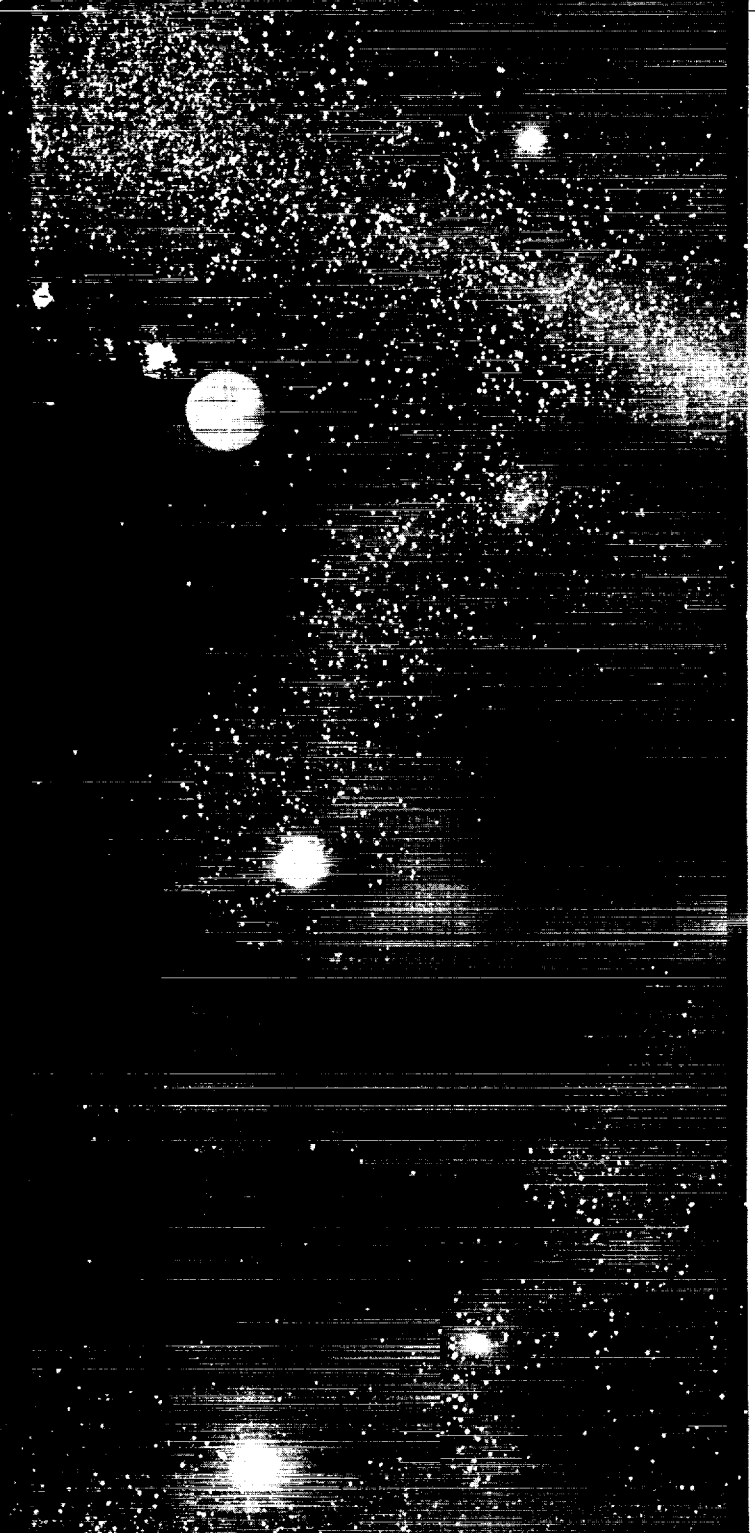

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APOLLO/SATURN V
POSTFLIGHT TRAJECTORY
AS-505

JULY 17, 1969

THE BOEING COMPANY · AEROSPACE GROUP
SOUTHEAST DIVISION

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July 17, 1969

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ABSTRACT AND LIST OF KEY WORDS

This document presents the postflight trajectory for the Apollo/Saturn V AS-505 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 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-505
Postflight Trajectory
Powered Flight Trajectory
Orbital Trajectory
Spent Stage Trajectory
Slingshot Trajectory

CONTENTS

CONTENTS (Continued)

ILLUSTRATIONS

TABLES

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. Boeing Memorandum 5-9600-H-291, "Saturn V AS-505 Postlaunch Predicted Operational Trajectory," May 23, 1969.

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

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G. Engels
J. Graham
J. Jaap
J. Liu
J. Welch

The analysis presented in Section 6 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	4/18/69
R-AERO-P-#17	Tracking and Network Specifications	5/9/69
R-AERO-P-#35b	Transponder Locations	5/9/69
DRL-20F	Operational Trajectory Certified Data	5/19/69
I-MO-#4a	Insertion Point and/or Orbital Elements	5/19/69
I-MO-#4c	Six Seconds Raw Radar	5/19/69
I-MO-#4f	Meteorological Data (Final)	5/24/69
I-MO-#6	IP Raw MP	5/19/69
I-MO-#9	Pulse Radar	6/3/69
I-MO-#17c	Final Significant Time of Events	6/5/69
I-MO-#18a	Preliminary Guidance Velocities	5/20/69

SECTION 1

SUMMARY AND INTRODUCTION

The Apollo/Saturn V AS-505 vehicle was launched from Launch Complex 39, Pad B at the Kennedy Space Center on May 18, 1969, at 11:49:00 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 0.25 second. At 13.05 seconds, a roll maneuver was initiated orienting the vehicle to a flight azimuth of 72.028 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 nominally throughout the entire flight. The vehicle was inserted into a parking orbit at 713.76 seconds at an altitude of 191.37 km (103.33 n mi) and a total space-fixed velocity of 7,793.09 m/s (25,567.88 ft/s). The vehicle remained in orbit for approximately one and one-half revolutions. Near the middle of the second revolution, at 9,199.20 seconds, the restart of the S-IVB stage occurred. At 9,560.58 seconds, the vehicle was injected onto a circumlunar trajectory at an altitude of 333.21 km (179.92 n mi) and a total space-fixed velocity of 10,839.59 m/s (35,562.96 ft/s). At 10,962.4 seconds, the CSM separated from the launch vehicle at an altitude of 6,486.86 km (3,502.62 n mi) and a total space-fixed velocity of 7,787.25 m/s (25,548.72 ft/s). Following LM extraction, the vehicle maneuvered to a slingshot attitude frozen relative to local horizontal. The retrograde velocity to achieve S-IVB/IU lunar slingshot was accomplished by an engine lead experiment, LOX dump, APS burn, and LH_2 venting. The S-IVB/IU closest approach of 3,112 km (1,680 n mi) above the lunar surface occurred at 78.851 hours into the mission.

The impact location of the expended S-IC stage was determined to be 30.19 degrees north latitude and 74.21 degrees west longitude at 539.12 seconds. The impact location of the expended S-II stage was determined to be 31.52 degrees north latitude and 34.51 degrees west longitude at 1,217.89 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, 4, 5, and 6. 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 (713.76 seconds), is discussed in Section 3. This trajectory was established from data provided by an external electrical tracking system and telemetered onboard data obtained from the ST-124M guidance platform. External data were available from C-band radars.

The orbital phase, discussed in Section 4, covers the portion of flight from orbital insertion to S-IVB restart preparations (8,629.26 seconds). The orbital trajectory was established from data provided by an external electrical tracking system. External tracking data were provided by the C-band radars of the Manned Space Flight Network.

The second burn phase, discussed in Section 3, covers the portion of flight from S-IVB restart preparations to translunar injection (9,560.58 seconds). This trajectory was established by integrating the ST-124M guidance platform telemetered data.

The post translunar injection (TLI) phase, discussed in Section 4, covers the portion of flight from the translunar injection to CSM separation (10,962.4 seconds). This trajectory was established by integrating orbital model equations forward from the TLI state vector.

The free flight phase, discussed in Section 5, 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 separation impulses for both stages were used in the simulation.

The slingshot phase, discussed in Section 6, 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 21.75 hours GMT, May 18, 1969, which was established by Goddard Space Flight

SECTION 1 (Continued)

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. The earth-fixed launch site, geographic polar, and launch vehicle navigation 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 B, at the Kennedy Space Center are:

Geodetic Latitude	28.627306 degrees north
Longitude	80.620869 degrees west

The height of the center of gravity of the launch vehicle above the reference ellipsoid is 64.1 m (210.3 ft).

The azimuth alignments are as follows:

Launch Azimuth	90.0	degrees east of north
Flight Azimuth	72.028	degrees east of north
ST-124M Platform Azimuth	72.028	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

3.1.2 (Continued)

maximum total inertial acceleration and earth-fixed velocity are shown in Table 3-II. The translunar injection conditions are shown in Table 3-V.

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-VI. These parameters are used in the guidance computer as terminal conditions for the powered flight phases. This table illustrates how close the actual flight was to nominal.

3.2 DATA SOURCES

3.2.1 Ascent Phase

Tracking data and telemetered guidance velocity data were obtained 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-VII. 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 ascent trajectory) were calculated, smoothed, and plotted as functions of

3.2.1 (Continued)

time, and are shown in Figures 3-13 through 3-15.

Cape Kennedy (1.16) radar provided tracking data from 15 to 440 seconds. The azimuth and elevation angle measurements were noisy throughout the time span of tracking. The slant range measurements contained little noise except near the end (420 to 440 seconds) of tracking. A discontinuity in the slant range occurred at approximately 210 seconds indicating a switch from beacon to skin tracking. The azimuth and elevation angle measurements oscillated about the ascent trajectory up to about 175 seconds. After 175 seconds, the data agree favorably with the trajectory with maximum deviations of 0.012 degree in azimuth angle, and 0.029 degree in elevation angle. The slant range measurements agree favorably with the trajectory throughout the tracking span with maximum deviation of 50 m (164 ft).

Patrick (0.18) radar tracked the launch vehicle from 27 to 520 seconds. The azimuth angle measurements were noisy throughout the tracking period and deviated considerably from the trajectory up to about 160 seconds, but agree excellently thereafter with maximum deviation of 0.004 degree. The elevation angle measurements were noisy during the early portion (27 to 75 seconds) and the later portion (400 to 520 seconds) of tracking. The elevation angle measurements also deviated considerably from the trajectory up to about 110 seconds, and agree favorably afterward with maximum deviation of 0.008 degree. The slant range measurements were noisy from 100 to 300 seconds, but agree favorably with the trajectory with maximum deviation of 72 m (236 ft).

Merritt Island (19.18) radar data from 20 to 520 seconds were received. The azimuth angle measurements were of good quality except in the time spans of 80-130 and 430-520 seconds, where the data were noisy. The azimuth angle measurements deviated a maximum of 0.028 degrees from the ascent trajectory up to 190 seconds, and were in excellent agreement with the trajectory thereafter with maximum deviation of 0.006 degree. The elevation angle measurements were of good quality except near the end of tracking (420 to 520 seconds), where the data were noisy. The elevation angle measurements were in good agreement with the trajectory throughout the tracking period with maximum deviation of 0.022 degree. The slant range measurements contained little noise except at several short intervals (102 to 112, 123 to 130, 170 to 176, and 361 to 367 seconds) of tracking, where the data were erratic. The slant range measurements had a discontinuity at about 420 seconds indicating a switch from beacon to skin tracking. The maximum deviation of slant range measurements from the trajectory

3.2.1 (Continued)

amounted to 115 m (377 ft).

Grand Turk (7.18) radar furnished tracking data from 230 to 520 seconds. The azimuth angle measurements were of good quality throughout the tracking period with maximum deviation of 0.006 degree from the ascent trajectory. The elevation angle measurements were noisy throughout the tracking period with maximum deviation of 0.016 degree from the ascent trajectory. The slant range measurements contained little noise throughout the tracking period with maximum deviation of 40 m (131 ft) from the ascent trajectory.

The Bermuda (67.16) radar acquired track at 265 and provided data to 740 seconds. The azimuth angle measurements contained little noise throughout the tracking period. Except for a characteristic deviation near the middle (500 to 600 seconds) of the tracking period, the azimuth angle measurements were in good agreement with the trajectory with maximum deviation of 0.015 degree. The elevation angle measurements were noisy at the beginning (265 to 390 seconds) and at the end (650 to 740 seconds) of tracking, with maximum deviation of 0.052 degree from the trajectory. The slant range measurements contained little noise throughout the tracking period, with maximum deviation of 130 m (427 ft) from the trajectory.

Bermuda (67.18) radar also provided tracking data from 265 to 740 seconds. The azimuth angle measurements contained little noise throughout the tracking period. As with the 67.16 radar a characteristic deviation was seen near the middle span (500 to 600 seconds) of tracking. Otherwise the azimuth angle measurements were in good agreement with the trajectory. The maximum deviation was 0.03 degree. The elevation angle measurements were noisy at the beginning (265 to 340 seconds) and at the end (650 to 740 seconds) of tracking, with maximum deviation of 0.04 degree from the trajectory. The slant range measurements contained little noise throughout the tracking period, with maximum deviation of 140 m (459 ft) from the trajectory.

3.2.2 Second Burn Phase

Telemetered guidance velocity data during the S-IVB second burn period were obtained. Also, C-band radar tracking data were obtained from Mercury Ship during the major portion of the second burn phase of flight. 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.

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 22 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 22 seconds to orbital insertion at 713.76 seconds) was based on a composite fit of external tracking data and telemetered onboard guidance velocity data. 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. The GATE program was also constrained to satisfy the insertion conditions that were obtained by the Orbital Correction Program (OCP). Reference 4 gives a theoretical discussion of the GATE program.

The GATE output data were then transformed to the vehicle center of gravity.

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.

3.3.1 (Continued)

In calculating the Mach number and dynamic pressure, measured meteorological data were used up to an altitude of 89.75 km (48.46 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 (Time Base 6 to 9,180 seconds) and a powered flight trajectory segment (9,180 seconds to translunar injection). The orbital trajectory segment was obtained from the orbital solution as described in Section 4. The powered flight trajectory segment was obtained by integrating the telemetered guidance velocities using the restart vector (9,180 seconds) from Section 4 as the initial conditions. The GATE program,described in Section 3.3.1, was used for the integration.

The only tracking data available during the powered flight trajectory segment was the Mercury Ship C-band radar. The Mercury Ship data was of sufficient quality to be utilized in the orbit solution. (See Section 4.) However, after 9,180 seconds the residuals of all three measured parameters became erratic and were clearly invalid.

The translunar injection vector (9,560.58 seconds) when integrated forward was verified by post TLI tracking data. (See Section 4.4.)

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

3.4 ERROR ANALYSIS

3.4.1 Ascent Phase

An estimate of the total uncertainty of the ascent trajectory can be obtained by examining the tracking data comparison plots and utilizing the accuracy of the insertion point obtained by orbital analysis.

Comparisons of the measured parameter data with the ascent trajectory are shown in Figures 3-13 through 3-15. These plots illustrate the dispersion and scattering of the data.

The accuracy of the insertion point, established in Section 4.3.1 by the Orbital Correction Program (OCP), was ±250 m (±820 ft) in position components and ±0.7 m/s (±2.3 ft/s) in

3.4.1 (Continued)

velocity components referenced to the earth-fixed launch site coordinate system (PACSS10).

Based on the above information, an estimate of the total uncertainty of the ascent trajectory was derived and plotted in Figure 3-16. At S-IC OECO, the estimated uncertainties of position and velocity components in PACSS10 are ±30 m (±98 ft) and ±0.3 m/s (±1.0 ft/s), respectively. At S-II OECO, the estimated uncertainties of position and velocity components in PACSS10 are ±170 m (±558 ft) and ±0.5 m/s (±1.6 ft/s) respectively. At S-IVB first ECO, the estimated uncertainties of position and velocity components in PACSS10 are ±240 m (±787 ft) and ±0.7 m/s (±2.3 ft/s) respectively. At parking orbit insertion, the estimated uncertainties of position and velocity components in PACSS10 are ±250 m (±820 ft) and ±0.7 m/s (±2.3 ft/s) respectively.

3.4.2 Second Burn Phase

The accuracy of the second burn trajectory is governed by the accuracy of the S-IVB restart vector, established in Section 4.3.2 by the Orbital Correction Program. The total uncertainties of the second burn trajectory are estimated to be ±500 m (±1,640 ft) in position components and ±1.0 m/s (±3.3 ft/s) in velocity components referenced to the earth-fixed launch site coordinate system (PACSS10).

