815	138.5373	-30.6527	-30.8167	78.55	0.03	25568.7	104.893
3700.0	3545.915	142.1736	-29.9211	-30.0928	76.61	0.03	25568.5	104.865
3750.0	3546.019	145.7494	-29.0795	-29.2384	74.74	0.03	25568.4	104.822
3800.0	3546.124	149.2600	-28.1334	-28.2889	72.95	0.03	25568.2	104.767
3850.0	3546.232	152.7019	-27.0884	-27.2401	71.26	0.03	25568.1	104.701
3900.0	3546.341	156.0732	-25.9508	-26.0980	69.65	0.03	25568.1	104.626
3950.0	3546.450	159.3732	-24.7267	-24.8689	68.15	0.03	25568.0	104.544
4000.0	3546.560	162.6025	-23.4225	-23.5590	66.74	0.03	25568.0	104.458
4050.0	3546.668	165.7625	-22.0443	-22.1746	65.44	0.03	25568.0	104.368
4100.0	3546.776	168.8559	-20.5985	-20.7218	64.23	0.03	25568.0	104.277
4150.0	3546.882	171.8857	-19.0911	-19.2069	63.13	0.03	25567.9	104.189
4200.0	3546.986	174.8559	-17.5281	-17.6356	62.13	0.03	25567.9	104.104
4250.0	3547.086	177.7706	-15.9152	-16.0140	61.23	0.03	25567.9	104.024
4300.0	3547.183	-179.3652	-14.2580	-14.3475	60.42	0.03	25567.9	103.953
4350.0	3547.276	-176.5464	-12.5621	-12.6416	59.72	0.02	25567.8	103.891
4400.0	3547.365	-173.7679	-10.8325	-10.9017	59.11	0.02	25567.7	103.840
4450.0	3547.448	-171.0241	-9.0746	-9.1329	58.60	0.02	25567.6	103.803
4500.0	3547.526	-168.3094	-7.2931	-7.3403	58.18	0.02	25567.5	103.779
4550.0	3547.598	-165.6182	-5.4930	-5.5287	57.86	0.02	25567.3	103.771
4600.0	3547.665	-162.9445	-3.6790	-3.7030	57.63	0.02	25567.2	103.778
4650.0	3547.725	-160.2827	-1.8558	-1.8679	57.49	0.02	25566.9	103.803
4700.0	3547.778	-157.6269	-0.0280	-0.0282	57.44	0.01	25566.7	103.844
4750.0	3547.825	-154.9713	1.7999	1.8116	57.48	0.01	25566.4	103.903
4800.0	3547.866	-152.3099	3.6232	3.6468	57.62	0.01	25566.0	103.978

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	3547.900	-149.6371	5.4373	5.4726	57.85	0.01	25565.7	104.070
4900.0	3547.927	-146.9469	7.2376	7.2844	58.17	0.01	25565.3	104.177
4950.0	3547.948	-144.2337	9.0193	9.0773	58.59	0.00	25564.9	104.299
5000.0	3547.963	-141.4917	10.7776	10.8464	59.09	0.00	25564.5	104.434
5050.0	3547.971	-138.7153	12.5075	12.5867	59.70	0.00	25564.0	104.581
5100.0	3547.974	-135.8991	14.2040	14.2931	60.40	0.00	25563.5	104.739
5150.0	3547.972	-133.0377	15.8618	15.9603	61.20	-0.00	25563.1	104.904
5200.0	3547.964	-130.1261	17.4755	17.5927	62.10	-0.00	25562.6	105.076
5250.0	3547.952	-127.1594	19.0395	19.1549	63.09	-0.00	25562.1	105.252
5300.0	3547.936	-124.1335	20.5480	20.6710	64.19	-0.00	25561.6	105.430
5350.0	3547.916	-121.0444	21.9952	22.1251	65.39	-0.01	25561.2	105.608
5400.0	3547.892	-117.8888	23.3749	23.5111	66.69	-0.01	25560.8	105.783
5450.0	3547.866	-114.6644	24.6810	24.8229	68.10	-0.01	25560.4	105.953
5500.0	3547.838	-111.3695	25.9072	26.0542	69.60	-0.01	25560.0	106.116
5550.0	3547.807	-108.0035	27.0472	27.1987	71.20	-0.01	25559.7	106.270
5600.0	3547.775	-104.5671	28.0950	28.2503	72.89	-0.01	25559.4	106.412
5650.0	3547.743	-101.0623	29.0443	29.2030	74.67	-0.01	25559.1	106.540
5700.0	3547.709	-97.4922	29.8894	30.0509	76.53	-0.01	25559.0	106.653
5750.0	3547.676	-93.9617	30.6248	30.7887	78.47	-0.01	25558.8	106.749
5800.0	3547.643	-90.1770	31.2456	31.4113	80.48	-0.01	25558.8	106.827
5850.0	3547.611	-86.4456	31.7473	31.9145	82.54	-0.01	25558.8	106.885
5900.0	3547.580	-82.6766	32.1263	32.2946	84.65	-0.01	25558.8	106.923
5950.0	3547.550	-78.8798	32.3798	32.5488	86.79	-0.01	25559.0	106.939
6000.0	3547.522	-75.0661	32.5058	32.6751	88.96	-0.01	25559.2	106.934
6050.0	3547.496	-71.2468	32.5032	32.6726	91.13	-0.01	25559.4	106.907
6100.0	3547.471	-67.4334	32.3722	32.5412	93.29	-0.01	25559.8	106.859
6150.0	3547.449	-63.6373	32.1138	32.2821	95.43	-0.01	25560.2	106.789
6200.0	3547.428	-59.8691	31.7298	31.8970	97.54	-0.01	25560.6	106.699
6250.0	3547.410	-56.1389	31.2233	31.3890	99.60	-0.00	25561.1	106.590
6300.0	3547.394	-52.4555	30.5978	30.7616	101.61	-0.00	25561.7	106.463
6350.0	3547.380	-48.8265	29.8577	30.0192	103.54	-0.00	25562.3	106.319
6400.0	3547.369	-45.2580	29.0082	29.1667	105.41	-0.00	25563.0	106.160
6450.0	3547.359	-41.7549	28.0545	28.2097	107.18	-0.00	25563.7	105.988
6500.0	3547.350	-38.3202	27.0026	27.1539	108.87	-0.00	25564.4	105.806
6550.0	3547.344	-34.9560	25.8585	26.0053	110.47	-0.00	25565.2	105.615
6600.0	3547.339	-31.6628	24.6285	24.7702	111.96	-0.00	25565.9	105.418
6650.0	3547.335	-28.4399	23.3187	23.4547	113.36	-0.00	25566.7	105.217
6700.0	3547.331	-25.2859	21.9355	22.0652	114.66	-0.00	25567.5	105.016
6750.0	3547.329	-22.1981	20.4850	20.6077	115.86	-0.00	25568.3	104.815
6800.0	3547.327	-19.1734	18.9733	19.0884	116.95	-0.00	25569.0	104.619
6850.0	3547.326	-16.2078	17.4063	17.5132	117.95	-0.00	25569.8	104.429
6900.0	3547.324	-13.2970	15.7899	15.8879	118.84	-0.00	25570.5	104.249
6950.0	3547.322	-10.4362	14.1294	14.2181	119.63	-0.00	25571.1	104.080

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	3547.320	-7.6204	12.4305	12.5093	120.33	-0.00	25571.8	103.924
7050.0	3547.318	-4.8443	10.6983	10.7667	120.93	-0.00	25572.3	103.784
7100.0	3547.315	-2.1022	8.9380	8.9955	121.44	-0.00	25572.8	103.661
7150.0	3547.311	0.6112	7.1545	7.2008	121.85	-0.00	25573.3	103.557
7200.0	3547.306	3.3018	5.3525	5.3874	122.16	-0.00	25573.7	103.473
7250.0	3547.301	5.9753	3.5370	3.5601	122.39	-0.00	25574.0	103.411
7300.0	3547.295	8.6376	1.7126	1.7238	122.52	-0.00	25574.3	103.371
7350.0	3547.288	11.2944	-0.1162	-0.1170	122.56	-0.00	25574.4	103.354
7400.0	3547.280	13.9516	-1.9447	-1.9574	122.51	-0.00	25574.5	103.359
7450.0	3547.272	16.6150	-3.7684	-3.7929	122.37	-0.00	25574.5	103.388
7500.0	3547.263	19.2905	-5.5825	-5.6188	122.13	-0.00	25574.5	103.439
7550.0	3547.254	21.9839	-7.3824	-7.4302	121.80	-0.00	25574.4	103.512
7600.0	3547.246	24.7008	-9.1634	-9.2223	121.38	-0.00	25574.2	103.606
7650.0	3547.238	27.4471	-10.9206	-10.9903	120.86	-0.00	25573.9	103.720
7700.0	3547.230	30.2283	-12.6490	-12.7290	120.25	-0.00	25573.6	103.852
7750.0	3547.223	33.0498	-14.3435	-14.4334	119.54	-0.00	25573.2	104.001
7800.0	3547.218	35.9170	-15.9988	-16.0981	118.73	-0.00	25572.7	104.165
7850.0	3547.215	38.8350	-17.6095	-17.7175	117.82	-0.00	25572.2	104.342
7900.0	3547.214	41.8083	-19.1700	-19.2861	116.82	-0.00	25571.7	104.530
7950.0	3547.215	44.8413	-20.6744	-20.7981	115.71	0.00	25571.1	104.726
8000.0	3547.219	47.9379	-22.1169	-22.2474	114.50	0.00	25570.5	104.929
8050.0	3547.227	51.1012	-23.4913	-23.6281	113.19	0.00	25569.8	105.135
8100.0	3547.238	54.3335	-24.7914	-24.9338	111.78	0.00	25569.2	105.342
8150.0	3547.253	57.6364	-26.0110	-26.1584	110.27	0.00	25568.5	105.548
8200.0	3547.273	61.0104	-27.1437	-27.2956	108.66	0.01	25567.8	105.751
8250.0	3547.297	64.4545	-28.1835	-28.3392	106.96	0.01	25567.2	105.949
8300.0	3547.327	67.9669	-29.1242	-29.2832	105.17	0.01	25566.5	106.138
8350.0	3547.361	71.5441	-29.9601	-30.1219	103.30	0.01	25565.8	106.318
8400.0	3547.402	75.1811	-30.6857	-30.8498	101.35	0.01	25565.2	106.485
8450.0	3547.447	78.8715	-31.2962	-31.4621	99.34	0.01	25564.6	106.640
8500.0	3547.499	82.6077	-31.7872	-31.9545	97.27	0.01	25564.0	106.780
8550.0	3547.556	86.3805	-32.1550	-32.3234	95.16	0.02	25563.5	106.904
8600.0	3547.619	90.1799	-32.3971	-32.5661	93.01	0.02	25562.9	107.011
8650.0	3547.688	93.9951	-32.5115	-32.6809	90.85	0.02	25562.5	107.101
8700.0	3547.762	97.8145	-32.4973	-32.6666	88.68	0.02	25562.0	107.173
8750.0	3547.842	101.6268	-32.3547	-32.5236	86.51	0.02	25561.6	107.226
8800.0	3547.927	105.4207	-32.0848	-32.2529	84.38	0.02	25561.3	107.262
8850.0	3548.017	109.1853	-31.6896	-31.8567	82.27	0.03	25560.9	107.280
8900.0	3548.111	112.9109	-31.1722	-31.3378	80.21	0.03	25560.7	107.282
8950.0	3548.209	116.5888	-30.5364	-30.6999	78.22	0.03	25560.4	107.267
9000.0	3548.312	120.2114	-29.7865	-29.9477	76.29	0.03	25560.2	107.237
9050.0	3548.417	123.7728	-28.9277	-29.0860	74.43	0.03	2556C.C	107.194
9100.0	3548.524	127.2683	-27.9655	-28.1203	72.66	0.03	25559.9	107.139

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
9150.0	3548.634	130.6949	-26.9057	-27.0566	70.98	0.03	25559.7	107.074
9200.0	3548.745	134.0508	-25.7544	-25.9008	69.40	0.03	25559.6	107.000
9250.0	3548.857	137.3356	-24.5179	-24.6591	67.91	0.03	25559.5	106.919
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6								
9278.200	3548.920	139.1570	-23.7853	-23.9234	67.11	0.03	25559.5	106.872

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								
9278.200	-38390441	-3589801	-12103170	14052.8	-8586.9	-17787.0	21.99	3.08	15.87
9280.0	-38365110	-3605253	-12135161	14092.3	-8581.3	-17758.4	21.96	3.10	15.91
9290.0	-38223092	-3690909	-12311946	14311.0	-8549.7	-17598.2	21.78	3.22	16.13
9300.0	-38078896	-3776243	-12487118	14527.9	-8516.9	-17435.9	21.60	3.35	16.34
9310.0	-37932540	-3861242	-12660657	14743.0	-8482.8	-17271.4	21.42	3.47	16.56
9320.0	-37784042	-3945895	-12832540	14956.2	-8447.5	-17104.8	21.23	3.59	16.77
9330.0	-37633421	-4030188	-13002746	15167.6	-8411.0	-16936.1	21.04	3.71	16.98
9340.0	-37480696	-4114111	-13171254	15377.1	-8373.3	-16765.3	20.85	3.83	17.18
9350.0	-37325886	-4197649	-13338044	15584.6	-8334.3	-16592.4	20.65	3.96	17.39
9360.0	-37169011	-4280792	-13503095	15790.1	-8294.1	-16417.5	20.46	4.08	17.59
9370.0	-37010090	-4363528	-13666387	15993.7	-8252.7	-16240.5	20.26	4.20	17.79
9380.0	-36849143	-4445843	-13827899	16195.3	-8210.2	-16061.6	20.06	4.32	17.99
9390.0	-36686191	-4527727	-13987613	16394.9	-8166.4	-15880.7	19.85	4.44	18.19
9400.0	-36521253	-4609166	-14145507	16592.3	-8121.4	-15697.9	19.65	4.56	18.38
9410.0	-36354351	-4690150	-14301563	16787.7	-8075.2	-15513.1	19.44	4.68	18.57
9420.0	-36185505	-4770666	-14455762	16981.0	-8027.8	-15326.4	19.22	4.80	18.76
9430.0	-36014737	-4850702	-14608085	17172.2	-7979.2	-15137.9	19.01	4.92	18.95
9440.0	-35842068	-4930246	-14758513	17361.2	-7929.5	-14947.4	18.79	5.03	19.13
9450.0	-35667520	-5009287	-14907028	17548.1	-7878.5	-14755.2	18.57	5.15	19.31
9460.0	-35491115	-5087813	-15053611	17732.7	-7826.4	-14561.2	18.35	5.27	19.49
9470.0	-35312874	-5165812	-15198246	17915.1	-7773.2	-14365.4	18.13	5.39	19.67
9480.0	-35132820	-5243272	-15340913	18095.2	-7718.7	-14167.8	17.90	5.50	19.84
9490.0	-34950977	-5320183	-15481597	18273.1	-7663.1	-13968.5	17.67	5.62	20.01
9500.0	-34767366	-5396531	-15620278	18448.7	-7606.4	-13767.6	17.44	5.73	20.18
9510.0	-34582010	-5472306	-15756942	18622.0	-7548.5	-13564.9	17.21	5.85	20.35
9520.0	-34394934	-5547497	-15891571	18792.9	-7489.4	-13360.6	16.98	5.96	20.51
9530.0	-34206160	-5622092	-16024149	18961.5	-7429.3	-13154.7	16.74	6.07	20.67
9540.0	-34015712	-5696079	-16154659	19127.7	-7368.0	-12947.2	16.50	6.19	20.83
9550.0	-33823615	-5769448	-16283087	19291.4	-7305.6	-12738.1	16.26	6.30	20.98
9560.0	-33629892	-5842186	-16409416	19452.8	-7242.0	-12527.5	16.01	6.41	21.14
9570.0	-33434568	-5914285	-16533632	19611.7	-7177.4	-12315.4	15.77	6.52	21.29
9580.0	-33237666	-5985731	-16655719	19768.2	-7111.7	-12101.8	15.52	6.63	21.43
9590.0	-33039213	-6056514	-16775663	19922.2	-7044.8	-11886.7	15.27	6.74	21.58
9600.0	-32839232	-6126624	-16893449	20073.6	-6976.9	-11670.3	15.02	6.85	21.72
9610.0	-32637748	-6196050	-17009063	20222.6	-6907.9	-11452.4	14.77	6.95	21.86
9620.0	-32434788	-6264790	-17122492	20369.0	-6837.9	-11233.1	14.52	7.06	21.99
9630.0	-32230376	-6332804	-17233721	20512.9	-6766.8	-11012.5	14.26	7.17	22.13
9640.0	-32024538	-6400112	-17342738	20654.2	-6694.6	-10790.6	14.00	7.27	22.26
9650.0	-31817301	-6466692	-17449530	20792.9	-6621.4	-10567.4	13.74	7.37	22.38
9660.0	-31608689	-6532535	-17554083	20929.0	-6547.1	-10343.0	13.48	7.48	22.51

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
9670.0	-31398730	-6597631	-17656386	21062.4	-6471.8	-10117.3	13.21	7.58	22.63
9680.0	-31187449	-6661968	-17756426	21193.2	-6395.5	-9890.4	12.95	7.68	22.75
9690.0	-30974874	-6725537	-17854191	21321.4	-6318.1	-9662.4	12.68	7.78	22.86
9700.0	-30761031	-6788327	-17949670	21446.8	-6239.8	-9433.2	12.41	7.88	22.98
9710.0	-30545947	-6850330	-18042851	21569.6	-6160.5	-9202.9	12.14	7.98	23.09
9720.0	-30329649	-6911533	-18133724	21689.6	-6080.1	-8971.5	11.87	8.08	23.19
9730.0	-30112164	-6971929	-18222277	21806.9	-5998.9	-8739.1	11.59	8.18	23.30
9740.0	-29893520	-7031507	-18308501	21921.4	-5916.6	-8505.6	11.32	8.27	23.40
9750.0	-29673745	-7090258	-18392386	22033.2	-5833.4	-8271.1	11.04	8.37	23.49
9760.0	-29452865	-7148171	-18473921	22142.3	-5749.1	-8035.7	10.77	8.49	23.58
9770.0	-29230908	-7205237	-18553097	22248.5	-5663.9	-7799.4	10.48	8.56	23.68
9780.0	-29007903	-7261447	-18629906	22352.1	-5577.9	-7562.2	10.23	8.66	23.79
9790.0	-28783875	-7316792	-18704338	22453.0	-5491.0	-7324.1	9.92	8.74	23.86
9800.0	-28558853	-7371263	-18776385	22550.9	-5403.2	-7085.2	9.64	8.83	23.94
9810.0	-28332866	-7424852	-18846039	22646.0	-5314.4	-6845.5	9.36	8.92	24.01
9820.0	-28105943	-7477549	-18913292	22738.2	-5224.8	-6605.0	9.09	9.00	24.07
9830.0	-27878111	-7529346	-18978136	22827.7	-5134.3	-6363.7	8.81	9.09	24.15
9840.0	-27649398	-7580233	-19040563	22914.3	-5043.0	-6121.7	8.52	9.17	24.22
9850.0	-27419835	-7630202	-19100568	22997.9	-4950.8	-5879.1	8.27	9.26	24.28
	S-IVB RE-IGNITION (STDV OPEN)								
9856.200	-27277090	-7660719	-19136551	23048.9	-4893.2	-5728.4	8.21	9.23	24.24
9858.0	-27235585	-7669513	-19146825	23071.7	-4878.4	-5687.0	19.58	6.79	21.07
9860.0	-27189397	-7679257	-19158158	23119.2	-4865.9	-5646.5	25.52	5.95	19.80
9862.0	-27143108	-7688976	-19169412	23170.8	-4853.6	-5607.0	25.98	5.98	19.71
9864.0	-27096715	-7698672	-19180586	23222.9	-4841.9	-5567.6	26.12	5.85	19.71
9866.0	-27050217	-7708344	-19191682	23275.3	-4830.2	-5528.2	26.28	5.81	19.70
9868.0	-27003615	-7717992	-19202699	23328.0	-4818.6	-5488.5	26.43	5.76	20.07
9870.0	-26956907	-7727618	-19213634	23380.9	-4807.0	-5447.0	26.57	5.86	20.90
9872.0	-26910092	-7737220	-19224487	23434.2	-4795.1	-5404.9	26.69	5.97	21.30
9874.0	-26863171	-7746799	-19235254	23487.4	-4783.1	-5362.3	26.79	6.05	21.33
9876.0	-26816142	-7756353	-19245936	23541.0	-4771.0	-5319.6	26.83	6.08	21.24
9878.0	-26769007	-7765883	-19256532	23594.7	-4758.8	-5277.1	26.85	6.11	21.26
9880.0	-26721764	-7775388	-19267044	23648.4	-4746.5	-5234.5	26.84	6.21	21.34
9882.0	-26674413	-7784868	-19277470	23702.0	-4733.9	-5191.8	26.84	6.33	21.40
9884.0	-26626955	-7794324	-19287811	23755.3	-4721.2	-5149.0	26.87	6.42	21.42
9886.0	-26579390	-7803753	-19298066	23809.6	-4708.3	-5106.2	26.92	6.45	21.42
9888.0	-26531717	-7813157	-19308236	23863.5	-4695.4	-5063.3	26.97	6.49	21.42
9890.0	-26483936	-7822535	-19318320	23917.4	-4682.3	-5020.4	26.97	6.54	21.44
9892.0	-26436049	-7831886	-19328318	23971.3	-4669.2	-4977.5	26.94	6.62	21.49
9894.0	-26388051	-7841211	-19338230	24025.1	-4655.9	-4934.5	26.87	6.70	21.54
9896.0	-26339947	-7850510	-19348055	24078.8	-4642.4	-4891.4	26.83	6.76	21.58

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
9898.0	-26291736	-7859781	-19357795	24132.5	-4628.9	-4848.2	26.84	6.81	21.58
9900.0	-26243417	-7869025	-19367448	24186.2	-4615.2	-4805.0	26.87	6.85	21.56
9902.0	-26194991	-7878242	-19377015	24240.0	-4601.5	-4761.9	26.90	6.89	21.56
9904.0	-26146457	-7887431	-19386496	24293.8	-4587.7	-4718.8	26.92	6.91	21.58
9906.0	-26097816	-7896592	-19395890	24347.6	-4573.8	-4675.6	26.95	6.95	21.62
9908.0	-26049067	-7905726	-19405198	24401.6	-4559.8	-4632.3	26.98	7.00	21.66
9910.0	-26000210	-7914831	-19414419	24455.5	-4545.8	-4589.0	26.97	7.05	21.68
9912.0	-25951244	-7923909	-19423554	24509.5	-4531.7	-4545.6	26.95	7.09	21.69
9914.0	-25902172	-7932958	-19432602	24563.4	-4517.4	-4502.2	26.93	7.13	21.70
9916.0	-25852991	-7941979	-19441563	24617.2	-4503.1	-4458.8	26.92	7.19	21.71
9918.0	-25803703	-7950971	-19450437	24671.0	-4488.7	-4415.4	26.91	7.23	21.72
9920.0	-25754307	-7959933	-19459224	24724.8	-4474.2	-4371.9	26.89	7.28	21.73
9922.0	-25704804	-7968867	-19467924	24778.6	-4459.6	-4328.4	26.88	7.34	21.74
9924.0	-25655193	-7977772	-19476538	24832.4	-4444.9	-4284.9	26.89	7.37	21.75
9926.0	-25605474	-7986647	-19485064	24886.2	-4430.1	-4241.4	26.93	7.39	21.76
9928.0	-25555648	-7995492	-19493504	24940.1	-4415.3	-4197.9	26.97	7.41	21.78
9930.0	-25505714	-8004308	-19501856	24994.1	-4400.5	-4154.3	27.01	7.46	21.78
9932.0	-25455672	-8013094	-19510121	25048.1	-4385.5	-4110.8	27.03	7.51	21.79
9934.0	-25405521	-8021850	-19518299	25102.2	-4370.4	-4067.2	27.03	7.55	21.80
9936.0	-25355263	-8030576	-19526390	25156.2	-4355.3	-4023.5	27.03	7.58	21.84
9938.0	-25304897	-8039271	-19534393	25210.3	-4340.1	-3979.8	27.02	7.60	21.86
9940.0	-25254422	-8047936	-19542309	25264.3	-4324.9	-3936.1	27.04	7.63	21.86
9942.0	-25203839	-8056571	-19550137	25318.5	-4309.5	-3892.4	27.07	7.69	21.84
9944.0	-25153148	-8065174	-19557878	25372.6	-4294.1	-3848.7	27.08	7.73	21.85
9946.0	-25102349	-8073747	-19565532	25426.7	-4278.6	-3805.0	27.06	7.76	21.87
9948.0	-25051441	-8082289	-19573098	25480.8	-4263.1	-3761.2	27.05	7.79	21.90
9950.0	-25000425	-8090799	-19580577	25535.0	-4247.4	-3717.4	27.08	7.85	21.92
9952.0	-24949301	-8099278	-19587968	25589.2	-4231.7	-3673.6	27.12	7.89	21.93
9954.0	-24898069	-8107726	-19595271	25643.4	-4215.9	-3629.7	27.14	7.92	21.92
9956.0	-24846727	-8116142	-19602487	25697.7	-4200.0	-3585.9	27.15	7.94	21.92
9958.0	-24795278	-8124526	-19609615	25752.1	-4184.1	-3542.0	27.16	7.99	21.92
9960.0	-24743719	-8132878	-19616655	25806.4	-4168.1	-3498.2	27.16	8.02	21.93
9962.0	-24692052	-8141199	-19623607	25860.7	-4152.0	-3454.3	27.14	8.04	21.95
9964.0	-24640276	-8149486	-19630472	25914.9	-4135.9	-3410.4	27.13	8.09	21.97
9966.0	-24588392	-8157742	-19637249	25969.2	-4119.7	-3366.4	27.12	8.14	21.99
9968.0	-24536400	-8165965	-19643938	26023.4	-4103.3	-3322.5	27.10	8.16	21.94
9970.0	-24484299	-8174155	-19650539	26077.6	-4087.0	-3278.4	27.09	8.20	22.04
9972.0	-24432089	-8182313	-19657052	26131.7	-4070.5	-3234.4	27.08	8.26	21.98
9974.0	-24379771	-8190437	-19663476	26185.8	-4054.0	-3190.4	27.17	8.24	22.00
9976.0	-24327342	-8198529	-19669814	26244.9	-4037.8	-3146.9	30.45	8.06	21.65
9978.0	-24274790	-8206589	-19676064	26305.8	-4021.7	-3103.6	30.52	8.07	21.65
9980.0	-24222118	-8214616	-19682228	26366.9	-4005.5	-3060.4	30.59	8.11	21.58
9982.0	-24169323	-8222611	-19688306	26428.2	-3989.3	-3017.3	30.66	8.10	21.58