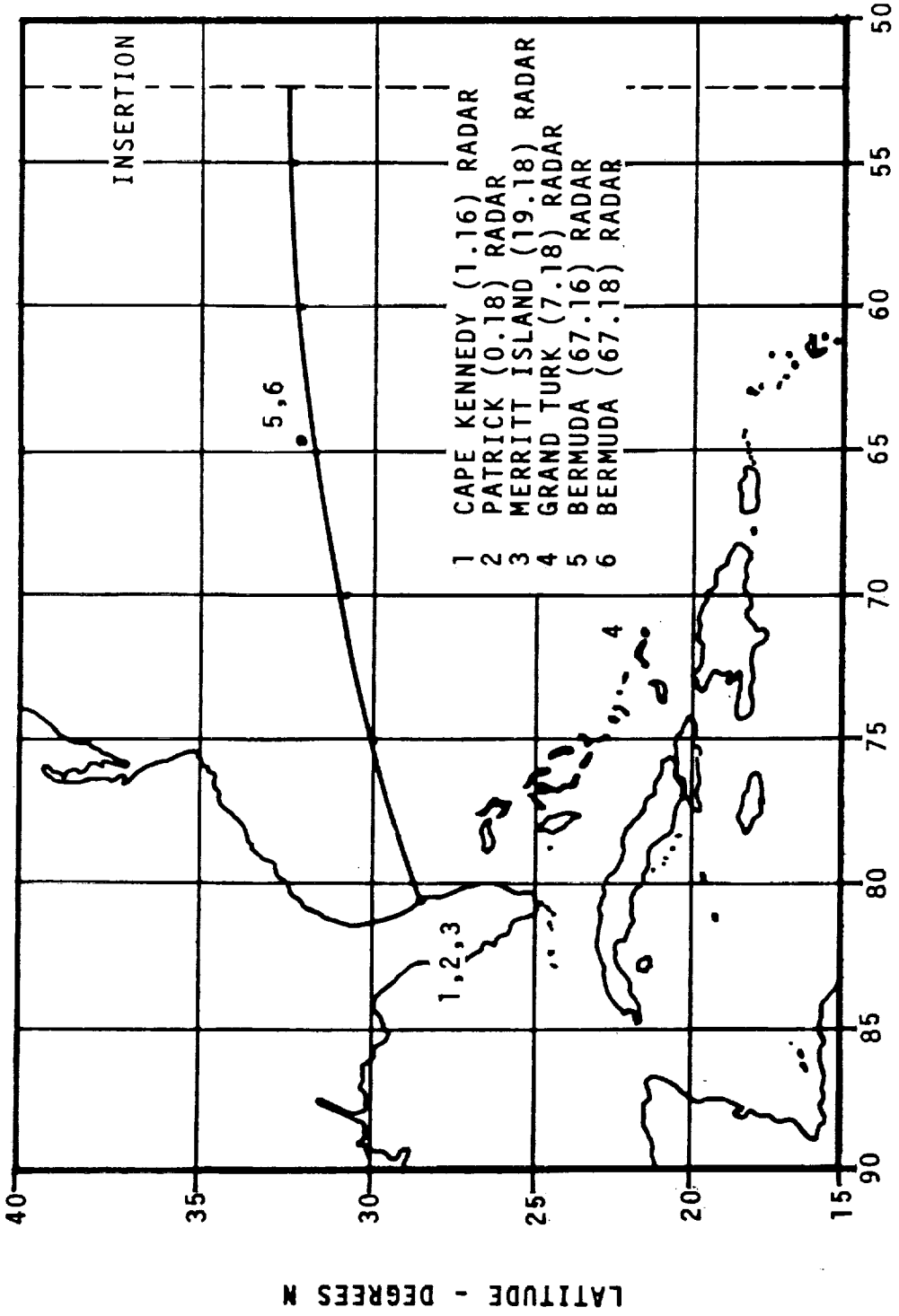

FIGURE 3-1. GROUND TRACK AND TRACKING STATIONS - ASCENT PHASE

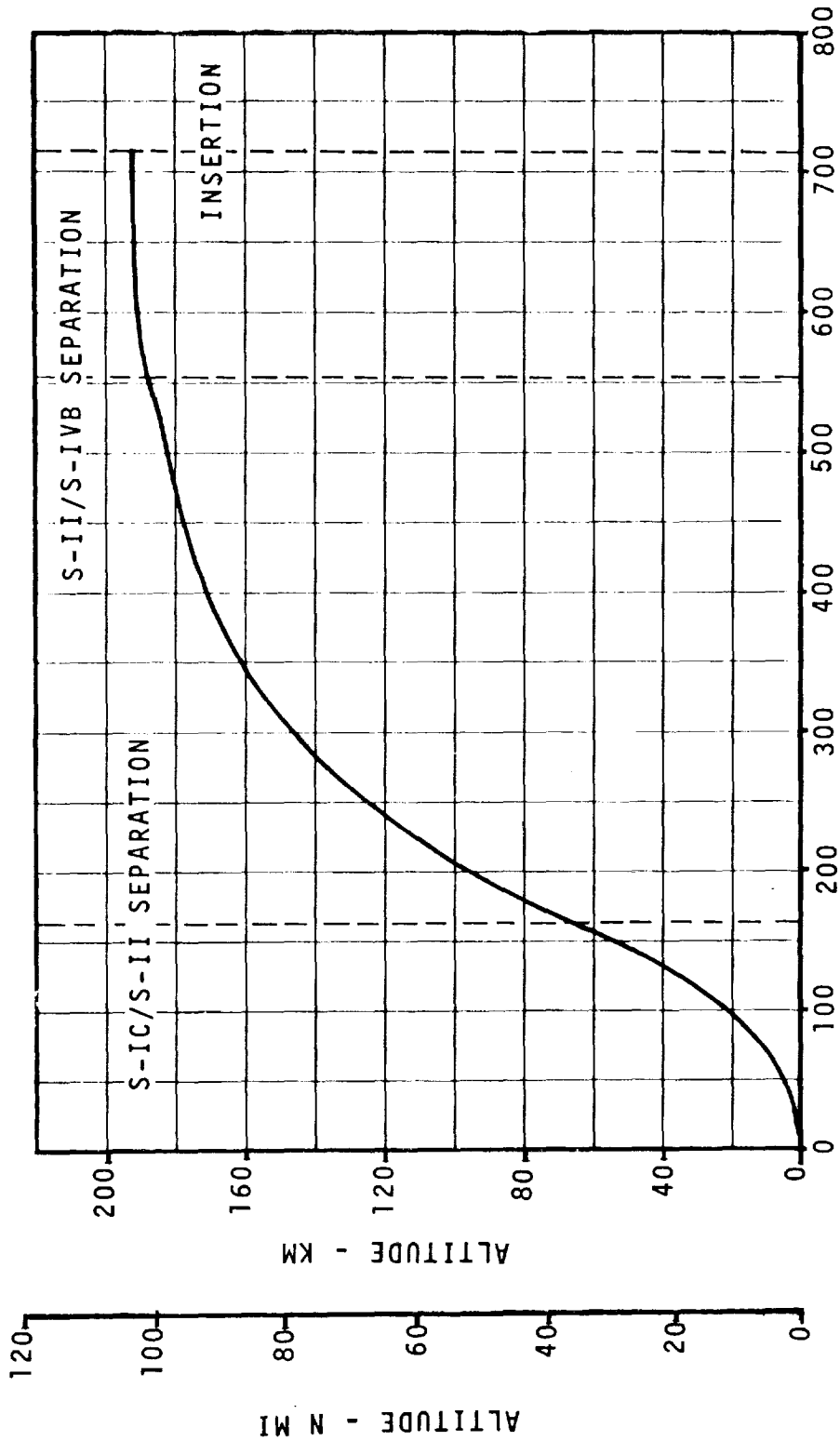

FIGURE 3-2. ALTITUDE - ASCENT PHASE

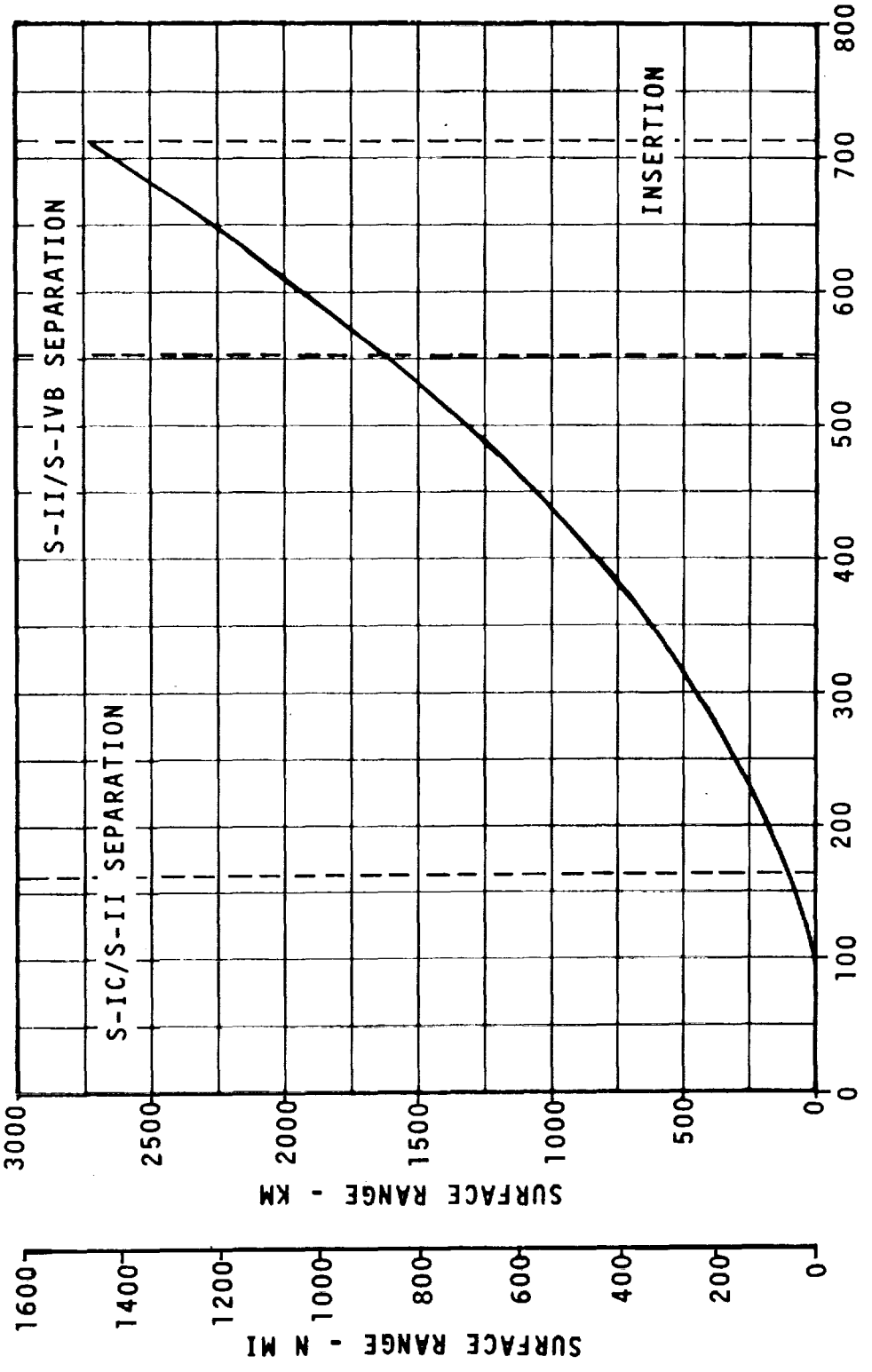

FIGURE 3-3. SURFACE RANGE - ASCENT PHASE

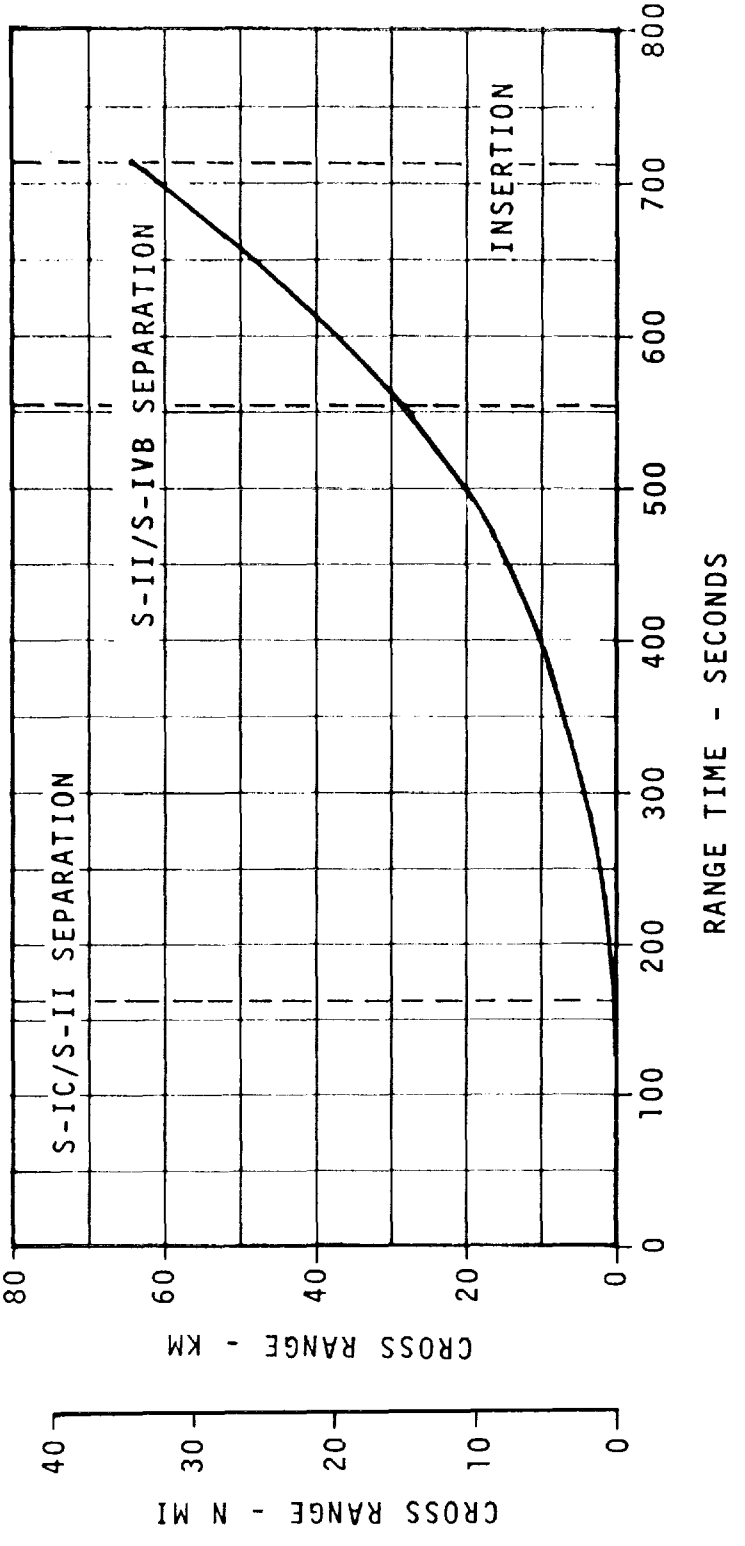

FIGURE 3-4. CROSS RANGE - ASCENT PHASE

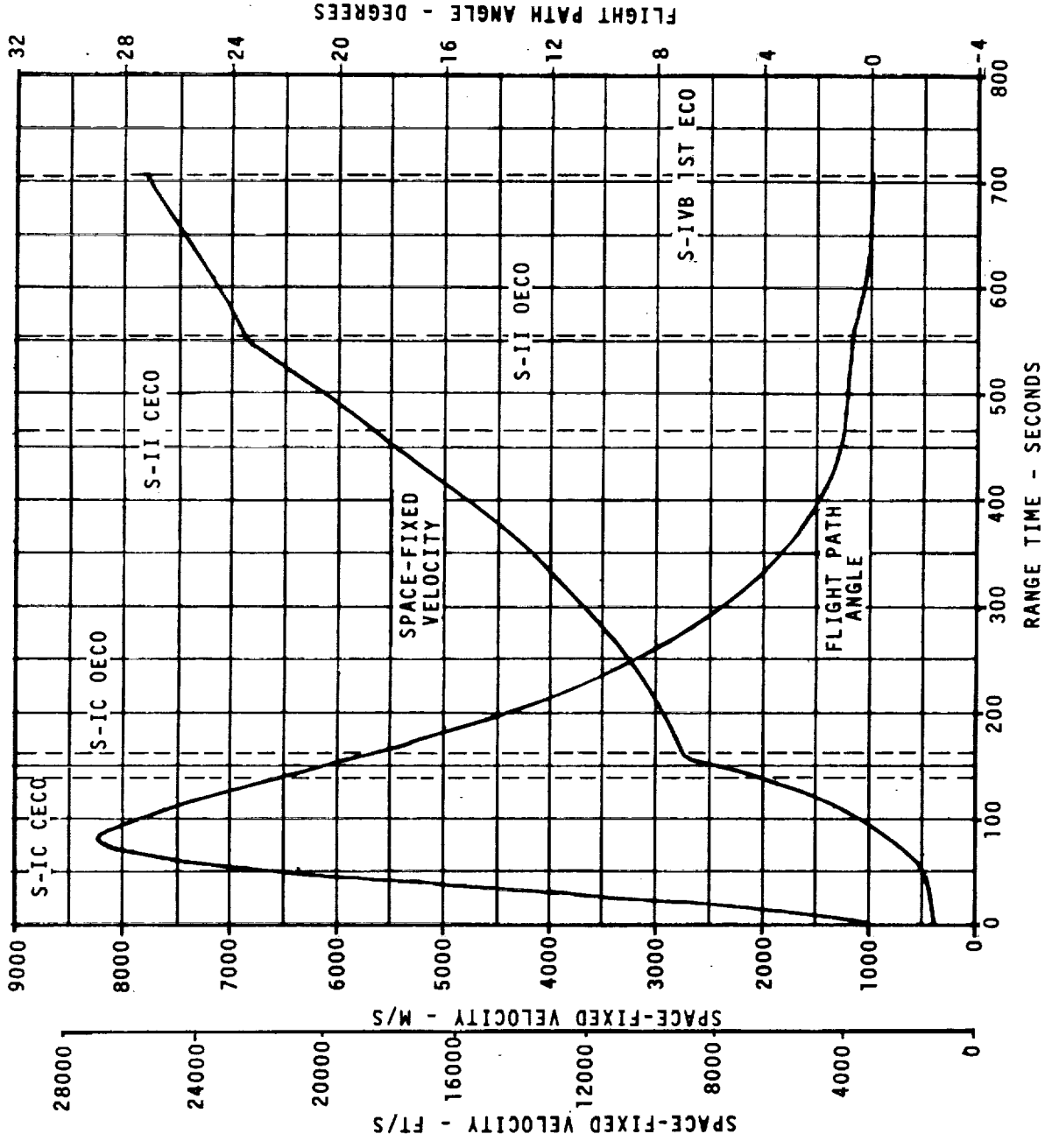

FIGURE 3-5. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - ASCENT PHASE

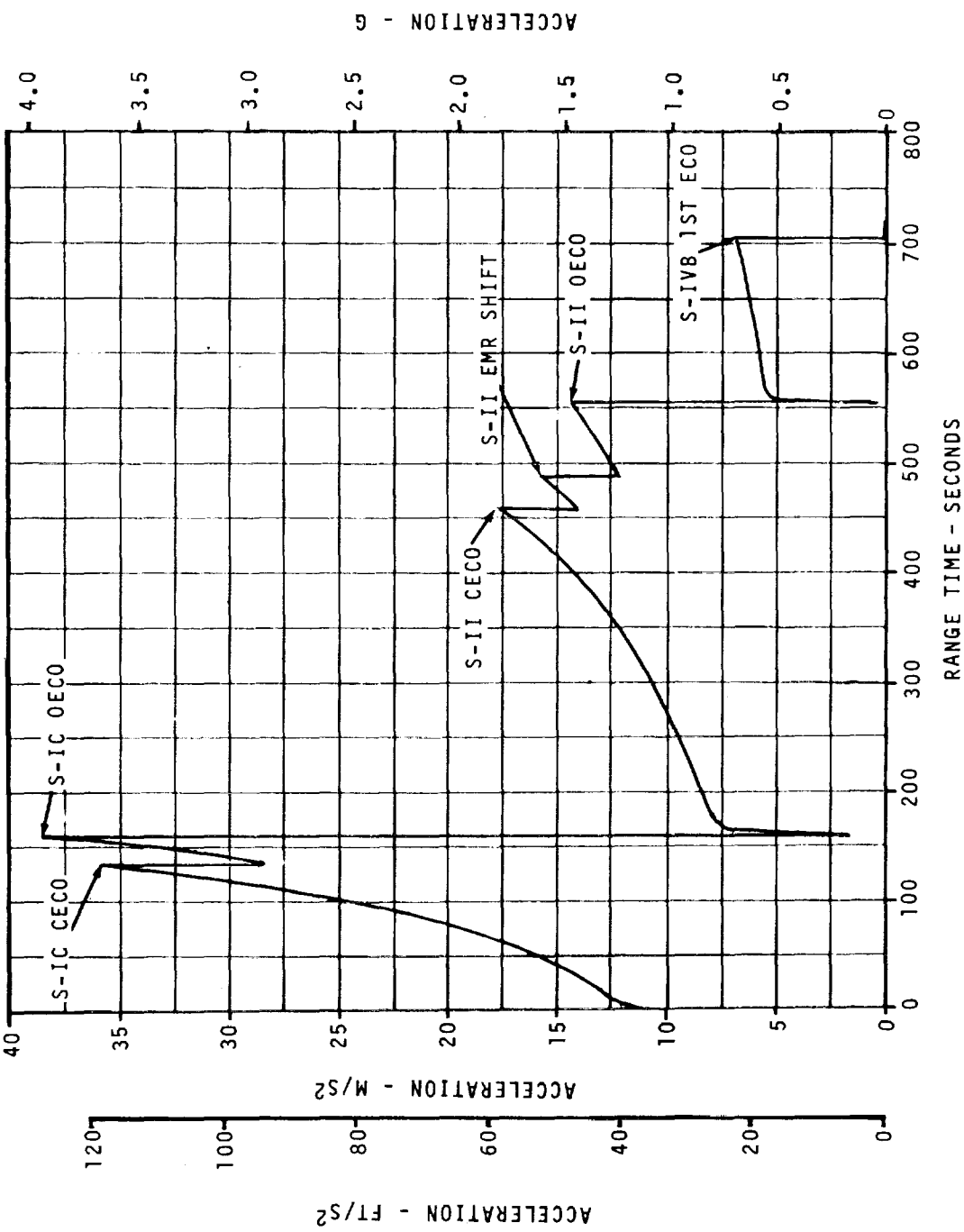

FIGURE 3-6. TOTAL INERTIAL ACCELERATION - ASCENT PHASE

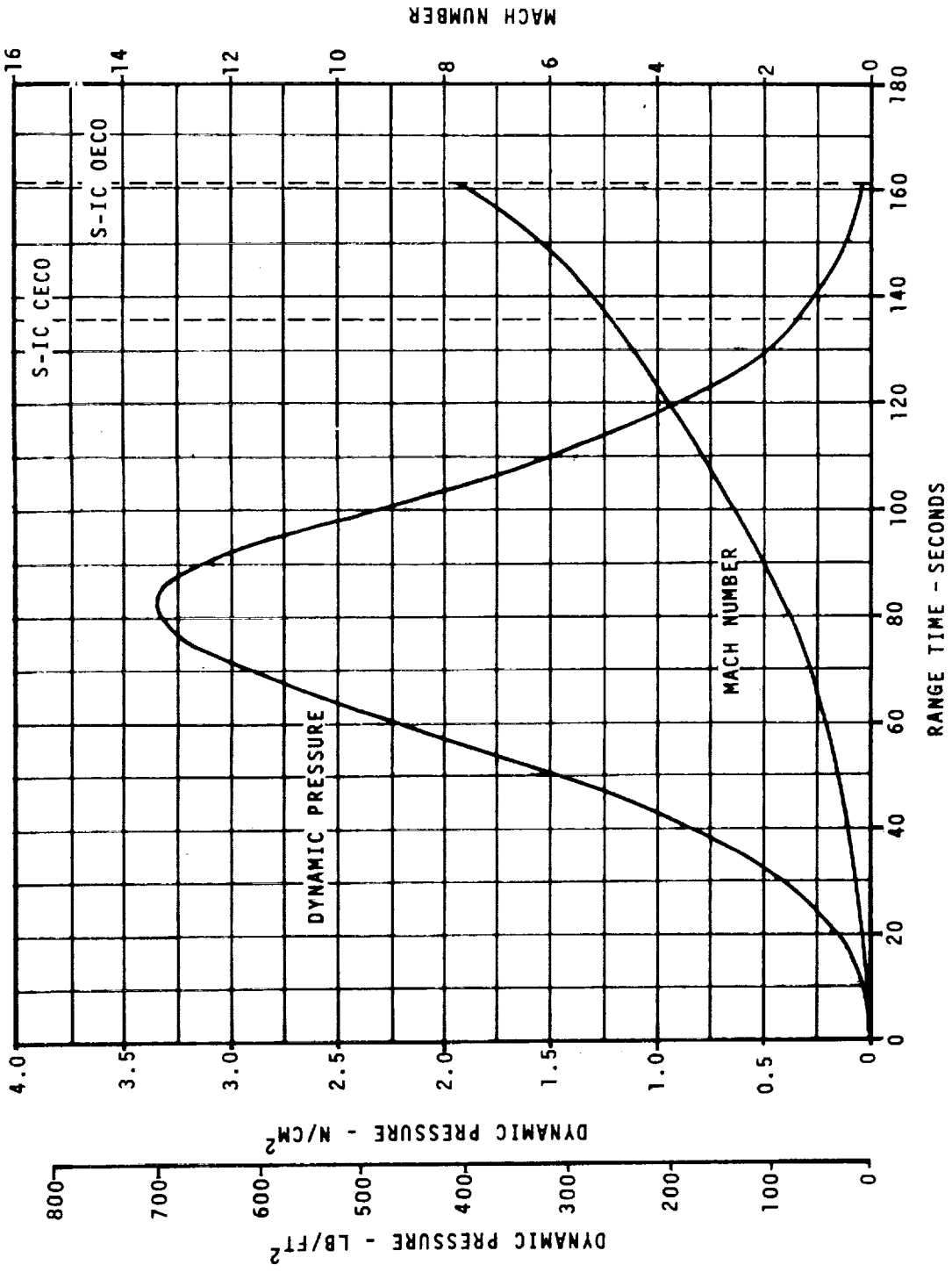

FIGURE 3-7. MACH NUMBER AND DYNAMIC PRESSURE - S-IC PHASE

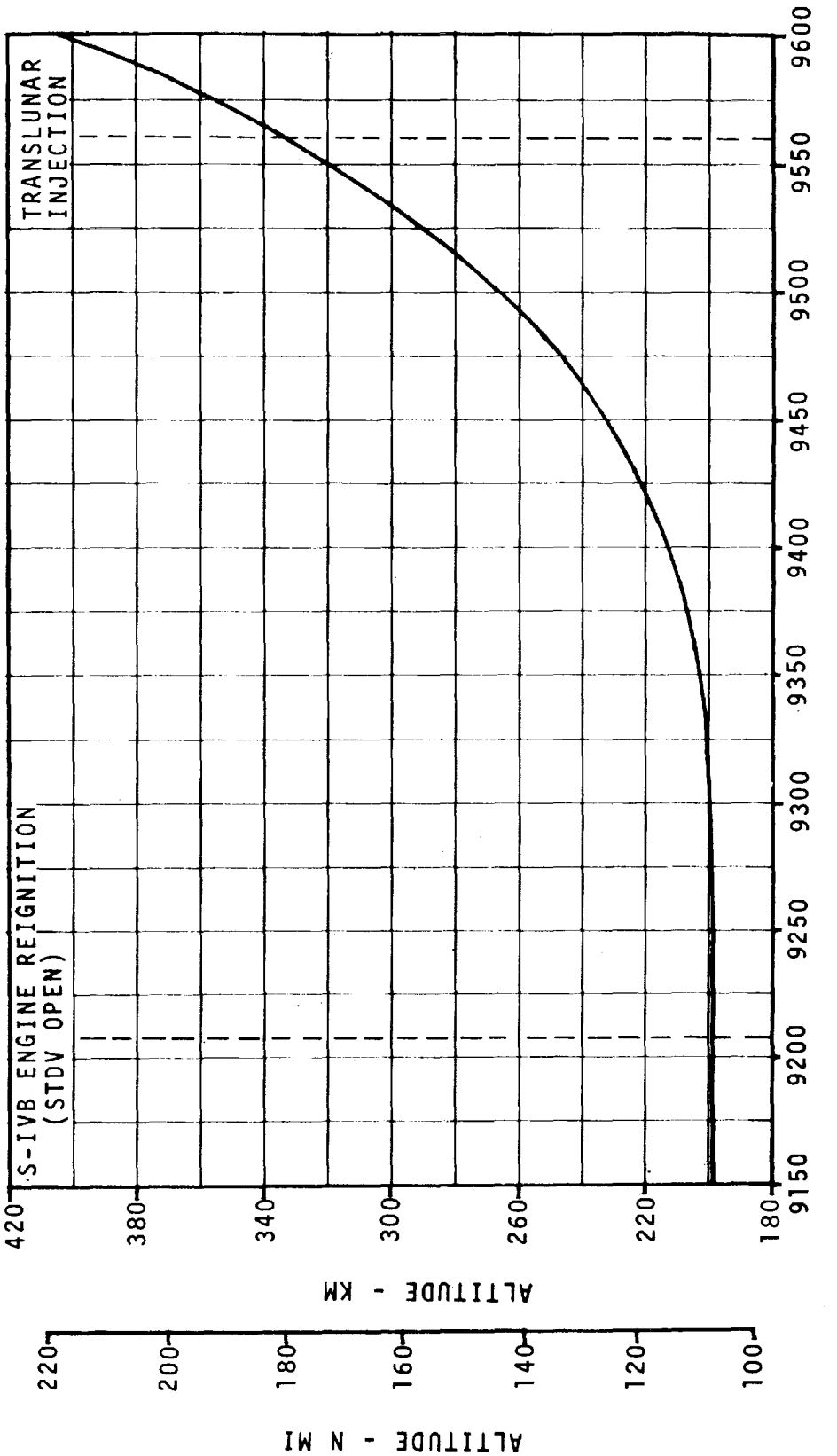

FIGURE 3-8. ALTITUDE - SECOND BURN PHASE

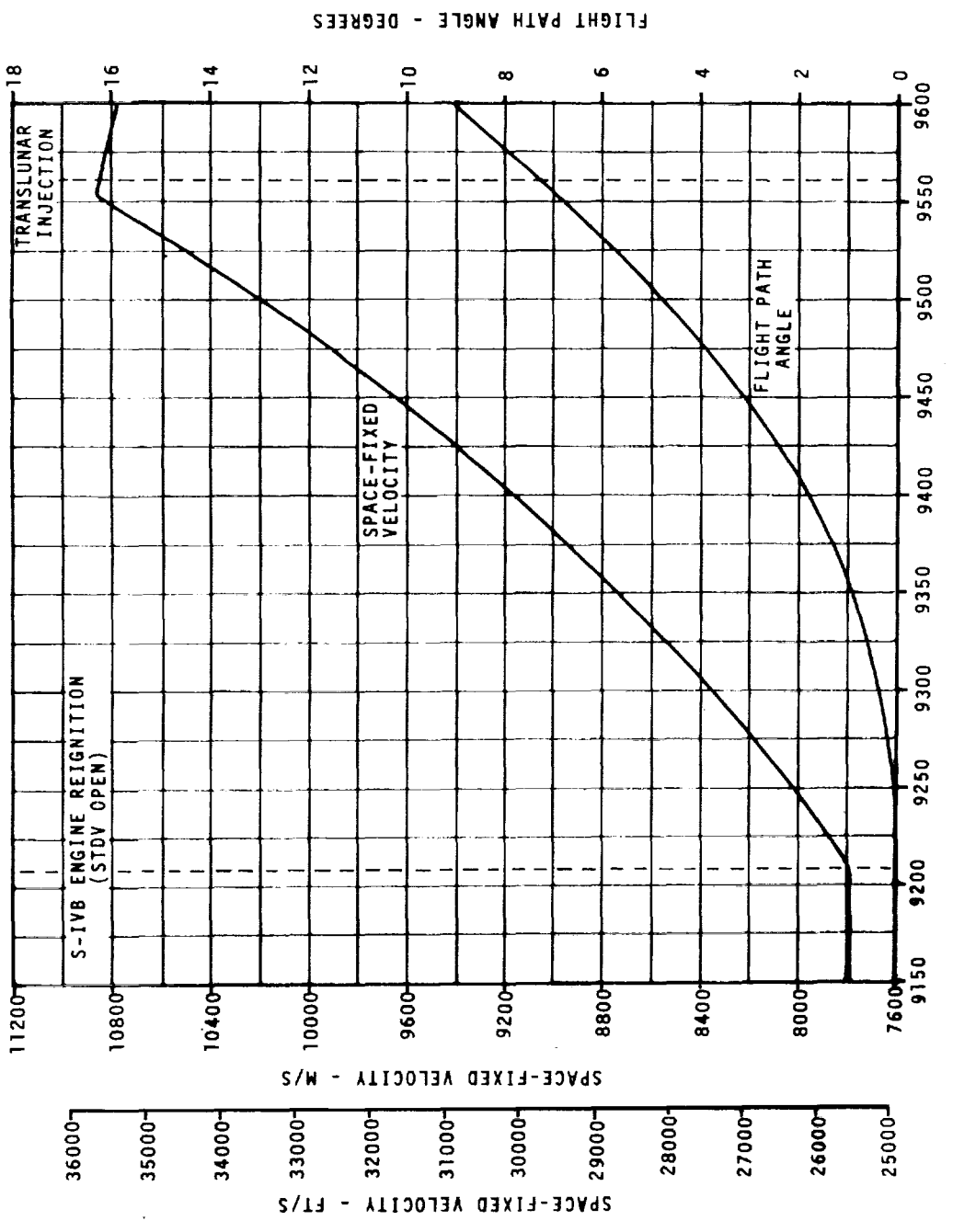

FIGURE 3-9. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - SECOND BURN PHASE