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
9984.0	-24116405	-8230573	-19694298	26489.5	-3972.9	-2974.2	30.73	8.28	21.55
9986.0	-24063365	-8238502	-19700203	26551.0	-3956.2	-2931.1	30.80	8.45	21.55
9988.0	-24010201	-8246398	-19706022	26612.7	-3939.3	-2887.9	30.86	8.46	21.60
9990.0	-23956914	-8254259	-19711754	26674.5	-3922.5	-2844.7	30.89	8.31	21.66
9992.0	-23903503	-8262088	-19717400	26736.3	-3906.0	-2801.3	30.90	8.17	21.68
9994.0	-23849968	-8269883	-19722960	26798.1	-3889.7	-2758.0	30.93	8.17	21.65
9996.0	-23796310	-8277646	-19728432	26860.0	-3873.3	-2714.7	30.98	8.23	21.64
9998.0	-23742528	-8285376	-19733819	26922.0	-3856.8	-2671.4	31.03	8.27	21.65
10000.0	-23688622	-8293073	-19739118	26984.1	-3840.2	-2628.1	31.06	8.31	21.65
10002.0	-23634592	-8300737	-19744331	27046.3	-3823.5	-2584.8	31.09	8.36	21.62
10004.0	-23580437	-8308368	-19749457	27108.5	-3806.7	-2541.6	31.15	8.44	21.59
10006.0	-23526159	-8315964	-19754497	27170.9	-3789.8	-2498.4	31.22	8.53	21.58
10008.0	-23471753	-8323526	-19759451	27233.4	-3772.6	-2455.3	31.27	8.59	21.60
10010.0	-23417224	-8331054	-19764318	27295.9	-3755.4	-2412.0	31.31	8.65	21.62
10012.0	-23362570	-8338548	-19769099	27358.6	-3738.1	-2368.8	31.36	8.69	21.63
10014.0	-23307790	-8346007	-19773794	27421.4	-3720.6	-2325.6	31.42	8.75	21.60
10016.0	-23252884	-8353430	-19778402	27484.3	-3703.0	-2282.4	31.49	8.82	21.58
10018.0	-23197852	-8360819	-19782923	27547.3	-3685.3	-2239.2	31.54	8.98	21.59
10020.0	-23142695	-8368172	-19787358	27610.4	-3667.5	-2196.0	31.56	8.94	21.59
10022.0	-23087411	-8375489	-19791707	27673.5	-3649.6	-2152.9	31.57	8.96	21.56
10024.0	-23032001	-8382770	-19795970	27736.7	-3631.7	-2109.8	31.62	8.99	21.54
10026.0	-22976464	-8390015	-19800146	27800.0	-3613.6	-2066.7	31.71	9.04	21.53
10028.0	-22920800	-8397225	-19804237	27863.5	-3595.5	-2023.6	31.79	9.11	21.55
10030.0	-22865010	-8404397	-19808241	27927.2	-3577.2	-1980.5	31.84	9.15	21.56
10032.0	-22809092	-8411533	-19812159	27990.9	-3558.9	-1937.4	31.88	9.18	21.55
10034.0	-22753046	-8418633	-19815991	28054.7	-3540.5	-1894.3	31.91	9.22	21.56
10036.0	-22696873	-8425695	-19819736	28118.5	-3522.0	-1851.1	31.96	9.27	21.58
10038.0	-22640572	-8432721	-19823395	28182.5	-3503.4	-1808.0	32.03	9.32	21.59
10040.0	-22584142	-8439709	-19826968	28246.7	-3484.8	-1764.8	32.11	9.35	21.57
10042.0	-22527585	-8446660	-19830455	28311.0	-3466.1	-1721.7	32.18	9.38	21.53
10044.0	-22470899	-8453573	-19833855	28375.4	-3447.3	-1678.7	32.23	9.42	21.51
10046.0	-22414083	-8460449	-19837169	28439.9	-3428.4	-1635.7	32.29	9.48	21.51
10048.0	-22357139	-8467287	-19840398	28504.6	-3409.3	-1592.7	32.36	9.54	21.50
10050.0	-22300065	-8474086	-19843540	28569.3	-3390.2	-1549.7	32.44	9.59	21.50
10052.0	-22242861	-8480847	-19846596	28634.3	-3371.0	-1506.6	32.52	9.63	21.50
10054.0	-22185528	-8487570	-19849566	28699.4	-3351.7	-1463.6	32.60	9.66	21.51
10056.0	-22128064	-8494254	-19852451	28764.7	-3332.3	-1420.6	32.67	9.70	21.50
10058.0	-22070469	-8500899	-19855249	28830.1	-3312.9	-1377.6	32.72	9.75	21.49
10060.0	-22012743	-8507506	-19857961	28895.6	-3293.3	-1334.7	32.77	9.80	21.48
10062.0	-21954887	-8514073	-19860588	28961.2	-3273.7	-1291.7	32.86	9.85	21.48
10064.0	-21896899	-8520600	-19863128	29027.0	-3253.9	-1248.8	32.94	9.89	21.47
10066.0	-21838779	-8527088	-19865583	29092.9	-3234.1	-1205.8	32.99	9.92	21.47
10068.0	-21780527	-8533537	-19867951	29159.0	-3214.2	-1162.9	33.05	9.97	21.46

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
10070.0	-21722143	-8539945	-19870234	29225.2	-3194.3	-1120.0	33.15	10.02	21.45
10072.0	-21663626	-8546314	-19872431	29291.6	-3174.2	-1077.1	33.26	10.09	21.45
10074.0	-21604976	-8552642	-19874542	29358.2	-3153.9	-1034.2	33.33	10.15	21.44
10076.0	-21546193	-8558929	-19876568	29424.9	-3133.6	-991.3	33.39	10.20	21.42
10078.0	-21487277	-8565176	-19878508	29491.7	-3113.2	-948.5	33.46	10.22	21.42
10080.0	-21428226	-8571382	-19880362	29558.7	-3092.7	-905.6	33.55	10.26	21.42
10082.0	-21369042	-8577547	-19882130	29625.9	-3072.1	-862.8	33.65	10.31	21.42
10084.0	-21309722	-8583670	-19883813	29693.3	-3051.4	-820.0	33.74	10.34	21.41
10086.0	-21250268	-8589752	-19885410	29760.9	-3030.7	-777.2	33.83	10.39	21.39
10088.0	-21190679	-8595793	-19886922	29828.6	-3009.9	-734.4	33.92	10.45	21.38
10090.0	-21130954	-8601792	-19888348	29896.5	-2988.9	-691.6	34.00	10.52	21.37
10092.0	-21071093	-8607749	-19889688	29964.6	-2967.8	-648.9	34.09	10.57	21.36
10094.0	-21011095	-8613663	-19890943	30032.9	-2946.6	-606.2	34.19	10.60	21.34
10096.0	-20950961	-8619535	-19892113	30101.4	-2925.4	-563.5	34.27	10.65	21.33
10098.0	-20890690	-8625364	-19893197	30170.0	-2904.0	-520.9	34.35	10.72	21.35
10100.0	-20830281	-8631151	-19894196	30238.8	-2882.5	-478.1	34.46	10.78	21.37
10102.0	-20769734	-8636894	-19895110	30307.8	-2860.9	-435.4	34.55	10.84	21.38
10104.0	-20709050	-8642594	-19895938	30377.0	-2839.2	-392.7	34.64	10.89	21.36
10106.0	-20648226	-8648251	-19896681	30446.4	-2817.3	-349.9	34.76	10.95	21.34
10108.0	-20587264	-8653864	-19897338	30516.0	-2795.4	-307.3	34.85	11.01	21.34
10110.0	-20526162	-8659432	-19897910	30585.8	-2773.3	-264.6	34.97	11.07	21.36
10112.0	-20464920	-8664957	-19898396	30655.9	-2751.1	-221.8	35.07	11.12	21.37
10114.0	-20403538	-8670437	-19898797	30726.1	-2728.8	-179.1	35.17	11.19	21.37
10116.0	-20342016	-8675872	-19899112	30796.5	-2706.3	-136.3	35.27	11.26	21.37
10118.0	-20280352	-8681262	-19899342	30867.2	-2683.8	-93.6	35.38	11.32	21.37
10120.0	-20218547	-8686607	-19899487	30938.1	-2661.1	-50.9	35.50	11.36	21.37
10122.0	-20156600	-8691906	-19899546	31009.2	-2638.3	-8.1	35.61	11.42	21.36
10124.0	-20094510	-8697160	-19899519	31080.5	-2615.4	34.6	35.71	11.50	21.36
10126.0	-20032277	-8702368	-19899407	31152.1	-2592.3	77.4	35.84	11.58	21.40
10128.0	-19969902	-8707529	-19899210	31223.9	-2569.1	120.2	35.97	11.63	21.42
10130.0	-19907382	-8712644	-19898927	31295.9	-2545.8	163.0	36.08	11.67	21.42
10132.0	-19844718	-8717712	-19898558	31368.2	-2522.4	205.8	36.18	11.71	21.41
10134.0	-19781909	-8722733	-19898103	31440.6	-2498.9	248.7	36.31	11.78	21.43
10136.0	-19718955	-8727708	-19897563	31513.4	-2475.3	291.6	36.46	11.86	21.46
10138.0	-19655855	-8732634	-19896937	31586.5	-2451.5	334.5	36.60	11.95	21.49
10140.0	-19592609	-8737513	-19896225	31659.8	-2427.5	377.5	36.71	12.03	21.51
10142.0	-19529216	-8742344	-19895427	31733.3	-2403.4	420.6	36.84	12.10	21.53
10144.0	-19465676	-8747127	-19894543	31807.1	-2379.1	463.6	36.97	12.17	21.52
10146.0	-19401987	-8751861	-19893573	31881.2	-2354.7	506.7	37.13	12.23	21.53
10148.0	-19338150	-8756545	-19892516	31955.6	-2330.2	549.8	37.28	12.29	21.57
10150.0	-19274165	-8761181	-19891373	32030.3	-2305.5	592.9	37.42	12.37	21.61
10152.0	-19210029	-8765767	-19890144	32105.3	-2280.7	636.2	37.55	12.45	21.66
10154.0	-19145743	-8770304	-19888828	32180.5	-2255.7	679.6	37.70	12.54	21.70

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
10156.0	-19081307	-8774790	-19887426	32256.1	-2230.5	723.0	37.87	12.64	21.75
10158.0	-19016719	-8779226	-19885936	32332.0	-2205.1	766.5	38.03	12.75	21.78
10160.0	-18951978	-8783610	-19884360	32408.2	-2179.5	810.1	38.20	12.84	21.81
10162.0	-18887086	-8787944	-19882696	32484.8	-2153.8	853.8	38.37	12.90	21.87
10164.0	-18822039	-8792225	-19880944	32561.7	-2127.9	897.6	38.56	12.95	21.93
10166.0	-18756838	-8796455	-19879105	32639.0	-2102.0	941.5	38.72	13.01	21.99
10168.0	-18691483	-8800633	-19877178	32716.6	-2075.9	985.5	38.86	13.08	22.03
10170.0	-18625972	-8804759	-19875163	32794.5	-2049.7	1029.7	39.01	13.16	22.09
10172.0	-18560305	-8808832	-19873059	32872.6	-2023.3	1073.9	39.17	13.24	22.14
10174.0	-18494481	-8812852	-19870867	32951.2	-1996.7	1118.2	39.37	13.35	22.21
10176.0	-18428500	-8816818	-19868586	33030.1	-1969.7	1163.0	39.56	13.61	22.51
10178.0	-18362361	-8820730	-19866215	33109.4	-1942.1	1208.5	39.73	13.97	23.03
10180.0	-18296062	-8824586	-19863752	33189.0	-1913.9	1255.0	39.92	14.28	23.50
10182.0	-18229604	-8828386	-19861194	33269.1	-1885.2	1302.2	40.15	14.39	23.67
10184.0	-18162986	-8832127	-19858543	33349.6	-1856.5	1349.4	40.33	14.34	23.49
10186.0	-18096206	-8835812	-19855797	33430.4	-1827.8	1396.2	40.51	14.31	23.34
10188.0	-18029264	-8839439	-19852958	33511.7	-1799.2	1442.9	40.74	14.33	23.32
10190.0	-17962159	-8843008	-19850025	33593.4	-1770.5	1489.6	41.02	14.36	23.35
10192.0	-17894890	-8846520	-19847000	33675.7	-1741.8	1536.2	41.27	14.35	23.33
10194.0	-17827456	-8849975	-19843881	33758.4	-1713.1	1582.8	41.45	14.32	23.20
10196.0	-17759856	-8853373	-19840669	33841.5	-1684.5	1629.1	41.62	14.31	23.15
10198.0	-17692089	-8856713	-19837364	33924.9	-1655.9	1675.2	41.80	14.30	23.07
10200.0	-17624155	-8859996	-19833968	34008.6	-1627.3	1721.4	41.98	14.24	23.02
10202.0	-17556053	-8863223	-19830479	34092.7	-1598.9	1767.3	42.16	14.13	22.94
	S-IVB 2ND GUIDANCE CUTOFF								
10203.030	-17520916	-8864862	-19828646	34136.1	-1584.9	1790.8	42.25	13.06	22.62
10204.0	-17487796	-8866393	-19826899	34145.6	-1573.3	1812.5	-4.44	10.73	22.19
10206.0	-17419524	-8869520	-19823230	34136.7	-1552.3	1856.9	-4.49	10.45	22.15
10208.0	-17351257	-8872603	-19819472	34127.6	-1531.4	1901.1	-4.54	10.44	22.10
10210.0	-17283009	-8875645	-19815625	34118.5	-1510.5	1945.3	-4.62	10.43	22.06
10212.0	-17214781	-8878645	-19811691	34109.2	-1489.6	1989.3	-4.69	10.43	22.02
	TRANSLUNAR INJECTION (TLI)								
10213.030	-17179652	-8880174	-19809630	34104.4	-1478.9	2012.0	-4.73	10.42	22.00
10250.0	-15922361	-8927759	-19720377	33904.0	-1096.3	2811.6	-6.10	10.26	21.23
10300.0	-14235511	-8969873	-19553757	33556.0	-590.9	3842.9	-7.78	9.94	19.99
10350.0	-12568048	-8987166	-19337193	33130.6	-104.2	4808.0	-9.20	9.52	18.59
10400.0	-10923522	-8980682	-19074178	32640.8	359.5	5700.1	-10.35	9.02	17.08
10450.0	-9304830	-8951650	-18768460	32099.4	797.2	6515.6	-11.26	8.48	15.53
10500.0	-7714228	-8901424	-18423921	31519.2	1207.1	7253.0	-11.92	7.91	13.97