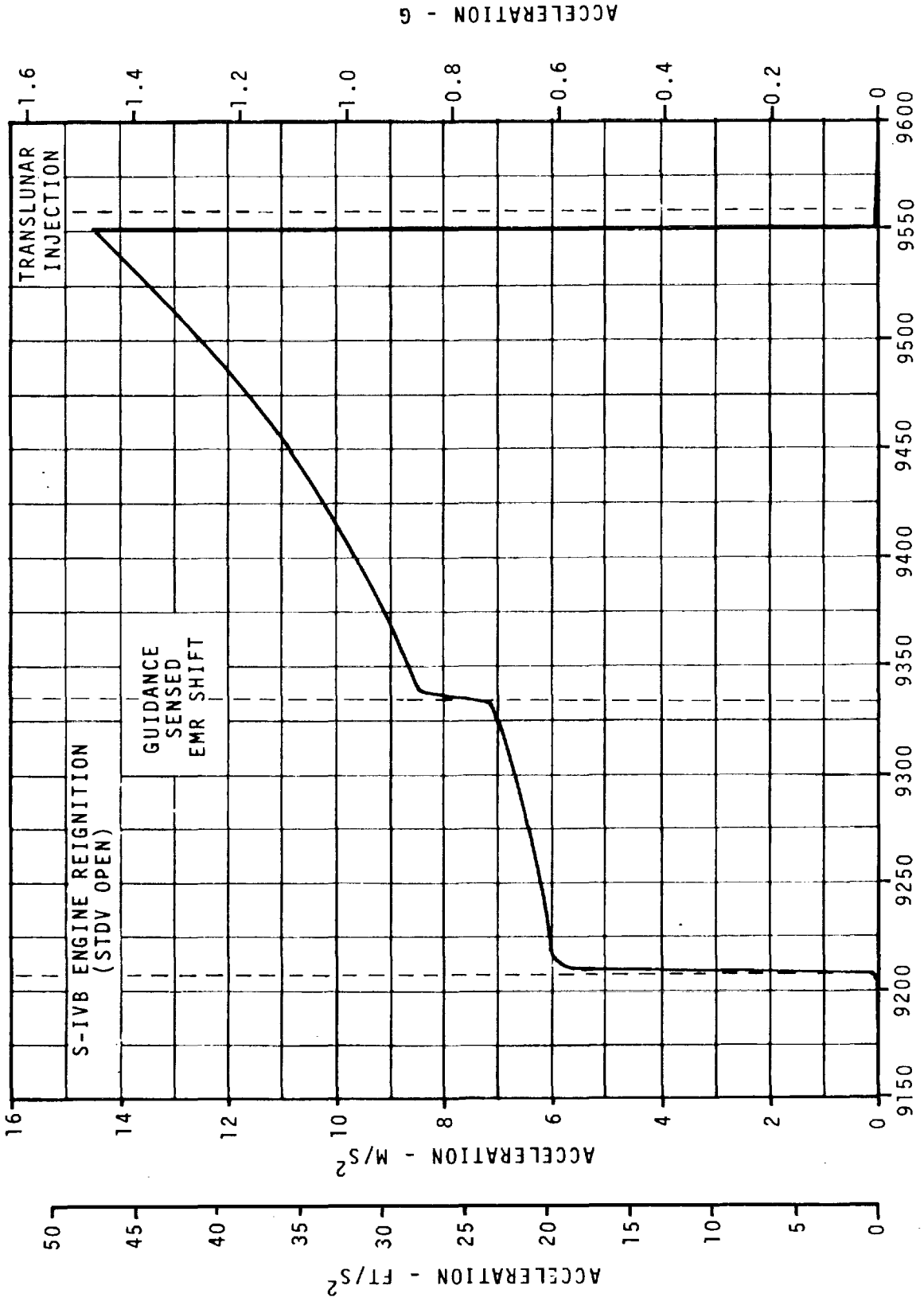

FIGURE 3-10. TOTAL INERTIAL ACCELERATION - SECOND BURN PHASE

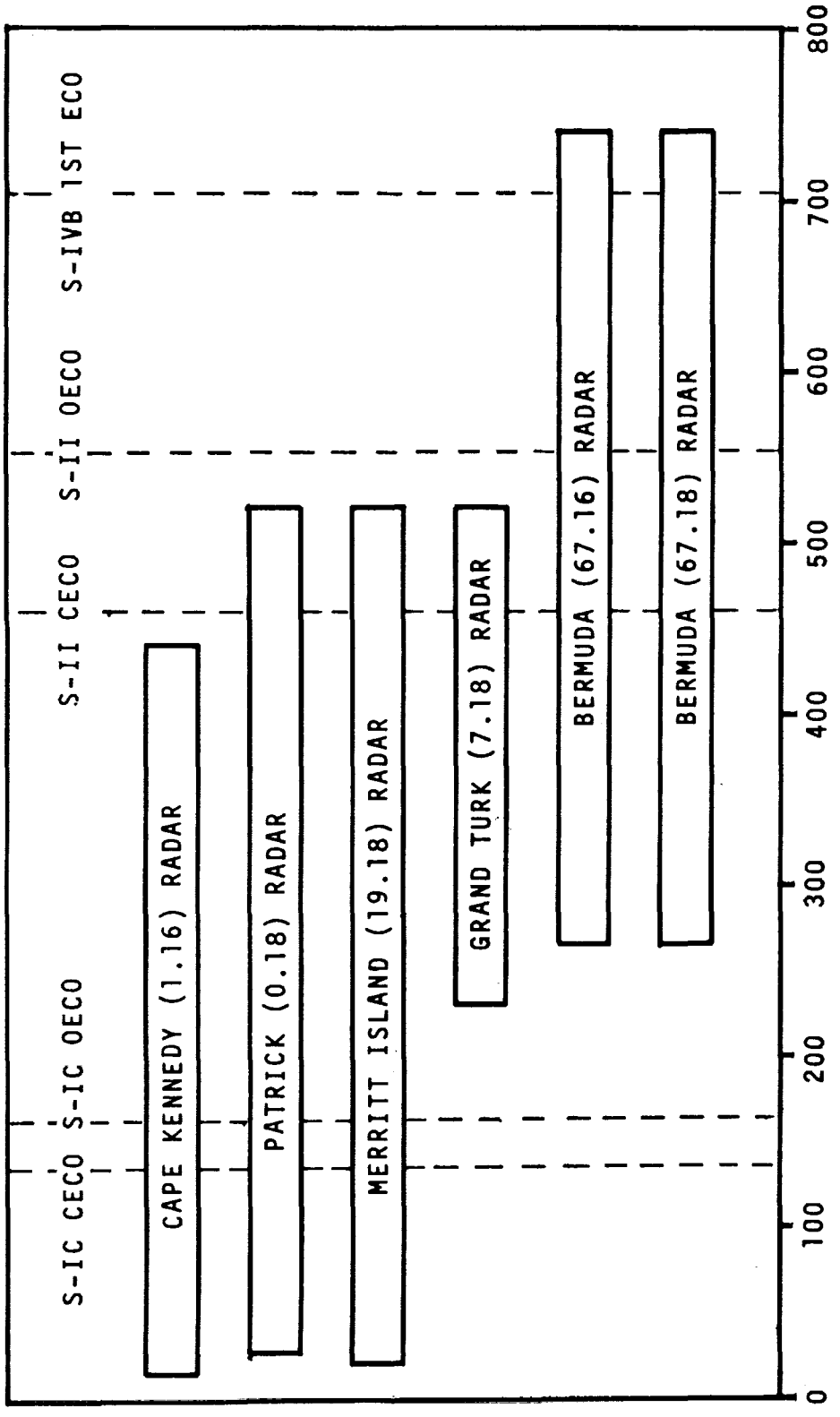

FIGURE 3-11. AVAILABLE TRACKING DATA - ASCENT PHASE

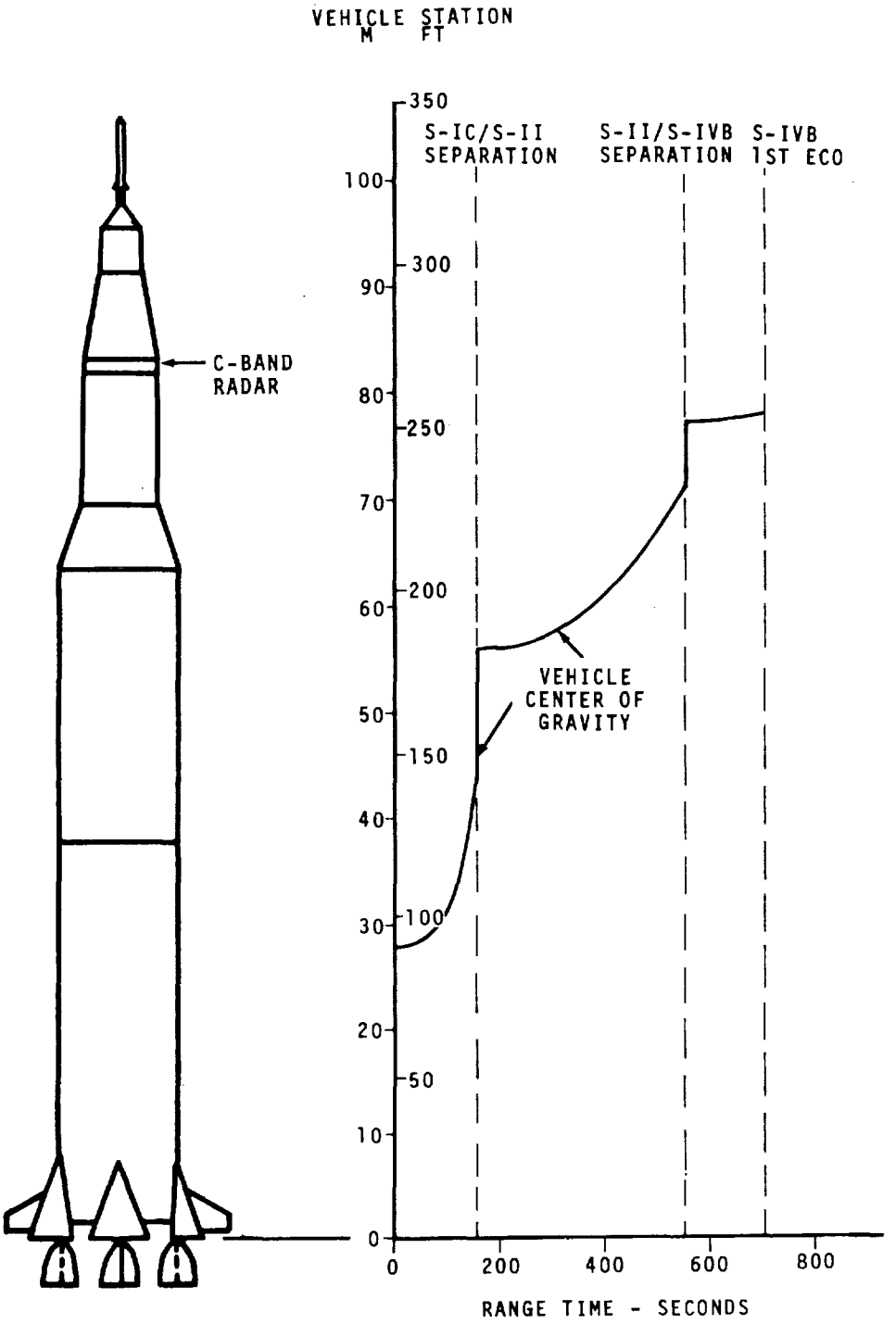

FIGURE 3-12. ANTENNA LOCATION AND CENTER OF GRAVITY

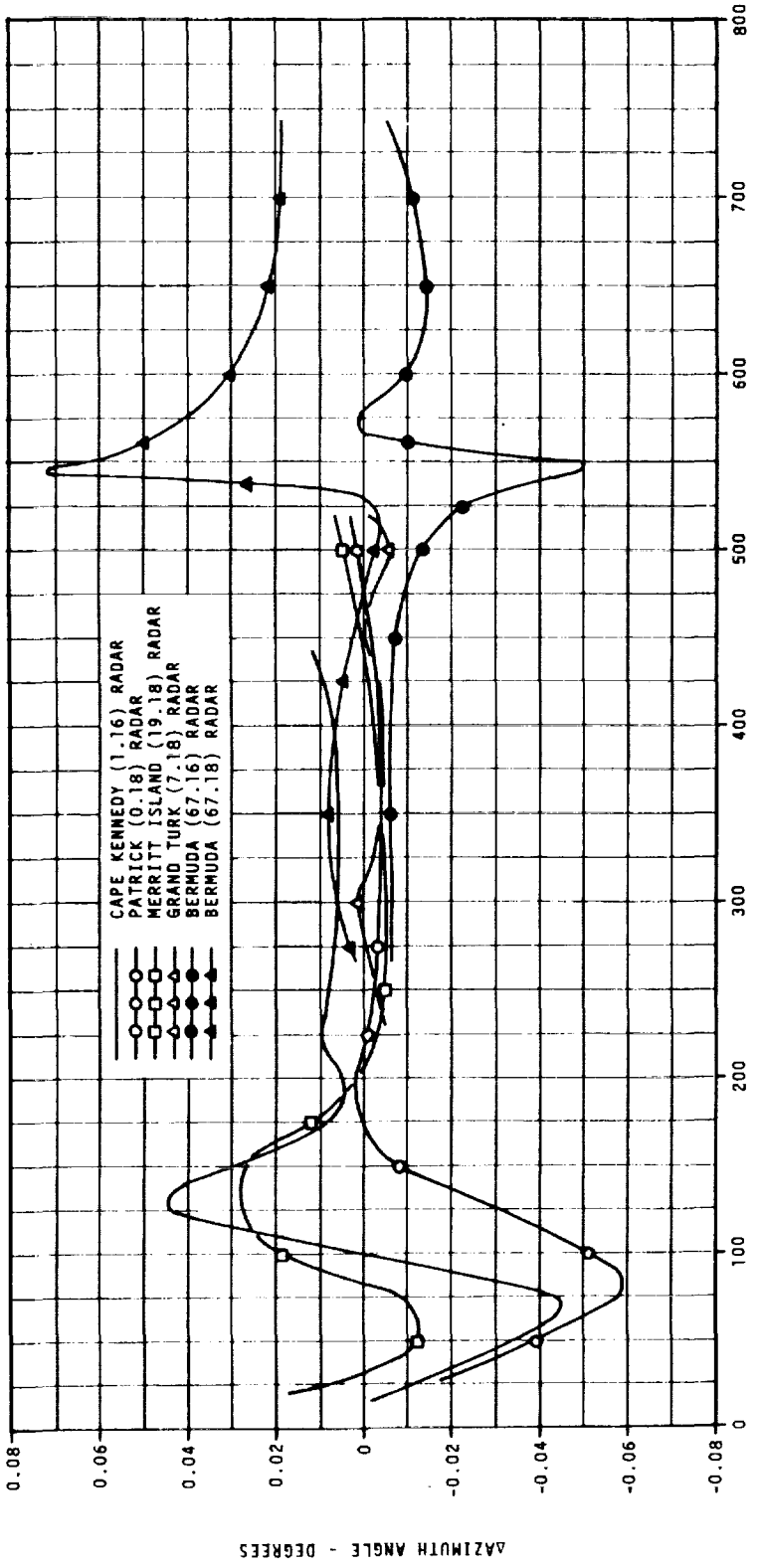

FIGURE 3-13. AZIMUTH ANGLE TRACKING COMPARISON - ASCENT PHASE

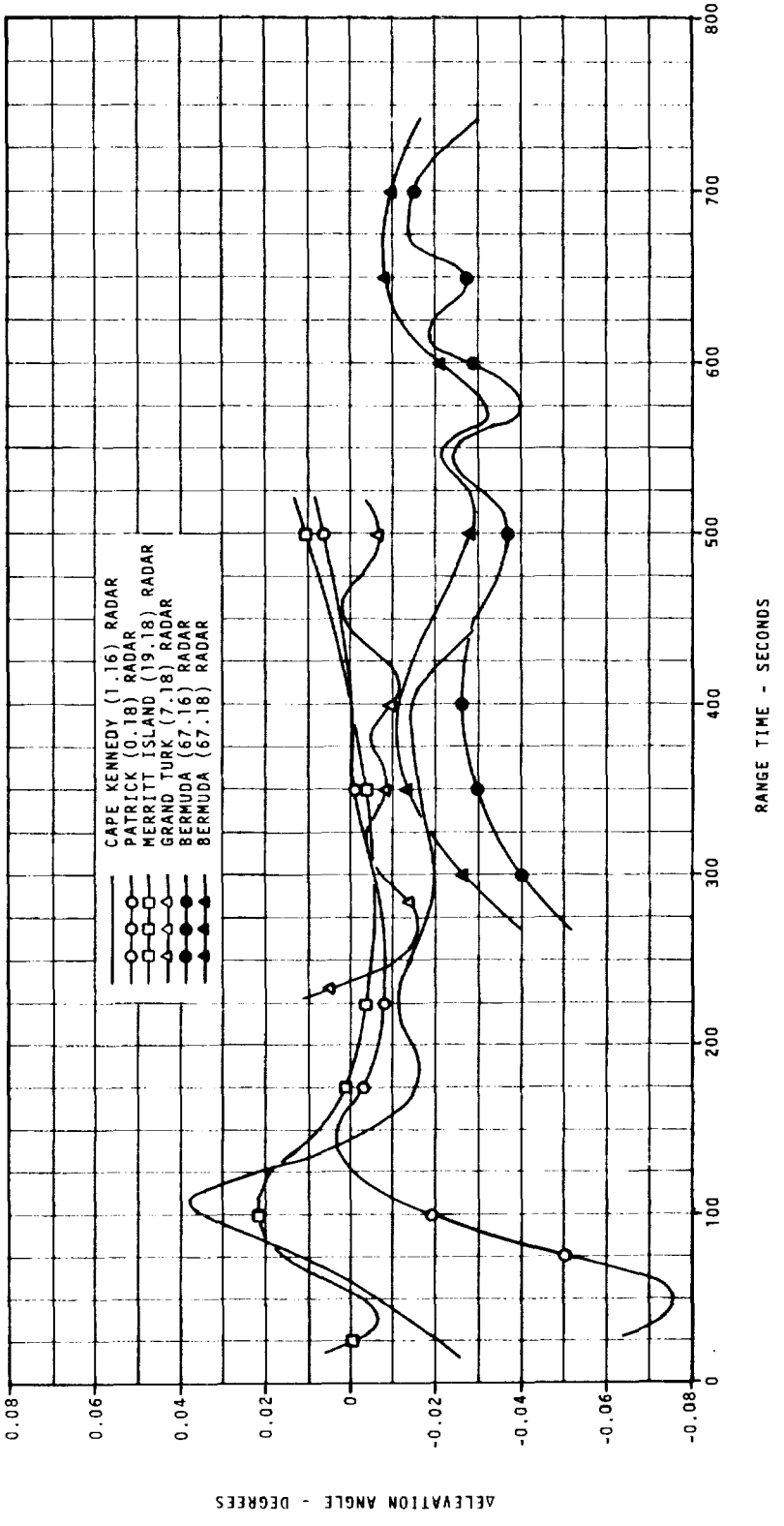

FIGURE 3-14. ELEVATION ANGLE TRACKING COMPARISON - ASCENT PHASE

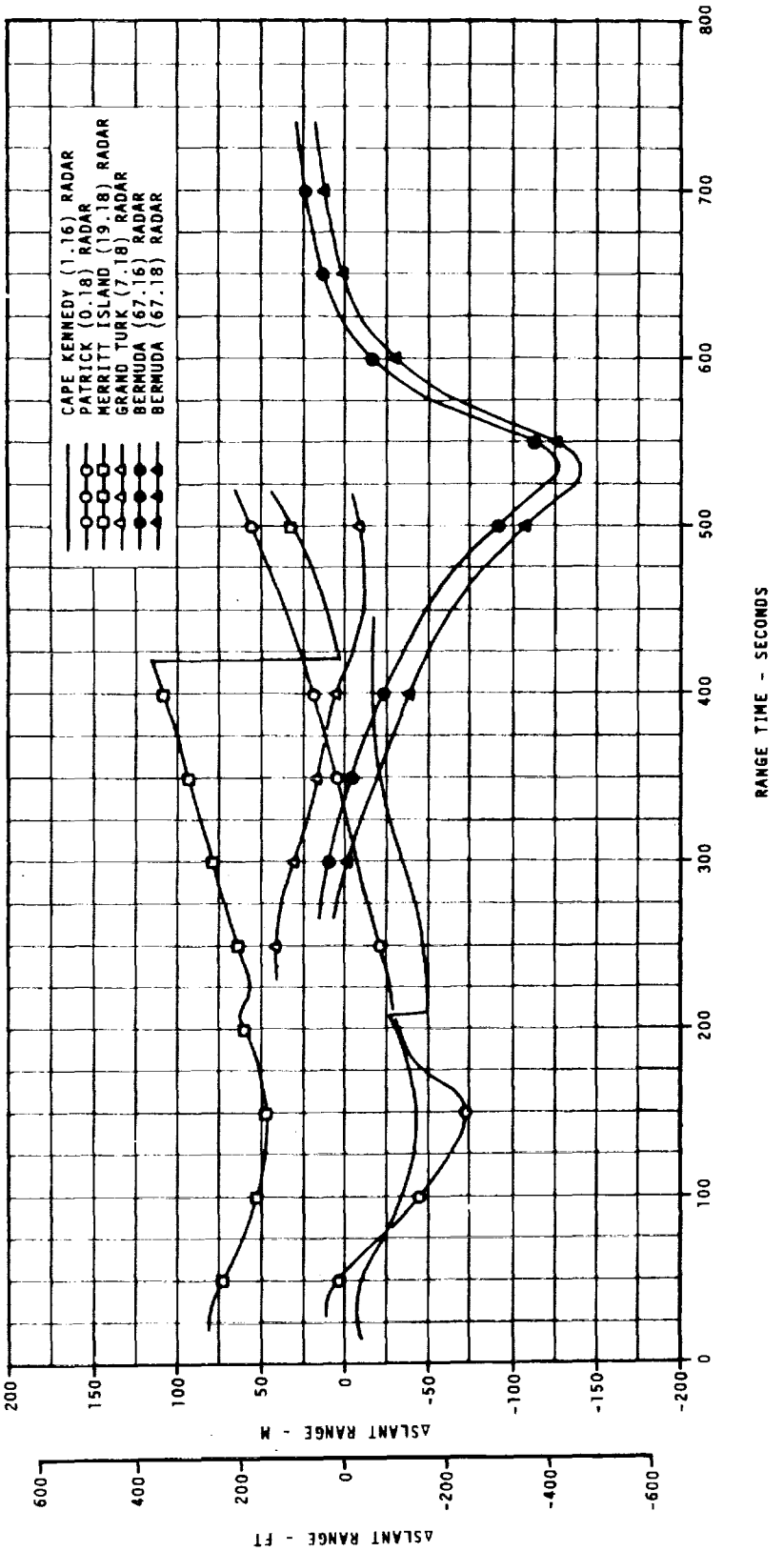

FIGURE 3-15. SLANT RANGE TRACKING COMPARISON - ASCENT PHASE

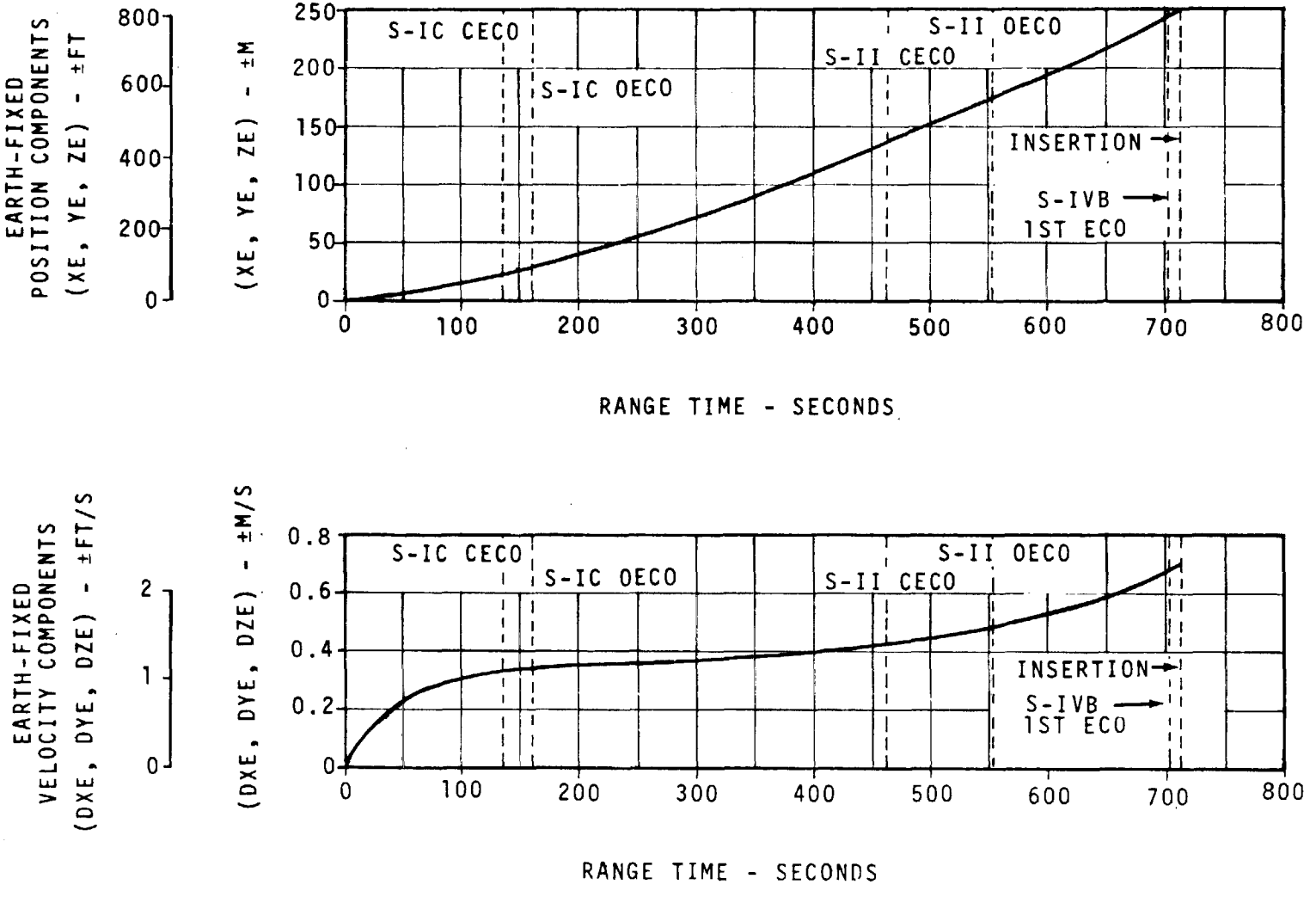

FIGURE 3-16. ESTIMATED UNCERTAINTY OF ASCENT PHASE TRAJECTORY

TABLE 3-I. TIMES OF SIGNIFICANT EVENTS

EVENT	RANGE TIME, SEC		
	ACTUAL	NOMINAL	ACT-NOM
Guidance Reference Release	-16.968	-17.003	0.035
First Motion	0.25	0.25	0.00
Start of Time Base 1	0.58	0.65	-0.07
Mach 1	66.8	65.9	0.9
Maximum Dynamic Pressure	82.6	81.1	1.5
S-IC Center Engine Cutoff	135.16	135.26	-0.10
S-IC Outboard Engine Cutoff	161.63	160.20	1.43
S-IC/S-II Separation Command	162.31	160.91	1.40
S-II Center Engine Cutoff	460.61	459.21	1.40
S-II Outboard Engine Cutoff	552.64	554.13	-1.49
S-II/S-IVB Separation Command	553.50	555.04	-1.54
S-IVB 1st Guidance Cutoff	703.76	703.48	0.28
Parking Orbit Insertion	713.76	713.48	0.28
Begin S-IVB Restart Preparations	8,629.26	8,626.92	2.34
S-IVB Engine Restart (ESC)	9,199.20	9,197.79	1.41
S-IVB Engine Reignition (STDV Open)	9,207.52	9,204.87	2.65
S-IVB 2nd Guidance Cutoff	9,550.58	9,548.64	1.94
Translunar Injection	9,560.58	9,558.64	1.94
CSM Separation	10,962.4	11,004.9	-42.5

TABLE 3-II. SIGNIFICANT TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
First Motion	Range Time, sec	0.25
	Total Inertial Acceleration, m/s^2 (ft/s^2)	10.40 (34.12)
Mach 1	Range Time, sec	66.8
	Altitude, km (n mi)	7.86 (4.24)
Maximum Dynamic Pressure	Range Time, sec	82.6
	Dynamic Pressure, N/cm^2 (lb/ft^2)	3.324 (694.2)
	Altitude, km (n mi)	13.22 (7.14)
Maximum Total Inertial Acceleration: S-IC	Range Time, sec	161.71
	Acceleration, m/s^2 (ft/s^2)	38.47 (126.21)
S-II	Range Time, sec	460.69
	Acceleration, m/s^2 (ft/s^2)	17.82 (58.46)
S-IVB 1st Burn	Range Time, sec	703.84
	Acceleration, m/s^2 (ft/s^2)	6.89 (22.60)
S-IVB 2nd Burn	Range Time, sec	9,550.66
	Acceleration, m/s^2 (ft/s^2)	14.60 (47.90)
Maximum Earth-Fixed Velocity: S-IC	Range Time, sec	161.96
	Velocity, m/s (ft/s)	2,388.34 (7,835.76)
S-II	Range Time, sec	553.50
	Velocity, m/s (ft/s)	6,497.67 (21,317.81)
S-IVB 1st Burn	Range Time, sec	703.84
	Velocity, m/s (ft/s)	7,388.38 (24,240.09)
S-IVB 2nd Burn	Range Time, sec	9,551.30
	Velocity, m/s (ft/s)	10,439.91 (34,251.67)

TABLE 3-III. ENGINE CUTOFF CONDITIONS

PARAMETER	S-IC CECO	S-IC OECO	S-II CECO	S-II OECO	S-IVB 1ST GUIDANCE CUTOFF
Range Time, sec	135.16	161.63	460.61	552.64	703.76
Altitude, km (n mi)	43.39 (23.43)	65.28 (35.25)	179.00 (96.65)	187.43 (101.20)	191.47 (103.39)
Surface Range, km (n mi)	46.32 (25.01)	93.38 (50.42)	1,109.50 (599.08)	1,636.56 (833.67)	2,650.21 (1,431.00)
Space-Fixed Velocity, m/s (ft/s)	1,973.03 (6,473.20)	2,751.91 (9,028.58)	5,678.47 (18,630.15)	6,898.24 (22,632.02)	7,791.42 (25,562.40)
Flight Path Angle, deg	22.807	18.946	1.029	0.741	-0.0064
Heading Angle, deg	76.461	75.538	79.585	82.458	88.497
Cross Range, km (n mi)	0.23 (0.12)	0.60 (0.32)	15.89 (8.58)	28.68 (15.49)	62.10 (33.53)
Cross Range Velocity, m/s (ft/s)	10.49 (34.42)	17.89 (58.69)	109.59 (359.55)	172.16 (564.83)	275.31 (903.25)

TABLE 3-III. ENGINE CUTOFF CONDITIONS (Continued)

PARAMETER	S-IVB 2ND GUIDANCE CUTOFF
Range Time, sec	9,550.58
Altitude, km (n mi)	319.81 (172.68)
Space-Fixed Velocity, m/s (ft/s)	10,846.56 (35,585.83)
Flight Path Angle, deg	6.927
Heading Angle, deg	61.258
Eccentricity	0.97688
C_3*, m^2/s^2 (ft^2/s^2)	-1,396,436 (-15,031,112)
Inclination, deg	31.701
Descending Node, deg	123.511

*C_3 is 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	162.31	553.50
Altitude, km (n mi)	65.89 (35.58)	187.51 (101.25)
Surface Range, km (n mi)	94.88 (51.23)	1,642.05 (886.64)
Space-Fixed Velocity, m/s (ft/s)	2,759.29 (9,052.79)	6,900.65 (22,639.93)
Flight Path Angle, deg	18.848	0.730
Heading Angle, deg	75.538	82.490
Cross Range, km (n mi)	0.61 (0.33)	28.83 (15.57)
Cross Range Velocity, m/s (ft/s)	18.05 (59.22)	172.65 (566.44)
Geodetic Latitude, deg N	28.883	31.925
Longitude, deg E	-79.694	-63.965

TABLE 3-V. TRANSLUNAR INJECTION CONDITIONS

PARAMETER	VALUE
Range Time, sec	9,560.58
Altitude, km (n mi)	333.21 (179.92)
Space-Fixed Velocity, m/s (ft/s)	10,839.59 (35,562.96)
Flight Path Angle, deg	7.379
Heading Angle, deg	61.065
Inclination, deg	31.698
Descending Node, deg	123.515
Eccentricity	0.97834
C_3*, m^2/s^2 (ft^2/s^2)	-1,308,471 (-14,084,265)
Geodetic Latitude, deg N	-13.627
Longitude, deg E	159.920

* C_3 is twice the specific energy of orbit

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

V = inertial velocity

μ = gravitational constant

R = radius vector from center of earth

TABLE 3-VI. TARGETING PARAMETERS

PARAMETER	ACTUAL	NOMINAL	ACT - NOM
S-IVB 1ST GUIDANCE CUTOFF			
Range Time, sec	703.76	703.48	0.28
Altitude, km (n mi)	191.47 (103.39)	191.50 (103.40)	-0.03 (-0.01)
Space-Fixed Velocity, m/s (ft/s)	7,791.42 (25,562.40)	7,791.35 (25,562.17)	0.07 (0.23)
Flight Path Angle, deg	-0.0064	-0.0002	-0.0062
TRANSLUNAR INJECTION			
Range Time, sec	9,560.58	9,558.64	1.94
Eccentricity	0.97834	0.97836	-0.00002
C_3, m^2/s^2 (ft^2/s^2)	-1,308,471 (-14,084,265)	-1,307,603 (-14,074,922)	-868 (-9,343)
Inclination, deg	31.698	31.691	0.007
Descending Node, deg	123.515	123.537	-0.022

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

DATA SOURCE	TIME AVAILABLE (SEC)
ASCENT PHASE	
Cape Kennedy (1.16) Radar (FPS-16)*	15 - 440
Patrick (0.18) Radar (FPQ-6)*	27 - 520
Merritt Island (19.18) Radar (TPQ-18)*	20 - 520
Grand Turk (7.18) Radar (TPQ-18)*	230 - 520
Bermuda (67.16) Radar (FPS-16)*	265 - 740
Bermuda (67.18) Radar (FPQ-6)*	265 - 740
SECOND BURN PHASE	
No Valid Tracking Data Available	

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

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SECTION 4

ORBITAL TRAJECTORY RECONSTRUCTION

4.1 ORBITAL TRAJECTORY

The S-IVB/LM/CSM was inserted into a circular parking orbit at 713.76 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 over Australia, 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 0.07 m/s (0.23 ft/s) less than nominal and the flight path angle was 0.006 degree less than nominal. The eccentricity was 0.00004 greater than nominal. The apogee and perigee were 0.13 km (0.07 n mi) and 0.62 km (0.33 n mi) less than nominal, respectively.

The insertion conditions, as determined by the Orbital Correction Program (OCP), were obtained by a differential correction procedure which adjusted the estimated insertion 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 conditions.

The orbital trajectory from insertion to the restart time (9,180 seconds) was established by the integration of the orbital model equations using the insertion vector as the initial conditions. The restart vector was verified by the good agreement with the Mercury Ship C-band radar data from 9,078 to 9,180 seconds.

4.2 ORBITAL 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. The perturbation due to LH_2 venting thrust was modeled by the predicted venting profile. The predicted venting profile was assumed close to actual venting because of the excellent orbit fit of the C-band radars.

4.3 TRAJECTORY RECONSTRUCTION

4.3.1 Orbital Insertion Conditions

The Orbital Correction Program (OCP) was used to solve for the insertion conditions utilizing C-band tracking data and the above-mentioned vent model. The insertion conditions are given in Table 4-II. A family of values for the insertion parameters was obtained depending upon the combination of data used and the weights applied to the data. The solutions had a spread of ±250 m (±820 ft) in position components and ±0.7 m/s (±2.3 ft/s) in velocity components referenced to the earth-fixed launch site coordinate system (PACSS10). The orbital insertion conditions determined independently from powered flight tracking lie within this band of solutions. The ground track from parking orbit insertion to CSM separation is given in Figure 4-1. The orbital trajectory in PACSS1 is given in Tables B-IV and C-IV.

4.3.2 Orbital Tracking Analysis

The stations (with their time of tracking) used to obtain the initial orbital conditions, the number of data points, and the Root-Mean-Square (RMS) errors of the residuals of each data type are shown in Table 4-III. 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 was 25 m (82 ft) in slant range, 0.023 degree in elevation angle, and 0.016 degree in azimuth angle. Design specifications indicate the expected high frequency errors of the measuring systems are 3 m (10 ft) in slant range and 0.005 degree in angles for the TPQ-18 and FPQ-6 radars; 6 m (20 ft) in slant range and 0.01 degree in angles for the FPS-16 radars.

4.4 POST TLI TRAJECTORY

The post translunar injection (TLI) trajectory spans the time interval from translunar injection (9,560.58 seconds) to CSM separation (10,962.4 seconds). The translunar injection conditions were integrated by the orbital model equations forward to CSM separation. The separation conditions are presented in Table 4-IV. 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 post TLI radar data which were received were used to verify the post TLI trajectory.

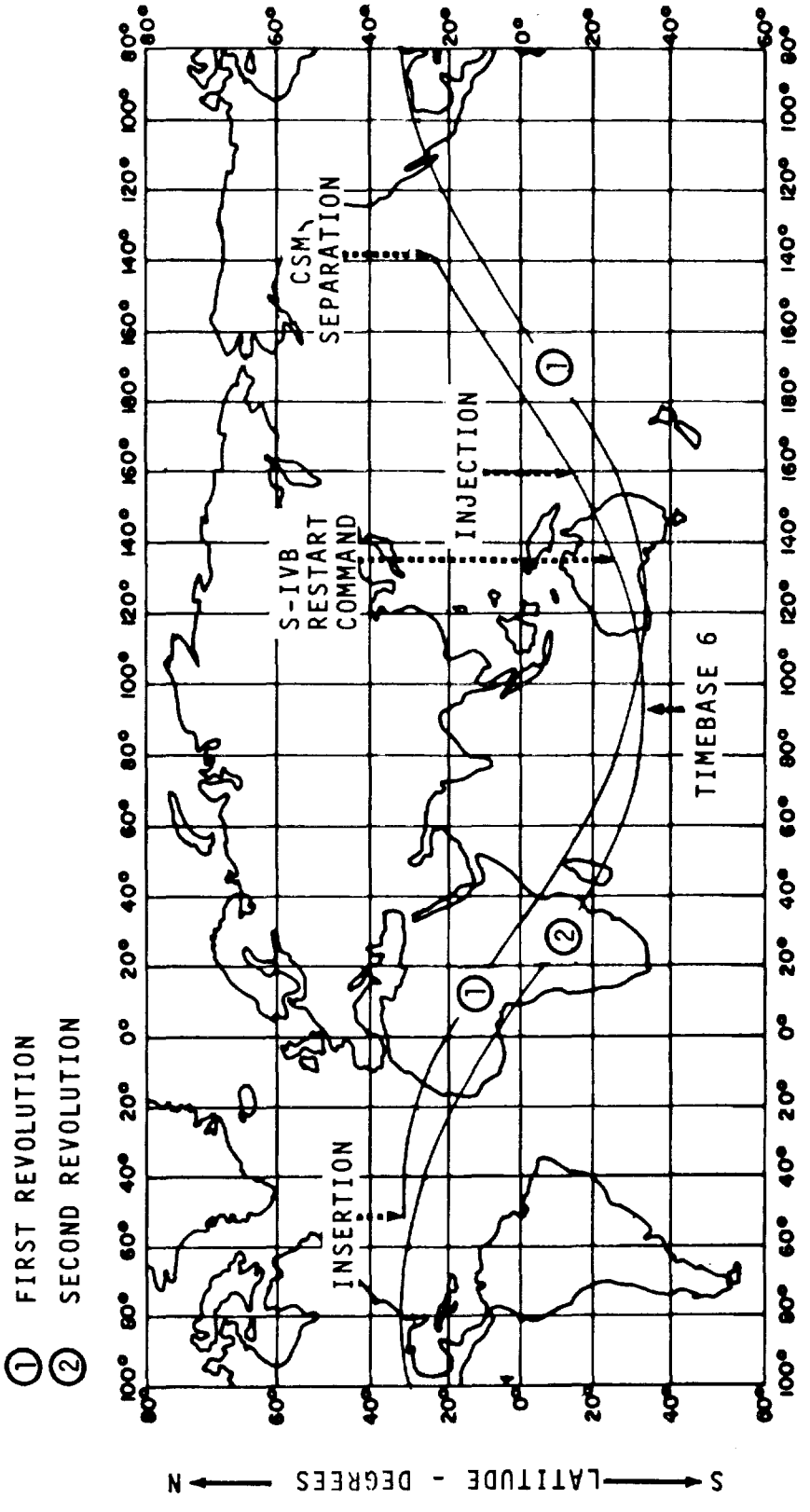

FIGURE 4-1. GROUND TRACK

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	
Carnarvon	FPQ-6	X		
California	TPQ-18	X		X
Patrick	FPQ-6		X	X
Merritt Island	TPQ-18		X	
Grand Turk	TPQ-18		X	X
Vanguard Ship	FPS-16M		X	
Mercury Ship	FPS-16M		X	

TABLE 4-II. PARKING ORBIT INSERTION CONDITIONS

PARAMETER	VALUE
Range Time, sec	713.76
Altitude, km (n mi)	191.37 (103.33)
Space-Fixed Velocity, m/s (ft/s)	7,793.09 (25,567.88)
Flight Path Angle, deg	-0.0049
Heading Angle, deg	88.933
Inclination, deg	32.546
Descending Node, deg	123.132
Eccentricity	0.000086
Apogee*, km (n mi)	185.79 (100.32)
Perigee*, km (n mi)	184.66 (99.71)
Period, min	88.20
Geodetic Latitude, deg N	32.700
Longitude, deg E	-52.526

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

TABLE 4-III. ORBITAL TRACKING UTILIZATION SUMMARY

STATION	TIME OF TRACK (SECONDS) BEGIN	END	DATA TYPE	VALID OBSERVATIONS	RMS ERROR OR RESIDUALS
Bermuda (FPS-16M)	714	750	Azimuth Angle	7	0.011 deg
			Elevation Angle	7	0.015 deg
			Slant Range	7	9 m (30 ft)
Bermuda (FPQ-6)	714	750	Azimuth Angle	7	0.016
			Elevation Angle	6	0.010
			Slant Range	7	5 m (16 ft)
Carnarvon (FPQ-6)	3,222	3,444	Azimuth Angle	38	0.010
			Elevation Angle	34	0.008
			Slant Range	38	6 m (20 ft)
Merritt Island (TPQ-18)	5,778	6,066	Azimuth Angle	45	0.013
			Elevation Angle	45	0.008
			Slant Range	46	25 m (82 ft)
Mercury Ship (FPS-16M)	9,078	9,180	Azimuth Angle	15	0.005
			Elevation Angle	15	0.023
			Slant Range	17	21 m (69 ft)

TABLE 4-IV. CSM SEPARATION CONDITIONS

PARAMETER	VALUE
Range Time, sec	10,962.4
Altitude, km (n mi)	6,486.86 (3,502.62)
Space-Fixed Velocity, m/s (ft/s)	7,787.25 (25,548.72)
Flight Path Angle, deg	43.928
Heading Angle, deg	67.467
Geodetic Latitude, deg N	22.967
Longitude, deg E	-139.826

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SECTION 5

SPENT STAGE TRAJECTORIES

5.1 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 5-I. The ground track is shown in Figure 5-1.

5.2 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 5-II. The ground track is shown in Figure 5-1.

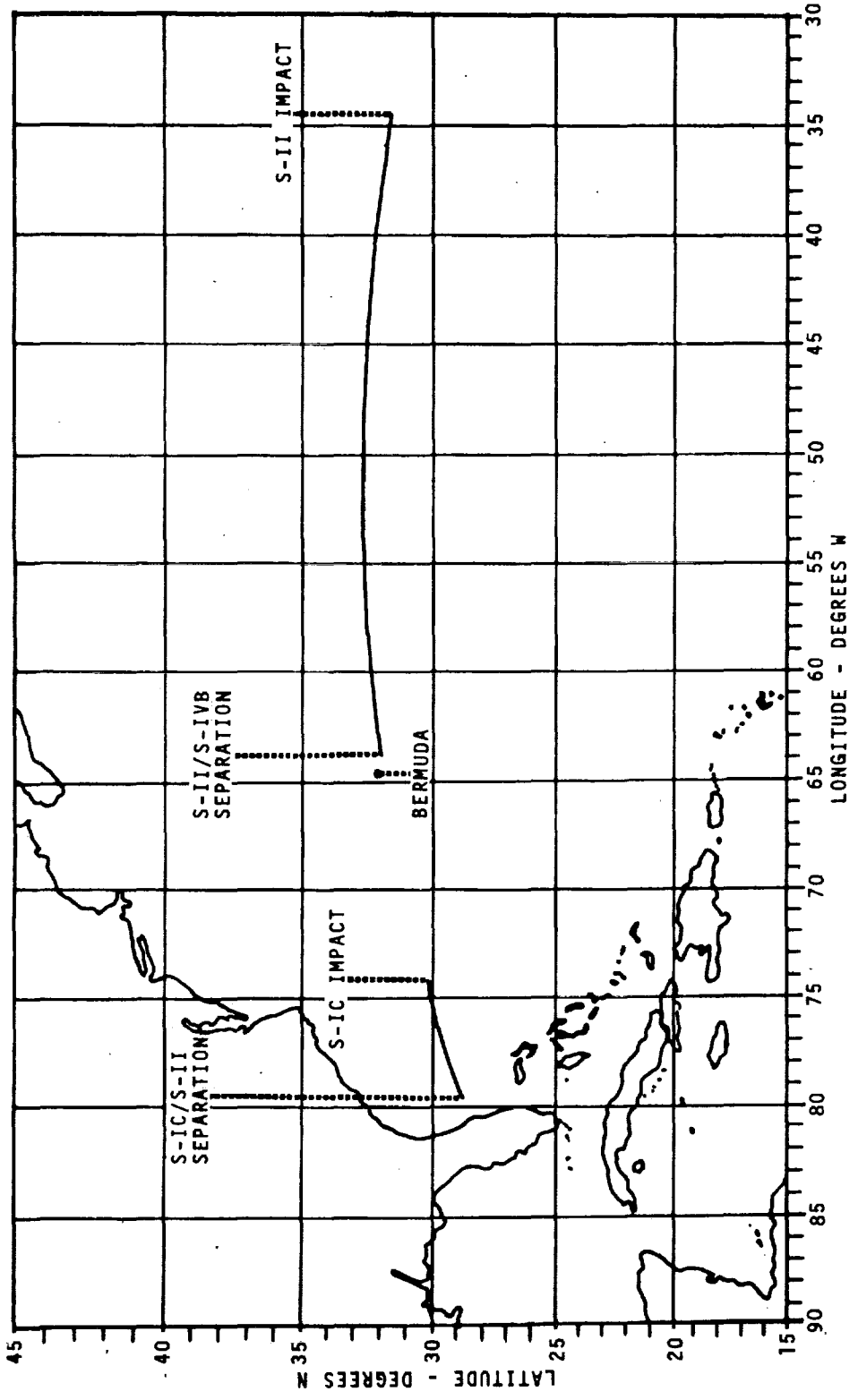

FIGURE 5-1. GROUND TRACKS FOR S-IC AND S-II SPENT STAGES

TABLE 5-I. S-IC SPENT STAGE TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	539.12
	Latitude, deg N	30.19
	Longitude, deg E	-74.21
	Surface Range, km (n mi)	645.98 (348.80)
Impact: 0° Angle-of-Attack	Range Time, sec	499.00
	Latitude, deg N	30.21
	Longitude, deg E	-74.11
	Surface Range, km (n mi)	655.72 (354.06)
Impact: 90° Angle-of-Attack	Range Time, sec	573.11
	Latitude, deg N	30.17
	Longitude, deg E	-74.28
	Surface Range, km (n mi)	639.24 (345.16)
Apex: Tumbling Case	Range Time, sec	266.87
	Altitude, km (n mi)	112.25 (60.61)
	Surface Range, km (n mi)	320.21 (172.90)

TABLE 5-II. S-II SPENT STAGE TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	1,217.89
	Latitude, deg N	31.52
	Longitude, deg E	-34.51
	Surface Range, km (n mi)	4,424.97 (2,389.29)
Impact: 0° Angle-of-Attack	Range Time, sec	1,184.45
	Latitude, deg N	31.48
	Longitude, deg E	-34.26
	Surface Range, km (n mi)	4,449.74 (2,402.67)
Impact: 90° Angle-of-Attack	Range Time, sec	1,256.35
	Latitude, deg N	31.56
	Longitude, deg E	-34.78
	Surface Range, km (n mi)	4,399.57 (2,375.58)
Apex: Tumbling Case	Range Time, sec	597.21
	Altitude, km (n mi)	189.48 (102.31)
	Surface Range, km (n mi)	1,916.93 (1,035.06)

SECTION 6

S-IVB/IU SLINGSHOT TRAJECTORY

After final LM separation, the S-IVB/IU was placed on a near nominal lunar slingshot trajectory. The purpose of this maneuver was to slow 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. This was accomplished by a combination of an engine lead experiment, LOX dump, APS burn, and LH_2 vent. The engine lead experiment consisted of a 273-second APS burn, a 9-second LOX lead and a 53-second LH_2 lead. The final APS burn was shortened in real time from 155 seconds to approximately 8 seconds to reflect the effect of updated LOX residuals which were not considered at the time slingshot targeting was performed. A time history of the velocity increase along the S-IVB's longitudinal axis for the slingshot maneuver is presented in Figure 6-1. Table 6-I presents a comparison of the actual and nominal velocity increase due to the various phases of the maneuver. Figure 6-2 presents the resultant conditions for various velocity increases at the given attitude of the vehicle for the maneuver. The nominal and the 3σ band about the nominal are included.

The S-IVB/IU closest approach of 3,112 km (1,680 n mi) above the lunar surface occurred at 78.851 hours into the mission. The trajectory parameters were obtained by integrating forward a vector (furnished by 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 6-II. The velocity of the S-IVB/IU relative to the earth is presented in Figure 6-3. This vividly illustrates how the influence of the moon imparted energy to the S-IVB/IU. Figure 6-4 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 2,935 km (1,585 n mi) apart. Some of the heliocentric orbit parameters of the S-IVB/IU are presented in Table 6-III. Similar parameters for the earth's orbit are also presented for comparison.

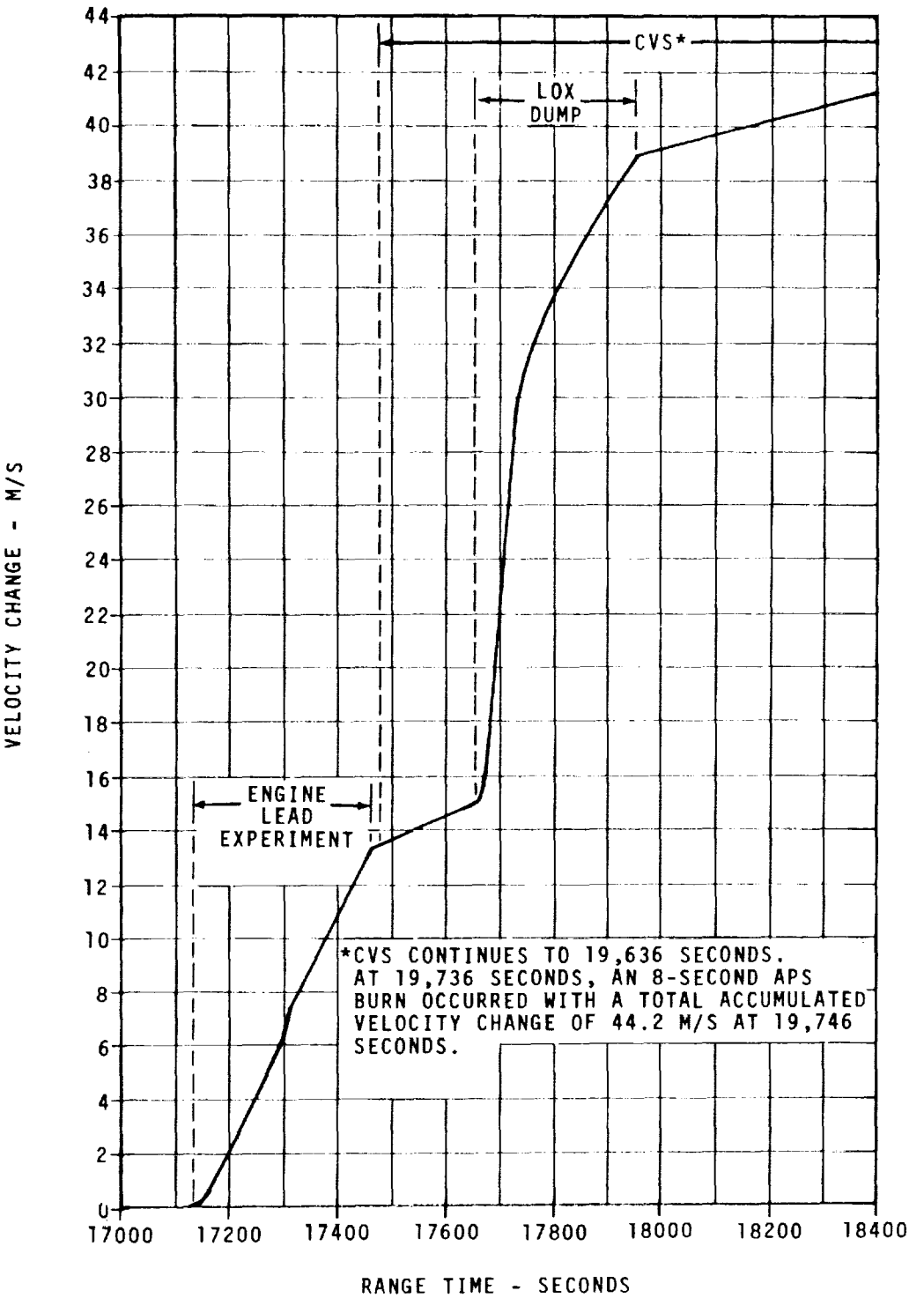

FIGURE 6-1. SLINGSHOT MANEUVER LONGITUDINAL VELOCITY INCREASE

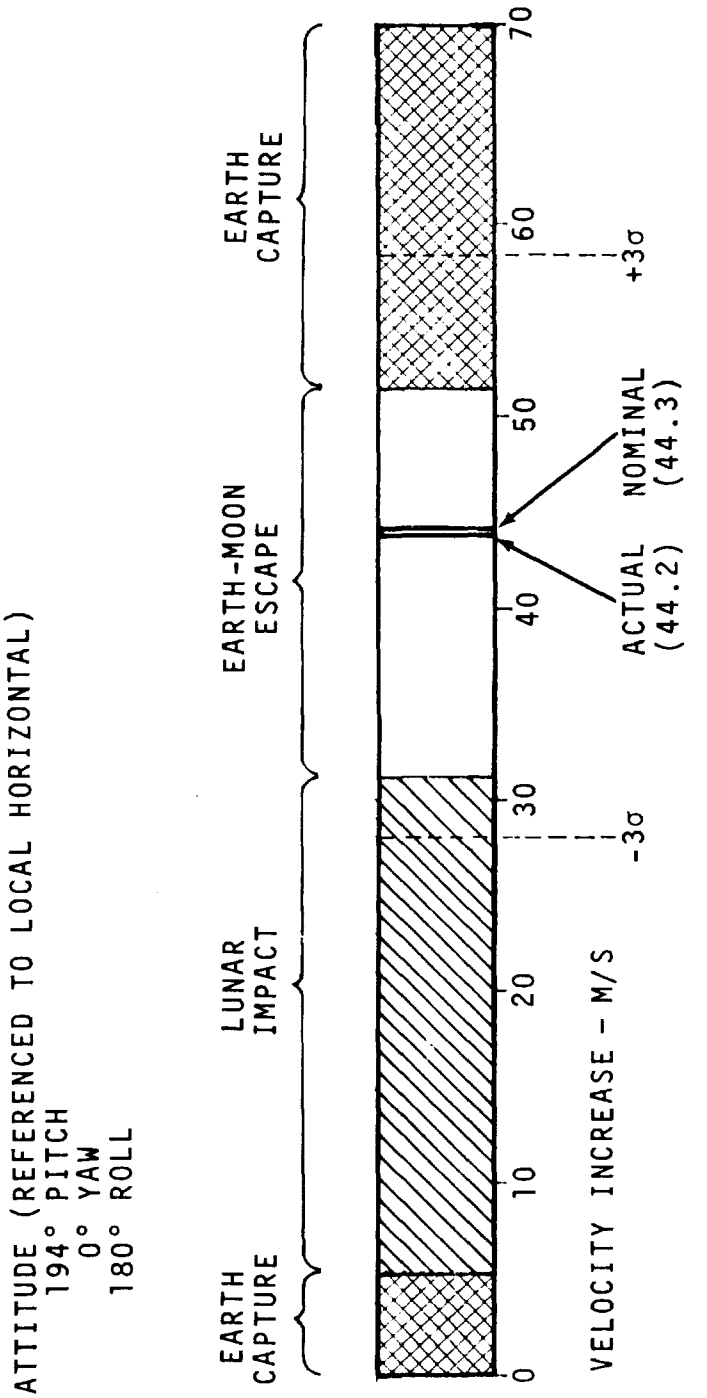

FIGURE 6-2. RESULTANT SLINGSHOT MANEUVER CONDITIONS

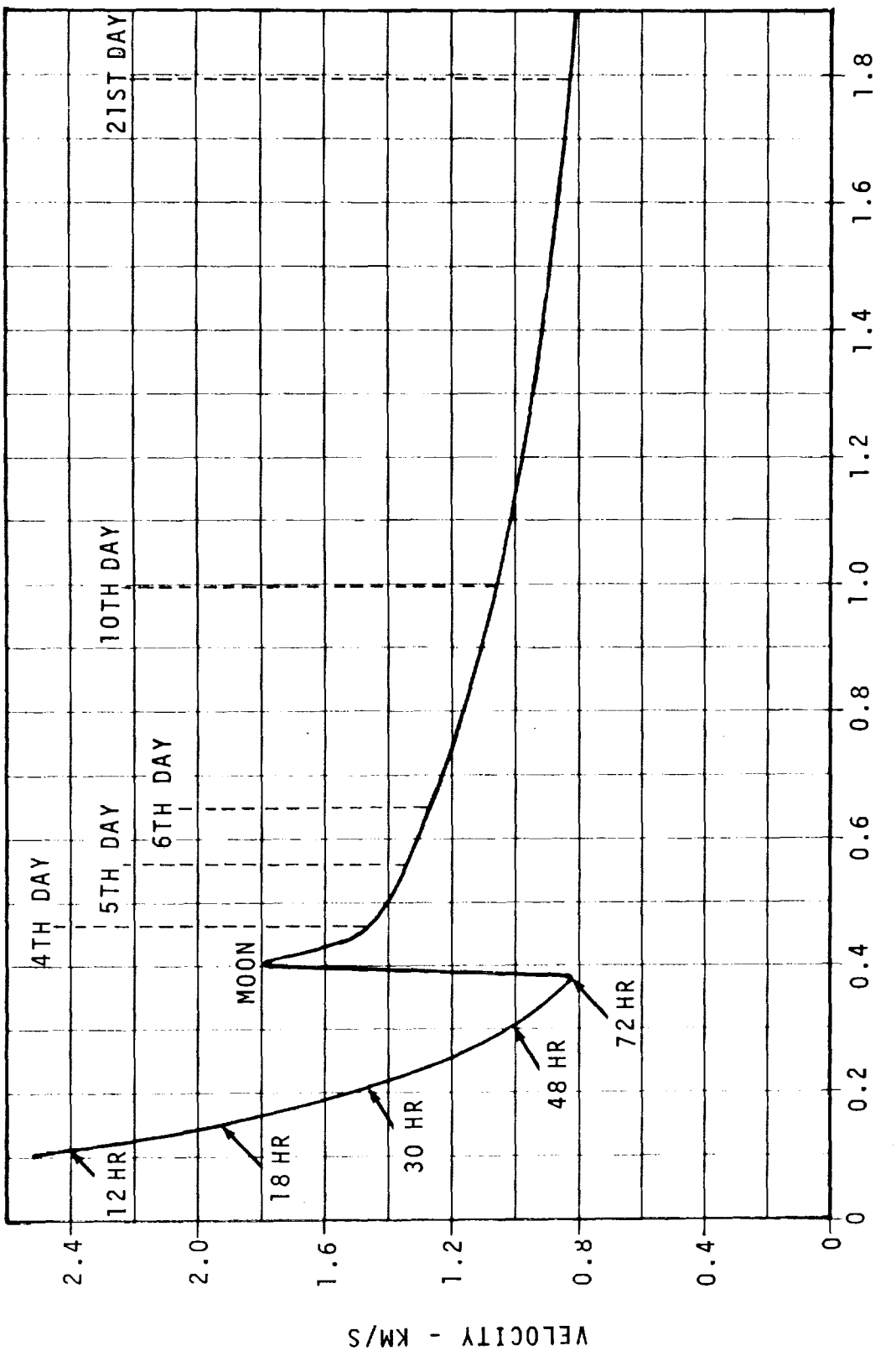

FIGURE 6-3. S-IVB/IU VELOCITY RELATIVE TO EARTH DISTANCE

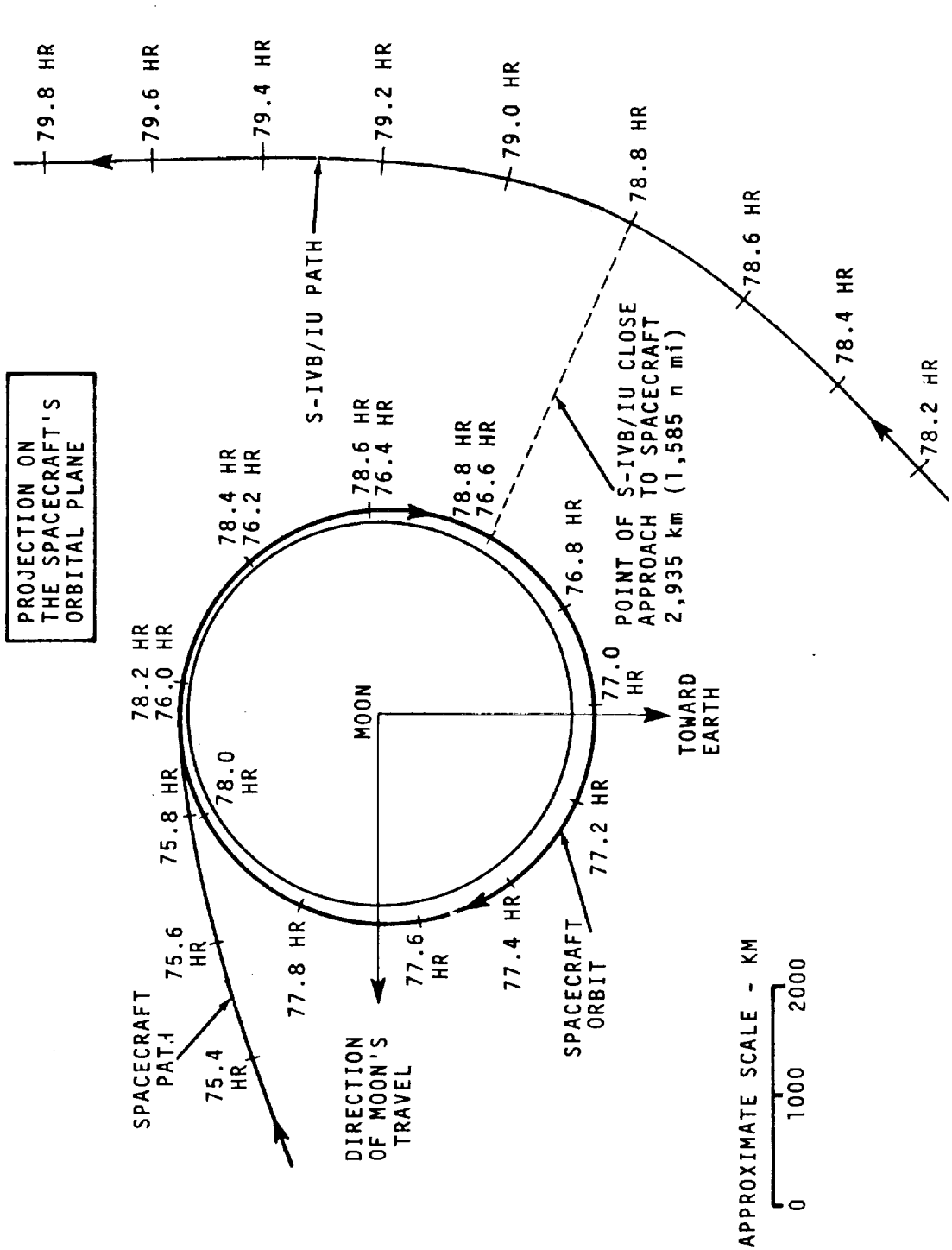

FIGURE 6-4. S-IVB/IU AND SPACECRAFT RELATIVE TRAJECTORIES

TABLE 6-I. COMPARISON OF SLINGSHOT MANEUVER VELOCITY INCREMENT

PARAMETER	ACTUAL	NOMINAL
Longitudinal Velocity Increase, m/s (ft/s)	44.2 (145.0)	44.3 (145.3)
Engine Lead Experiment, m/s (ft/s)	13.4 (44.0)	13.8 (45.3)
LOX Dump, m/s (ft/s)	23.0 (75.5)	22.3 (73.2)
APS Ullage Burn, m/s (ft/s)	0.3 (1.0)	6.2 (20.3)
Miscellaneous (CVS Performance and Hardware), m/s (ft/s)	7.5 (24.6)	2.0 (6.6)

TABLE 6-II. LUNAR CLOSEST APPROACH PARAMETERS

PARAMETER	ACTUAL	NOMINAL
Lunar Radius, km (n mi)	4,850 (2,619)	4,748 (2,564)
Altitude Above Lunar Surface, km (n mi)	3,112 (1,680)	3,010 (1,625)
Time from Launch, hr	78.9	78.5
Velocity Increase Relative to Earth from Lunar Encounter, km/s (n mi/s)	0.850 (0.459)	0.861 (0.465)

TABLE 6-III. HELIOCENTRIC ORBIT PARAMETERS

PARAMETER	S-IVB/IU	EARTH
Semimajor Axis, km (n mi)	1.4398×10^8 (0.7774×10^8)	1.4900×10^8 (0.8045×10^8)
Aphelion, km (n mi)	1.5216×10^8 (0.8216×10^8)	1.5115×10^8 (0.8161×10^8)
Perihelion, km (n mi)	1.3581×10^8 (0.7333×10^8)	1.4684×10^8 (0.7929×10^8)
Inclination, deg*	23.46	23.44
Period, days	344.88	365.25

*For purposes of this report the solar equatorial plane is considered parallel with the earth's equatorial 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 local horizontal plane, positive above the horizontal plane. This coordinate system is identical to Standard Coordinate System 1 of Project Apollo Coordinate System Standards, abbreviated as PACSS1.
ALTITUDE	Perpendicular distance from vehicle center of gravity to Fischer Ellipsoid, positive above Fischer Ellipsoid.

APPENDIX A (Continued)

SYMBOL	DEFINITION
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	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	64	0	0	0.0	0.0	0.0	0.0	0.0	0.0
FIRST MOTION									
0.250	64	0	0	0.0	0.0	0.0	0.60	0.0	0.0
START OF TIME BASE 1									
0.580	65	0	0	0.4	-0.0	0.0	1.00	-0.03	0.02
1.0	66	0	0	1.0	-0.0	0.0	1.51	-0.03	0.03
2.0	67	0	0	3.0	-0.0	0.1	2.18	0.08	0.06
3.0	71	0	0	5.2	0.1	0.1	2.24	0.23	0.07
4.0	77	0	0	7.5	0.4	0.2	2.30	0.27	0.06
5.0	85	1	0	9.8	0.7	0.2	2.36	0.27	0.04
6.0	96	2	1	12.2	0.9	0.3	2.42	0.28	0.01
7.0	109	3	1	14.6	1.2	0.2	2.48	0.27	-0.02
8.0	125	4	1	17.1	1.5	0.2	2.53	0.27	-0.05
9.0	144	6	1	19.7	1.8	0.1	2.58	0.26	-0.08
10.0	164	8	2	22.2	2.0	0.0	2.63	0.24	-0.12
11.0	187	10	1	24.9	2.2	-0.1	2.68	0.15	-0.14
12.0	213	12	1	27.5	2.3	-0.2	2.72	0.07	-0.13
13.0	242	14	1	30.3	2.4	-0.3	2.77	0.02	-0.11
14.0	274	17	1	33.0	2.4	-0.4	2.83	-0.04	-0.08

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	307	19	0	35.9	2.3	-0.5	2.89	-0.09	-0.05
16.0	345	21	0	38.9	2.2	-0.6	2.96	-0.11	-0.01
17.0	386	24	-1	41.8	2.1	-0.5	3.02	-0.12	0.03
18.0	429	26	-1	44.8	2.0	-0.5	3.10	-0.13	0.08
19.0	475	28	-2	47.9	1.8	-0.4	3.18	-0.12	0.13
20.0	524	29	-2	51.2	1.7	-0.2	3.27	-0.11	0.19
21.0	576	31	-2	54.5	1.6	-0.0	3.35	-0.11	0.24
22.0	633	33	-2	57.9	1.5	0.2	3.43	-0.11	0.29
23.0	692	34	-2	61.4	1.4	0.6	3.51	-0.12	0.34
24.0	755	35	-1	64.9	1.3	0.9	3.59	-0.13	0.39
25.0	822	37	0	68.5	1.1	1.3	3.66	-0.13	0.44
26.0	892	38	2	72.2	1.0	1.8	3.74	-0.13	0.50
27.0	967	39	4	76.0	0.9	2.3	3.81	-0.13	0.57
28.0	1044	39	6	79.9	0.7	2.9	3.89	-0.14	0.64
29.0	1126	40	10	83.8	0.6	3.6	3.97	-0.13	0.71
30.0	1212	41	14	87.8	0.5	4.4	4.06	-0.13	0.79
31.0	1302	41	18	91.9	0.3	5.2	4.14	-0.13	0.87
32.0	1396	41	24	96.1	0.2	6.1	4.23	-0.14	0.96
33.0	1494	41	31	100.4	0.1	7.1	4.31	-0.14	1.07
34.0	1597	41	38	104.7	-0.1	8.2	4.40	-0.13	1.17
35.0	1704	41	47	109.2	-0.2	9.5	4.48	-0.13	1.29
36.0	1815	41	57	113.7	-0.3	10.8	4.56	-0.12	1.42
37.0	1931	41	69	118.3	-0.4	12.3	4.65	-0.11	1.56
38.0	2052	40	82	123.0	-0.6	13.9	4.73	-0.11	1.69
39.0	2177	40	97	127.7	-0.7	15.7	4.82	-0.11	1.84
40.0	2307	39	113	132.6	-0.8	17.6	4.91	-0.11	1.99
41.0	2442	38	132	137.6	-0.9	19.7	5.00	-0.11	2.15
42.0	2582	37	153	142.6	-1.0	21.9	5.08	-0.11	2.33
43.0	2727	36	176	147.7	-1.1	24.4	5.16	-0.11	2.50
44.0	2878	35	202	152.9	-1.2	26.9	5.24	-0.11	2.69
45.0	3033	34	230	158.2	-1.3	29.7	5.31	-0.10	2.87
46.0	3194	32	261	163.5	-1.4	32.7	5.38	-0.09	3.05
47.0	3360	31	295	169.0	-1.5	35.8	5.45	-0.08	3.23
48.0	3532	29	333	174.5	-1.6	39.1	5.53	-0.07	3.41
49.0	3709	28	374	180.0	-1.6	42.6	5.60	-0.07	3.60
50.0	3892	26	418	185.7	-1.7	46.3	5.68	-0.07	3.79
51.0	4081	24	466	191.4	-1.8	50.2	5.75	-0.07	4.00
52.0	4275	23	519	197.2	-1.8	54.4	5.83	-0.08	4.23
53.0	4475	21	575	203.0	-1.9	58.7	5.89	-0.08	4.46
54.0	4681	19	636	208.9	-2.0	63.3	5.95	-0.09	4.69
55.0	4893	17	702	214.9	-2.1	68.1	6.01	-0.08	4.94
56.0	5111	15	772	221.0	-2.2	73.1	6.06	-0.08	5.18
57.0	5335	12	848	227.0	-2.3	78.4	6.11	-0.08	5.42

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	5565	10	929	233.2	-2.3	84.0	6.15	-0.07	5.67
59.0	5801	8	1016	239.4	-2.4	89.8	6.20	-0.06	5.92
60.0	6044	5	1109	245.6	-2.5	95.8	6.24	-0.05	6.17
61.0	6292	3	1208	251.8	-2.5	102.1	6.29	-0.04	6.42
62.0	6547	0	1313	258.2	-2.5	108.7	6.33	-0.03	6.68
63.0	6809	-2	1425	264.5	-2.6	115.4	6.36	-0.01	6.93
64.0	7076	-5	1544	270.9	-2.6	122.5	6.37	0.01	7.18
65.0	7350	-7	1670	277.2	-2.5	129.8	6.38	0.03	7.43
66.0	7631	-10	1804	283.6	-2.5	137.4	6.37	0.05	7.67
MACH 1									
66.800	7860	-12	1916	288.7	-2.5	143.6	6.37	0.07	7.87
67.0	7918	-12	1945	290.0	-2.4	145.2	6.37	0.07	7.92
68.0	8211	-15	2094	296.3	-2.4	153.2	6.36	0.09	8.15
69.0	8510	-17	2252	302.7	-2.3	161.5	6.36	0.11	8.41
70.0	8816	-19	2417	309.1	-2.1	170.0	6.36	0.13	8.68
71.0	9129	-21	2592	315.4	-2.0	178.8	6.36	0.13	8.97
72.0	9447	-23	2775	321.8	-1.9	188.0	6.38	0.12	9.27
73.0	9772	-25	2968	328.2	-1.8	197.4	6.39	0.10	9.59
74.0	10103	-27	3170	334.6	-1.7	207.2	6.40	0.07	9.94
75.0	10441	-29	3382	341.0	-1.6	217.3	6.39	0.05	10.28
76.0	10785	-30	3605	347.4	-1.6	227.7	6.38	0.04	10.64
77.0	11136	-32	3838	353.7	-1.5	238.6	6.36	0.04	11.01
78.0	11493	-33	4082	360.1	-1.5	249.8	6.34	0.07	11.37
79.0	11856	-35	4337	366.4	-1.4	261.3	6.31	0.13	11.74
80.0	12226	-36	4605	372.7	-1.2	273.2	6.27	0.20	12.11
81.0	12601	-37	4884	378.9	-1.0	285.5	6.24	0.30	12.48
82.0	12983	-38	5176	385.2	-0.6	298.2	6.23	0.41	12.83
MAXIMUM DYNAMIC PRESSURE									
82.600	13216	-38	5357	388.9	-0.3	305.9	6.23	0.47	13.02
83.0	13372	-38	5491	391.4	-0.1	311.2	6.24	0.51	13.14
84.0	13766	-38	5798	397.7	0.4	324.5	6.27	0.59	13.43
85.0	14167	-38	6130	404.0	1.0	338.0	6.34	0.62	13.69
86.0	14574	-36	6474	410.4	1.6	351.8	6.42	0.62	13.93
87.0	14989	-34	6833	416.8	2.2	365.8	6.53	0.58	14.13
88.0	15408	-32	7206	423.4	2.7	380.1	6.65	0.50	14.32
89.0	15835	-29	7593	430.1	3.2	394.5	6.77	0.41	14.52
90.0	16269	-26	7995	437.0	3.6	409.1	6.90	0.32	14.72
91.0	16709	-22	8412	443.9	3.9	423.9	7.01	0.24	14.93
92.0	17156	-19	8843	451.0	4.1	439.0	7.10	0.17	15.16

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
93.0	17611	-14	9290	458.1	4.2	454.3	7.17	0.11	15.42
94.0	18072	-9	9752	465.3	4.3	469.8	7.22	0.06	15.70
95.0	18541	-5	10230	472.5	4.3	485.7	7.25	0.01	16.01
96.0	19017	-1	10723	479.8	4.3	501.9	7.25	-0.03	16.36
97.0	19501	4	11233	487.0	4.3	518.4	7.23	-0.06	16.74
98.0	19991	8	11760	494.2	4.2	535.4	7.20	-0.08	17.13
99.0	20489	12	12304	501.4	4.1	552.7	7.16	-0.09	17.51
100.0	20994	16	12866	508.5	4.0	570.4	7.12	-0.09	17.90
101.0	21506	20	13445	515.6	4.0	588.5	7.07	-0.07	18.29
102.0	22026	24	14043	522.7	3.9	607.0	7.04	-0.06	18.66
103.0	22552	28	14659	529.7	3.8	625.8	7.01	-0.04	19.03
104.0	23085	32	15295	536.7	3.8	645.0	6.99	-0.01	19.38
105.0	23625	35	15950	543.7	3.8	664.6	6.99	0.02	19.73
106.0	24172	39	16624	550.7	3.9	684.5	6.99	0.06	20.07
107.0	24727	43	17319	557.7	4.0	704.7	6.99	0.11	20.40
108.0	25288	47	18034	564.7	4.1	725.3	7.01	0.14	20.74
109.0	25856	51	18769	571.7	4.2	746.2	7.02	0.17	21.07
110.0	26431	56	19526	578.7	4.4	767.4	7.03	0.19	21.40
111.0	27013	60	20304	585.8	4.6	789.0	7.04	0.19	21.74
112.0	27603	65	21104	592.8	4.8	810.9	7.05	0.18	22.08
113.0	28199	70	21926	599.9	4.9	833.2	7.06	0.17	22.43
114.0	28803	75	22771	606.9	5.1	855.8	7.07	0.16	22.77
115.0	29413	80	23639	614.0	5.3	878.7	7.09	0.16	23.13
116.0	30031	85	24528	621.1	5.4	902.0	7.11	0.17	23.49
117.0	30655	91	25442	628.2	5.6	925.7	7.13	0.19	23.85
118.0	31287	96	26380	635.4	5.8	949.7	7.15	0.21	24.22
119.0	31926	102	27342	642.5	6.0	974.1	7.15	0.23	24.60
120.0	32572	109	28328	649.7	6.3	999.0	7.13	0.25	25.00
121.0	33225	115	29340	656.8	6.5	1024.2	7.09	0.26	25.41
122.0	33886	122	30377	663.8	6.8	1049.8	7.03	0.26	25.81
123.0	34553	128	31439	670.8	7.0	1075.8	6.98	0.26	26.22
124.0	35227	136	32528	677.8	7.3	1102.2	6.93	0.25	26.64
125.0	35909	143	33644	684.7	7.5	1129.1	6.90	0.25	27.09
126.0	36597	151	34787	691.6	7.8	1156.4	6.89	0.25	27.55
127.0	37292	159	35957	698.5	8.0	1184.2	6.90	0.26	28.02
128.0	37994	167	37155	705.4	8.3	1212.4	6.92	0.25	28.46
129.0	38703	175	38381	712.4	8.6	1241.1	6.95	0.30	28.90
130.0	39419	184	39638	719.3	8.9	1270.2	6.98	0.31	29.34
131.0	40141	193	40923	726.3	9.2	1299.8	7.01	0.31	29.77
132.0	40871	202	42237	733.3	9.5	1329.8	7.03	0.32	30.21
133.0	41608	212	43583	740.4	9.8	1360.2	7.05	0.31	30.65
134.0	42352	222	44958	747.4	10.1	1391.1	7.07	0.32	31.10
135.0	43103	232	46365	754.5	10.4	1422.4	7.09	0.29	31.55