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
10550.0	-6153368	-8831425	-18044450	30911.6	1588.1	7913.1	-12.35	7.33	12.44
10600.0	-4623353	-8743100	-17633858	30287.0	1940.2	8498.4	-12.60	6.76	10.98
10650.0	-3124802	-8637882	-17195800	29654.4	2263.9	9012.4	-12.68	6.20	9.60
10700.0	-1657925	-8517162	-16733728	29021.2	2560.4	9459.7	-12.63	5.67	8.31
10750.0	-222591	-8382272	-16250860	28393.6	2831.0	9845.1	-12.46	5.16	7.12
10800.0	1181605	-8234464	-15750162	27776.4	3077.4	10173.8	-12.21	4.70	6.04
10850.0	2555284	-8074909	-15234345	27173.4	3301.2	10450.7	-11.90	4.26	5.06
10900.0	3899227	-7904693	-14705868	26587.4	3504.2	10680.9	-11.54	3.86	4.17
10950.0	5214336	-7724810	-14166950	26020.3	3688.1	10869.1	-11.14	3.50	3.37
11000.0	6501595	-7536175	-13619582	25473.5	3854.6	11019.7	-10.73	3.17	2.66
11050.0	7762038	-7339619	-13065545	24947.8	4005.2	11136.6	-10.30	2.86	2.03
11100.0	8996729	-7135897	-12506426	24443.4	4141.4	11223.5	-9.87	2.59	1.46
11150.0	10206737	-6925695	-11943636	23960.5	4264.6	11283.9	-9.45	2.34	0.96
11200.0	11393131	-6709633	-11378429	23498.7	4376.0	11320.7	-9.03	2.12	0.52
11250.0	12556957	-6488272	-10811914	23057.8	4476.7	11336.6	-8.62	1.92	0.13
11300.0	13699242	-6262119	-10245074	22637.0	4567.8	11334.1	-8.22	1.73	-0.22
11350.0	14820979	-6031632	-9678776	22235.7	4650.2	11315.3	-7.83	1.57	-0.53
11400.0	15923126	-5797225	-9113788	21853.2	4724.8	11282.0	-7.47	1.42	-0.80
11450.0	17006604	-5559272	-8550786	21488.8	4792.2	11236.1	-7.11	1.28	-1.04
11500.0	18072295	-5318111	-7990367	21141.6	4853.2	11178.9	-6.78	1.16	-1.25
11550.0	19121042	-5074047	-7433056	20810.9	4908.4	11112.0	-6.46	1.05	-1.43
11600.0	20153649	-4827359	-6879316	20495.9	4958.3	11036.3	-6.15	0.95	-1.59
11650.0	21170878	-4578297	-6329555	20195.7	5003.4	10953.0	-5.86	0.86	-1.74
11700.0	22173458	-4327090	-5784130	19909.7	5044.2	10863.0	-5.58	0.77	-1.86
	CSM SEPARATION								
11723.000	22629863	-4210865	-5534769	19782.7	5061.6	10819.5	-5.46	0.74	-1.91

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								
9278.200	-1249.010	-77.668	-3320.960	23919.2	-88.1	-9008.4	10.67	0.63	28.35
9280.0	-1241.921	-77.694	-3323.621	23938.3	-86.9	-8957.4	10.61	0.63	28.37
9290.0	-1202.437	-77.832	-3338.129	24042.8	-80.6	-8673.1	10.27	0.63	28.50
9300.0	-1162.784	-77.959	-3352.168	24143.9	-74.3	-8387.5	9.93	0.63	28.62
9310.0	-1122.968	-78.076	-3365.737	24241.6	-67.9	-8100.8	9.59	0.63	28.73
9320.0	-1082.993	-78.183	-3378.832	24335.9	-61.6	-7813.0	9.25	0.63	28.84
9330.0	-1042.866	-78.279	-3391.453	24426.8	-55.2	-7524.0	8.91	0.63	28.95
9340.0	-1002.592	-78.364	-3403.597	24514.2	-48.8	-7234.0	8.56	0.63	29.06
9350.0	-962.178	-78.439	-3415.264	24598.2	-42.4	-6943.0	8.22	0.64	29.16
9360.0	-921.627	-78.504	-3426.450	24678.8	-36.0	-6651.0	7.87	0.64	29.25
9370.0	-880.947	-78.558	-3437.155	24755.9	-29.6	-6358.0	7.52	0.64	29.34
9380.0	-840.143	-78.601	-3447.378	24829.5	-23.1	-6064.2	7.18	0.64	29.43
9390.0	-799.221	-78.634	-3457.116	24899.6	-16.7	-5769.5	6.83	0.64	29.51
9400.0	-758.186	-78.656	-3466.368	24966.2	-10.2	-5474.0	6.48	0.64	29.59
9410.0	-717.045	-78.668	-3475.133	25029.3	-3.8	-5177.7	6.12	0.64	29.67
9420.0	-675.803	-78.669	-3483.411	25088.9	2.7	-4880.8	5.77	0.64	29.74
9430.0	-634.465	-78.659	-3491.198	25145.0	9.1	-4583.1	5.42	0.64	29.81
9440.0	-593.038	-78.639	-3498.496	25197.5	15.6	-4284.7	5.07	0.64	29.87
9450.0	-551.527	-78.608	-3505.302	25246.5	22.0	-3985.8	4.71	0.64	29.93
9460.0	-509.939	-78.566	-3511.615	25291.9	28.5	-3686.3	4.36	0.64	29.98
9470.0	-468.279	-78.514	-3517.435	25333.8	34.9	-3386.3	4.00	0.64	30.03
9480.0	-426.553	-78.451	-3522.761	25372.1	41.4	-3085.8	3.64	0.64	30.08
9490.0	-384.767	-78.378	-3527.592	25406.9	47.9	-2784.9	3.29	0.64	30.12
9500.0	-342.926	-78.294	-3531.927	25438.1	54.3	-2483.6	2.93	0.64	30.15
9510.0	-301.037	-78.199	-3535.767	25465.7	60.8	-2181.9	2.57	0.64	30.19
9520.0	-259.106	-78.094	-3539.109	25489.7	67.2	-1879.9	2.21	0.64	30.22
9530.0	-217.138	-77.978	-3541.954	25510.2	73.7	-1577.7	1.86	0.64	30.24
9540.0	-175.139	-77.851	-3544.302	25527.0	80.1	-1275.2	1.49	0.64	30.26
9550.0	-133.116	-77.714	-3546.152	25540.3	86.5	-972.6	1.14	0.64	30.27
9560.0	-91.073	-77.566	-3547.503	25550.0	92.9	-669.8	0.78	0.64	30.29
9570.0	-49.013	-77.408	-3548.357	25556.1	99.4	-367.0	0.42	0.64	30.29
9580.0	-6.955	-77.239	-3548.711	25558.6	105.8	-64.1	0.06	0.63	30.30
9590.0	35.108	-77.060	-3548.568	25557.6	112.1	238.9	-0.30	0.63	30.30
9600.0	77.167	-76.870	-3547.925	25552.9	118.5	541.7	-0.65	0.63	30.29
9610.0	119.216	-76.670	-3546.784	25544.7	124.9	844.6	-1.01	0.63	30.28
9620.0	161.248	-76.459	-3545.145	25532.9	131.3	1147.3	-1.37	0.63	30.27
9630.0	203.257	-76.238	-3543.008	25517.5	137.6	1449.8	-1.73	0.63	30.25
9640.0	245.238	-76.006	-3540.373	25498.5	143.9	1752.1	-2.09	0.63	30.23
9650.0	287.185	-75.764	-3537.241	25475.9	150.2	2054.2	-2.45	0.63	30.20
9660.0	329.092	-75.512	-3533.612	25449.7	156.5	2356.0	-2.81	0.62	30.17

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
9670.0	370.953	-75.249	-3529.486	25419.9	162.8	2657.5	-3.16	0.62	30.13
9680.0	412.762	-74.976	-3524.865	25386.6	169.1	2958.6	-3.52	0.62	30.09
9690.0	454.513	-74.692	-3519.748	25349.7	175.3	3259.2	-3.88	0.62	30.05
9700.0	496.201	-74.399	-3514.137	25309.3	181.5	3559.5	-4.24	0.62	30.00
9710.0	537.819	-74.095	-3508.032	25265.2	187.7	3859.2	-4.59	0.61	29.95
9720.0	579.361	-73.781	-3501.435	25217.6	193.9	4158.3	-4.95	0.61	29.89
9730.0	620.822	-73.457	-3494.345	25166.5	200.0	4456.9	-5.30	0.61	29.83
9740.0	662.197	-73.122	-3486.765	25111.8	206.2	4754.9	-5.65	0.61	29.77
9750.0	703.478	-72.778	-3478.694	25053.6	212.3	5052.2	-6.01	0.60	29.70
9760.0	744.661	-72.424	-3470.135	24991.9	218.4	5348.8	-6.36	0.63	29.62
9770.0	785.739	-72.059	-3461.089	24926.6	224.6	5644.6	-6.71	0.60	29.55
9780.0	826.707	-71.685	-3451.556	24858.0	230.6	5939.7	-7.05	0.60	29.50
9790.0	867.559	-71.300	-3441.538	24786.0	236.6	6234.0	-7.41	0.59	29.38
9800.0	908.290	-70.906	-3431.037	24710.4	242.6	6527.3	-7.76	0.59	29.29
9810.0	948.893	-70.502	-3420.054	24631.4	248.5	6819.7	-8.10	0.59	29.20
9820.0	989.364	-70.088	-3408.590	24548.8	254.4	7111.1	-8.42	0.59	29.09
9830.0	1029.696	-69.664	-3396.647	24462.8	260.3	7401.7	-8.76	0.58	29.00
9840.0	1069.883	-69.231	-3384.227	24373.4	266.2	7691.1	-9.10	0.58	28.89
9850.0	1109.921	-68.788	-3371.332	24280.6	272.0	7979.4	-9.42	0.58	28.80
	S-IVB RE-IGNITION (STDV OPEN)								
9856.200	1134.666	-68.509	-3363.099	24221.8	275.6	8158.0	-9.46	0.54	28.71
9858.0	1141.840	-68.427	-3360.674	24213.0	276.4	8212.2	2.04	0.36	32.26
9860.0	1149.812	-68.336	-3357.960	24224.9	277.4	8279.9	7.72	0.52	34.53
9862.0	1157.788	-68.244	-3355.224	24240.8	278.9	8349.4	8.13	0.61	34.75
9864.0	1165.770	-68.152	-3352.464	24257.2	279.9	8418.9	8.27	0.50	34.79
9866.0	1173.757	-68.060	-3349.681	24273.9	280.9	8488.5	8.39	0.47	34.87
9868.0	1181.749	-67.967	-3346.876	24290.6	281.7	8558.6	8.32	0.29	35.24
9870.0	1189.747	-67.875	-3344.047	24306.7	281.9	8630.1	7.97	0.08	35.98
9872.0	1197.751	-67.782	-3341.195	24322.5	282.1	8702.4	7.81	0.04	36.40
9874.0	1205.759	-67.689	-3338.318	24337.9	282.2	8775.2	7.84	0.10	36.50
9876.0	1213.773	-67.596	-3335.418	24353.7	282.4	8848.2	7.91	0.16	36.47
9878.0	1221.791	-67.503	-3332.493	24369.5	282.8	8921.2	7.88	0.18	36.50
9880.0	1229.815	-67.410	-3329.545	24385.2	283.2	8994.2	7.79	0.23	36.59
9882.0	1237.845	-67.316	-3326.572	24400.7	283.9	9067.5	7.72	0.32	36.67
9884.0	1245.879	-67.223	-3323.575	24416.1	284.5	9140.9	7.70	0.38	36.73
9886.0	1253.918	-67.129	-3320.555	24431.6	285.3	9214.4	7.71	0.41	36.77
9888.0	1261.962	-67.035	-3317.509	24447.0	286.1	9287.9	7.73	0.44	36.81
9890.0	1270.012	-66.941	-3314.440	24462.5	287.1	9361.6	7.69	0.47	36.85
9892.0	1278.066	-66.846	-3311.347	24477.8	288.1	9435.3	7.61	0.52	36.88
9894.0	1286.126	-66.751	-3308.229	24492.9	289.1	9509.1	7.49	0.56	36.91
9896.0	1294.191	-66.656	-3305.087	24507.8	290.3	9582.9	7.40	0.59	36.94