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
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.160	43224	234	46594	755.7	10.5	1427.4	7.10	0.29	31.62
136.0	43860	243	47802	759.8	10.7	1451.5	3.61	0.28	25.17
137.0	44622	254	49267	763.5	11.0	1476.8	3.62	0.23	25.51
138.0	45387	265	50756	767.1	11.2	1502.5	3.63	0.19	25.84
139.0	46155	276	52271	770.7	11.4	1528.5	3.64	0.20	26.18
140.0	46928	288	53813	774.4	11.6	1554.8	3.66	0.15	26.54
141.0	47704	299	55381	778.0	11.7	1581.5	3.69	0.16	26.91
142.0	48484	311	56976	781.7	11.9	1608.6	3.71	0.18	27.26
143.0	49268	323	58599	785.5	12.1	1636.0	3.74	0.15	27.60
144.0	50055	335	60249	789.2	12.3	1663.9	3.77	0.21	27.95
145.0	50846	348	61927	793.0	12.5	1692.0	3.81	0.23	28.34
146.0	51641	360	63633	796.8	12.7	1720.6	3.84	0.25	28.68
147.0	52440	373	65368	800.7	13.0	1749.4	3.87	0.27	29.04
148.0	53242	386	67132	804.5	13.3	1778.7	3.91	0.28	29.43
149.0	54049	400	68925	808.5	13.6	1808.3	3.95	0.30	29.82
150.0	54859	413	70749	812.5	13.9	1838.3	4.00	0.31	30.22
151.0	55674	427	72602	816.5	14.2	1868.7	4.04	0.32	30.62
152.0	56492	442	74486	820.5	14.5	1899.6	4.09	0.33	31.03
153.0	57315	456	76402	824.6	14.8	1930.6	4.14	0.34	31.43
154.0	58141	471	78348	828.8	15.2	1962.2	4.19	0.34	31.84
155.0	58972	487	80327	833.0	15.5	1994.3	4.24	0.34	32.33
156.0	59808	502	82337	837.3	15.9	2026.8	4.31	0.32	32.77
157.0	60647	518	84381	841.6	16.2	2059.8	4.39	0.33	33.21
158.0	61491	535	86458	846.1	16.5	2093.3	4.47	0.37	33.71
159.0	62339	551	88568	850.6	16.9	2127.3	4.56	0.41	34.21
160.0	63192	568	90713	855.2	17.3	2161.7	4.67	0.37	34.69
161.0	64054	586	92903	859.9	17.7	2196.7	4.79	0.38	35.17
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
161.630	64588	597	94272	862.9	17.9	2218.6	4.86	0.31	35.47
162.0	64915	604	95111	863.0	18.0	2226.9	-8.94	0.15	1.05
S-IC/S-II SEPARATION COMMAND									
162.310	65191	609	95804	863.2	18.1	2227.2	-8.94	0.14	1.05
164.0	66622	640	99568	845.1	18.3	2229.0	-8.94	0.11	1.05
166.0	68296	677	104035	828.3	18.5	2232.9	-7.31	0.14	4.65
168.0	69939	714	108509	814.4	18.8	2243.7	-6.79	0.16	5.76
170.0	71555	752	113010	801.0	19.1	2255.8	-6.40	0.15	6.74

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
172.0	73144	791	117536	788.4	19.4	2269.7	-6.33	0.16	6.89
174.0	74708	830	122089	775.8	19.7	2283.6	-6.29	0.16	7.00
176.0	76247	869	126670	763.2	20.0	2297.6	-6.27	0.16	7.03
178.0	77761	910	131279	750.7	20.4	2311.7	-6.25	0.17	7.06
180.0	79250	951	135917	738.2	20.7	2325.9	-6.22	0.18	7.10
182.0	80714	993	140583	725.8	21.1	2340.1	-6.20	0.18	7.13
184.0	82153	1035	145278	713.4	21.4	2354.4	-6.18	0.18	7.16
186.0	83568	1078	150001	701.1	21.8	2368.8	-6.16	0.18	7.19
188.0	84957	1122	154753	688.8	22.2	2383.1	-6.14	0.18	7.21
190.0	86323	1167	159533	676.5	22.5	2397.6	-6.12	0.19	7.24
192.0	87663	1212	164343	664.3	22.9	2412.1	-6.09	0.19	7.28
194.0	88980	1259	169182	652.2	23.3	2426.7	-6.06	0.19	7.33
196.0	90272	1305	174050	640.1	23.7	2441.4	-6.03	0.19	7.38
198.0	91540	1353	178948	628.1	24.0	2456.2	-5.99	0.19	7.42
200.0	92784	1402	183875	616.0	24.4	2471.1	-6.02	0.20	7.47
202.0	94004	1451	188832	604.0	24.8	2486.1	-6.04	0.20	7.52
204.0	95200	1501	193820	591.9	25.2	2501.2	-5.99	0.20	7.54
206.0	96372	1552	198837	580.1	25.6	2516.2	-5.82	0.18	7.50
208.0	97521	1603	203884	568.7	25.9	2531.1	-5.54	0.15	7.41
210.0	98647	1656	208961	557.9	26.2	2545.8	-5.27	0.13	7.30
212.0	99753	1708	214068	547.6	26.5	2560.4	-5.02	0.12	7.21
214.0	100838	1761	219203	537.8	26.7	2574.7	-4.85	0.12	7.16
216.0	101904	1815	224367	528.2	27.0	2589.0	-4.76	0.12	7.15
218.0	102951	1869	229559	518.7	27.2	2603.3	-4.70	0.12	7.15
220.0	103979	1924	234780	509.3	27.5	2617.7	-4.70	0.13	7.18
222.0	104988	1979	240030	499.9	27.7	2632.1	-4.71	0.13	7.23
224.0	105979	2035	245308	490.5	28.0	2646.6	-4.72	0.13	7.28
226.0	106950	2091	250616	481.0	28.2	2661.2	-4.72	0.13	7.32
228.0	107903	2149	255953	471.6	28.5	2675.9	-4.73	0.13	7.36
230.0	108837	2205	261320	462.1	28.8	2690.6	-4.72	0.14	7.40
232.0	109751	2263	266716	452.7	29.0	2705.5	-4.72	0.14	7.44
234.0	110647	2321	272142	443.3	29.3	2720.4	-4.72	0.14	7.48
236.0	111525	2380	277597	433.8	29.6	2735.4	-4.72	0.14	7.52
238.0	112383	2440	283083	424.4	29.9	2750.5	-4.72	0.14	7.56
240.0	113222	2500	288599	414.9	30.2	2765.6	-4.72	0.15	7.60
242.0	114042	2560	294146	405.5	30.5	2780.9	-4.73	0.16	7.65
244.0	114844	2622	299723	396.0	30.8	2796.2	-4.73	0.15	7.69
246.0	115626	2683	305331	386.5	31.1	2811.6	-4.73	0.16	7.74
248.0	116390	2746	310969	377.1	31.4	2827.2	-4.73	0.16	7.78
250.0	117135	2809	316639	367.6	31.8	2842.8	-4.73	0.17	7.82
252.0	117861	2873	322340	358.1	32.1	2858.5	-4.74	0.17	7.87
254.0	118567	2938	328073	348.7	32.4	2874.2	-4.74	0.17	7.91
256.0	119255	3003	333837	339.2	32.8	2890.1	-4.75	0.17	7.95

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
258.0	119924	3069	339634	329.7	33.1	2906.1	-4.75	0.18	8.00
260.0	120574	3135	345462	320.2	33.5	2922.1	-4.76	0.18	8.05
262.0	121205	3202	351322	310.6	33.8	2938.3	-4.77	0.18	8.10
264.0	121816	3270	357215	301.1	34.2	2954.5	-4.77	0.18	8.15
266.0	122409	3339	363140	291.6	34.5	2970.9	-4.77	0.19	8.20
268.0	122983	3409	369098	282.0	34.9	2987.3	-4.77	0.20	8.26
270.0	123537	3479	375090	272.5	35.3	3003.9	-4.78	0.20	8.30
272.0	124072	3550	381114	262.9	35.7	3020.5	-4.78	0.19	8.35
274.0	124589	3622	387172	253.3	36.1	3037.3	-4.78	0.20	8.39
276.0	125086	3694	393263	243.8	36.5	3054.1	-4.79	0.20	8.45
278.0	125564	3768	399388	234.2	36.9	3071.1	-4.80	0.21	8.50
280.0	126022	3842	405547	224.6	37.3	3088.1	-4.81	0.21	8.55
282.0	126462	3917	411741	214.9	37.7	3105.3	-4.82	0.21	8.60
284.0	126882	3993	417968	205.3	38.2	3122.5	-4.83	0.21	8.66
286.0	127283	4069	424231	195.6	38.6	3139.9	-4.84	0.22	8.71
288.0	127665	4147	430528	185.9	39.0	3157.4	-4.84	0.22	8.76
290.0	128027	4226	436860	176.2	39.5	3174.9	-4.84	0.23	8.81
292.0	128370	4305	443228	166.5	39.9	3192.6	-4.85	0.23	8.87
294.0	128693	4385	449631	156.8	40.4	3210.4	-4.86	0.23	8.92
296.0	128997	4466	456070	147.1	40.9	3228.3	-4.88	0.23	8.98
298.0	129281	4549	462544	137.3	41.3	3246.3	-4.89	0.24	9.03
300.0	129546	4632	469055	127.5	41.8	3264.4	-4.90	0.24	9.09
302.0	129791	4716	475602	117.7	42.3	3282.7	-4.91	0.24	9.14
304.0	130017	4801	482186	107.9	42.8	3301.0	-4.92	0.25	9.20
306.0	130223	4887	488806	98.0	43.3	3319.5	-4.93	0.25	9.26
308.0	130409	4974	495464	88.2	43.8	3338.1	-4.94	0.25	9.32
310.0	130576	5062	502159	78.3	44.3	3356.8	-4.95	0.26	9.38
312.0	130722	5151	508891	68.4	44.8	3375.6	-4.97	0.26	9.44
314.0	130849	5241	515661	58.4	45.3	3394.5	-4.98	0.26	9.50
316.0	130956	5333	522469	48.4	45.9	3413.6	-4.99	0.27	9.56
318.0	131043	5425	529315	38.4	46.4	3432.7	-5.00	0.28	9.62
320.0	131110	5518	536200	28.4	47.0	3452.0	-5.02	0.27	9.68
322.0	131156	5613	543123	18.4	47.5	3471.4	-5.04	0.28	9.75
324.0	131183	5708	550086	8.3	48.1	3491.0	-5.06	0.28	9.81
326.0	131189	5805	557088	-1.9	48.6	3510.7	-5.07	0.29	9.87
328.0	131176	5903	564129	-12.0	49.2	3530.5	-5.08	0.29	9.93
330.0	131141	6002	571210	-22.2	49.8	3550.4	-5.10	0.30	10.00
332.0	131087	6102	578330	-32.4	50.4	3570.5	-5.12	0.30	10.06
334.0	131012	6204	585492	-42.7	51.0	3590.7	-5.13	0.30	10.12
336.0	130916	6306	592693	-52.9	51.6	3611.0	-5.14	0.31	10.19
338.0	130800	6410	599936	-63.2	52.3	3631.4	-5.17	0.31	10.26
340.0	130663	6515	607219	-73.6	52.9	3652.0	-5.20	0.31	10.33
342.0	130505	6622	614544	-84.0	53.5	3672.8	-5.21	0.32	10.40

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
344.0	130327	6729	621910	-94.4	54.1	3693.6	-5.22	0.32	10.47
346.0	130128	6838	629318	-104.9	54.8	3714.6	-5.24	0.33	10.54
348.0	129907	6948	636769	-115.4	55.5	3735.8	-5.27	0.34	10.61
350.0	129666	7060	644261	-126.0	56.1	3757.1	-5.29	0.34	10.68
352.0	129403	7173	651797	-136.6	56.8	3778.5	-5.32	0.34	10.75
354.0	129120	7287	659376	-147.2	57.5	3800.1	-5.33	0.34	10.82
356.0	128814	7403	666997	-157.9	58.2	3821.8	-5.35	0.34	10.90
358.0	128488	7520	674663	-168.7	58.9	3843.7	-5.38	0.35	10.98
360.0	128140	7639	682372	-179.4	59.6	3865.7	-5.41	0.36	11.05
362.0	127770	7758	690126	-190.3	60.3	3887.9	-5.44	0.36	11.13
364.0	127379	7880	697924	-201.2	61.0	3910.2	-5.46	0.37	11.21
366.0	126965	8003	705767	-212.1	61.8	3932.7	-5.48	0.37	11.28
368.0	126530	8127	713655	-223.1	62.5	3955.4	-5.50	0.38	11.36
370.0	126073	8253	721588	-234.1	63.3	3978.2	-5.52	0.38	11.44
372.0	125593	8380	729568	-245.2	64.1	4001.1	-5.55	0.39	11.52
374.0	125092	8509	737593	-256.4	64.8	4024.2	-5.59	0.39	11.60
376.0	124569	8640	745665	-267.6	65.6	4047.5	-5.62	0.39	11.69
378.0	124021	8772	753783	-278.9	66.4	4071.0	-5.65	0.40	11.77
380.0	123452	8905	761949	-290.2	67.2	4094.6	-5.67	0.41	11.86
382.0	122861	9041	770162	-301.5	68.0	4118.4	-5.70	0.41	11.94
384.0	122246	9177	778423	-313.0	68.9	4142.4	-5.72	0.41	12.02
386.0	121609	9316	786732	-324.4	69.7	4166.5	-5.75	0.42	12.10
388.0	120948	9456	795089	-336.0	70.5	4190.8	-5.78	0.43	12.19
390.0	120265	9598	803495	-347.6	71.4	4215.3	-5.82	0.44	12.29
392.0	119558	9742	811950	-359.3	72.3	4240.0	-5.86	0.44	12.38
394.0	118828	9887	820455	-371.0	73.2	4264.8	-5.89	0.44	12.47
396.0	118074	10035	829010	-382.8	74.1	4289.9	-5.92	0.45	12.56
398.0	117297	10184	837615	-394.7	75.0	4315.1	-5.95	0.45	12.65
400.0	116495	10334	846270	-406.6	75.9	4340.5	-5.98	0.46	12.75
402.0	115670	10487	854977	-418.6	76.8	4366.1	-6.01	0.47	12.85
404.0	114821	10642	863735	-430.7	77.8	4391.8	-6.05	0.48	12.93
406.0	113947	10798	872544	-442.8	78.7	4417.8	-6.09	0.48	13.03
408.0	113050	10957	881406	-455.0	79.7	4444.0	-6.14	0.48	13.14
410.0	112127	11117	890320	-467.3	80.6	4470.4	-6.18	0.48	13.25
412.0	111180	11279	899288	-479.7	81.6	4497.0	-6.21	0.49	13.35
414.0	110208	11443	908308	-492.2	82.6	4523.8	-6.25	0.50	13.44
416.0	109211	11609	917383	-504.7	83.6	4550.8	-6.29	0.51	13.55
418.0	108189	11778	926511	-517.3	84.6	4578.0	-6.33	0.52	13.65
420.0	107142	11948	935695	-530.0	85.7	4605.4	-6.37	0.52	13.76
422.0	106069	12120	944933	-542.8	86.7	4633.0	-6.42	0.52	13.87
424.0	104971	12295	954227	-555.7	87.8	4660.9	-6.47	0.53	13.98
426.0	103846	12472	963577	-568.7	88.8	4688.9	-6.51	0.54	14.09
428.0	102696	12650	972983	-581.7	89.9	4717.2	-6.56	0.54	14.20

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
430.0	101519	12831	982446	-594.9	91.0	4745.7	-6.60	0.55	14.32
432.0	100316	13014	991966	-608.1	92.1	4774.5	-6.65	0.55	14.44
434.0	99087	13200	1001544	-621.5	93.2	4803.5	-6.70	0.56	14.55
436.0	97830	13387	1011180	-634.9	94.4	4832.7	-6.75	0.56	14.67
438.0	96547	13577	1020875	-648.5	95.5	4862.2	-6.80	0.57	14.79
440.0	95236	13769	1030629	-662.1	96.6	4891.9	-6.84	0.59	14.91
442.0	93898	13964	1040442	-675.9	97.8	4921.8	-6.90	0.60	15.04
444.0	92533	14161	1050316	-689.7	99.0	4952.0	-6.95	0.61	15.16
446.0	91140	14360	1060251	-703.7	100.3	4982.4	-7.00	0.61	15.28
448.0	89718	14562	1070246	-717.7	101.5	5013.1	-7.06	0.61	15.41
450.0	88269	14766	1080303	-731.9	102.7	5044.1	-7.12	0.63	15.54
452.0	86791	14973	1090423	-746.2	104.0	5075.2	-7.18	0.64	15.68
454.0	85284	15182	1100605	-760.6	105.3	5106.7	-7.23	0.65	15.82
456.0	83748	15394	1110850	-775.2	106.6	5138.5	-7.29	0.65	15.95
458.0	82183	15608	1121159	-789.8	107.9	5170.5	-7.36	0.66	16.09
460.0	80589	15825	1131533	-804.6	109.2	5202.8	-7.43	0.66	16.23
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
460.610	80105	15891	1134658	-809.1	109.6	5212.6	-7.45	0.64	16.27
462.0	78964	16045	1141968	-819.6	110.5	5231.2	-7.67	0.60	12.82
464.0	77309	16267	1152456	-835.2	111.6	5256.9	-7.80	0.54	12.88
466.0	75624	16491	1162996	-850.7	112.7	5282.7	-7.70	0.54	12.94
468.0	73907	16718	1173587	-865.9	113.8	5308.6	-7.52	0.57	13.01
470.0	72161	16946	1184231	-880.8	114.9	5334.7	-7.30	0.57	13.09
472.0	70385	17177	1194927	-895.0	116.0	5361.1	-7.16	0.57	13.17
474.0	68581	17411	1205675	-909.3	117.2	5387.6	-7.12	0.58	13.26
476.0	66748	17646	1216477	-923.6	118.4	5414.2	-7.14	0.59	13.37
478.0	64886	17884	1227332	-937.9	119.5	5441.0	-7.18	0.61	13.47
480.0	62996	18124	1238241	-952.3	120.8	5468.1	-7.24	0.63	13.56
482.0	61077	18367	1249205	-966.8	122.0	5495.3	-7.30	0.64	13.66
484.0	59129	18613	1260223	-981.5	123.3	5522.7	-7.37	0.66	13.76
486.0	57151	18861	1271297	-996.3	124.7	5550.3	-7.44	0.66	13.86
488.0	55143	19111	1282425	-1011.3	126.0	5578.1	-7.53	0.66	13.96
490.0	53105	19364	1293604	-1026.6	127.3	5603.4	-7.71	0.65	11.03
492.0	51036	19620	1304830	-1042.2	128.6	5624.4	-7.91	0.64	10.44
494.0	48935	19879	1316099	-1058.2	129.9	5645.3	-8.13	0.65	10.47
496.0	46802	20140	1327410	-1074.7	131.2	5666.3	-8.34	0.66	10.50
498.0	44635	20404	1338764	-1091.5	132.5	5687.3	-8.38	0.67	10.52
500.0	42436	20670	1350160	-1108.1	133.9	5708.3	-8.27	0.67	10.55
502.0	40203	20939	1361598	-1124.4	135.2	5729.5	-8.08	0.67	10.58
504.0	37938	21211	1373078	-1140.5	136.5	5750.7	-7.95	0.66	10.62
506.0	35642	21485	1384601	-1156.3	137.9	5772.0	-7.92	0.66	10.69

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
508.0	33313	21762	1396166	-1172.2	139.2	5793.5	-7.93	0.65	10.75
510.0	30953	22042	1407775	-1188.1	140.5	5815.0	-7.96	0.66	10.81
512.0	28561	22324	1419427	-1204.0	141.8	5836.7	-8.01	0.67	10.85
514.0	26137	22609	1431122	-1220.1	143.1	5858.4	-8.10	0.68	10.91
516.0	23680	22897	1442861	-1236.4	144.5	5880.3	-8.19	0.69	10.97
518.0	21191	23187	1454643	-1252.9	145.9	5902.3	-8.27	0.70	11.02
520.0	18668	23480	1466470	-1269.5	147.3	5924.4	-8.34	0.71	11.09
522.0	16113	23776	1478341	-1286.2	148.8	5946.7	-8.41	0.72	11.15
524.0	13523	24075	1490257	-1303.1	150.2	5969.0	-8.48	0.73	11.22
526.0	10900	24377	1502217	-1320.1	151.7	5991.5	-8.54	0.74	11.28
528.0	8243	24682	1514223	-1337.3	153.2	6014.2	-8.61	0.74	11.34
530.0	5551	24990	1526274	-1354.6	154.6	6036.9	-8.67	0.74	11.41
532.0	2825	25301	1538370	-1372.0	156.1	6059.8	-8.73	0.74	11.48
534.0	63	25614	1550513	-1389.5	157.6	6082.8	-8.79	0.75	11.55
536.0	-2734	25931	1562702	-1407.1	159.1	6106.0	-8.85	0.75	11.61
538.0	-5566	26251	1574937	-1424.9	160.6	6129.3	-8.90	0.77	11.68
540.0	-8433	26574	1587219	-1442.7	162.2	6152.7	-8.95	0.78	11.74
542.0	-11337	26900	1599548	-1460.7	163.7	6176.2	-9.01	0.78	11.80
544.0	-14276	27229	1611924	-1478.8	165.3	6199.9	-9.07	0.78	11.87
546.0	-17252	27561	1624348	-1497.0	166.8	6223.6	-9.13	0.78	11.95
548.0	-20264	27896	1636819	-1515.3	168.4	6247.6	-9.19	0.82	12.01
550.0	-23313	28234	1649338	-1533.8	170.0	6271.6	-9.25	0.79	12.04
552.0	-26399	28576	1661906	-1552.3	171.7	6295.7	-9.30	0.83	12.05
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
552.640	-27379	28685	1665875	-1558.2	172.2	6303.2	-9.32	0.68	12.06
S-II/S-IVB SEPARATION COMMAND									
553.500	-28738	28834	1671358	-1565.5	172.7	6303.9	-8.19	0.49	-2.01
554.0	-29522	28921	1674512	-1569.6	172.9	6302.9	-8.19	0.47	-2.01
556.0	-32678	29268	1687121	-1586.0	173.8	6298.9	-8.19	0.47	-2.00
558.0	-35867	29616	1699717	-1602.5	174.8	6296.9	-8.29	0.50	0.43
560.0	-39089	29967	1712313	-1619.3	175.9	6300.2	-8.47	0.58	2.48
562.0	-42345	30320	1724922	-1636.5	177.0	6306.1	-8.55	0.57	3.23
564.0	-45635	30675	1737541	-1653.7	178.2	6312.9	-8.61	0.55	3.36
566.0	-48959	31033	1750174	-1671.0	179.3	6319.6	-8.70	0.54	3.28
568.0	-52319	31392	1762820	-1688.4	180.4	6326.2	-8.77	0.54	3.27
570.0	-55713	31754	1775478	-1706.0	181.5	6332.8	-8.78	0.56	3.31
572.0	-59143	32118	1788151	-1723.6	182.6	6339.4	-8.79	0.57	3.31
574.0	-62607	32485	1800836	-1741.2	183.7	6346.0	-8.84	0.58	3.31
576.0	-66108	32853	1813535	-1758.9	184.9	6352.6	-8.89	0.59	3.31

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
578.0	-69643	33224	1826247	-1776.7	186.1	6359.2	-8.90	0.62	3.30
580.0	-73214	33599	1838972	-1794.5	187.4	6365.8	-8.91	0.63	3.29
582.0	-76821	33974	1851710	-1812.4	188.6	6372.4	-8.93	0.63	3.28
584.0	-80464	34352	1864461	-1830.3	189.9	6379.0	-8.98	0.63	3.27
586.0	-84143	34733	1877226	-1848.3	191.1	6385.5	-9.01	0.63	3.27
588.0	-87857	35117	1890003	-1866.3	192.4	6392.0	-9.03	0.64	3.26
590.0	-91608	35503	1902794	-1884.4	193.7	6398.5	-9.04	0.65	3.26
592.0	-95395	35892	1915597	-1902.5	195.0	6405.0	-9.05	0.67	3.26
594.0	-99218	36283	1928414	-1920.6	196.4	6411.6	-9.08	0.67	3.26
596.0	-103077	36677	1941244	-1938.8	197.7	6418.1	-9.11	0.68	3.26
598.0	-106973	37074	1954086	-1957.0	199.1	6424.6	-9.14	0.69	3.25
600.0	-110905	37473	1966942	-1975.3	200.5	6431.1	-9.16	0.69	3.24
602.0	-114874	37876	1979811	-1993.7	201.8	6437.6	-9.18	0.69	3.23
604.0	-118880	38281	1992692	-2012.1	203.2	6444.0	-9.21	0.69	3.22
606.0	-122923	38688	2005587	-2030.5	204.6	6450.4	-9.24	0.68	3.22
608.0	-127002	39099	2018494	-2049.0	206.0	6456.9	-9.25	0.69	3.21
610.0	-131119	39512	2031414	-2067.5	207.3	6463.3	-9.27	0.69	3.21
612.0	-135272	39928	2044347	-2086.1	208.7	6469.7	-9.29	0.70	3.22
614.0	-139463	40347	2057293	-2104.7	210.1	6476.2	-9.32	0.70	3.22
616.0	-143691	40769	2070252	-2123.4	211.5	6482.6	-9.35	0.71	3.21
618.0	-147957	41193	2083223	-2142.1	212.9	6489.0	-9.38	0.71	3.19
620.0	-152260	41621	2096208	-2160.9	214.3	6495.4	-9.40	0.71	3.18
622.0	-156600	42051	2109205	-2179.7	215.8	6501.7	-9.42	0.71	3.18
624.0	-160978	42484	2122215	-2198.5	217.2	6508.1	-9.43	0.71	3.17
626.0	-165394	42919	2135237	-2217.4	218.6	6514.4	-9.45	0.71	3.17
628.0	-169848	43358	2148272	-2236.4	220.0	6520.7	-9.48	0.71	3.16
630.0	-174340	43799	2161320	-2255.3	221.4	6527.1	-9.50	0.71	3.15
632.0	-178870	44244	2174381	-2274.4	222.9	6533.3	-9.52	0.71	3.14
634.0	-183437	44691	2187454	-2293.4	224.3	6539.6	-9.54	0.72	3.14
636.0	-188043	45141	2200539	-2312.5	225.7	6545.9	-9.56	0.72	3.13
638.0	-192687	45594	2213637	-2331.7	227.2	6552.2	-9.58	0.72	3.13
640.0	-197370	46050	2226748	-2350.8	228.6	6558.4	-9.61	0.72	3.12
642.0	-202091	46508	2239871	-2370.1	230.0	6564.7	-9.62	0.72	3.12
644.0	-206850	46970	2253006	-2389.3	231.5	6570.9	-9.64	0.71	3.12
646.0	-211648	47434	2266154	-2408.6	232.9	6577.1	-9.66	0.71	3.11
648.0	-216485	47901	2279315	-2428.0	234.3	6583.3	-9.69	0.72	3.11
650.0	-221360	48371	2292488	-2447.4	235.8	6589.6	-9.72	0.72	3.12
652.0	-226274	48844	2305673	-2466.9	237.2	6595.8	-9.74	0.72	3.12
654.0	-231228	49320	2318871	-2486.4	238.6	6602.1	-9.76	0.73	3.12
656.0	-236220	49799	2332081	-2505.9	240.1	6608.3	-9.78	0.73	3.11
658.0	-241251	50281	2345304	-2525.5	241.6	6614.5	-9.79	0.73	3.09
660.0	-246322	50765	2358539	-2545.1	243.0	6620.6	-9.80	0.73	3.08
662.0	-251432	51253	2371787	-2564.7	244.5	6626.8	-9.83	0.72	3.07

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
664.0	-256581	51743	2385046	-2584.4	245.9	6632.9	-9.86	0.73	3.07
666.0	-261769	52236	2398318	-2604.1	247.4	6639.1	-9.87	0.73	3.07
668.0	-266997	52733	2411603	-2623.9	248.8	6645.2	-9.88	0.73	3.07
670.0	-272265	53232	2424899	-2643.6	250.3	6651.4	-9.88	0.73	3.07
672.0	-277572	53734	2438208	-2663.4	251.8	6657.5	-9.91	0.73	3.06
674.0	-282919	54239	2451529	-2683.3	253.2	6663.6	-9.95	0.73	3.04
676.0	-288305	54747	2464863	-2703.2	254.7	6669.7	-9.98	0.74	3.04
678.0	-293731	55257	2478208	-2723.2	256.2	6675.8	-9.98	0.74	3.05
680.0	-299198	55771	2491566	-2743.1	257.7	6681.9	-9.96	0.75	3.06
682.0	-304704	56288	2504936	-2763.1	259.1	6688.0	-9.95	0.75	3.06
684.0	-310250	56808	2518319	-2783.0	260.6	6694.1	-9.95	0.74	3.06
686.0	-315836	57331	2531712	-2802.9	262.1	6700.2	-9.96	0.74	3.06
688.0	-321461	57856	2545118	-2822.8	263.6	6706.3	-9.96	0.74	3.06
690.0	-327127	58385	2558537	-2842.7	265.1	6712.5	-9.96	0.74	3.06
692.0	-332832	58917	2571968	-2862.7	266.6	6718.6	-9.97	0.74	3.06
694.0	-338578	59451	2585412	-2882.6	268.0	6724.7	-9.98	0.75	3.07
696.0	-344363	59989	2598867	-2902.5	269.6	6730.8	-9.98	0.75	3.08
698.0	-350188	60529	2612335	-2922.5	271.0	6737.0	-9.98	0.76	3.08
700.0	-356053	61073	2625815	-2942.5	272.5	6743.2	-9.98	0.76	3.09
702.0	-361957	61620	2639307	-2962.4	274.0	6749.3	-9.99	0.73	3.09
	S-IVB 1ST GUIDANCE CUTOFF								
703.760	-367158	62100	2651126	-2979.9	275.3	6754.7	-9.99	0.66	3.10
704.0	-367902	62169	2652812	-2982.2	275.5	6755.0	-8.04	0.62	-1.27
706.0	-373881	62721	2666314	-2997.5	276.5	6748.7	-7.60	0.51	-3.41
708.0	-379892	63275	2679807	-3012.7	277.5	6741.9	-7.60	0.51	-3.42
710.0	-385933	63831	2693283	-3027.9	278.5	6735.1	-7.59	0.51	-3.43
712.0	-392004	64389	2706747	-3043.1	279.6	6728.2	-7.58	0.50	-3.45
	PARKING ORBIT INSERTION								
713.760	-397473	64881	2718582	-3056.4	280.5	6722.1	-7.57	0.50	-3.46

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	6373.328	17.091	-5.544	0.0	126.1	388.6	-0.02	-0.01	0.00
-16.0	6373.328	17.213	-5.168	-0.0	126.1	388.6	-0.02	-0.01	0.00
-15.0	6373.328	17.339	-4.779	-0.1	126.0	388.6	-0.02	-0.01	0.00
-14.0	6373.328	17.465	-4.390	-0.1	126.0	388.6	-0.02	-0.01	0.00
-13.0	6373.328	17.591	-4.002	-0.1	126.0	388.6	-0.02	-0.01	0.00
-12.0	6373.328	17.717	-3.613	-0.1	126.0	388.7	-0.02	-0.01	0.00
-11.0	6373.328	17.843	-3.225	-0.2	126.0	388.7	-0.02	-0.01	0.00
-10.0	6373.328	17.969	-2.836	-0.2	126.0	388.7	-0.02	-0.01	0.00
-9.0	6373.327	18.095	-2.447	-0.2	126.0	388.7	-0.02	-0.01	0.00
-8.0	6373.327	18.221	-2.059	-0.2	125.9	388.7	-0.02	-0.01	0.00
-7.0	6373.327	18.347	-1.670	-0.3	125.9	388.7	-0.02	-0.01	0.00
-6.0	6373.327	18.473	-1.281	-0.3	125.9	388.7	-0.02	-0.01	0.00
-5.0	6373.326	18.599	-0.893	-0.3	125.9	388.7	-0.02	-0.01	0.00
-4.0	6373.326	18.725	-0.504	-0.3	125.9	388.7	-0.02	-0.01	0.00
-3.0	6373.325	18.851	-0.115	-0.4	125.9	388.7	-0.02	-0.01	0.00
-2.0	6373.325	18.976	0.274	-0.4	125.9	388.7	-0.02	-0.01	0.00
-1.0	6373.325	19.102	0.662	-0.4	125.8	388.7	-0.02	-0.01	0.00
0.0	6373.325	19.228	1.051	-0.4	125.8	388.7	-0.02	-0.01	0.00
FIRST MOTION									
0.250	6373.324	19.260	1.148	-0.5	125.8	388.7	0.58	-0.01	0.00
START OF TIME BASE 1									
0.580	6373.325	19.301	1.276	-0.1	125.8	388.7	0.98	-0.04	0.02
1.0	6373.326	19.354	1.440	0.6	125.9	388.7	1.49	-0.04	0.04
2.0	6373.326	19.480	1.828	2.5	125.8	388.8	2.16	0.07	0.07
3.0	6373.330	19.606	2.217	4.7	125.9	388.9	2.22	0.22	0.07
4.0	6373.335	19.732	2.606	6.9	126.2	388.9	2.28	0.26	0.06
5.0	6373.343	19.858	2.995	9.2	126.4	389.0	2.34	0.26	0.04
6.0	6373.353	19.985	3.384	11.6	126.7	389.0	2.40	0.27	0.02
7.0	6373.366	20.111	3.773	14.0	127.0	389.0	2.46	0.26	-0.01
8.0	6373.381	20.239	4.162	16.5	127.2	389.0	2.51	0.26	-0.04
9.0	6373.399	20.366	4.551	19.0	127.5	388.9	2.56	0.25	-0.07
10.0	6373.419	20.494	4.940	21.5	127.7	388.8	2.61	0.23	-0.11
11.0	6373.441	20.621	5.329	24.1	127.9	388.7	2.66	0.15	-0.13
12.0	6373.466	20.749	5.717	26.8	128.0	388.6	2.70	0.06	-0.12
13.0	6373.494	20.877	6.106	29.5	128.1	388.5	2.75	0.01	-0.10
14.0	6373.525	21.005	6.494	32.2	128.0	388.4	2.81	-0.05	-0.07

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	6373.558	21.133	6.883	35.1	128.0	388.3	2.87	-0.10	-0.04
16.0	6373.595	21.261	7.271	38.0	127.8	388.3	2.94	-0.12	0.00
17.0	6373.635	21.389	7.659	40.9	127.7	388.3	3.00	-0.13	0.04
18.0	6373.677	21.517	8.048	43.9	127.6	388.4	3.08	-0.13	0.09
19.0	6373.722	21.644	8.436	47.0	127.5	388.5	3.16	-0.13	0.15
20.0	6373.770	21.772	8.825	50.2	127.3	388.7	3.25	-0.12	0.21
21.0	6373.822	21.899	9.214	53.5	127.2	388.9	3.33	-0.11	0.26
22.0	6373.877	22.026	9.603	56.9	127.1	389.2	3.40	-0.12	0.31
23.0	6373.936	22.153	9.992	60.3	127.0	389.6	3.48	-0.12	0.36
24.0	6373.998	22.280	10.382	63.8	126.8	389.9	3.56	-0.13	0.41
25.0	6374.063	22.407	10.772	67.4	126.7	390.4	3.64	-0.14	0.46
26.0	6374.132	22.533	11.163	71.1	126.6	390.9	3.71	-0.14	0.52
27.0	6374.205	22.660	11.554	74.8	126.4	391.4	3.79	-0.14	0.59
28.0	6374.282	22.786	11.945	78.7	126.3	392.1	3.87	-0.14	0.66
29.0	6374.363	22.913	12.338	82.6	126.1	392.8	3.95	-0.14	0.73
30.0	6374.447	23.039	12.731	86.6	126.0	393.5	4.03	-0.14	0.81
31.0	6374.536	23.165	13.125	90.6	125.9	394.4	4.12	-0.14	0.90
32.0	6374.629	23.290	13.520	94.8	125.7	395.3	4.20	-0.14	0.99
33.0	6374.726	23.416	13.916	99.0	125.6	396.4	4.29	-0.14	1.09
34.0	6374.827	23.541	14.312	103.3	125.4	397.5	4.37	-0.14	1.20
35.0	6374.932	23.667	14.711	107.8	125.3	398.8	4.45	-0.13	1.32
36.0	6375.042	23.792	15.110	112.2	125.2	400.2	4.53	-0.13	1.45
37.0	6375.157	23.917	15.511	116.8	125.0	401.7	4.62	-0.12	1.59
38.0	6375.276	24.042	15.914	121.5	124.9	403.3	4.71	-0.12	1.73
39.0	6375.400	24.167	16.318	126.2	124.8	405.1	4.79	-0.11	1.87
40.0	6375.528	24.292	16.724	131.1	124.7	407.1	4.88	-0.11	2.03
41.0	6375.662	24.416	17.132	136.0	124.6	409.2	4.96	-0.11	2.19
42.0	6375.800	24.541	17.542	141.0	124.4	411.5	5.05	-0.11	2.36
43.0	6375.944	24.665	17.955	146.1	124.3	413.9	5.13	-0.11	2.54
44.0	6376.092	24.789	18.370	151.2	124.2	416.6	5.20	-0.11	2.73
45.0	6376.246	24.914	18.788	156.4	124.1	419.4	5.28	-0.11	2.91
46.0	6376.405	25.038	19.209	161.8	124.0	422.4	5.35	-0.10	3.09
47.0	6376.570	25.162	19.633	167.1	123.9	425.6	5.42	-0.09	3.27
48.0	6376.740	25.285	20.060	172.6	123.8	428.9	5.49	-0.08	3.46
49.0	6376.915	25.409	20.491	178.1	123.7	432.5	5.56	-0.08	3.65
50.0	6377.096	25.533	20.925	183.7	123.6	436.2	5.63	-0.08	3.84
51.0	6377.282	25.656	21.364	189.4	123.6	440.2	5.71	-0.08	4.05
52.0	6377.475	25.780	21.806	195.1	123.5	444.4	5.79	-0.09	4.28
53.0	6377.673	25.903	22.252	200.9	123.4	448.8	5.84	-0.09	4.51
54.0	6377.877	26.027	22.703	206.8	123.3	453.4	5.90	-0.10	4.75
55.0	6378.086	26.150	23.159	212.7	123.2	458.3	5.96	-0.10	4.99
56.0	6378.302	26.273	23.620	218.7	123.1	463.4	6.01	-0.09	5.23
57.0	6378.524	26.396	24.086	224.7	123.0	468.7	6.05	-0.09	5.48

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	6378.751	26.519	24.558	230.8	122.9	474.3	6.10	-0.09	5.72
59.0	6378.995	26.642	25.035	236.9	122.8	480.2	6.14	-0.08	5.98
60.0	6379.225	26.765	25.518	243.0	122.8	486.3	6.18	-0.07	6.23
61.0	6379.471	26.889	26.007	249.2	122.7	492.6	6.22	-0.06	6.48
62.0	6379.724	27.010	26.503	255.5	122.6	499.3	6.26	-0.04	6.74
63.0	6379.982	27.133	27.006	261.8	122.6	506.1	6.29	-0.03	7.00
64.0	6380.247	27.255	27.516	268.0	122.6	513.2	6.30	-0.01	7.25
65.0	6380.518	27.378	28.033	274.3	122.6	520.6	6.30	0.00	7.50
66.0	6380.796	27.501	28.557	280.6	122.6	528.2	6.30	0.02	7.74
MACH 1									
66.800	6381.022	27.599	28.982	285.7	122.6	534.5	6.29	0.04	7.94
67.0	6381.080	27.623	29.089	286.9	122.6	536.1	6.29	0.05	7.99
68.0	6381.370	27.746	29.629	293.2	122.7	544.2	6.28	0.07	8.23
69.0	6381.666	27.869	30.178	299.5	122.7	552.6	6.27	0.08	8.48
70.0	6381.969	27.991	30.734	305.7	122.8	561.2	6.27	0.10	8.76
71.0	6382.278	28.114	31.300	312.0	122.9	570.1	6.27	0.10	9.04
72.0	6382.593	28.237	31.875	318.3	123.0	579.3	6.28	0.09	9.35
73.0	6382.914	28.360	32.459	324.6	123.1	588.8	6.29	0.07	9.67
74.0	6383.242	28.483	33.052	330.9	123.1	598.6	6.29	0.04	10.01
75.0	6383.576	28.606	33.656	337.1	123.2	608.8	6.29	0.02	10.36
76.0	6383.916	28.730	34.270	343.4	123.2	619.4	6.27	0.00	10.72
77.0	6384.263	28.853	34.895	349.7	123.2	630.3	6.24	0.01	11.09
78.0	6384.615	28.976	35.531	355.9	123.2	641.6	6.22	0.03	11.45
79.0	6384.974	29.099	36.178	362.1	123.3	653.2	6.18	0.08	11.82
80.0	6385.340	29.223	36.837	368.2	123.4	665.2	6.14	0.16	12.20
81.0	6385.711	29.346	37.509	374.4	123.6	677.6	6.11	0.25	12.56
82.0	6386.088	29.470	38.193	380.5	123.9	690.3	6.09	0.36	12.92
MAXIMUM DYNAMIC PRESSURE									
82.600	6386.318	29.544	38.609	384.1	124.1	698.2	6.09	0.42	13.11
83.0	6386.472	29.594	38.890	386.5	124.3	703.4	6.10	0.46	13.23
84.0	6386.861	29.718	39.600	392.7	124.8	716.8	6.13	0.53	13.52
85.0	6387.257	29.844	40.323	398.8	125.3	730.4	6.19	0.57	13.78
86.0	6387.659	29.969	41.061	405.1	125.9	744.3	6.27	0.57	14.02
87.0	6388.067	30.095	41.812	411.4	126.4	758.5	6.37	0.52	14.23
88.0	6388.482	30.222	42.578	417.8	126.9	772.8	6.49	0.44	14.42
89.0	6388.903	30.349	43.359	424.3	127.3	787.3	6.61	0.35	14.62
90.0	6389.330	30.477	44.152	431.0	127.6	802.0	6.73	0.25	14.82
91.0	6389.765	30.604	44.962	437.8	127.8	817.0	6.83	0.18	15.04
92.0	6390.206	30.732	45.786	444.6	128.0	832.1	6.92	0.11	15.27

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
93.0	6390.654	30.860	46.626	451.6	128.0	847.5	6.99	0.04	15.53
94.0	6391.109	30.988	47.481	458.6	128.1	863.2	7.04	-0.01	15.81
95.0	6391.571	31.116	48.353	465.6	128.0	879.2	7.06	-0.07	16.12
96.0	6392.041	31.244	49.240	472.7	127.9	895.5	7.05	-0.11	16.47
97.0	6392.517	31.372	50.144	479.7	127.8	912.1	7.03	-0.14	16.85
98.0	6393.000	31.500	51.064	486.7	127.6	929.2	6.99	-0.16	17.24
99.0	6393.490	31.627	52.002	493.7	127.5	946.6	6.95	-0.17	17.63
100.0	6393.987	31.755	52.958	500.6	127.3	964.4	6.90	-0.18	18.02
101.0	6394.491	31.882	53.931	507.5	127.1	982.6	6.85	-0.17	18.41
102.0	6395.002	32.009	54.923	514.3	127.0	1001.2	6.81	-0.15	18.78
103.0	6395.520	32.136	55.934	521.1	126.8	1020.2	6.77	-0.14	19.14
104.0	6396.044	32.263	56.963	527.9	126.7	1039.5	6.75	-0.11	19.50
105.0	6396.576	32.389	58.013	534.6	126.6	1059.2	6.74	-0.09	19.85
106.0	6397.114	32.516	59.082	541.3	126.5	1079.2	6.73	-0.05	20.19
107.0	6397.658	32.642	60.171	548.0	126.5	1099.6	6.73	-0.01	20.53
108.0	6398.210	32.769	61.281	554.8	126.5	1120.3	6.74	0.03	20.87
109.0	6398.768	32.895	62.412	561.5	126.5	1141.3	6.74	0.05	21.20
110.0	6399.333	33.022	63.564	568.3	126.6	1162.7	6.75	0.06	21.53
111.0	6399.904	33.149	64.737	575.0	126.7	1184.4	6.76	0.06	21.87
112.0	6400.483	33.275	65.933	581.7	126.7	1206.4	6.75	0.05	22.21
113.0	6401.068	33.402	67.150	588.5	126.7	1228.8	6.76	0.04	22.56
114.0	6401.660	33.529	68.390	595.3	126.8	1251.5	6.76	0.02	22.91
115.0	6402.258	33.655	69.653	602.0	126.8	1274.6	6.77	0.02	23.26
116.0	6402.864	33.782	70.940	608.8	126.8	1298.1	6.79	0.03	23.62
117.0	6403.476	33.909	72.250	615.6	126.9	1321.9	6.80	0.04	23.99
118.0	6404.095	34.036	73.584	622.4	126.9	1346.0	6.81	0.06	24.36
119.0	6404.721	34.163	74.942	629.2	127.0	1370.6	6.80	0.08	24.74
120.0	6405.353	34.290	76.325	636.0	127.0	1395.5	6.78	0.09	25.14
121.0	6405.993	34.417	77.733	642.7	127.1	1420.9	6.73	0.10	25.55
122.0	6406.639	34.544	79.167	649.4	127.2	1446.6	6.66	0.09	25.95
123.0	6407.292	34.671	80.627	656.0	127.3	1472.8	6.60	0.09	26.37
124.0	6407.951	34.799	82.113	662.6	127.4	1499.3	6.55	0.08	26.78
125.0	6408.617	34.926	83.625	669.1	127.5	1526.4	6.51	0.07	27.23
126.0	6409.289	35.054	85.165	675.6	127.5	1553.9	6.49	0.07	27.70
127.0	6409.968	35.181	86.733	682.1	127.6	1581.8	6.49	0.07	28.16
128.0	6410.653	35.309	88.329	688.6	127.7	1610.2	6.50	0.06	28.61
129.0	6411.345	35.437	89.953	695.1	127.8	1639.0	6.52	0.10	29.05
130.0	6412.044	35.564	91.608	701.6	127.8	1668.3	6.54	0.10	29.49
131.0	6412.749	35.692	93.291	708.2	128.0	1698.0	6.56	0.10	29.93
132.0	6413.460	35.820	95.004	714.7	128.1	1728.1	6.57	0.11	30.36
133.0	6414.178	35.949	96.747	721.3	128.1	1758.7	6.58	0.09	30.81
134.0	6414.903	36.077	98.522	727.9	128.2	1789.7	6.59	0.10	31.26
135.0	6415.634	36.205	100.327	734.5	128.3	1821.2	6.61	0.06	31.70

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
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.160	6415.751	36.226	100.620	735.5	128.3	1826.3	6.61	0.06	31.78
136.0	6416.370	36.333	102.163	739.3	128.4	1850.5	3.17	0.07	25.30
137.0	6417.112	36.462	104.027	742.5	128.4	1875.9	3.18	0.02	25.64
138.0	6417.856	36.590	105.916	745.7	128.4	1901.8	3.18	-0.02	25.97
139.0	6418.602	36.719	107.829	748.8	128.4	1927.9	3.18	-0.02	26.31
140.0	6419.353	36.847	109.771	752.0	128.3	1954.3	3.20	-0.08	26.67
141.0	6420.106	36.975	111.738	755.2	128.3	1981.1	3.21	-0.07	27.04
142.0	6420.863	37.104	113.733	758.4	128.2	2008.3	3.23	-0.05	27.39
143.0	6421.623	37.232	115.756	761.7	128.1	2035.9	3.25	-0.09	27.73
144.0	6422.387	37.360	117.806	764.9	128.1	2064.0	3.27	-0.04	28.08
145.0	6423.153	37.488	119.884	768.2	128.1	2092.2	3.30	-0.02	28.47
146.0	6423.923	37.616	121.990	771.5	128.1	2120.9	3.32	-0.01	28.81
147.0	6424.696	37.744	124.126	774.8	128.1	2149.9	3.34	0.01	29.18
148.0	6425.473	37.872	126.290	778.2	128.1	2179.3	3.37	0.02	29.56
149.0	6426.252	38.000	128.484	781.6	128.1	2209.0	3.41	0.03	29.96
150.0	6427.036	38.128	130.708	785.0	128.1	2239.2	3.44	0.03	30.36
151.0	6427.822	38.256	132.963	788.4	128.2	2269.7	3.48	0.04	30.76
152.0	6428.613	38.385	135.248	791.9	128.2	2300.7	3.51	0.04	31.17
153.0	6429.406	38.513	137.564	795.5	128.3	2331.9	3.55	0.05	31.58
154.0	6430.204	38.641	139.912	799.0	128.3	2363.7	3.59	0.04	31.98
155.0	6431.004	38.769	142.292	802.6	128.3	2395.9	3.64	0.04	32.48
156.0	6431.809	38.898	144.705	806.3	128.4	2428.6	3.69	0.01	32.92
157.0	6432.617	39.026	147.150	810.0	128.4	2461.7	3.76	0.02	33.35
158.0	6433.429	39.154	149.629	813.8	128.4	2495.3	3.84	0.05	33.86
159.0	6434.245	39.283	152.142	817.7	128.5	2529.5	3.91	0.09	34.36
160.0	6435.064	39.411	154.688	821.6	128.5	2564.1	4.01	0.04	34.84
161.0	6435.892	39.540	157.281	825.7	128.6	2599.2	4.12	0.04	35.33
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
161.630	6436.404	39.621	158.904	828.3	128.6	2621.2	4.18	-0.03	35.63
162.0	6436.718	39.668	159.892	828.1	128.6	2629.5	-9.25	-0.03	1.06
S-IC/S-II SEPARATION COMMAND									
162.310	6436.974	39.709	160.709	825.3	128.6	2629.8	-9.25	-0.03	1.06
164.0	6438.356	39.926	165.154	809.6	128.5	2631.6	-9.25	-0.06	1.05
166.0	6439.958	40.183	170.426	792.1	128.4	2635.5	-7.65	-0.06	4.67
168.0	6441.527	40.439	175.706	777.6	128.3	2646.5	-7.15	-0.04	5.78
170.0	6443.069	40.696	181.012	763.4	128.1	2658.6	-6.78	-0.05	6.76

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
172.0	6444.582	40.952	186.343	750.0	128.0	2672.5	-6.71	-0.05	6.91
174.0	6446.069	41.208	191.702	736.6	127.9	2686.4	-6.67	-0.05	7.02
176.0	6447.529	41.463	197.089	723.3	127.8	2700.5	-6.65	-0.05	7.05
178.0	6448.962	41.719	202.504	710.0	127.7	2714.7	-6.64	-0.05	7.08
180.0	6450.369	41.974	207.948	696.7	127.6	2728.9	-6.62	-0.04	7.11
182.0	6451.749	42.230	213.420	683.5	127.5	2743.1	-6.60	-0.04	7.14
184.0	6453.103	42.484	218.920	670.3	127.4	2757.4	-6.58	-0.04	7.17
186.0	6454.430	42.739	224.449	657.2	127.3	2771.8	-6.56	-0.05	7.19
188.0	6455.732	42.994	230.007	644.1	127.2	2786.2	-6.55	-0.05	7.22
190.0	6457.007	43.248	235.594	631.0	127.2	2800.7	-6.52	-0.05	7.25
192.0	6458.255	43.502	241.210	618.0	127.1	2815.2	-6.50	-0.05	7.28
194.0	6459.478	43.756	246.855	605.0	127.0	2829.8	-6.47	-0.05	7.33
196.0	6460.675	44.010	252.530	592.0	126.9	2844.5	-6.44	-0.05	7.37
198.0	6461.847	44.264	258.233	579.2	126.8	2859.3	-6.41	-0.05	7.41
200.0	6462.992	44.517	263.967	566.3	126.7	2874.2	-6.44	-0.05	7.47
202.0	6464.112	44.771	269.730	553.4	126.6	2889.2	-6.47	-0.05	7.51
204.0	6465.206	45.024	275.524	540.5	126.5	2904.3	-6.42	-0.05	7.53
206.0	6466.274	45.276	281.347	527.8	126.3	2919.3	-6.25	-0.07	7.49
208.0	6467.317	45.529	287.201	515.6	126.1	2934.2	-5.97	-0.10	7.40
210.0	6468.336	45.781	293.084	503.9	125.9	2948.9	-5.70	-0.12	7.30
212.0	6469.333	46.033	298.996	492.7	125.7	2963.4	-5.45	-0.13	7.21
214.0	6470.308	46.284	304.937	482.0	125.4	2977.7	-5.29	-0.13	7.16
216.0	6471.261	46.534	310.907	471.5	125.1	2992.0	-5.20	-0.13	7.14
218.0	6472.194	46.784	316.905	461.1	124.9	3006.3	-5.14	-0.13	7.14
220.0	6473.105	47.034	322.932	450.8	124.6	3020.6	-5.14	-0.13	7.18
222.0	6473.997	47.283	328.988	440.5	124.3	3035.0	-5.16	-0.13	7.22
224.0	6474.867	47.531	335.073	430.2	124.1	3049.5	-5.17	-0.13	7.26
226.0	6475.718	47.779	341.186	419.8	123.8	3064.1	-5.18	-0.13	7.31
228.0	6476.547	48.026	347.329	409.4	123.5	3078.7	-5.19	-0.13	7.35
230.0	6477.355	48.273	353.501	399.1	123.3	3093.5	-5.18	-0.13	7.38
232.0	6478.143	48.519	359.703	388.7	123.0	3108.3	-5.18	-0.13	7.42
234.0	6478.910	48.765	365.935	378.3	122.7	3123.2	-5.19	-0.14	7.46
236.0	6479.656	49.010	372.196	367.9	122.4	3138.1	-5.19	-0.14	7.49
238.0	6480.382	49.255	378.487	357.5	122.2	3153.2	-5.20	-0.14	7.53
240.0	6481.086	49.499	384.808	347.1	121.9	3168.3	-5.20	-0.13	7.57
242.0	6481.770	49.742	391.160	336.7	121.6	3183.5	-5.21	-0.13	7.62
244.0	6482.433	49.985	397.542	326.2	121.3	3198.7	-5.22	-0.13	7.66
246.0	6483.075	50.227	403.955	315.8	121.1	3214.1	-5.22	-0.14	7.70
248.0	6483.696	50.469	410.399	305.3	120.8	3229.6	-5.22	-0.13	7.74
250.0	6484.296	50.711	416.874	294.9	120.5	3245.1	-5.23	-0.13	7.79
252.0	6484.876	50.951	423.379	284.4	120.3	3260.7	-5.24	-0.13	7.83
254.0	6485.434	51.192	429.916	273.9	120.0	3276.4	-5.25	-0.14	7.87
256.0	6485.971	51.431	436.485	263.4	119.7	3292.2	-5.25	-0.13	7.91

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
258.0	6486.488	51.671	443.085	252.9	119.4	3308.1	-5.26	-0.13	7.96
260.0	6486.983	51.909	449.717	242.3	119.2	3324.1	-5.27	-0.13	8.01
262.0	6487.457	52.147	456.392	231.8	118.9	3340.1	-5.28	-0.14	8.05
264.0	6487.910	52.385	463.078	221.2	118.6	3356.3	-5.29	-0.14	8.10
266.0	6488.341	52.622	469.807	210.6	118.4	3372.5	-5.29	-0.13	8.15
268.0	6488.752	52.858	476.568	200.0	118.1	3388.9	-5.30	-0.12	8.20
270.0	6489.141	53.094	483.362	189.3	117.8	3405.3	-5.31	-0.13	8.25
272.0	6489.509	53.329	490.189	178.7	117.6	3421.9	-5.31	-0.13	8.29
274.0	6489.856	53.564	497.050	168.1	117.3	3438.5	-5.32	-0.13	8.33
276.0	6490.182	53.799	503.943	157.4	117.0	3455.2	-5.34	-0.13	8.39
278.0	6490.486	54.032	510.871	146.7	116.8	3472.0	-5.35	-0.12	8.44
280.0	6490.768	54.266	517.832	136.0	116.5	3489.0	-5.37	-0.13	8.49
282.0	6491.030	54.499	524.827	125.2	116.2	3506.0	-5.38	-0.14	8.54
284.0	6491.269	54.731	531.856	114.4	116.0	3523.1	-5.39	-0.13	8.59
286.0	6491.487	54.962	538.919	103.6	115.7	3540.4	-5.40	-0.13	8.64
288.0	6491.684	55.193	546.017	92.8	115.4	3557.7	-5.41	-0.13	8.69
290.0	6491.858	55.424	553.150	82.0	115.2	3575.1	-5.42	-0.13	8.74
292.0	6492.011	55.654	560.318	71.1	114.9	3592.6	-5.43	-0.13	8.79
294.0	6492.143	55.884	567.521	60.2	114.7	3610.3	-5.45	-0.13	8.84
296.0	6492.252	56.113	574.759	49.3	114.4	3628.0	-5.46	-0.13	8.90
298.0	6492.340	56.341	582.033	38.3	114.1	3645.9	-5.48	-0.13	8.95
300.0	6492.406	56.569	589.342	27.4	113.9	3663.8	-5.49	-0.13	9.00
302.0	6492.449	56.797	596.688	16.3	113.6	3681.9	-5.51	-0.13	9.06
304.0	6492.471	57.024	604.070	5.3	113.3	3700.1	-5.52	-0.13	9.11
306.0	6492.471	57.250	611.488	-5.8	113.1	3718.3	-5.54	-0.13	9.17
308.0	6492.448	57.476	618.943	-16.9	112.8	3736.7	-5.55	-0.13	9.22
310.0	6492.403	57.702	626.435	-28.0	112.6	3755.2	-5.57	-0.13	9.28
312.0	6492.336	57.926	633.964	-39.2	112.3	3773.9	-5.59	-0.13	9.34
314.0	6492.246	58.151	641.531	-50.4	112.0	3792.6	-5.61	-0.13	9.39
316.0	6492.134	58.375	649.135	-61.6	111.8	3811.4	-5.62	-0.12	9.45
318.0	6492.000	58.598	656.777	-72.9	111.5	3830.4	-5.64	-0.12	9.51
320.0	6491.843	58.821	664.457	-84.2	111.3	3849.5	-5.66	-0.13	9.57
322.0	6491.663	59.043	672.175	-95.6	111.0	3868.7	-5.68	-0.13	9.64
324.0	6491.460	59.265	679.932	-107.0	110.7	3888.0	-5.71	-0.13	9.70
326.0	6491.235	59.486	687.727	-118.4	110.5	3907.5	-5.72	-0.12	9.75
328.0	6490.987	59.707	695.562	-129.9	110.2	3927.1	-5.74	-0.12	9.81
330.0	6490.716	59.927	703.435	-141.4	110.0	3946.8	-5.76	-0.12	9.88
332.0	6490.421	60.147	711.349	-153.0	109.7	3966.6	-5.79	-0.12	9.94
334.0	6490.104	60.366	719.302	-164.6	109.5	3986.5	-5.80	-0.12	10.00
336.0	6489.763	60.584	727.295	-176.2	109.2	4006.6	-5.82	-0.12	10.06
338.0	6489.399	60.803	735.328	-187.9	109.0	4026.8	-5.85	-0.12	10.13
340.0	6489.011	61.020	743.402	-199.6	108.7	4047.1	-5.89	-0.12	10.20
342.0	6488.600	61.238	751.517	-211.4	108.5	4067.6	-5.91	-0.13	10.27

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
344.0	6488.166	61.454	759.673	-223.3	108.2	4088.2	-5.92	-0.12	10.33
346.0	6487.707	61.670	767.870	-235.2	108.0	4108.9	-5.95	-0.12	10.40
348.0	6487.225	61.886	776.109	-247.1	107.7	4129.8	-5.98	-0.11	10.47
350.0	6486.719	62.101	784.389	-259.1	107.5	4150.8	-6.01	-0.12	10.54
352.0	6486.189	62.316	792.712	-271.2	107.2	4172.0	-6.04	-0.12	10.60
354.0	6485.634	62.530	801.077	-283.3	107.0	4193.2	-6.06	-0.13	10.67
356.0	6485.055	62.744	809.485	-295.4	106.7	4214.7	-6.08	-0.12	10.75
358.0	6484.452	62.957	817.936	-307.6	106.5	4236.2	-6.12	-0.12	10.82
360.0	6483.825	63.170	826.430	-319.9	106.2	4258.0	-6.16	-0.12	10.90
362.0	6483.173	63.382	834.968	-332.3	106.0	4279.8	-6.19	-0.12	10.97
364.0	6482.496	63.594	843.550	-344.7	105.7	4301.9	-6.21	-0.12	11.04
366.0	6481.794	63.805	852.175	-357.2	105.5	4324.0	-6.24	-0.12	11.12
368.0	6481.067	64.016	860.846	-369.7	105.3	4346.3	-6.27	-0.12	11.19
370.0	6480.315	64.226	869.561	-382.3	105.0	4368.8	-6.30	-0.12	11.27
372.0	6479.538	64.436	878.321	-394.9	104.8	4391.4	-6.33	-0.12	11.35
374.0	6478.735	64.645	887.127	-407.7	104.5	4414.2	-6.38	-0.12	11.43
376.0	6477.907	64.854	895.978	-420.5	104.3	4437.1	-6.42	-0.12	11.51
378.0	6477.053	65.062	904.875	-433.3	104.0	4460.2	-6.45	-0.12	11.59
380.0	6476.174	65.270	913.819	-446.3	103.8	4483.5	-6.48	-0.11	11.67
382.0	6475.268	65.477	922.810	-459.3	103.6	4506.9	-6.51	-0.12	11.75
384.0	6474.337	65.684	931.847	-472.3	103.3	4530.5	-6.54	-0.12	11.83
386.0	6473.379	65.891	940.932	-485.5	103.1	4554.3	-6.57	-0.12	11.91
388.0	6472.395	66.097	950.064	-498.7	102.8	4578.2	-6.61	-0.11	12.00
390.0	6471.384	66.302	959.245	-511.9	102.6	4602.3	-6.66	-0.11	12.09
392.0	6470.347	66.507	968.474	-525.3	102.4	4626.6	-6.70	-0.11	12.18
394.0	6469.283	66.712	977.751	-538.8	102.2	4651.0	-6.74	-0.11	12.27
396.0	6468.192	66.916	987.078	-552.3	101.9	4675.6	-6.77	-0.11	12.35
398.0	6467.073	67.119	996.454	-565.9	101.7	4700.4	-6.81	-0.11	12.44
400.0	6465.928	67.322	1005.879	-579.6	101.5	4725.4	-6.85	-0.11	12.53
402.0	6464.755	67.525	1015.355	-593.3	101.3	4750.6	-6.89	-0.10	12.63
404.0	6463.555	67.727	1024.882	-607.2	101.0	4775.9	-6.94	-0.10	12.71
406.0	6462.326	67.929	1034.459	-621.1	100.8	4801.4	-6.98	-0.11	12.80
408.0	6461.070	68.131	1044.088	-635.1	100.6	4827.1	-7.04	-0.11	12.91
410.0	6459.786	68.332	1053.768	-649.3	100.4	4853.1	-7.08	-0.11	13.02
412.0	6458.473	68.532	1063.500	-663.5	100.1	4879.2	-7.12	-0.11	13.11
414.0	6457.132	68.732	1073.285	-677.8	99.9	4905.5	-7.17	-0.11	13.20
416.0	6455.762	68.932	1083.122	-692.2	99.7	4932.0	-7.22	-0.10	13.30
418.0	6454.363	69.131	1093.013	-706.7	99.5	4958.8	-7.26	-0.10	13.41
420.0	6452.935	69.330	1102.957	-721.3	99.3	4985.7	-7.31	-0.10	13.51
422.0	6451.478	69.528	1112.956	-736.0	99.1	5012.8	-7.37	-0.11	13.62
424.0	6449.991	69.726	1123.009	-750.8	98.9	5040.2	-7.43	-0.11	13.72
426.0	6448.474	69.924	1133.117	-765.7	98.6	5067.7	-7.48	-0.10	13.82
428.0	6446.928	70.121	1143.280	-780.8	98.4	5095.5	-7.53	-0.10	13.93