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
9898.0	1302.260	-66.560	-3301.920	24522.6	291.5	9656.8	7.39	0.63	36.96
9900.0	1310.334	-66.464	-3298.729	24537.4	292.9	9730.8	7.39	0.68	36.97
9902.0	1318.413	-66.367	-3295.514	24552.2	294.3	9804.7	7.40	0.71	37.00
9904.0	1326.497	-66.270	-3292.275	24567.0	295.7	9878.8	7.38	0.72	37.04
9906.0	1334.586	-66.173	-3289.011	24581.8	297.2	9952.9	7.36	0.73	37.10
9908.0	1342.680	-66.074	-3285.723	24596.5	298.7	10027.2	7.34	0.76	37.16
9910.0	1350.778	-65.976	-3282.410	24611.2	300.2	10101.5	7.30	0.79	37.19
9912.0	1358.882	-65.877	-3279.073	24625.7	301.8	10175.9	7.25	0.81	37.20
9914.0	1366.990	-65.777	-3275.711	24640.2	303.5	10250.3	7.20	0.85	37.21
9916.0	1375.103	-65.677	-3272.325	24654.6	305.2	10324.7	7.16	0.88	37.23
9918.0	1383.220	-65.576	-3268.914	24668.9	307.0	10399.2	7.12	0.91	37.24
9920.0	1391.343	-65.475	-3265.479	24683.1	308.9	10473.7	7.08	0.95	37.26
9922.0	1399.470	-65.373	-3262.019	24697.2	310.8	10548.2	7.03	0.99	37.28
9924.0	1407.601	-65.270	-3258.535	24711.3	312.8	10622.8	7.01	1.01	37.30
9926.0	1415.737	-65.167	-3255.026	24725.3	314.9	10697.4	7.02	1.02	37.34
9928.0	1423.878	-65.063	-3251.492	24739.4	316.9	10772.1	7.03	1.03	37.38
9930.0	1432.024	-64.958	-3247.934	24753.5	319.0	10846.9	7.02	1.07	37.43
9932.0	1440.174	-64.853	-3244.352	24767.5	321.2	10921.8	7.01	1.11	37.46
9934.0	1448.329	-64.747	-3240.744	24781.5	323.5	10996.8	6.98	1.13	37.49
9936.0	1456.488	-64.640	-3237.112	24795.5	325.8	11071.8	6.94	1.14	37.52
9938.0	1464.652	-64.532	-3233.456	24809.3	328.1	11146.8	6.90	1.15	37.55
9940.0	1472.820	-64.424	-3229.774	24823.2	330.4	11221.9	6.90	1.17	37.57
9942.0	1480.993	-64.315	-3226.068	24837.0	332.8	11297.1	6.90	1.23	37.59
9944.0	1489.171	-64.205	-3222.337	24850.8	335.3	11372.3	6.88	1.26	37.61
9946.0	1497.353	-64.094	-3218.581	24864.5	337.8	11447.5	6.83	1.26	37.63
9948.0	1505.539	-63.983	-3214.801	24878.1	340.4	11522.8	6.79	1.28	37.65
9950.0	1513.731	-63.870	-3210.996	24891.7	343.0	11598.2	6.77	1.31	37.71
9952.0	1521.926	-63.757	-3207.166	24905.3	345.6	11673.6	6.77	1.35	37.75
9954.0	1530.126	-63.643	-3203.311	24918.8	348.4	11749.1	6.77	1.37	37.76
9956.0	1538.330	-63.527	-3199.431	24932.4	351.1	11824.7	6.76	1.39	37.78
9958.0	1546.539	-63.411	-3195.527	24945.9	354.0	11900.2	6.74	1.43	37.80
9960.0	1554.753	-63.294	-3191.597	24959.4	356.8	11975.8	6.71	1.44	37.82
9962.0	1562.971	-63.176	-3187.643	24972.8	359.7	12051.5	6.67	1.45	37.84
9964.0	1571.193	-63.058	-3183.663	24986.1	362.7	12127.2	6.62	1.48	37.86
9966.0	1579.419	-62.938	-3179.659	24999.3	365.7	12202.9	6.58	1.51	37.88
9968.0	1587.650	-62.817	-3175.630	25012.4	368.7	12278.7	6.57	1.54	37.84
9970.0	1595.885	-62.695	-3171.576	25025.4	371.8	12354.4	6.48	1.52	37.93
9972.0	1604.125	-62.572	-3167.497	25038.4	374.9	12430.2	6.47	1.60	37.89
9974.0	1612.368	-62.448	-3163.393	25051.3	378.1	12506.0	6.53	1.57	37.96
9976.0	1620.617	-62.323	-3159.264	25068.5	381.6	12584.3	9.39	1.79	39.58
9978.0	1628.872	-62.197	-3155.108	25087.3	385.2	12663.4	9.43	1.80	39.63
9980.0	1637.132	-62.070	-3150.927	25106.2	388.8	12742.7	9.50	1.86	39.63
9982.0	1645.399	-61.941	-3146.720	25125.3	392.5	12821.9	9.54	1.85	39.67

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
9984.0	1653.673	-61.811	-3142.486	25144.4	396.4	12901.3	9.55	2.03	39.74
9986.0	1661.952	-61.680	-3138.226	25163.4	400.7	12980.9	9.54	2.18	39.83
9988.0	1670.238	-61.547	-3133.941	25182.6	405.0	13060.6	9.55	2.17	39.91
9990.0	1678.530	-61.413	-3129.628	25201.7	409.2	13140.5	9.57	2.00	39.94
9992.0	1686.829	-61.278	-3125.290	25220.9	413.1	13220.4	9.59	1.87	39.93
9994.0	1695.134	-61.141	-3120.925	25240.1	416.8	13300.2	9.61	1.86	39.93
9996.0	1703.445	-61.004	-3116.534	25259.4	420.6	13380.1	9.63	1.92	39.97
9998.0	1711.762	-60.865	-3112.117	25278.7	424.5	13460.1	9.63	1.96	40.02
10000.0	1720.086	-60.724	-3107.673	25297.9	428.4	13540.2	9.64	1.99	40.05
10002.0	1728.416	-60.583	-3103.203	25317.2	432.5	13620.3	9.65	2.04	40.07
10004.0	1736.753	-60.439	-3098.707	25336.6	436.6	13700.5	9.67	2.13	40.11
10006.0	1745.096	-60.295	-3094.184	25356.0	441.0	13780.7	9.70	2.21	40.16
10008.0	1753.445	-60.149	-3089.635	25375.4	445.5	13861.1	9.70	2.26	40.23
10010.0	1761.801	-60.002	-3085.059	25394.9	450.0	13941.6	9.69	2.29	40.29
10012.0	1770.163	-59.853	-3080.457	25414.2	454.7	14022.2	9.69	2.33	40.34
10014.0	1778.531	-59.702	-3075.828	25433.6	459.4	14103.0	9.72	2.39	40.38
10016.0	1786.906	-59.550	-3071.173	25453.1	464.2	14183.8	9.76	2.46	40.42
10018.0	1795.288	-59.397	-3066.491	25472.6	469.2	14264.7	9.76	2.52	40.48
10020.0	1803.675	-59.242	-3061.782	25492.1	474.3	14345.6	9.75	2.56	40.51
10022.0	1812.069	-59.085	-3057.047	25511.6	479.5	14426.6	9.75	2.59	40.51
10024.0	1820.470	-58.926	-3052.285	25531.2	484.7	14507.7	9.78	2.62	40.53
10026.0	1828.877	-58.766	-3047.496	25550.8	490.0	14588.8	9.82	2.67	40.59
10028.0	1837.291	-58.603	-3042.681	25570.5	495.4	14670.1	9.85	2.73	40.68
10030.0	1845.710	-58.439	-3037.838	25590.2	500.9	14751.5	9.86	2.75	40.73
10032.0	1854.137	-58.274	-3032.969	25610.0	506.4	14832.9	9.87	2.78	40.76
10034.0	1862.570	-58.106	-3028.074	25629.7	512.0	14914.5	9.86	2.81	40.81
10036.0	1871.009	-57.937	-3023.151	25649.4	517.6	14996.2	9.87	2.85	40.87
10038.0	1879.455	-57.765	-3018.201	25669.2	523.4	15078.0	9.89	2.88	40.93
10040.0	1887.908	-57.592	-3013.225	25689.0	529.2	15159.9	9.93	2.92	40.97
10042.0	1896.367	-57.417	-3008.221	25709.0	535.1	15241.8	9.99	2.96	41.00
10044.0	1904.832	-57.240	-3003.191	25729.0	541.0	15323.8	10.02	3.00	41.03
10046.0	1913.305	-57.061	-2998.133	25749.1	547.1	15405.9	10.04	3.06	41.08
10048.0	1921.783	-56.880	-2993.049	25769.2	553.3	15488.2	10.06	3.11	41.14
10050.0	1930.269	-56.696	-2987.937	25789.4	559.6	15570.5	10.09	3.16	41.21
10052.0	1938.761	-56.511	-2982.799	25809.6	565.9	15653.0	10.13	3.19	41.27
10054.0	1947.260	-56.324	-2977.633	25829.9	572.3	15735.6	10.17	3.22	41.33
10056.0	1955.765	-56.134	-2972.440	25850.3	578.8	15818.3	10.20	3.26	41.39
10058.0	1964.277	-55.943	-2967.219	25870.7	585.4	15901.1	10.22	3.31	41.42
10060.0	1972.796	-55.749	-2961.972	25891.2	592.1	15984.0	10.24	3.36	41.46
10062.0	1981.322	-55.553	-2956.697	25911.7	598.8	16067.0	10.28	3.40	41.53
10064.0	1989.854	-55.355	-2951.395	25932.3	605.7	16150.1	10.32	3.43	41.59
10066.0	1998.394	-55.154	-2946.065	25953.0	612.6	16233.3	10.34	3.47	41.64
10068.0	2006.940	-54.951	-2940.708	25973.7	619.6	16316.6	10.37	3.51	41.68

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
10070.0	2015.493	-54.746	-2935.324	25994.5	626.6	16400.0	10.42	3.56	41.75
10072.0	2024.052	-54.539	-2929.912	26015.4	633.8	16483.6	10.47	3.63	41.83
10074.0	2032.619	-54.329	-2924.472	26036.4	641.1	16567.3	10.50	3.69	41.89
10076.0	2041.192	-54.117	-2919.005	26057.5	648.6	16651.1	10.53	3.73	41.93
10078.0	2049.773	-53.902	-2913.510	26078.6	656.1	16735.0	10.56	3.76	41.98
10080.0	2058.360	-53.685	-2907.988	26099.7	663.6	16819.1	10.61	3.79	42.05
10082.0	2066.955	-53.465	-2902.438	26121.0	671.3	16903.2	10.66	3.84	42.13
10084.0	2075.556	-53.243	-2896.860	26142.4	679.0	16987.5	10.72	3.87	42.19
10086.0	2084.165	-53.018	-2891.255	26163.9	686.8	17072.0	10.77	3.92	42.24
10088.0	2092.780	-52.791	-2885.622	26185.5	694.7	17156.5	10.81	3.98	42.31
10090.0	2101.403	-52.561	-2879.961	26207.2	702.7	17241.2	10.84	4.05	42.37
10092.0	2110.033	-52.328	-2874.271	26228.9	710.9	17326.0	10.89	4.10	42.44
10094.0	2118.670	-52.093	-2868.555	26250.8	719.1	17410.9	10.96	4.13	42.49
10096.0	2127.314	-51.855	-2862.810	26272.8	727.4	17496.0	11.00	4.19	42.55
10098.0	2135.966	-51.614	-2857.037	26294.8	735.9	17581.2	11.02	4.24	42.64
10100.0	2144.625	-51.370	-2851.236	26316.9	744.4	17666.6	11.06	4.29	42.74
10102.0	2153.291	-51.124	-2845.406	26339.1	753.0	17752.1	11.10	4.34	42.83
10104.0	2161.964	-50.875	-2839.549	26361.3	761.8	17837.8	11.16	4.39	42.90
10106.0	2170.645	-50.623	-2833.664	26383.7	770.6	17923.7	11.22	4.46	42.96
10108.0	2179.333	-50.367	-2827.750	26406.2	779.6	18009.7	11.26	4.51	43.04
10110.0	2188.028	-50.109	-2821.807	26428.8	788.7	18095.8	11.31	4.56	43.14
10112.0	2196.731	-49.848	-2815.837	26451.5	797.8	18182.2	11.36	4.61	43.23
10114.0	2205.442	-49.584	-2809.838	26474.3	807.1	18268.7	11.40	4.67	43.31
10116.0	2214.160	-49.317	-2803.810	26497.1	816.5	18355.4	11.44	4.73	43.40
10118.0	2222.885	-49.047	-2797.754	26520.1	826.1	18442.3	11.50	4.79	43.49
10120.0	2231.618	-48.773	-2791.669	26543.2	835.7	18529.4	11.57	4.83	43.57
10122.0	2240.359	-48.496	-2785.556	26566.4	845.4	18616.6	11.63	4.89	43.65
10124.0	2249.107	-48.216	-2779.414	26589.7	855.3	18704.0	11.67	4.96	43.74
10126.0	2257.864	-47.933	-2773.243	26613.1	865.3	18791.6	11.72	5.03	43.87
10128.0	2266.627	-47.647	-2767.043	26636.6	875.4	18879.4	11.78	5.07	43.98
10130.0	2275.399	-47.357	-2760.814	26660.3	885.5	18967.5	11.84	5.10	44.06
10132.0	2284.178	-47.064	-2754.556	26684.0	895.8	19055.7	11.89	5.15	44.14
10134.0	2292.965	-46.767	-2748.269	26707.9	906.2	19144.1	11.96	5.21	44.25
10136.0	2301.760	-46.467	-2741.953	26731.8	916.7	19232.7	12.02	5.27	44.39
10138.0	2310.563	-46.164	-2735.608	26755.9	927.3	19321.6	12.07	5.35	44.53
10140.0	2319.374	-45.857	-2729.234	26780.1	938.0	19410.8	12.11	5.41	44.64
10142.0	2328.193	-45.546	-2722.830	26804.4	948.9	19500.1	12.16	5.48	44.75
10144.0	2337.020	-45.232	-2716.397	26828.8	960.0	19589.7	12.24	5.54	44.85
10146.0	2345.855	-44.914	-2709.934	26853.4	971.1	19679.5	12.32	5.60	44.97
10148.0	2354.698	-44.593	-2703.441	26878.1	982.4	19769.6	12.39	5.65	45.11
10150.0	2363.549	-44.268	-2696.919	26903.0	993.7	19860.0	12.44	5.71	45.25
10152.0	2372.409	-43.939	-2690.367	26927.9	1005.2	19950.6	12.48	5.77	45.39
10154.0	2381.276	-43.606	-2683.785	26952.9	1016.8	20041.6	12.53	5.83	45.55

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
10156.0	2390.152	-43.269	-2677.173	26978.1	1028.6	20132.8	12.60	5.91	45.71
10158.0	2399.036	-42.929	-2670.531	27003.4	1040.5	20224.4	12.67	6.01	45.88
10160.0	2407.929	-42.584	-2663.859	27028.8	1052.6	20316.3	12.74	6.09	46.03
10162.0	2416.830	-42.236	-2657.157	27054.3	1064.8	20408.5	12.81	6.12	46.20
10164.0	2425.739	-41.883	-2650.424	27080.1	1077.1	20501.1	12.90	6.15	46.38
10166.0	2434.657	-41.527	-2643.661	27105.9	1089.5	20594.0	12.96	6.19	46.54
10168.0	2443.584	-41.166	-2636.867	27131.9	1101.9	20687.2	13.01	6.24	46.68
10170.0	2452.518	-40.801	-2630.042	27158.0	1114.4	20780.7	13.06	6.30	46.84
10172.0	2461.462	-40.432	-2623.186	27184.2	1127.1	20874.6	13.12	6.35	47.00
10174.0	2470.414	-40.059	-2616.300	27210.5	1139.9	20968.7	13.19	6.44	47.21
10176.0	2479.375	-39.682	-2609.382	27236.8	1152.9	21063.6	13.09	6.57	47.63
10178.0	2488.345	-39.300	-2602.433	27262.7	1166.2	21159.5	12.83	6.71	48.23
10180.0	2497.323	-38.914	-2595.452	27288.2	1179.7	21256.5	12.62	6.82	48.78
10182.0	2506.309	-38.524	-2588.440	27313.5	1193.4	21354.3	12.67	6.87	49.08
10184.0	2515.304	-38.129	-2581.395	27339.1	1207.2	21452.5	12.91	6.89	49.05
10186.0	2524.307	-37.729	-2574.317	27365.1	1221.0	21550.5	13.12	6.93	49.04
10188.0	2533.318	-37.325	-2567.207	27391.5	1234.9	21648.8	13.29	6.97	49.19
10190.0	2542.339	-36.916	-2560.065	27418.3	1248.9	21747.4	13.47	6.99	49.38
10192.0	2551.368	-36.503	-2552.891	27445.4	1262.9	21846.2	13.66	7.00	49.53
10194.0	2560.407	-36.085	-2545.684	27472.9	1276.9	21945.3	13.86	7.03	49.53
10196.0	2569.454	-35.662	-2538.444	27500.8	1291.0	22044.4	14.02	7.05	49.60
10198.0	2578.511	-35.235	-2531.171	27529.1	1305.1	22143.6	14.18	7.07	49.66
10200.0	2587.577	-34.803	-2523.866	27557.5	1319.3	22243.0	14.35	7.05	49.71
10202.0	2596.653	-34.366	-2516.528	27586.5	1333.4	22342.3	14.55	6.98	49.74
S-IVB 2ND GUIDANCE CUTOFF									
10203.030	2601.330	-34.140	-2512.737	27601.6	1340.1	22393.3	15.09	6.12	49.28
10204.0	2605.736	-33.925	-2509.159	27591.6	1342.7	22421.8	-21.16	0.53	20.29
10206.0	2614.810	-33.483	-2501.773	27549.4	1343.3	22462.1	-21.10	0.27	20.14
10208.0	2623.872	-33.041	-2494.373	27507.2	1343.9	22502.3	-21.12	0.28	20.06
10210.0	2632.919	-32.599	-2486.959	27465.0	1344.5	22542.4	-21.17	0.27	19.98
10212.0	2641.952	-32.156	-2479.533	27422.6	1345.0	22582.2	-21.21	0.27	19.90
TRANSLUNAR INJECTION (TLI)									
10213.030	2646.599	-31.928	-2475.703	27400.7	1345.3	22602.7	-21.24	0.27	19.85
10250.0	2810.901	-23.715	-2336.003	26601.6	1353.9	23307.6	-21.98	0.20	18.27
10300.0	3025.228	-12.539	-2140.600	25483.4	1361.6	24165.6	-22.70	0.11	16.05
10350.0	3230.231	-1.317	-1938.594	24338.2	1365.0	24912.4	-23.07	0.02	13.83
10400.0	3425.755	9.915	-1730.895	23182.3	1364.4	25549.7	-23.13	-0.05	11.68
10450.0	3611.773	21.128	-1518.388	22030.2	1360.2	26081.7	-22.92	-0.12	9.63
10500.0	3788.369	32.292	-1301.916	20894.2	1352.9	26514.7	-22.49	-0.18	7.72

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
10550.0	3955.719	43.386	-1082.262	19784.4	1342.9	26856.5	-21.88	-0.22	5.98
10600.0	4114.072	54.388	-860.142	18738.7	1339.7	27115.6	-21.14	-0.26	4.41
10650.0	4263.733	65.281	-636.200	17672.6	1316.7	27300.7	-20.30	-0.30	3.02
10700.0	4405.046	76.053	-411.009	16580.2	1301.3	27420.7	-19.40	-0.32	1.81
10750.0	4538.379	86.694	-185.069	15733.7	1284.7	27483.9	-18.46	-0.34	0.75
10800.0	4664.117	97.195	41.184	14834.1	1267.4	27498.1	-17.52	-0.35	-0.16
10850.0	4782.647	107.551	267.377	13981.7	1249.5	27470.4	-16.58	-0.36	-0.93
10900.0	4894.353	117.758	493.192	13175.5	1231.3	27407.2	-15.67	-0.37	-1.58
10950.0	4999.612	127.815	718.360	12414.4	1212.9	27314.1	-14.78	-0.37	-2.13
11000.0	5098.787	137.720	942.656	11696.7	1194.5	27196.2	-13.93	-0.37	-2.58
11050.0	5192.229	147.474	1165.895	11020.5	1176.2	27057.7	-13.12	-0.36	-2.95
11100.0	5280.270	157.078	1387.924	10383.7	1158.0	26902.6	-12.36	-0.36	-3.25
11150.0	5363.225	166.533	1608.617	9784.1	1140.1	26733.8	-11.63	-0.35	-3.49
11200.0	5441.391	175.843	1827.876	9219.5	1122.6	26554.3	-10.95	-0.35	-3.68
11250.0	5515.048	185.009	2045.622	8687.9	1105.3	26366.5	-10.32	-0.34	-3.83
11300.0	5584.459	194.035	2261.795	8187.1	1088.5	26172.2	-9.72	-0.33	-3.94
11350.0	5649.869	202.924	2476.349	7715.1	1072.1	25973.2	-9.16	-0.32	-4.02
11400.0	5711.508	211.680	2689.250	7270.2	1056.0	25771.0	-8.64	-0.32	-4.07
11450.0	5769.593	220.305	2900.479	6850.4	1040.4	25566.7	-8.15	-0.31	-4.10
11500.0	5824.315	228.804	3110.021	6454.1	1025.3	25361.3	-7.70	-0.30	-4.11
11550.0	5875.870	237.180	3317.872	6079.7	1010.5	25155.7	-7.28	-0.29	-4.11
11600.0	5924.430	245.436	3524.031	5725.7	996.2	24950.5	-6.88	-0.28	-4.09
11650.0	5970.156	253.577	3728.507	5390.9	982.3	24746.4	-6.51	-0.27	-4.07
11700.0	6013.201	261.604	3931.309	5073.8	968.9	24543.8	-6.17	-0.27	-4.03
	CSM SEPARATION								
11723.000	6032.133	265.259	4024.035	4933.6	962.7	24451.2	-6.02	-0.26	-4.02

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										
9278.200	3548.920	139.1570	-23.7853	65.79	0.03	24240.3	67.11	0.03	25559.5	649365
9280.0	3549.924	139.2726	-23.7377	65.74	0.03	24240.3	67.06	0.03	25559.5	649346
9290.0	3549.946	139.9126	-23.4716	65.45	0.03	24240.5	66.79	0.03	25559.4	649241
9300.0	3548.968	140.5499	-23.2025	65.16	0.03	24240.6	66.52	0.03	25559.4	649136
9310.0	3548.991	141.1845	-22.9305	64.88	0.03	24240.8	66.26	0.03	25559.4	649031
9320.0	3549.013	141.8163	-22.6556	64.60	0.03	24241.0	65.99	0.03	25559.4	648924
9330.0	3549.035	142.4454	-22.3779	64.32	0.03	24241.1	65.74	0.03	25559.4	648818
9340.0	3549.057	143.0718	-22.0975	64.05	0.03	24241.3	65.48	0.03	25559.4	648711
9350.0	3549.079	143.6956	-21.8143	63.79	0.03	24241.4	65.23	0.03	25559.3	648604
9360.0	3549.101	144.3166	-21.5285	63.53	0.03	24241.6	64.99	0.03	25559.3	648496
9370.0	3549.123	144.9351	-21.2401	63.27	0.03	24241.7	64.75	0.03	25559.3	648389
9380.0	3549.145	145.5510	-20.9491	63.01	0.03	24241.9	64.51	0.03	25559.3	648282
9390.0	3549.167	146.1643	-20.6556	62.77	0.03	24242.1	64.28	0.03	25559.3	648175
9400.0	3549.189	146.7750	-20.3596	62.52	0.03	24242.2	64.05	0.03	25559.3	648068
9410.0	3549.210	147.3833	-20.0612	62.28	0.03	24242.4	63.82	0.03	25559.2	647961
9420.0	3549.232	147.9890	-19.7604	62.04	0.03	24242.5	63.60	0.03	25559.2	647856
9430.0	3549.253	148.5923	-19.4573	61.81	0.03	24242.7	63.38	0.03	25559.2	647750
9440.0	3549.275	149.1932	-19.1520	61.59	0.03	24242.8	63.17	0.03	25559.2	647645
9450.0	3549.296	149.7917	-18.8444	61.36	0.03	24243.0	62.96	0.03	25559.2	647542
9460.0	3549.317	150.3878	-18.5346	61.14	0.03	24243.1	62.76	0.03	25559.2	647439
9470.0	3549.338	150.9816	-18.2227	60.93	0.03	24243.3	62.56	0.03	25559.1	647336
9480.0	3549.359	151.5731	-17.9087	60.72	0.03	24243.4	62.36	0.03	25559.1	647235
9490.0	3549.379	152.1624	-17.5926	60.51	0.03	24243.6	62.17	0.03	25559.1	647135
9500.0	3549.400	152.7494	-17.2746	60.31	0.03	24243.7	61.98	0.03	25559.1	647037
9510.0	3549.420	153.3343	-16.9546	60.11	0.03	24243.8	61.79	0.03	25559.1	646939
9520.0	3549.441	153.9170	-16.6327	59.92	0.03	24244.0	61.61	0.03	25559.0	646843
9530.0	3549.461	154.4976	-16.3089	59.73	0.03	24244.1	61.43	0.03	25559.0	646749
9540.0	3549.481	155.0762	-15.9833	59.54	0.03	24244.2	61.26	0.03	25559.0	646656
9550.0	3549.500	155.6527	-15.6559	59.36	0.03	24244.4	61.09	0.03	25559.0	646565
9560.0	3549.520	156.2272	-15.3268	59.18	0.03	24244.5	60.93	0.03	25558.9	646476
9570.0	3549.539	156.7998	-14.9960	59.01	0.03	24244.6	60.77	0.03	25558.9	646389
9580.0	3549.559	157.3705	-14.6636	58.84	0.03	24244.8	60.61	0.03	25558.9	646304
9590.0	3549.578	157.9393	-14.3296	58.68	0.03	24244.9	60.45	0.03	25558.9	646221
9600.0	3549.597	158.5063	-13.9940	58.52	0.03	24245.1	60.31	0.03	25558.9	646140
9610.0	3549.616	159.0715	-13.6569	58.36	0.03	24245.2	60.16	0.03	25559.0	646062
9620.0	3549.634	159.6349	-13.3183	58.21	0.03	24245.4	60.02	0.03	25559.0	645986
9630.0	3549.653	160.1967	-12.9783	58.06	0.03	24245.5	59.88	0.02	25559.0	645912
9640.0	3549.671	160.7568	-12.6369	57.92	0.03	24245.7	59.75	0.02	25559.0	645842
9650.0	3549.689	161.3152	-12.2942	57.78	0.03	24245.8	59.62	0.02	25559.0	645773
9660.0	3549.707	161.8721	-11.9501	57.64	0.03	24245.9	59.49	0.02	25559.0	645708