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
430.0	6445.351	70.317	1153.499	-795.9	98.2	5123.5	-7.58	-0.10	14.05
432.0	6443.744	70.514	1163.774	-811.1	98.0	5151.7	-7.64	-0.11	14.16
434.0	6442.107	70.709	1174.106	-826.5	97.8	5180.1	-7.70	-0.11	14.27
436.0	6440.438	70.905	1184.494	-842.0	97.5	5208.8	-7.76	-0.11	14.38
438.0	6438.739	71.099	1194.941	-857.6	97.3	5237.7	-7.81	-0.10	14.50
440.0	6437.008	71.294	1205.445	-873.3	97.1	5266.8	-7.87	-0.10	14.62
442.0	6435.246	71.488	1216.008	-889.1	96.9	5296.2	-7.93	-0.09	14.74
444.0	6433.451	71.682	1226.630	-905.0	96.7	5325.8	-7.99	-0.09	14.86
446.0	6431.625	71.875	1237.312	-921.1	96.5	5355.6	-8.06	-0.09	14.98
448.0	6429.767	72.068	1248.053	-937.3	96.3	5385.7	-8.12	-0.09	15.10
450.0	6427.876	72.260	1258.855	-953.6	96.2	5416.1	-8.19	-0.09	15.23
452.0	6425.953	72.452	1269.717	-970.1	96.0	5446.6	-8.26	-0.08	15.36
454.0	6423.996	72.644	1280.641	-986.7	95.8	5477.4	-8.32	-0.08	15.50
456.0	6422.006	72.836	1291.628	-1003.5	95.6	5508.6	-8.39	-0.09	15.63
458.0	6419.982	73.027	1302.676	-1020.3	95.4	5540.0	-8.47	-0.09	15.76
460.0	6417.924	73.217	1313.788	-1037.4	95.3	5571.6	-8.55	-0.10	15.89
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
460.610	6417.299	73.275	1317.138	-1042.5	95.2	5581.1	-8.57	-0.12	15.93
462.0	6415.832	73.408	1324.960	-1054.5	95.1	5599.3	-8.69	-0.10	12.48
464.0	6413.705	73.598	1336.183	-1072.2	94.8	5624.3	-8.84	-0.16	12.53
466.0	6411.544	73.787	1347.457	-1089.8	94.4	5649.4	-8.74	-0.17	12.59
468.0	6409.347	73.975	1358.782	-1107.1	94.1	5674.6	-8.57	-0.15	12.66
470.0	6407.116	74.163	1370.157	-1124.0	93.8	5700.1	-8.35	-0.15	12.75
472.0	6404.851	74.350	1381.582	-1140.5	93.5	5725.8	-8.22	-0.15	12.82
474.0	6402.554	74.537	1393.060	-1156.9	93.2	5751.5	-8.18	-0.15	12.92
476.0	6400.224	74.723	1404.589	-1173.3	92.9	5777.5	-8.21	-0.14	13.02
478.0	6397.861	74.909	1416.170	-1189.8	92.6	5803.6	-8.26	-0.13	13.12
480.0	6395.465	75.094	1427.803	-1206.4	92.3	5829.9	-8.33	-0.12	13.21
482.0	6393.035	75.278	1439.490	-1223.1	92.1	5856.5	-8.40	-0.11	13.30
484.0	6390.572	75.462	1451.229	-1240.0	91.9	5883.1	-8.47	-0.10	13.39
486.0	6388.075	75.646	1463.023	-1257.1	91.7	5910.0	-8.56	-0.10	13.49
488.0	6385.543	75.829	1474.870	-1274.4	91.5	5937.1	-8.65	-0.11	13.58
490.0	6382.977	76.012	1486.766	-1291.8	91.3	5961.6	-8.75	-0.07	10.64
492.0	6380.375	76.194	1498.708	-1309.5	91.2	5981.8	-8.94	-0.07	10.05
494.0	6377.738	76.376	1510.691	-1327.6	91.0	6001.9	-9.16	-0.07	10.06
496.0	6375.064	76.558	1522.715	-1346.1	90.9	6022.1	-9.37	-0.06	10.08
498.0	6372.353	76.740	1534.779	-1365.0	90.7	6042.3	-9.42	-0.06	10.10
500.0	6369.604	76.921	1546.884	-1383.7	90.6	6062.5	-9.31	-0.06	10.13
502.0	6366.818	77.102	1559.030	-1402.1	90.5	6082.9	-9.12	-0.07	10.16
504.0	6363.996	77.283	1571.216	-1420.3	90.3	6103.2	-9.00	-0.07	10.20
506.0	6361.137	77.463	1583.443	-1438.3	90.1	6123.7	-8.98	-0.08	10.27

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
508.0	6358.243	77.644	1595.711	-1456.3	90.0	6144.3	-9.00	-0.09	10.33
510.0	6355.312	77.823	1608.020	-1474.3	89.8	6165.0	-9.03	-0.09	10.38
512.0	6352.346	78.003	1620.371	-1492.4	89.6	6185.9	-9.08	-0.09	10.42
514.0	6349.342	78.182	1632.764	-1510.7	89.4	6206.8	-9.18	-0.08	10.47
516.0	6346.303	78.360	1645.198	-1529.2	89.2	6227.8	-9.27	-0.08	10.52
518.0	6343.226	78.539	1657.675	-1547.8	89.1	6248.9	-9.36	-0.07	10.58
520.0	6340.111	78.717	1670.194	-1566.6	88.9	6270.1	-9.43	-0.06	10.63
522.0	6336.959	78.894	1682.755	-1585.6	88.8	6291.4	-9.51	-0.06	10.70
524.0	6333.769	79.072	1695.360	-1604.7	88.7	6312.9	-9.59	-0.05	10.76
526.0	6330.540	79.249	1708.007	-1624.0	88.6	6334.5	-9.66	-0.05	10.81
528.0	6327.273	79.426	1720.697	-1643.4	88.4	6356.1	-9.73	-0.06	10.87
530.0	6323.966	79.603	1733.432	-1662.9	88.3	6378.0	-9.80	-0.06	10.93
532.0	6320.621	79.779	1746.209	-1682.6	88.2	6399.9	-9.86	-0.06	10.99
534.0	6317.236	79.956	1759.031	-1702.4	88.0	6421.9	-9.93	-0.06	11.06
536.0	6313.811	80.132	1771.897	-1722.4	87.9	6444.1	-9.99	-0.06	11.12
538.0	6310.346	80.307	1784.808	-1742.4	87.8	6466.4	-10.05	-0.06	11.18
540.0	6306.841	80.483	1797.763	-1762.6	87.7	6488.8	-10.11	-0.05	11.24
542.0	6303.296	80.658	1810.763	-1782.9	87.5	6511.4	-10.17	-0.06	11.29
544.0	6299.709	80.833	1823.809	-1803.4	87.4	6534.0	-10.24	-0.06	11.35
546.0	6296.082	81.007	1836.899	-1824.0	87.3	6556.7	-10.31	-0.06	11.43
548.0	6292.414	81.182	1850.036	-1844.7	87.2	6579.6	-10.37	-0.03	11.48
550.0	6288.703	81.356	1863.218	-1865.5	87.1	6602.6	-10.43	-0.06	11.50
552.0	6284.952	81.530	1876.447	-1886.5	87.0	6625.6	-10.50	-0.03	11.51
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
552.640	6283.760	81.585	1880.627	-1893.1	86.9	6632.8	-10.52	-0.18	11.51
S-II/S-IVB SEPARATION COMMAND									
553.500	6282.111	81.660	1886.394	-1901.2	86.8	6633.0	-8.90	-0.08	-2.51
554.0	6281.159	81.704	1889.712	-1905.6	86.8	6631.8	-8.90	-0.10	-2.51
556.0	6277.329	81.877	1902.978	-1923.4	86.6	6626.8	-8.90	-0.10	-2.50
558.0	6273.464	82.050	1916.228	-1941.4	86.4	6623.8	-9.08	-0.12	-0.08
560.0	6269.563	82.223	1929.477	-1959.8	86.2	6626.1	-9.33	-0.09	1.96
562.0	6265.623	82.395	1942.737	-1978.9	86.0	6630.9	-9.44	-0.11	2.71
564.0	6261.647	82.566	1956.005	-1997.9	85.7	6636.7	-9.50	-0.13	2.83
566.0	6257.632	82.738	1969.284	-2017.0	85.4	6642.3	-9.59	-0.15	2.74
568.0	6253.579	82.908	1982.574	-2036.2	85.1	6647.8	-9.66	-0.14	2.72
570.0	6249.487	83.078	1995.875	-2055.6	84.8	6653.3	-9.68	-0.13	2.77
572.0	6245.356	83.247	2009.187	-2075.0	84.6	6658.8	-9.69	-0.13	2.76
574.0	6241.187	83.416	2022.510	-2094.5	84.3	6664.4	-9.74	-0.12	2.76
576.0	6236.978	83.585	2035.844	-2114.0	84.1	6669.9	-9.78	-0.11	2.75

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
578.0	6232.731	83.753	2049.190	-2133.6	83.9	6675.4	-9.80	-0.08	2.73
580.0	6228.444	83.920	2062.546	-2153.2	83.7	6680.8	-9.81	-0.07	2.72
582.0	6224.118	84.087	2075.913	-2172.9	83.5	6686.3	-9.83	-0.07	2.71
584.0	6219.752	84.254	2089.291	-2192.7	83.4	6691.7	-9.88	-0.08	2.70
586.0	6215.347	84.421	2102.680	-2212.5	83.2	6697.1	-9.92	-0.08	2.68
588.0	6210.902	84.587	2116.079	-2232.3	83.1	6702.4	-9.93	-0.07	2.67
590.0	6206.418	84.753	2129.489	-2252.2	82.9	6707.8	-9.94	-0.06	2.67
592.0	6201.893	84.919	2142.910	-2272.2	82.8	6713.1	-9.96	-0.05	2.66
594.0	6197.329	85.084	2156.342	-2292.1	82.7	6718.4	-9.99	-0.04	2.66
596.0	6192.725	85.250	2169.784	-2312.2	82.6	6723.8	-10.02	-0.04	2.66
598.0	6188.080	85.415	2183.237	-2332.3	82.5	6729.1	-10.05	-0.03	2.65
600.0	6183.396	85.580	2196.700	-2352.4	82.5	6734.4	-10.07	-0.03	2.63
602.0	6178.671	85.745	2210.174	-2372.6	82.4	6739.6	-10.09	-0.03	2.61
604.0	6173.905	85.909	2223.659	-2392.8	82.3	6744.8	-10.12	-0.04	2.60
606.0	6169.099	86.074	2237.154	-2413.1	82.2	6750.0	-10.15	-0.04	2.59
608.0	6164.253	86.238	2250.659	-2433.5	82.1	6755.2	-10.17	-0.04	2.58
610.0	6159.366	86.402	2264.174	-2453.8	82.0	6760.4	-10.18	-0.04	2.58
612.0	6154.438	86.566	2277.700	-2474.2	81.9	6765.6	-10.21	-0.04	2.58
614.0	6149.469	86.730	2291.237	-2494.7	81.9	6770.7	-10.24	-0.03	2.58
616.0	6144.459	86.894	2304.783	-2515.2	81.8	6775.9	-10.27	-0.03	2.56
618.0	6139.408	87.057	2318.340	-2535.9	81.7	6781.0	-10.29	-0.03	2.54
620.0	6134.315	87.220	2331.907	-2556.5	81.6	6786.1	-10.32	-0.03	2.53
622.0	6129.182	87.384	2345.484	-2577.1	81.6	6791.1	-10.33	-0.04	2.52
624.0	6124.007	87.547	2359.072	-2597.9	81.5	6796.1	-10.35	-0.04	2.51
626.0	6118.790	87.710	2372.669	-2618.6	81.4	6801.2	-10.37	-0.03	2.50
628.0	6113.532	87.872	2386.276	-2639.4	81.3	6806.1	-10.40	-0.03	2.48
630.0	6108.232	88.035	2399.893	-2660.3	81.2	6811.1	-10.42	-0.04	2.47
632.0	6102.891	88.197	2413.521	-2681.1	81.1	6816.0	-10.44	-0.04	2.46
634.0	6097.508	88.359	2427.158	-2702.1	81.1	6821.0	-10.46	-0.04	2.45
636.0	6092.083	88.521	2440.804	-2723.0	81.0	6825.9	-10.48	-0.03	2.44
638.0	6086.616	88.683	2454.461	-2744.0	80.9	6830.8	-10.51	-0.04	2.43
640.0	6081.107	88.845	2468.127	-2765.1	80.8	6835.6	-10.53	-0.04	2.42
642.0	6075.555	89.007	2481.803	-2786.2	80.7	6840.5	-10.55	-0.04	2.41
644.0	6069.962	89.168	2495.489	-2807.4	80.6	6845.3	-10.57	-0.05	2.41
646.0	6064.326	89.329	2509.185	-2828.5	80.5	6850.1	-10.59	-0.05	2.40
648.0	6058.647	89.490	2522.890	-2849.8	80.4	6854.9	-10.62	-0.05	2.40
650.0	6052.927	89.650	2536.604	-2871.1	80.3	6859.7	-10.65	-0.05	2.39
652.0	6047.163	89.811	2550.329	-2892.4	80.2	6864.5	-10.67	-0.05	2.39
654.0	6041.357	89.971	2564.062	-2913.8	80.1	6869.3	-10.69	-0.04	2.39
656.0	6035.508	90.131	2577.806	-2935.2	80.0	6874.1	-10.71	-0.04	2.37
658.0	6029.616	90.291	2591.559	-2956.7	79.9	6878.8	-10.72	-0.05	2.35
660.0	6023.681	90.451	2605.321	-2978.2	79.7	6883.5	-10.74	-0.05	2.33
662.0	6017.703	90.610	2619.093	-2999.7	79.6	6888.2	-10.77	-0.05	2.32

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
664.0	6011.682	90.769	2632.874	-3021.3	79.5	6892.8	-10.79	-0.05	2.32
666.0	6005.618	90.928	2646.664	-3042.9	79.4	6897.5	-10.81	-0.05	2.32
668.0	5999.511	91.087	2660.463	-3064.6	79.3	6902.1	-10.81	-0.05	2.31
670.0	5993.360	91.245	2674.272	-3086.2	79.2	6906.7	-10.82	-0.06	2.30
672.0	5987.166	91.403	2688.090	-3107.9	79.0	6911.3	-10.85	-0.06	2.28
674.0	5980.928	91.561	2701.917	-3129.7	78.9	6915.9	-10.89	-0.06	2.27
676.0	5974.647	91.719	2715.754	-3151.5	78.8	6920.4	-10.92	-0.05	2.26
678.0	5968.322	91.876	2729.599	-3173.4	78.7	6924.9	-10.92	-0.05	2.26
680.0	5961.953	92.033	2743.453	-3195.2	78.5	6929.5	-10.90	-0.05	2.27
682.0	5955.541	92.190	2757.317	-3217.1	78.4	6934.0	-10.89	-0.05	2.26
684.0	5949.085	92.347	2771.189	-3238.9	78.3	6938.5	-10.90	-0.05	2.26
686.0	5942.586	92.504	2785.071	-3260.7	78.2	6943.1	-10.90	-0.06	2.26
688.0	5936.042	92.660	2798.962	-3282.5	78.0	6947.6	-10.91	-0.06	2.26
690.0	5929.455	92.816	2812.861	-3304.4	77.9	6952.1	-10.91	-0.07	2.25
692.0	5922.825	92.972	2826.770	-3326.2	77.8	6956.6	-10.91	-0.06	2.25
694.0	5916.151	93.127	2840.688	-3348.1	77.6	6961.1	-10.92	-0.05	2.26
696.0	5909.432	93.282	2854.615	-3370.0	77.5	6965.6	-10.93	-0.06	2.26
698.0	5902.671	93.437	2868.550	-3391.9	77.3	6970.2	-10.93	-0.05	2.26
700.0	5895.865	93.591	2882.495	-3413.7	77.2	6974.7	-10.93	-0.05	2.26
702.0	5889.016	93.746	2896.449	-3435.6	77.0	6979.2	-10.94	-0.09	2.26
S-IVB 1ST GUIDANCE CUTOFF									
703.760	5882.984	93.881	2908.672	-3454.8	76.9	6983.2	-10.94	-0.16	2.26
704.0	5882.123	93.900	2910.412	-3457.3	76.9	6983.2	-8.80	-0.06	-2.02
706.0	5875.192	94.053	2924.369	-3474.0	76.6	6975.5	-8.27	-0.11	-4.14
708.0	5868.227	94.206	2938.314	-3490.6	76.4	6967.2	-8.26	-0.11	-4.16
710.0	5961.229	94.359	2952.239	-3507.1	76.2	6958.9	-8.25	-0.11	-4.17
712.0	5854.198	94.511	2966.149	-3523.7	75.9	6950.6	-8.24	-0.11	-4.19
PARKING ORBIT INSERTION									
713.760	5847.382	94.642	2978.370	-3538.2	75.7	6943.2	-8.23	-0.11	-4.21

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
GUIDANCE REFERENCE RELEASE											
-16.969	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-16.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-15.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-14.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-13.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-12.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-11.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-10.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-9.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-8.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-7.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-6.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-5.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-4.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-3.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-2.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
-1.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
0.0	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
FIRST MOTION											
0.250	6373.354	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	408.6	0	64
START OF TIME BASE 1											
0.580	6373.355	-80.6209	28.4658	20.82	88.53	0.4	90.00	0.06	408.6	0	65
1.0	6373.355	-80.6209	28.4658	17.49	88.61	1.0	90.00	0.14	408.6	0	66
2.0	6373.356	-80.6209	28.4658	57.97	88.59	3.0	89.99	0.41	408.6	0	67
3.0	6373.360	-80.6209	28.4658	116.50	87.90	5.2	90.01	0.73	408.8	0	71
4.0	6373.366	-80.6209	28.4658	136.03	86.74	7.5	90.04	1.05	408.9	0	77
5.0	6373.375	-80.6209	28.4658	141.76	86.01	9.8	90.08	1.37	409.1	1	85
6.0	6373.386	-80.6209	28.4658	145.92	85.56	12.2	90.11	1.70	409.3	1	96
7.0	6373.399	-80.6209	28.4658	149.68	85.30	14.7	90.15	2.05	409.4	3	109
8.0	6373.415	-80.6208	28.4657	153.30	85.15	17.2	90.18	2.40	409.6	4	125
9.0	6373.433	-80.6208	28.4657	156.84	85.04	19.8	90.22	2.75	409.7	5	144
10.0	6373.454	-80.6208	28.4657	160.47	84.96	22.3	90.26	3.11	409.8	7	164
11.0	6373.477	-80.6208	28.4657	163.81	85.05	25.0	90.29	3.48	409.9	9	187
12.0	6373.503	-80.6208	28.4657	167.22	85.29	27.6	90.31	3.85	410.0	11	213
13.0	6373.531	-80.6208	28.4657	169.97	85.61	30.4	90.32	4.23	410.1	14	242
14.0	6373.563	-80.6208	28.4656	172.48	85.98	33.1	90.32	4.62	410.2	16	274

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

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
15.0	6373.597	-80.6208	28.4656	174.55	86.40	36.0	90.32	5.03	410.4	18	307
16.0	6373.635	-80.6208	28.4656	175.96	86.82	39.0	90.30	5.44	410.6	20	345
17.0	6373.675	-80.6208	28.4656	176.42	87.21	41.9	90.28	5.84	410.9	22	386
18.0	6373.718	-80.6208	28.4656	175.69	87.58	44.8	90.27	6.26	411.2	24	429
19.0	6373.765	-80.6208	28.4655	173.43	87.91	48.0	90.24	6.69	411.6	26	475
20.0	6373.814	-80.6208	28.4655	168.43	88.21	51.2	90.22	7.14	412.1	28	524
21.0	6373.866	-80.6208	28.4655	160.83	88.45	54.5	90.19	7.59	412.7	29	576
22.0	6373.922	-80.6208	28.4655	149.70	88.63	57.9	90.17	8.05	413.4	31	633
23.0	6373.982	-80.6208	28.4655	135.67	88.72	61.4	90.14	8.52	414.1	32	692
24.0	6374.045	-80.6208	28.4655	120.40	88.70	64.9	90.10	9.00	415.0	33	755
25.0	6374.112	-80.6208	28.4655	106.48	88.59	68.5	90.07	9.48	415.9	34	822
26.0	6374.182	-80.6207	28.4655	95.59	88.38	72.3	90.03	9.97	417.0	35	892
27.0	6374.256	-80.6207	28.4655	87.70	88.11	76.0	89.99	10.47	418.1	36	967
28.0	6374.334	-80.6207	28.4655	82.02	87.80	79.9	89.94	10.98	419.3	37	1044
29.0	6374.416	-80.6206	28.4655	77.96	87.46	83.9	89.89	11.49	420.7	38	1126
30.0	6374.502	-80.6206	28.4655	75.12	87.10	87.9	89.84	12.00	422.2	40	1212
31.0	6374.592	-80.6206	28.4655	73.03	86.72	92.0	89.79	12.52	423.8	42	1302
32.0	6374.686	-80.6205	28.4655	71.51	86.31	96.3	89.73	13.05	425.5	45	1396
33.0	6374.784	-80.6204	28.4655	70.43	85.89	100.6	89.67	13.58	427.4	49	1494
34.0	6374.886	-80.6204	28.4656	69.64	85.45	105.0	89.60	14.11	429.5	54	1597
35.0	6374.993	-80.6203	28.4656	69.11	84.98	109.6	89.53	14.65	431.7	61	1704
36.0	6375.105	-80.6202	28.4656	68.75	84.50	114.2	89.46	15.18	434.0	69	1815
37.0	6375.221	-80.6201	28.4657	68.54	83.99	118.9	89.38	15.72	436.6	79	1931
38.0	6375.341	-80.6199	28.4657	68.43	83.47	123.8	89.30	16.25	439.4	90	2052
39.0	6375.466	-80.6198	28.4658	68.39	82.93	128.7	89.21	16.78	442.3	104	2177
40.0	6375.597	-80.6196	28.4658	68.40	82.37	133.8	89.12	17.32	445.5	120	2307
41.0	6375.732	-80.6195	28.4659	68.43	81.79	139.0	89.02	17.85	448.8	138	2442
42.0	6375.872	-80.6193	28.4659	68.48	81.19	144.3	88.92	18.37	452.4	158	2582
43.0	6376.017	-80.6190	28.4660	68.55	80.57	149.7	88.81	18.89	456.2	180	2727
44.0	6376.167	-80.6188	28.4661	68.63	79.94	155.2	88.70	19.40	460.3	206	2878
45.0	6376.323	-80.6185	28.4662	68.72	79.29	161.0	88.58	19.91	464.5	234	3033
46.0	6376.484	-80.6182	28.4663	68.83	78.64	166.8	88.45	20.40	469.0	265	3194
47.0	6376.650	-80.6179	28.4664	68.95	77.97	172.7	88.33	20.89	473.7	299	3360
48.0	6376.821	-80.6175	28.4665	69.08	77.29	178.8	88.19	21.37	478.6	336	3532
49.0	6376.999	-80.6171	28.4667	69.20	76.61	185.0	88.06	21.84	483.8	377	3709
50.0	6377.181	-80.6167	28.4668	69.32	75.93	191.4	87.92	22.30	489.2	421	3892
51.0	6377.370	-80.6163	28.4670	69.43	75.23	197.9	87.77	22.75	494.9	470	4081
52.0	6377.564	-80.6158	28.4671	69.54	74.53	204.5	87.63	23.18	500.8	522	4275
53.0	6377.764	-80.6152	28.4673	69.63	73.82	211.3	87.47	23.60	506.9	579	4475
54.0	6377.970	-80.6146	28.4675	69.71	73.10	218.3	87.31	24.01	513.3	640	4681
55.0	6378.182	-80.6140	28.4677	69.79	72.37	225.5	87.14	24.41	520.0	705	4893
56.0	6378.400	-80.6133	28.4679	69.87	71.63	232.8	86.98	24.78	526.9	776	5111
57.0	6378.624	-80.6126	28.4682	69.94	70.89	240.2	86.80	25.15	534.1	852	5335

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	6378.854	-80.6118	28.4684	70.02	70.14	247.8	86.63	25.49	541.6	933	5565
59.0	6379.090	-80.6110	28.4687	70.10	69.39	255.6	86.45	25.82	549.3	1020	5801
60.0	6379.332	-80.6101	28.4690	70.17	68.64	263.6	86.27	26.14	557.3	1113	6044
61.0	6379.581	-80.6091	28.4693	70.26	67.88	271.8	86.09	26.43	565.6	1212	6293
62.0	6379.836	-80.6081	28.4696	70.34	67.13	280.1	85.90	26.71	574.1	1317	6548
63.0	6380.097	-80.6070	28.4699	70.42	66.37	288.6	85.72	26.98	582.8	1430	6809
64.0	6380.365	-80.6059	28.4703	70.50	65.62	297.3	85.54	27.23	591.9	1549	7077
65.0	6380.639	-80.6047	28.4707	70.59	64.87	306.1	85.35	27.46	601.1	1675	7351
66.0	6380.919	-80.6034	28.4711	70.68	64.12	315.1	85.17	27.67	610.6	1808	7631
	MACH 1										
66.800	6381.148	-80.6023	28.4714	70.75	63.52	322.4	85.03	27.82	618.3	1921	7860
67.0	6381.206	-80.6020	28.4715	70.77	63.37	324.3	84.99	27.86	620.3	1950	7918
68.0	6381.499	-80.6006	28.4719	70.86	62.63	333.6	84.81	28.04	630.2	2099	8211
69.0	6381.798	-80.5990	28.4724	70.95	61.89	343.1	84.64	28.20	640.4	2256	8511
70.0	6382.104	-80.5974	28.4729	71.04	61.15	352.8	84.46	28.35	650.8	2422	8817
71.0	6382.416	-80.5958	28.4734	71.12	60.42	362.6	84.28	28.47	661.4	2596	9129
72.0	6382.735	-80.5940	28.4739	71.20	59.68	372.7	84.11	28.59	672.3	2779	9448
73.0	6383.060	-80.5921	28.4745	71.27	58.95	383.0	83.93	28.69	683.5	2972	9773
74.0	6383.391	-80.5902	28.4750	71.32	58.21	393.5	83.74	28.77	695.0	3174	10104
75.0	6383.729	-80.5881	28.4756	71.37	57.47	404.3	83.56	28.84	706.8	3386	10442
76.0	6384.073	-80.5860	28.4763	71.41	56.73	415.4	83.37	28.89	718.8	3608	10786
77.0	6384.423	-80.5837	28.4770	71.45	55.99	426.7	83.19	28.92	731.2	3841	11137
78.0	6384.780	-80.5813	28.4776	71.49	55.24	438.2	83.00	28.94	743.9	4085	11494
79.0	6385.143	-80.5789	28.4784	71.53	54.49	450.0	82.82	28.94	756.9	4340	11858
80.0	6385.513	-80.5763	28.4791	71.59	53.74	462.1	82.64	28.93	770.3	4607	12227
81.0	6385.888	-80.5736	28.4799	71.66	52.99	474.5	82.47	28.90	783.9	4886	12603
82.0	6386.270	-80.5707	28.4807	71.74	52.25	487.1	82.32	28.86	797.9	5177	12986
	MAXIMUM DYNAMIC PRESSURE										
82.600	6386.503	-80.5690	28.4813	71.80	51.81	494.8	82.23	28.83	806.5	5358	13218
83.0	6386.659	-80.5678	28.4816	71.84	51.51	500.0	82.17	28.81	812.2	5481	13374
84.0	6387.053	-80.5647	28.4825	71.94	50.79	513.2	82.02	28.75	826.8	5798	13769
85.0	6387.454	-80.5615	28.4834	72.04	50.09	526.7	81.89	28.69	841.6	6128	14170
86.0	6387.861	-80.5581	28.4844	72.14	49.40	540.5	81.75	28.62	856.7	6473	14578
87.0	6388.275	-80.5547	28.4853	72.23	48.74	554.6	81.62	28.56	872.0	6830	14992
88.0	6388.695	-80.5510	28.4864	72.30	48.10	569.0	81.48	28.50	887.6	7202	15412
89.0	6389.122	-80.5473	28.4874	72.36	47.49	583.7	81.35	28.44	903.4	7588	15839
90.0	6389.556	-80.5434	28.4885	72.40	46.91	598.6	81.21	28.39	919.4	7989	16273
91.0	6389.996	-80.5393	28.4896	72.43	46.35	613.8	81.06	28.34	935.6	8404	16714
92.0	6390.444	-80.5351	28.4908	72.44	45.80	629.4	80.92	28.29	952.1	8834	17162

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
93.0	6390.899	-80.5308	28.4920	72.45	45.27	645.2	80.77	28.24	968.8	9279	17617
94.0	6391.361	-80.5263	28.4933	72.45	44.76	661.3	80.62	28.19	985.8	9740	18080
95.0	6391.830	-80.5216	28.4945	72.44	44.25	677.6	80.47	28.13	1003.1	10216	18550
96.0	6392.307	-80.5168	28.4959	72.42	43.76	694.3	80.32	28.07	1020.6	10708	19026
97.0	6392.790	-80.5119	28.4973	72.41	43.26	711.3	80.17	28.00	1038.5	11216	19511
98.0	6393.282	-80.5068	28.4987	72.39	42.77	728.6	80.02	27.92	1056.7	11741	20002
99.0	6393.780	-80.5015	28.5002	72.37	42.28	746.3	79.87	27.83	1075.2	12283	20501
100.0	6394.286	-80.4960	28.5017	72.36	41.78	764.2	79.73	27.74	1094.0	12842	21007
101.0	6394.798	-80.4904	28.5033	72.34	41.30	782.4	79.58	27.64	1113.2	13419	21521
102.0	6395.318	-80.4846	28.5049	72.33	40.81	801.0	79.44	27.53	1132.7	14014	22041
103.0	6395.845	-80.4786	28.5066	72.32	40.33	819.9	79.31	27.41	1152.6	14627	22569
104.0	6396.380	-80.4725	28.5083	72.31	39.85	839.1	79.17	27.29	1172.7	15259	23103
105.0	6396.921	-80.4661	28.5101	72.31	39.38	858.7	79.05	27.17	1193.2	15911	23645
106.0	6397.469	-80.4596	28.5119	72.31	38.92	878.5	78.92	27.04	1214.0	16582	24194
107.0	6398.025	-80.4528	28.5138	72.31	38.46	898.7	78.80	26.91	1235.1	17273	24750
108.0	6398.587	-80.4459	28.5157	72.31	38.02	919.2	78.69	26.78	1256.5	17984	25313
109.0	6399.157	-80.4388	28.5177	72.32	37.58	940.0	78.58	26.65	1278.2	18716	25884
110.0	6399.734	-80.4314	28.5198	72.33	37.15	961.2	78.47	26.51	1300.3	19468	26461
111.0	6400.318	-80.4239	28.5219	72.34	36.72	982.7	78.37	26.38	1322.6	20242	27046
112.0	6400.909	-80.4161	28.5241	72.35	36.31	1004.5	78.26	26.24	1345.3	21037	27638
113.0	6401.507	-80.4082	28.5263	72.36	35.90	1026.7	78.16	26.10	1368.3	21854	28237
114.0	6402.113	-80.4000	28.5286	72.37	35.50	1049.2	78.07	25.96	1391.7	22693	28843
115.0	6402.726	-80.3916	28.5309	72.37	35.11	1072.0	77.97	25.82	1415.3	23554	29457
116.0	6403.346	-80.3830	28.5333	72.38	34.72	1095.2	77.87	25.68	1439.3	24439	30078
117.0	6403.973	-80.3741	28.5358	72.39	34.34	1118.8	77.78	25.54	1463.7	25346	30706
118.0	6404.608	-80.3650	28.5383	72.40	33.97	1142.7	77.69	25.40	1488.4	26278	31341
119.0	6405.250	-80.3557	28.5409	72.41	33.60	1167.0	77.61	25.26	1513.4	27233	31984
120.0	6405.900	-80.3462	28.5436	72.42	33.24	1191.6	77.52	25.12	1538.9	28212	32635
121.0	6406.557	-80.3364	28.5463	72.43	32.88	1216.7	77.44	24.97	1564.7	29216	33293
122.0	6407.221	-80.3263	28.5491	72.44	32.53	1242.1	77.36	24.83	1590.8	30245	33958
123.0	6407.893	-80.3160	28.5520	72.45	32.18	1267.8	77.28	24.68	1617.3	31299	34630
124.0	6408.571	-80.3055	28.5549	72.46	31.83	1293.9	77.21	24.52	1644.2	32380	35310
125.0	6409.258	-80.2947	28.5579	72.47	31.49	1320.5	77.13	24.37	1671.5	33486	35997
126.0	6409.951	-80.2836	28.5609	72.48	31.14	1347.5	77.06	24.21	1699.2	34619	36691
127.0	6410.651	-80.2723	28.5641	72.49	30.81	1374.9	76.98	24.06	1727.3	35779	37393
128.0	6411.359	-80.2607	28.5673	72.50	30.48	1402.7	76.91	23.90	1755.9	36967	38102
129.0	6412.074	-80.2489	28.5706	72.51	30.15	1431.0	76.85	23.75	1784.9	38183	38818
130.0	6412.797	-80.2367	28.5739	72.53	29.83	1459.8	76.78	23.59	1814.3	39428	39541
131.0	6413.526	-80.2243	28.5774	72.54	29.51	1489.0	76.71	23.44	1844.2	40701	40272
132.0	6414.264	-80.2116	28.5809	72.55	29.20	1518.6	76.65	23.28	1874.5	42003	41010
133.0	6415.008	-80.1985	28.5845	72.56	28.90	1548.7	76.59	23.13	1905.2	43335	41756
134.0	6415.760	-80.1852	28.5881	72.57	28.60	1579.2	76.53	22.98	1936.3	44697	42509
135.0	6416.520	-80.1716	28.5919	72.58	28.31	1610.2	76.47	22.83	1967.9	46090	43270