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
9670.0	3549.724	162.4275	-11.6048	57.51	0.03	24246.0	59.37	0.02	25559.0	645645
9680.0	3549.742	162.9814	-11.2582	57.39	0.02	24246.2	59.25	0.02	25559.0	645586
9690.0	3549.759	163.5339	-10.9105	57.26	0.02	24246.3	59.14	0.02	25559.0	645529
9700.0	3549.776	164.0849	-10.5616	57.14	0.02	24246.4	59.02	0.02	25559.0	645475
9710.0	3549.793	164.6347	-10.2116	57.03	0.02	24246.4	58.92	0.02	25559.0	645425
9720.0	3549.809	165.1831	-9.8606	56.92	0.02	24246.5	58.81	0.02	25558.9	645378
9730.0	3549.826	165.7302	-9.5085	56.81	0.02	24246.6	58.72	0.02	25558.9	645334
9740.0	3549.842	166.2761	-9.1555	56.71	0.02	24246.7	58.62	0.02	25558.9	645293
9750.0	3549.858	166.8209	-8.8015	56.61	0.02	24246.7	58.53	0.02	25558.8	645256
9760.0	3549.874	167.3645	-8.4466	56.52	0.02	24246.8	58.44	0.02	25558.8	645223
9770.0	3549.889	167.9070	-8.0908	56.43	0.02	24246.8	58.36	0.02	25558.7	645192
9780.0	3549.905	168.4485	-7.7342	56.34	0.02	24247.0	58.28	0.02	25558.9	645166
9790.0	3549.920	168.9890	-7.3768	56.26	0.02	24247.2	58.20	0.02	25559.0	645142
9800.0	3549.934	169.5286	-7.0187	56.18	0.02	24247.4	58.13	0.02	25559.1	645122
9810.0	3549.949	170.0673	-6.6598	56.10	0.02	24247.6	58.06	0.02	25559.2	645106
9820.0	3549.963	170.6051	-6.3002	56.03	0.02	24247.7	57.99	0.02	25559.3	645094
9830.0	3549.977	171.1422	-5.9401	55.97	0.02	24248.0	57.93	0.02	25559.4	645086
9840.0	3549.991	171.6784	-5.5793	55.90	0.02	24248.1	57.87	0.02	25559.5	645082
9850.0	3550.005	172.2140	-5.2179	55.84	0.02	24248.3	57.82	0.02	25559.6	645082
	S-IVB RE-IGNITION (STDV OPEN)									
9856.200	3550.013	172.5457	-4.9936	55.81	0.02	24248.9	57.78	0.02	25560.2	645084
9858.0	3550.016	172.6420	-4.9285	55.80	0.02	24257.9	57.77	0.02	25569.2	645086
9860.0	3550.019	172.7490	-4.8560	55.79	0.02	24291.1	57.76	0.02	25602.4	645088
9862.0	3550.022	172.8562	-4.7833	55.78	0.02	24328.7	57.75	0.02	25640.0	645092
9864.0	3550.025	172.9635	-4.7106	55.78	0.02	24366.9	57.74	0.02	25678.2	645096
9866.0	3550.028	173.0710	-4.6377	55.77	0.03	24405.5	57.73	0.02	25716.8	645102
9868.0	3550.032	173.1786	-4.5647	55.76	0.03	24444.5	57.72	0.03	25755.8	645111
9870.0	3550.036	173.2863	-4.4916	55.75	0.03	24483.6	57.71	0.03	25794.8	645120
9872.0	3550.040	173.3942	-4.4183	55.74	0.02	24522.8	57.70	0.02	25834.0	645128
9874.0	3550.043	173.5023	-4.3449	55.73	0.02	24561.9	57.68	0.02	25873.1	645134
9876.0	3550.046	173.6105	-4.2714	55.72	0.02	24601.6	57.67	0.02	25912.8	645137
9878.0	3550.048	173.7189	-4.1977	55.71	0.02	24641.5	57.66	0.02	25952.6	645139
9880.0	3550.050	173.8274	-4.1239	55.70	0.02	24681.5	57.65	0.01	25992.6	645140
9882.0	3550.053	173.9361	-4.0499	55.69	0.01	24721.5	57.64	0.01	26032.6	645139
9884.0	3550.054	174.0449	-3.9759	55.68	0.01	24761.6	57.63	0.01	26072.7	645138
9886.0	3550.056	174.1539	-3.9016	55.68	0.01	24801.9	57.62	0.01	26113.0	645137
9888.0	3550.059	174.2631	-3.8272	55.67	0.01	24842.5	57.61	0.01	26153.5	645135
9890.0	3550.060	174.3724	-3.7527	55.66	0.01	24883.2	57.60	0.01	26194.2	645134
9892.0	3550.062	174.4818	-3.6781	55.66	0.01	24923.9	57.59	0.01	26234.9	645134
9894.0	3550.064	174.5915	-3.6033	55.65	0.02	24964.6	57.58	0.01	26275.6	645135
9896.0	3550.066	174.7013	-3.5284	55.64	0.02	25005.3	57.57	0.02	26316.4	645137

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
9898.0	3550.069	174.8112	-3.4534	55.64	0.02	25046.1	57.57	0.02	26357.1	645142
9900.0	3550.072	174.9213	-3.3782	55.63	0.02	25087.1	57.56	0.02	26398.1	645148
9902.0	3550.075	175.0316	-3.3029	55.63	0.02	25128.2	57.55	0.02	26439.2	645158
9904.0	3550.079	175.1421	-3.2275	55.62	0.03	25169.4	57.54	0.03	26480.5	645171
9906.0	3550.083	175.2527	-3.1520	55.62	0.03	25210.9	57.54	0.03	26521.9	645188
9908.0	3550.088	175.3635	-3.0763	55.62	0.04	25252.5	57.53	0.04	26563.5	645209
9910.0	3550.094	175.4744	-3.0004	55.61	0.04	25294.2	57.52	0.04	26605.3	645235
9912.0	3550.101	175.5855	-2.9245	55.61	0.05	25336.0	57.52	0.05	26647.1	645265
9914.0	3550.108	175.6968	-2.8484	55.60	0.05	25377.8	57.51	0.05	26689.0	645301
9916.0	3550.117	175.8083	-2.7722	55.60	0.06	25419.8	57.50	0.06	26730.9	645344
9918.0	3550.126	175.9199	-2.6958	55.60	0.07	25461.8	57.50	0.07	26773.0	645392
9920.0	3550.137	176.0318	-2.6193	55.60	0.08	25503.9	57.49	0.07	26815.1	645448
9922.0	3550.149	176.1437	-2.5427	55.59	0.08	25546.1	57.49	0.08	26857.3	645511
9924.0	3550.162	176.2559	-2.4660	55.59	0.09	25588.4	57.49	0.09	26899.6	645583
9926.0	3550.176	176.3683	-2.3891	55.59	0.10	25630.8	57.48	0.10	26942.1	645663
9928.0	3550.192	176.4808	-2.3121	55.59	0.11	25673.4	57.48	0.11	26984.8	645752
9930.0	3550.210	176.5935	-2.2350	55.59	0.12	25716.2	57.47	0.12	27027.6	645850
9932.0	3550.229	176.7064	-2.1577	55.59	0.13	25759.2	57.47	0.13	27070.6	645959
9934.0	3550.250	176.8194	-2.0803	55.59	0.15	25802.3	57.47	0.14	27113.8	646078
9936.0	3550.272	176.9327	-2.0028	55.59	0.16	25845.6	57.46	0.15	27157.0	646208
9938.0	3550.296	177.0461	-1.9251	55.59	0.17	25888.9	57.46	0.16	27200.4	646349
9940.0	3550.323	177.1597	-1.8473	55.59	0.18	25932.3	57.46	0.17	27243.9	646503
9942.0	3550.351	177.2735	-1.7694	55.59	0.20	25975.9	57.46	0.19	27287.5	646669
9944.0	3550.381	177.3875	-1.6914	55.59	0.21	26019.6	57.45	0.20	27331.3	646848
9946.0	3550.414	177.5017	-1.6132	55.59	0.23	26063.5	57.45	0.21	27375.2	647041
9948.0	3550.449	177.6160	-1.5349	55.59	0.24	26107.4	57.45	0.23	27419.2	647248
9950.0	3550.486	177.7306	-1.4565	55.59	0.26	26151.4	57.45	0.24	27463.3	647470
9952.0	3550.526	177.8453	-1.3779	55.60	0.27	26195.6	57.45	0.26	27507.5	647706
9954.0	3550.569	177.9602	-1.2992	55.60	0.29	26239.9	57.45	0.28	27552.0	647959
9956.0	3550.613	178.0754	-1.2204	55.60	0.31	26284.5	57.45	0.29	27596.5	648228
9958.0	3550.661	178.1907	-1.1415	55.60	0.32	26329.1	57.45	0.31	27641.2	648514
9960.0	3550.712	178.3062	-1.0624	55.61	0.34	26373.8	57.45	0.33	27686.1	648818
9962.0	3550.765	178.4219	-0.9832	55.61	0.36	26418.7	57.45	0.35	27731.0	649139
9964.0	3550.822	178.5378	-0.9039	55.61	0.38	26463.6	57.45	0.36	27776.0	649479
9966.0	3550.881	178.6539	-0.8245	55.62	0.40	26508.5	57.45	0.38	27821.0	649838
9968.0	3550.944	178.7702	-0.7449	55.62	0.42	26553.6	57.45	0.40	27866.1	650217
9970.0	3551.010	178.8867	-0.6652	55.63	0.44	26598.7	57.45	0.42	27911.3	650617
9972.0	3551.080	179.0034	-0.5854	55.63	0.47	26643.9	57.45	0.44	27956.6	651037
9974.0	3551.153	179.1203	-0.5055	55.64	0.49	26689.2	57.45	0.46	28002.0	651479
9976.0	3551.229	179.2374	-0.4254	55.64	0.51	26739.5	57.46	0.49	28052.4	651942
9978.0	3551.310	179.3548	-0.3452	55.65	0.53	26791.9	57.46	0.51	28104.9	652428
9980.0	3551.394	179.4724	-0.2648	55.66	0.56	26844.5	57.46	0.53	28157.6	652938
9982.0	3551.481	179.5902	-0.1844	55.66	0.58	26897.3	57.47	0.55	28210.6	653471

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
9984.0	3551.573	179.7082	-0.1037	55.67	0.61	26950.4	57.47	0.58	28263.8	654029
9986.0	3551.669	179.8265	-0.0229	55.68	0.63	27003.7	57.47	0.60	28317.2	654612
9988.0	3551.770	179.9451	0.0580	55.69	0.66	27057.3	57.48	0.63	28370.9	655221
9990.0	3551.874	-179.9362	0.1390	55.70	0.69	27111.0	57.48	0.65	28424.8	655857
9992.0	3551.983	-179.8171	0.2202	55.70	0.71	27164.9	57.49	0.68	28478.8	656520
9994.0	3552.097	-179.6979	0.3015	55.71	0.74	27219.0	57.49	0.71	28533.0	657211
9996.0	3552.215	-179.5783	0.3830	55.72	0.77	27273.3	57.50	0.74	28587.4	657931
9998.0	3552.338	-179.4586	0.4646	55.73	0.80	27327.8	57.50	0.76	28642.0	658680
10000.0	3552.466	-179.3386	0.5464	55.74	0.83	27382.4	57.51	0.79	28696.8	659461
10002.0	3552.600	-179.2183	0.6283	55.75	0.86	27437.2	57.51	0.82	28751.7	660272
10004.0	3552.738	-179.0978	0.7103	55.76	0.89	27492.2	57.52	0.85	28806.9	661116
10006.0	3552.882	-178.9770	0.7925	55.77	0.93	27547.4	57.53	0.88	28862.2	661993
10008.0	3553.031	-178.8560	0.8748	55.78	0.96	27602.8	57.53	0.92	28917.8	662903
10010.0	3553.186	-178.7347	0.9573	55.79	0.99	27658.4	57.54	0.95	28973.5	663847
10012.0	3553.347	-178.6132	1.0399	55.80	1.03	27714.2	57.55	0.98	29029.5	664827
10014.0	3553.513	-178.4914	1.1226	55.81	1.06	27770.2	57.56	1.01	29085.6	665842
10016.0	3553.686	-178.3694	1.2055	55.82	1.10	27826.4	57.56	1.05	29142.0	666894
10018.0	3553.864	-178.2471	1.2885	55.84	1.13	27882.8	57.57	1.08	29198.5	667983
10020.0	3554.049	-178.1245	1.3716	55.85	1.17	27939.4	57.58	1.12	29255.3	669110
10022.0	3554.240	-178.0017	1.4549	55.86	1.21	27996.1	57.59	1.15	29312.1	670275
10024.0	3554.437	-177.8786	1.5383	55.88	1.25	28052.9	57.60	1.19	29369.2	671481
10026.0	3554.641	-177.7552	1.6219	55.89	1.29	28110.0	57.61	1.23	29426.5	672727
10028.0	3554.852	-177.6316	1.7056	55.91	1.32	28167.3	57.62	1.27	29484.0	674015
10030.0	3555.070	-177.5076	1.7894	55.92	1.37	28224.9	57.63	1.30	29541.8	675345
10032.0	3555.295	-177.3835	1.8733	55.94	1.41	28282.7	57.64	1.34	29599.7	676718
10034.0	3555.527	-177.2590	1.9574	55.95	1.45	28340.6	57.66	1.38	29657.8	678134
10036.0	3555.766	-177.1343	2.0416	55.97	1.49	28398.7	57.67	1.42	29716.1	679595
10038.0	3556.013	-177.0093	2.1259	55.98	1.53	28457.0	57.68	1.46	29774.6	681102
10040.0	3556.267	-176.8840	2.2104	56.00	1.58	28515.5	57.69	1.51	29833.3	682654
10042.0	3556.529	-176.7585	2.2950	56.02	1.62	28574.3	57.70	1.55	29892.3	684254
10044.0	3556.799	-176.6326	2.3797	56.03	1.66	28633.2	57.72	1.59	29951.5	685902
10046.0	3557.077	-176.5065	2.4646	56.05	1.71	28692.4	57.73	1.63	30010.9	687598
10048.0	3557.363	-176.3801	2.5495	56.07	1.76	28751.9	57.74	1.68	30070.6	689344
10050.0	3557.657	-176.2535	2.6347	56.09	1.80	28811.5	57.76	1.72	30130.5	691141
10052.0	3557.959	-176.1265	2.7199	56.10	1.85	28871.4	57.77	1.77	30190.6	692990
10054.0	3558.271	-175.9992	2.8053	56.12	1.90	28931.5	57.79	1.82	30251.0	694891
10056.0	3558.590	-175.8717	2.8907	56.14	1.95	28991.9	57.80	1.86	30311.6	696845
10058.0	3558.919	-175.7439	2.9764	56.16	2.00	29052.5	57.82	1.91	30372.4	698853
10060.0	3559.257	-175.6158	3.0621	56.18	2.05	29113.2	57.83	1.96	30433.4	700916
10062.0	3559.604	-175.4874	3.1480	56.20	2.10	29174.2	57.85	2.01	30494.6	703035
10064.0	3559.960	-175.3587	3.2340	56.22	2.15	29235.5	57.87	2.06	30556.1	705211
10066.0	3560.326	-175.2297	3.3201	56.24	2.20	29296.9	57.88	2.11	30617.9	707444
10068.0	3560.701	-175.1004	3.4063	56.26	2.25	29358.6	57.90	2.16	30679.8	709737

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
10070.0	3561.086	-174.9708	3.4926	56.29	2.31	29420.5	57.92	2.21	30742.0	712088
10072.0	3561.481	-174.8409	3.5791	56.31	2.36	29482.7	57.93	2.26	30804.4	714501
10074.0	3561.885	-174.7107	3.6657	56.33	2.42	29545.2	57.95	2.31	30867.2	716974
10076.0	3562.301	-174.5802	3.7524	56.35	2.47	29607.9	57.97	2.37	30930.1	719511
10078.0	3562.726	-174.4494	3.8393	56.38	2.53	29670.7	57.99	2.42	30993.3	722110
10080.0	3563.162	-174.3183	3.9262	56.40	2.58	29733.9	58.01	2.47	31056.7	724774
10082.0	3563.609	-174.1869	4.0133	56.42	2.64	29797.3	58.03	2.53	31120.4	727503
10084.0	3564.066	-174.0552	4.1004	56.45	2.70	29860.9	58.05	2.59	31184.4	730298
10086.0	3564.535	-173.9231	4.1877	56.47	2.76	29924.9	58.07	2.64	31248.6	733160
10088.0	3565.015	-173.7908	4.2751	56.50	2.82	29989.1	58.09	2.70	31313.1	736091
10090.0	3565.506	-173.6582	4.3627	56.52	2.88	30053.5	58.11	2.76	31377.8	739090
10092.0	3566.008	-173.5252	4.4503	56.55	2.94	30118.2	58.13	2.82	31442.8	742160
10094.0	3566.522	-173.3919	4.5381	56.57	3.00	30183.2	58.15	2.87	31508.1	745301
10096.0	3567.048	-173.2583	4.6259	56.60	3.06	30248.4	58.17	2.93	31573.7	748515
10098.0	3567.586	-173.1244	4.7139	56.63	3.13	30313.9	58.20	2.99	31639.5	751801
10100.0	3568.136	-172.9902	4.8020	56.65	3.19	30379.6	58.22	3.06	31705.5	755162
10102.0	3568.699	-172.8556	4.8901	56.68	3.25	30445.6	58.24	3.12	31771.9	758598
10104.0	3569.274	-172.7207	4.9784	56.71	3.32	30511.9	58.27	3.18	31838.5	762110
10106.0	3569.861	-172.5855	5.0668	56.74	3.38	30578.5	58.29	3.24	31905.4	765698
10108.0	3570.462	-172.4500	5.1553	56.76	3.45	30645.3	58.32	3.31	31972.6	769365
10110.0	3571.075	-172.3141	5.2439	56.79	3.52	30712.5	58.34	3.37	32040.0	773111
10112.0	3571.701	-172.1779	5.3327	56.82	3.58	30779.9	58.37	3.43	32107.8	776938
10114.0	3572.341	-172.0414	5.4215	56.85	3.65	30847.6	58.39	3.50	32175.9	780845
10116.0	3572.994	-171.9045	5.5104	56.88	3.72	30915.5	58.42	3.56	32244.2	784834
10118.0	3573.661	-171.7674	5.5994	56.91	3.79	30983.8	58.44	3.63	32312.8	788906
10120.0	3574.341	-171.6298	5.6885	56.95	3.86	31052.3	58.47	3.70	32381.7	793063
10122.0	3575.036	-171.4920	5.7777	56.98	3.93	31121.2	58.50	3.77	32451.0	797305
10124.0	3575.745	-171.3538	5.8670	57.01	4.00	31190.4	58.52	3.83	32520.5	801633
10126.0	3576.468	-171.2152	5.9564	57.04	4.07	31259.8	58.55	3.90	32590.3	806048
10128.0	3577.205	-171.0764	6.0459	57.07	4.14	31329.6	58.58	3.97	32660.5	810552
10130.0	3577.957	-170.9371	6.1355	57.11	4.21	31399.7	58.61	4.04	32731.0	815145
10132.0	3578.724	-170.7976	6.2252	57.14	4.29	31470.1	58.64	4.11	32801.8	819828
10134.0	3579.506	-170.6576	6.3150	57.17	4.36	31540.8	58.67	4.18	32872.9	824603
10136.0	3580.303	-170.5174	6.4049	57.21	4.44	31611.8	58.70	4.26	32944.3	829470
10138.0	3581.115	-170.3768	6.4948	57.24	4.51	31683.2	58.73	4.33	33016.1	834431
10140.0	3581.943	-170.2358	6.5849	57.28	4.59	31754.9	58.76	4.40	33088.3	839486
10142.0	3582.787	-170.0945	6.6750	57.31	4.66	31827.0	58.79	4.47	33160.7	844636
10144.0	3583.646	-169.9528	6.7652	57.35	4.74	31899.4	58.82	4.55	33233.5	849884
10146.0	3584.521	-169.8108	6.8555	57.39	4.82	31972.1	58.85	4.62	33306.6	855229
10148.0	3585.413	-169.6684	6.9459	57.42	4.89	32045.2	58.88	4.70	33380.2	860672
10150.0	3586.321	-169.5257	7.0364	57.46	4.97	32118.7	58.92	4.77	33454.1	866216
10152.0	3587.245	-169.3825	7.1269	57.50	5.05	32192.5	58.95	4.85	33528.3	871860
10154.0	3588.186	-169.2391	7.2176	57.54	5.13	32266.7	58.98	4.92	33603.0	877606

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
10156.0	3589.144	-169.0952	7.3083	57.57	5.21	32341.2	59.02	5.00	33678.0	883455
10158.0	3590.119	-168.9510	7.3991	57.61	5.29	32416.2	59.05	5.08	33753.4	889407
10160.0	3591.111	-168.8065	7.4899	57.65	5.37	32491.5	59.09	5.16	33829.2	895464
10162.0	3592.121	-168.6615	7.5809	57.69	5.45	32567.3	59.12	5.23	33905.4	901627
10164.0	3593.148	-168.5162	7.6719	57.73	5.53	32643.5	59.16	5.31	33982.1	907897
10166.0	3594.193	-168.3705	7.7629	57.77	5.61	32720.2	59.19	5.39	34059.2	914275
10168.0	3595.255	-168.2244	7.8541	57.81	5.70	32797.2	59.23	5.47	34136.7	920761
10170.0	3596.336	-168.0780	7.9453	57.85	5.78	32874.6	59.27	5.55	34214.6	927358
10172.0	3597.435	-167.9312	8.0366	57.90	5.86	32952.3	59.30	5.63	34292.8	934065
10174.0	3598.552	-167.7840	8.1280	57.94	5.95	33030.5	59.34	5.71	34371.5	940885
10176.0	3599.688	-167.6364	8.2194	57.98	6.03	33109.2	59.38	5.80	34450.7	947817
10178.0	3600.842	-167.4884	8.3109	58.02	6.11	33188.3	59.42	5.88	34530.3	954862
10180.0	3602.014	-167.3400	8.4025	58.07	6.20	33267.8	59.46	5.95	34610.3	962019
10182.0	3603.205	-167.1913	8.4941	58.11	6.28	33347.9	59.50	6.03	34690.9	969288
10184.0	3604.414	-167.0421	8.5858	58.16	6.36	33428.4	59.54	6.11	34772.0	976668
10186.0	3605.642	-166.8926	8.6775	58.20	6.44	33509.4	59.58	6.19	34853.5	984162
10188.0	3606.889	-166.7427	8.7693	58.25	6.53	33590.9	59.62	6.27	34935.5	991772
10190.0	3608.155	-166.5923	8.8612	58.29	6.61	33673.0	59.66	6.36	35018.1	999500
10192.0	3609.441	-166.4416	8.9531	58.34	6.70	33755.7	59.70	6.44	35101.3	1007346
10194.0	3610.746	-166.2904	9.0450	58.39	6.78	33838.9	59.74	6.52	35185.1	1015313
10196.0	3612.072	-166.1389	9.1371	58.43	6.87	33922.5	59.79	6.61	35269.2	1023403
10199.0	3613.418	-165.9869	9.2291	58.48	6.96	34006.5	59.83	6.69	35353.8	1031617
10200.0	3614.785	-165.8346	9.3213	58.53	7.05	34091.0	59.87	6.78	35438.8	1039957
10202.0	3616.172	-165.6818	9.4135	58.57	7.14	34175.9	59.91	6.87	35524.2	1048425
	S-IVB 2ND GUIDANCE CUTOFF									
10203.030	3616.895	-165.6030	9.4610	58.60	7.19	34219.8	59.93	6.91	35568.3	1052836
10204.0	3617.581	-165.5297	9.5057	58.61	7.23	34229.9	59.95	6.96	35578.6	1057021
10206.0	3619.009	-165.3755	9.5978	58.64	7.33	34222.4	59.98	7.05	35571.4	1065732
10208.0	3620.454	-165.2223	9.6898	58.67	7.42	34214.8	60.00	7.14	35564.1	1074554
10210.0	3621.918	-165.0692	9.7816	58.70	7.52	34207.3	60.03	7.23	35556.9	1083487
10212.0	3623.400	-164.9161	9.8733	58.72	7.61	34199.6	60.06	7.32	35549.5	1092529
	TRANSLUNAR INJECTION (TLI)									
10213.030	3624.170	-164.8373	9.9204	58.74	7.66	34195.6	60.07	7.37	35545.6	1097229
10250.0	3654.947	-162.0166	11.5846	59.30	9.39	34038.0	60.63	9.03	35393.8	1284982
10300.0	3705.986	-159.2347	13.7379	60.19	11.69	33780.5	61.51	11.22	35145.9	1596232
10350.0	3767.299	-154.5024	15.7646	61.20	13.91	33477.8	62.51	13.35	34854.6	1970002
10400.0	3838.214	-150.8321	17.6528	62.33	16.07	33136.7	63.63	15.41	34526.3	2402173
10450.0	3918.016	-147.2353	19.3952	63.56	18.15	32763.7	64.84	17.38	34167.8	2888349
10500.0	4005.967	-143.7227	20.9989	64.86	20.16	32365.4	66.13	19.28	33785.1	3424014

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
10550.0	4101.328	-140.3036	22.4341	66.22	22.08	31947.8	67.47	21.08	33394.1	4004659
10600.0	4203.379	-136.9861	23.7345	67.63	23.92	31516.5	68.86	22.81	32970.3	4625886
10650.0	4311.430	-133.7767	24.8959	69.07	25.68	31076.2	70.26	24.44	32548.2	5283491
10700.0	4424.832	-130.6804	25.9256	70.52	27.37	30631.2	71.68	26.00	32121.9	5973514
10750.0	4542.979	-127.7008	26.8323	71.97	28.98	30185.0	73.10	27.47	31694.9	6692271
10800.0	4665.312	-124.8400	27.6252	73.42	30.51	29740.6	74.51	28.87	31269.9	7436374
10850.0	4791.322	-122.0988	28.3136	74.84	31.98	29300.3	75.89	30.20	30849.2	8202729
10900.0	4920.548	-119.4768	28.9071	76.25	33.38	28866.1	77.25	31.46	30434.6	8988534
10950.0	5052.573	-116.9727	29.4145	77.63	34.72	28439.3	78.57	32.65	30027.5	9791261
11000.0	5187.022	-114.5841	29.8446	78.97	36.00	28021.2	79.86	33.78	29628.9	10608644
11050.0	5323.561	-112.3082	30.2053	80.28	37.23	27612.6	81.10	34.85	29239.6	11438654
11100.0	5461.891	-110.1415	30.5042	81.55	38.41	27214.0	82.31	35.86	28860.2	12279482
11150.0	5601.746	-108.0803	30.7481	82.79	39.54	26825.7	83.46	36.83	28490.8	13129521
11200.0	5742.890	-106.1202	30.9432	83.99	40.63	26448.0	84.58	37.75	28131.7	13987338
11250.0	5885.113	-104.2572	31.0951	85.15	41.67	26081.0	85.65	38.62	27782.9	14851667
11300.0	6028.230	-102.4866	31.2089	86.27	42.68	25724.7	86.67	39.45	27444.4	15721382
11350.0	6172.075	-100.8043	31.2891	87.35	43.65	25378.9	87.65	40.25	27116.1	16595487
11400.0	6316.502	-99.2058	31.3397	88.40	44.59	25043.4	88.59	41.00	26797.7	17473102
11450.0	6461.384	-97.6869	31.3644	89.42	45.50	24718.1	89.49	41.72	26489.0	18353446
11500.0	6606.605	-96.2433	31.3663	90.40	46.37	24402.7	90.35	42.41	26189.7	19235829
11550.0	6752.065	-94.8712	31.3483	91.36	47.22	24096.9	91.18	43.07	25899.6	20119640
11600.0	6897.674	-93.5667	31.3129	92.28	48.05	23800.5	91.96	43.70	25618.4	21004339
11650.0	7043.354	-92.3269	31.2623	93.18	48.85	23513.2	92.72	44.31	25345.8	21889451
11700.0	7189.034	-91.1459	31.1985	94.06	49.63	23234.6	93.44	44.89	25081.4	22774553
	CSM SEPARATION									
11723.000	7256.021	-90.6223	31.1652	94.45	49.98	23109.2	93.76	45.15	24962.5	23181538

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