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
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)											
135.160	6416.643	-80.1694	28.5925	72.58	28.26	1615.1	76.46	22.81	1973.0	46317	43393
136.0	6417.296	-80.1577	28.5957	72.59	28.01	1638.4	76.42	22.66	1996.8	47513	44038
137.0	6418.058	-80.1436	28.5996	72.60	27.73	1662.5	76.38	22.50	2021.6	48962	44811
138.0	6418.834	-80.1292	28.6036	72.61	27.45	1687.0	76.33	22.33	2046.7	50436	45588
139.0	6419.613	-80.1145	28.6076	72.62	27.18	1711.9	76.29	22.17	2072.2	51934	46368
140.0	6420.397	-80.0996	28.6117	72.63	26.91	1737.0	76.24	22.00	2097.9	53459	47153
141.0	6421.185	-80.0845	28.6159	72.63	26.64	1762.6	76.20	21.84	2124.1	55010	47943
142.0	6421.978	-80.0691	28.6201	72.64	26.38	1788.5	76.16	21.68	2150.6	56587	48737
143.0	6422.774	-80.0534	28.6244	72.65	26.12	1814.8	76.12	21.53	2177.5	58190	49535
144.0	6423.576	-80.0374	28.6288	72.66	25.86	1841.7	76.08	21.37	2204.9	59821	50337
145.0	6424.381	-80.0212	28.6332	72.67	25.61	1868.7	76.04	21.21	2232.5	61479	51144
146.0	6425.191	-80.0047	28.6377	72.68	25.37	1896.2	76.00	21.06	2260.5	63164	51956
147.0	6426.006	-79.9880	28.6423	72.69	25.13	1924.0	75.97	20.91	2288.8	64878	52772
148.0	6426.825	-79.9710	28.6470	72.70	24.89	1952.2	75.93	20.76	2317.6	66620	53593
149.0	6427.649	-79.9536	28.6517	72.71	24.65	1980.9	75.90	20.62	2346.7	68390	54418
150.0	6428.478	-79.9360	28.6565	72.72	24.42	2009.9	75.87	20.47	2376.2	70190	55248
151.0	6429.311	-79.9181	28.6614	72.73	24.20	2039.4	75.83	20.33	2406.2	72019	56083
152.0	6430.150	-79.8999	28.6663	72.74	23.98	2069.3	75.80	20.19	2436.6	73878	56923
153.0	6430.993	-79.8815	28.6714	72.76	23.76	2099.4	75.77	20.05	2467.1	75767	57768
154.0	6431.842	-79.8627	28.6765	72.77	23.55	2130.2	75.74	19.91	2498.4	77687	58618
155.0	6432.695	-79.8436	28.6817	72.78	23.34	2161.4	75.71	19.78	2530.0	79638	59474
156.0	6433.554	-79.8242	28.6870	72.79	23.13	2193.0	75.69	19.65	2562.1	81620	60334
157.0	6434.418	-79.8045	28.6923	72.91	22.93	2225.2	75.66	19.52	2594.7	83634	61200
158.0	6435.288	-79.7844	28.6978	72.82	22.73	2257.9	75.63	19.39	2627.8	85681	62071
159.0	6436.163	-79.7641	28.7033	72.83	22.53	2291.1	75.60	19.26	2661.5	87760	62948
160.0	6437.044	-79.7434	28.7089	72.85	22.34	2324.8	75.58	19.14	2695.6	89872	63831
161.0	6437.935	-79.7222	28.7146	72.86	22.16	2359.1	75.55	19.02	2730.2	92029	64724
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)											
161.630	6438.488	-79.7090	28.7182	72.87	22.04	2380.6	75.54	18.95	2751.9	93377	65277
162.0	6438.826	-79.7010	28.7204	72.87	21.98	2388.3	75.53	18.90	2759.8	94203	65617
S-IC/S-II SEPARATION COMMAND											
162.310	6439.102	-79.6943	28.7222	72.88	21.92	2387.6	75.54	18.85	2759.3	94884	65893
164.0	6440.597	-79.6580	28.7320	72.90	21.60	2383.9	75.56	18.57	2756.4	98589	67392
166.0	6442.338	-79.6149	28.7436	72.93	21.23	2381.6	75.58	18.24	2755.0	102983	69136
168.0	6444.050	-79.5718	28.7552	72.96	20.87	2387.1	75.59	17.93	2761.3	107383	70852
170.0	6445.739	-79.5284	28.7668	72.98	20.51	2393.9	75.60	17.63	2769.0	111807	72545

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
172.0	6447.406	-79.4848	28.7785	73.01	20.15	2402.8	75.61	17.33	2778.7	116254	74214
174.0	6449.050	-79.4409	28.7902	73.04	19.80	2411.8	75.62	17.04	2788.5	120726	75863
176.0	6450.674	-79.3968	28.8020	73.06	19.45	2421.2	75.63	16.74	2798.6	125224	77490
178.0	6452.275	-79.3524	28.8139	73.09	19.11	2430.6	75.64	16.46	2808.9	129749	79096
180.0	6453.856	-79.3077	28.8258	73.12	18.77	2440.3	75.65	16.17	2819.3	134299	80680
182.0	6455.416	-79.2627	28.8377	73.15	18.43	2450.2	75.67	15.89	2829.9	138875	82244
184.0	6456.955	-79.2175	28.8497	73.18	18.10	2460.2	75.68	15.61	2840.6	143478	83786
186.0	6458.473	-79.1720	28.8617	73.21	17.77	2470.4	75.69	15.33	2851.5	148108	85308
188.0	6459.971	-79.1263	28.8738	73.23	17.44	2480.8	75.70	15.06	2862.5	152764	86810
190.0	6461.448	-79.0802	28.8859	73.26	17.12	2491.3	75.71	14.79	2873.7	157448	88291
192.0	6462.905	-79.0339	28.8981	73.29	16.81	2502.0	75.73	14.52	2885.0	162158	89752
194.0	6464.342	-78.9873	28.9104	73.32	16.49	2512.9	75.74	14.26	2896.6	166895	91192
196.0	6465.759	-78.9404	28.9226	73.35	16.18	2524.1	75.75	14.00	2908.3	171660	92613
198.0	6467.156	-78.8932	28.9350	73.38	15.88	2535.4	75.77	13.74	2920.2	176452	94014
200.0	6468.534	-78.8458	28.9474	73.41	15.58	2546.9	75.78	13.49	2932.2	181273	95396
202.0	6469.892	-78.7981	28.9598	73.44	15.28	2558.6	75.79	13.24	2944.4	186121	96758
204.0	6471.231	-78.7500	28.9723	73.47	14.98	2570.4	75.81	12.99	2956.8	190998	98101
206.0	6472.550	-78.7017	28.9848	73.50	14.69	2582.4	75.82	12.75	2969.3	195902	99424
208.0	6473.851	-78.6531	28.9974	73.53	14.42	2594.4	75.83	12.51	2981.8	200836	100729
210.0	6475.135	-78.6042	29.0100	73.56	14.16	2606.4	75.85	12.30	2994.3	205796	102017
212.0	6476.402	-78.5550	29.0227	73.58	13.92	2618.4	75.86	12.09	3006.7	210785	103289
214.0	6477.655	-78.5055	29.0355	73.61	13.69	2630.4	75.87	11.90	3019.1	215800	104545
216.0	6478.892	-78.4558	29.0482	73.64	13.47	2642.5	75.88	11.71	3031.5	220843	105787
218.0	6480.116	-78.4057	29.0611	73.66	13.25	2654.7	75.90	11.53	3044.0	225912	107015
220.0	6481.326	-78.3554	29.0739	73.69	13.04	2666.9	75.91	11.35	3056.6	231008	108229
222.0	6482.523	-78.3048	29.0869	73.72	12.83	2679.3	75.92	11.18	3069.4	236131	109430
224.0	6483.706	-78.2540	29.0998	73.75	12.62	2691.8	75.94	11.00	3082.2	241281	110617
226.0	6484.875	-78.2028	29.1129	73.77	12.41	2704.5	75.95	10.83	3095.2	246459	111790
228.0	6486.031	-78.1514	29.1259	73.80	12.21	2717.3	75.96	10.65	3108.3	251664	112950
230.0	6487.174	-78.0997	29.1390	73.83	12.01	2730.2	75.98	10.48	3121.6	256897	114097
232.0	6488.303	-78.0476	29.1522	73.86	11.81	2743.2	75.99	10.31	3134.9	262158	115231
234.0	6489.419	-77.9953	29.1654	73.89	11.61	2756.4	76.01	10.15	3148.4	267447	116351
236.0	6490.522	-77.9427	29.1787	73.92	11.42	2769.7	76.02	9.98	3162.0	272764	117458
238.0	6491.612	-77.8898	29.1920	73.95	11.22	2783.2	76.04	9.82	3175.7	278110	118552
240.0	6492.689	-77.8366	29.2053	73.97	11.03	2796.7	76.05	9.66	3189.5	283485	119633
242.0	6493.753	-77.7831	29.2187	74.00	10.84	2810.4	76.07	9.50	3203.5	288888	120701
244.0	6494.804	-77.7293	29.2322	74.03	10.66	2824.3	76.09	9.34	3217.6	294321	121757
246.0	6495.842	-77.6752	29.2456	74.06	10.47	2838.3	76.10	9.19	3231.9	299782	122799
248.0	6496.868	-77.6208	29.2592	74.09	10.29	2852.4	76.12	9.03	3246.2	305273	123829
250.0	6497.881	-77.5661	29.2728	74.12	10.11	2866.6	76.14	8.88	3260.7	310794	124847
252.0	6498.881	-77.5111	29.2864	74.16	9.94	2881.0	76.15	8.73	3275.3	316345	125852
254.0	6499.869	-77.4557	29.3001	74.19	9.76	2895.5	76.17	8.58	3290.0	321925	126844
256.0	6500.845	-77.4001	29.3138	74.22	9.59	2910.1	76.19	8.44	3304.9	327536	127824

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
258.0	6501.809	-77.3441	29.3276	74.25	9.42	2924.9	76.21	8.29	3319.9	333178	128792
260.0	6502.760	-77.2878	29.3414	74.28	9.25	2939.8	76.22	8.15	3335.0	338850	129748
262.0	6503.699	-77.2312	29.3553	74.31	9.08	2954.8	76.24	8.00	3350.3	344552	130691
264.0	6504.626	-77.1742	29.3692	74.34	8.92	2970.0	76.26	7.86	3365.6	350286	131623
266.0	6505.541	-77.1169	29.3832	74.38	8.76	2985.3	76.28	7.73	3381.2	356051	132542
268.0	6506.444	-77.0593	29.3972	74.41	8.60	3000.8	76.30	7.59	3396.8	361848	133450
270.0	6507.335	-77.0014	29.4113	74.44	8.44	3016.4	76.32	7.45	3412.6	367676	134345
272.0	6508.215	-76.9431	29.4254	74.47	8.28	3032.2	76.34	7.32	3428.5	373536	135230
274.0	6509.083	-76.8845	29.4396	74.51	8.13	3048.0	76.36	7.19	3444.6	379429	136102
276.0	6509.939	-76.8255	29.4538	74.54	7.98	3064.0	76.38	7.06	3460.8	385354	136963
278.0	6510.784	-76.7663	29.4681	74.57	7.83	3080.2	76.40	6.93	3477.1	391311	137813
280.0	6511.618	-76.7066	29.4824	74.61	7.68	3096.5	76.42	6.81	3493.6	397301	138651
282.0	6512.440	-76.6466	29.4967	74.64	7.54	3112.9	76.44	6.68	3510.2	403324	139478
284.0	6513.251	-76.5863	29.5112	74.68	7.39	3129.5	76.46	6.56	3526.9	409381	140293
286.0	6514.051	-76.5256	29.5256	74.71	7.25	3146.2	76.48	6.43	3543.8	415471	141098
288.0	6514.840	-76.4646	29.5401	74.74	7.11	3163.1	76.51	6.31	3560.8	421595	141891
290.0	6515.618	-76.4032	29.5547	74.78	6.97	3180.1	76.53	6.20	3577.9	427752	142674
292.0	6516.384	-76.3414	29.5693	74.81	6.84	3197.2	76.55	6.08	3595.2	433944	143445
294.0	6517.140	-76.2793	29.5839	74.85	6.71	3214.5	76.57	5.96	3612.6	440171	144206
296.0	6517.886	-76.2168	29.5986	74.89	6.57	3231.9	76.60	5.85	3630.2	446432	144956
298.0	6518.621	-76.1539	29.6133	74.92	6.44	3249.5	76.62	5.74	3647.9	452728	145695
300.0	6519.345	-76.0907	29.6281	74.96	6.32	3267.2	76.64	5.63	3665.7	459059	146424
302.0	6520.058	-76.0271	29.6430	74.99	6.19	3285.1	76.67	5.52	3683.7	465426	147143
304.0	6520.762	-75.9631	29.6579	75.03	6.07	3303.1	76.69	5.41	3701.8	471828	147851
306.0	6521.455	-75.8988	29.6728	75.07	5.94	3321.2	76.71	5.30	3720.1	478266	148549
308.0	6522.137	-75.8340	29.6878	75.10	5.82	3339.5	76.74	5.20	3738.5	484740	149236
310.0	6522.810	-75.7689	29.7028	75.14	5.70	3358.0	76.76	5.10	3757.0	491251	149914
312.0	6523.472	-75.7034	29.7179	75.18	5.59	3376.6	76.79	5.00	3775.7	497799	150581
314.0	6524.125	-75.6375	29.7330	75.22	5.47	3395.3	76.81	4.90	3794.6	504383	151238
316.0	6524.768	-75.5712	29.7482	75.25	5.36	3414.2	76.84	4.80	3813.6	511005	151886
318.0	6525.400	-75.5045	29.7634	75.29	5.25	3433.3	76.87	4.70	3832.7	517664	152524
320.0	6526.024	-75.4374	29.7787	75.33	5.14	3452.5	76.89	4.60	3852.0	524360	153152
322.0	6526.637	-75.3699	29.7940	75.37	5.03	3471.8	76.92	4.51	3871.5	531095	153770
324.0	6527.241	-75.3020	29.8093	75.41	4.92	3491.3	76.95	4.42	3891.1	537868	154379
326.0	6527.836	-75.2337	29.8247	75.45	4.82	3511.0	76.97	4.33	3910.9	544680	154979
328.0	6528.421	-75.1649	29.8402	75.49	4.72	3530.9	77.00	4.24	3930.8	551531	155569
330.0	6528.997	-75.0958	29.8557	75.53	4.61	3550.8	77.03	4.15	3950.8	558420	156150
332.0	6529.564	-75.0262	29.8712	75.57	4.51	3571.0	77.06	4.06	3971.1	565349	156722
334.0	6530.121	-74.9563	29.8868	75.61	4.42	3591.3	77.08	3.97	3991.4	572318	157285
336.0	6530.670	-74.8858	29.9025	75.65	4.32	3611.7	77.11	3.89	4012.0	579327	157838
338.0	6531.210	-74.8150	29.9182	75.69	4.23	3632.4	77.14	3.81	4032.6	586376	158383
340.0	6531.741	-74.7437	29.9339	75.73	4.13	3653.1	77.17	3.72	4053.5	593465	158919
342.0	6532.263	-74.6720	29.9497	75.77	4.04	3674.1	77.20	3.64	4074.5	600596	159447

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
344.0	6532.777	-74.5999	29.9655	75.81	3.95	3695.2	77.23	3.56	4095.7	607767	159965
346.0	6533.282	-74.5273	29.9814	75.86	3.86	3716.5	77.26	3.49	4117.1	614980	160476
348.0	6533.779	-74.4543	29.9973	75.90	3.78	3738.0	77.29	3.41	4138.6	622235	160977
350.0	6534.267	-74.3808	30.0132	75.94	3.69	3759.6	77.32	3.34	4160.3	629532	161471
352.0	6534.747	-74.3068	30.0293	75.98	3.61	3781.4	77.35	3.26	4182.1	636872	161956
354.0	6535.219	-74.2325	30.0453	76.03	3.53	3803.4	77.39	3.19	4204.2	644254	162433
356.0	6535.683	-74.1576	30.0614	76.07	3.45	3825.5	77.42	3.12	4226.4	651679	162902
358.0	6536.138	-74.0823	30.0775	76.11	3.37	3847.8	77.45	3.05	4248.7	659147	163363
360.0	6536.586	-74.0065	30.0937	76.16	3.29	3870.3	77.48	2.98	4271.3	666659	163816
362.0	6537.027	-73.9303	30.1100	76.20	3.21	3893.0	77.51	2.91	4294.0	674216	164262
364.0	6537.459	-73.8535	30.1262	76.25	3.14	3915.9	77.55	2.85	4316.9	681816	164700
366.0	6537.884	-73.7763	30.1426	76.29	3.06	3938.9	77.58	2.78	4340.0	689462	165130
368.0	6538.301	-73.6986	30.1589	76.34	2.99	3962.1	77.62	2.72	4363.3	697152	165552
370.0	6538.711	-73.6205	30.1753	76.38	2.92	3985.5	77.65	2.65	4386.8	704888	165968
372.0	6539.114	-73.5418	30.1918	76.43	2.85	4009.1	77.68	2.59	4410.4	712669	166376
374.0	6539.509	-73.4626	30.2083	76.47	2.79	4032.9	77.72	2.53	4434.2	720497	166777
376.0	6539.898	-73.3830	30.2248	76.52	2.72	4056.9	77.75	2.47	4458.2	728371	167170
378.0	6540.279	-73.3028	30.2414	76.56	2.65	4081.1	77.79	2.42	4482.5	736292	167557
380.0	6540.654	-73.2221	30.2580	76.61	2.59	4105.5	77.83	2.36	4506.9	744260	167937
382.0	6541.022	-73.1409	30.2746	76.66	2.53	4130.0	77.86	2.30	4531.5	752276	168310
384.0	6541.383	-73.0593	30.2913	76.71	2.47	4154.8	77.90	2.25	4556.3	760339	168677
386.0	6541.737	-72.9770	30.3081	76.75	2.41	4179.7	77.93	2.20	4581.3	768451	169037
388.0	6542.086	-72.8943	30.3249	76.80	2.35	4204.9	77.97	2.15	4606.4	776612	169391
390.0	6542.427	-72.8110	30.3417	76.85	2.30	4230.2	78.01	2.10	4631.8	784821	169738
392.0	6542.763	-72.7272	30.3585	76.90	2.24	4255.8	78.05	2.05	4657.4	793081	170080
394.0	6543.093	-72.6429	30.3755	76.95	2.19	4281.6	78.09	2.00	4683.2	801389	170415
396.0	6543.417	-72.5580	30.3924	77.00	2.13	4307.5	78.12	1.95	4709.2	809749	170744
398.0	6543.735	-72.4726	30.4094	77.05	2.08	4333.7	78.16	1.91	4735.5	818158	171068
400.0	6544.047	-72.3866	30.4264	77.10	2.03	4360.1	78.20	1.86	4761.9	826619	171385
402.0	6544.354	-72.3001	30.4435	77.15	1.99	4386.8	78.24	1.82	4788.5	835131	171698
404.0	6544.655	-72.2130	30.4605	77.20	1.94	4413.6	78.28	1.78	4815.4	843696	172005
406.0	6544.951	-72.1253	30.4777	77.25	1.89	4440.6	78.32	1.74	4842.5	852312	172306
408.0	6545.242	-72.0371	30.4948	77.30	1.85	4467.9	78.36	1.70	4869.8	860981	172602
410.0	6545.527	-71.9483	30.5121	77.35	1.80	4495.5	78.41	1.66	4897.3	869703	172894
412.0	6545.808	-71.8589	30.5293	77.40	1.76	4523.2	78.45	1.62	4925.1	878479	173180
414.0	6546.084	-71.7689	30.5466	77.46	1.72	4551.2	78.49	1.58	4953.1	887309	173462
416.0	6546.355	-71.6784	30.5639	77.51	1.68	4579.4	78.53	1.55	4981.4	896194	173738
418.0	6546.622	-71.5872	30.5812	77.56	1.64	4607.9	78.57	1.51	5009.9	905133	174011
420.0	6546.884	-71.4955	30.5986	77.62	1.61	4636.6	78.62	1.48	5038.6	914128	174279
422.0	6547.142	-71.4031	30.6160	77.67	1.57	4665.5	78.66	1.45	5067.5	923178	174542
424.0	6547.396	-71.3102	30.6335	77.72	1.54	4694.7	78.71	1.42	5096.7	932285	174802
426.0	6547.646	-71.2166	30.6510	77.78	1.50	4724.1	78.75	1.39	5126.2	941449	175058
428.0	6547.892	-71.1224	30.6685	77.83	1.47	4753.8	78.79	1.36	5155.9	950670	175309

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
430.0	6548.134	-71.0275	30.6860	77.89	1.44	4783.7	78.84	1.33	5185.8	959949	175557
432.0	6548.372	-70.9321	30.7036	77.94	1.41	4813.9	78.89	1.30	5216.1	969286	175802
434.0	6548.608	-70.8360	30.7212	78.00	1.38	4844.4	78.93	1.28	5246.5	978682	176043
436.0	6548.839	-70.7392	30.7388	78.05	1.35	4875.1	78.98	1.25	5277.3	988137	176280
438.0	6549.068	-70.6418	30.7565	78.11	1.33	4906.1	79.02	1.23	5308.3	997652	176515
440.0	6549.294	-70.5438	30.7742	78.17	1.30	4937.4	79.07	1.20	5339.6	1007228	176746
442.0	6549.517	-70.4450	30.7919	78.23	1.28	4969.0	79.12	1.18	5371.2	1016864	176975
444.0	6549.737	-70.3457	30.8097	78.28	1.25	5000.8	79.17	1.16	5403.0	1026562	177201
446.0	6549.955	-70.2456	30.8274	78.34	1.23	5032.9	79.22	1.14	5435.1	1036321	177425
448.0	6550.171	-70.1449	30.8452	78.40	1.21	5065.3	79.27	1.12	5467.5	1046143	177646
450.0	6550.384	-70.0434	30.8631	78.46	1.19	5097.9	79.31	1.11	5500.2	1056028	177866
452.0	6550.595	-69.9413	30.8809	78.52	1.17	5130.9	79.36	1.09	5533.1	1065977	178083
454.0	6550.805	-69.8385	30.8988	78.58	1.16	5164.1	79.42	1.07	5566.4	1075990	178298
456.0	6551.012	-69.7350	30.9167	78.64	1.14	5197.7	79.47	1.06	5600.0	1086067	178512
458.0	6551.219	-69.6307	30.9346	78.70	1.13	5231.6	79.52	1.05	5633.9	1096210	178724
460.0	6551.424	-69.5258	30.9525	78.76	1.11	5265.8	79.57	1.03	5668.2	1106419	178935
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)											
460.610	6551.485	-69.4941	30.9579	78.78	1.11	5276.1	79.59	1.03	5678.5	1109495	178998
462.0	6551.626	-69.4201	30.9705	78.82	1.09	5296.2	79.62	1.01	5698.5	1116691	179143
464.0	6551.825	-69.3139	30.9884	78.89	1.06	5324.0	79.68	0.99	5726.4	1127019	179349
466.0	6552.021	-69.2070	31.0064	78.95	1.03	5351.9	79.73	0.96	5754.3	1137401	179550
468.0	6552.212	-69.0995	31.0243	79.01	1.01	5380.0	79.78	0.94	5782.4	1147837	179747
470.0	6552.401	-68.9914	31.0423	79.07	0.99	5408.2	79.83	0.93	5810.6	1158327	179942
472.0	6552.589	-68.8828	31.0602	79.13	0.99	5436.6	79.89	0.92	5839.0	1168873	180136
474.0	6552.776	-68.7735	31.0781	79.19	0.98	5465.0	79.94	0.91	5867.4	1179473	180328
476.0	6552.963	-68.6636	31.0960	79.26	0.97	5493.7	80.00	0.91	5896.1	1190128	180521
478.0	6553.150	-68.5531	31.1139	79.32	0.97	5522.6	80.05	0.91	5925.0	1200839	180714
480.0	6553.337	-68.4419	31.1318	79.38	0.97	5551.7	80.11	0.90	5954.2	1211606	180908
482.0	6553.525	-68.3302	31.1497	79.45	0.97	5581.0	80.17	0.90	5983.5	1222429	181102
484.0	6553.714	-68.2178	31.1675	79.51	0.97	5610.6	80.22	0.90	6013.1	1233310	181297
486.0	6553.904	-68.1047	31.1854	79.58	0.97	5640.4	80.28	0.90	6042.9	1244248	181492
488.0	6554.095	-67.9910	31.2032	79.65	0.96	5670.5	80.34	0.90	6073.0	1255244	181689
490.0	6554.285	-67.8767	31.2210	79.71	0.96	5698.1	80.40	0.90	6100.6	1266293	181885
492.0	6554.473	-67.7619	31.2388	79.78	0.94	5721.6	80.46	0.88	6124.1	1277392	182079
494.0	6554.659	-67.6465	31.2565	79.85	0.92	5745.1	80.52	0.86	6147.7	1288538	182271
496.0	6554.843	-67.5306	31.2742	79.92	0.90	5768.8	80.58	0.84	6171.4	1299730	182460
498.0	6555.022	-67.4142	31.2918	79.99	0.88	5792.6	80.64	0.82	6195.2	1310968	182646
500.0	6555.198	-67.2973	31.3094	80.06	0.86	5816.4	80.71	0.80	6219.0	1322252	182828
502.0	6555.371	-67.1798	31.3269	80.13	0.84	5840.4	80.77	0.79	6243.0	1333582	183007
504.0	6555.542	-67.0618	31.3444	80.20	0.83	5864.3	80.83	0.78	6267.0	1344958	183183
506.0	6555.712	-66.9433	31.3618	80.26	0.82	5888.3	80.89	0.77	6291.0	1356381	183359

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
508.0	6555.881	-66.8242	31.3792	80.33	0.82	5912.5	80.96	C.76	6315.2	1367850	183533
510.0	6556.049	-66.7046	31.3965	80.40	0.81	5936.8	81.02	0.76	6339.5	1379366	183707
512.0	6556.217	-66.5845	31.4138	80.48	0.81	5961.3	81.08	0.76	6364.0	1390930	183881
514.0	6556.385	-66.4638	31.4310	80.55	0.80	5985.9	81.15	0.75	6388.6	1402540	184054
516.0	6556.552	-66.3426	31.4481	80.62	0.80	6010.6	81.21	0.75	6413.4	1414198	184228
518.0	6556.719	-66.2209	31.4652	80.69	0.79	6035.6	81.28	0.74	6438.3	1425904	184400
520.0	6556.886	-66.0986	31.4823	80.76	0.79	6060.7	81.34	0.74	6463.5	1437659	184573
522.0	6557.053	-65.9757	31.4992	80.83	0.78	6086.0	81.41	0.74	6488.8	1449462	184745
524.0	6557.219	-65.8523	31.5162	80.91	0.78	6111.5	81.47	C.73	6514.2	1461314	184917
526.0	6557.386	-65.7283	31.5330	80.98	0.78	6137.1	81.54	0.73	6539.9	1473216	185089
528.0	6557.552	-65.6038	31.5498	81.05	0.77	6162.9	81.61	0.73	6565.8	1485167	185261
530.0	6557.719	-65.4787	31.5665	81.13	0.77	6188.9	81.67	C.72	6591.8	1497169	185434
532.0	6557.885	-65.3530	31.5831	81.20	0.77	6215.1	81.74	C.72	6618.0	1509221	185606
534.0	6558.053	-65.2267	31.5997	81.28	0.77	6241.5	81.81	0.72	6644.3	1521323	185779
536.0	6558.220	-65.0999	31.6162	81.35	0.77	6268.0	81.88	0.72	6670.9	1533477	185952
538.0	6558.388	-64.9725	31.6327	81.43	0.77	6294.8	81.95	0.72	6697.6	1545682	186125
540.0	6558.557	-64.8444	31.6490	81.50	0.77	6321.7	82.01	0.72	6724.6	1557938	186300
542.0	6558.727	-64.7158	31.6653	81.58	0.77	6348.7	82.08	C.72	6751.6	1570247	186475
544.0	6558.899	-64.5866	31.6815	81.65	0.77	6376.0	82.15	C.73	6778.9	1582609	186652
546.0	6559.071	-64.4568	31.6976	81.73	0.77	6403.3	82.22	0.73	6806.3	1595023	186830
548.0	6559.245	-64.3264	31.7137	81.81	0.78	6430.9	82.29	0.73	6833.9	1607490	187009
550.0	6559.420	-64.1954	31.7297	81.88	0.78	6458.7	82.36	0.74	6861.7	1620011	187190
552.0	6559.597	-64.0638	31.7455	81.96	0.79	6486.5	82.44	C.74	6889.5	1632585	187372
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
552.640	6559.653	-64.0222	31.7505	81.99	0.79	6495.3	82.46	0.74	6898.2	1636557	187430
	S-II/S-IVB SEPARATION COMMAND										
553.500	6559.730	-63.9647	31.7574	82.02	0.77	6497.7	82.49	0.73	6900.7	1642046	187509
554.0	6559.774	-63.9316	31.7613	82.04	0.77	6497.7	82.51	0.72	6900.7	1645204	187555
556.0	6559.945	-63.7993	31.7770	82.12	0.73	6497.8	82.58	C.69	6900.8	1657833	187731
558.0	6560.108	-63.6670	31.7925	82.20	0.70	6500.0	82.66	0.66	6903.0	1670458	187898
560.0	6560.264	-63.5346	31.8078	82.28	0.68	6507.4	82.73	C.64	6910.4	1683090	188059
562.0	6560.416	-63.4019	31.8230	82.36	0.66	6517.4	82.80	C.62	6920.5	1695743	188216
564.0	6560.563	-63.2690	31.8381	82.43	0.64	6528.3	82.88	0.60	6931.4	1708413	188369
566.0	6560.707	-63.1358	31.8530	82.51	0.62	6539.2	82.95	C.59	6942.3	1721104	188518
568.0	6560.847	-63.0024	31.8679	82.59	0.60	6550.1	83.02	C.57	6953.2	1733816	188663
570.0	6560.984	-62.8687	31.8825	82.67	0.59	6561.0	83.10	C.55	6964.1	1746549	188804
572.0	6561.116	-62.7347	31.8971	82.75	0.57	6572.1	83.17	C.53	6975.2	1759303	188941
574.0	6561.244	-62.6005	31.9115	82.83	0.55	6583.1	83.24	C.52	6986.2	1772078	189074
576.0	6561.368	-62.4659	31.9258	82.91	0.53	6594.2	83.32	0.50	6997.4	1784875	189203

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
578.0	6561.488	-62.3312	31.9400	82.99	0.51	6605.4	83.39	C.48	7008.6	1797693	189328
580.0	6561.604	-62.1961	31.9540	83.07	0.50	6616.6	83.47	0.47	7019.8	1810532	189449
582.0	6561.717	-62.0608	31.9679	83.15	0.48	6627.8	83.54	C.45	7031.0	1823394	189566
584.0	6561.825	-61.9252	31.9816	83.23	0.46	6639.1	83.62	0.43	7042.2	1836276	189679
586.0	6561.930	-61.7893	31.9952	83.31	0.44	6650.3	83.69	C.42	7053.5	1849181	189789
588.0	6562.031	-61.6532	32.0087	83.39	0.43	6661.7	83.77	C.40	7064.9	1862107	189894
590.0	6562.128	-61.5168	32.0220	83.47	0.41	6673.0	83.85	C.39	7076.3	1875055	189996
592.0	6562.222	-61.3801	32.0351	83.55	0.39	6684.5	83.92	0.37	7087.7	1888025	190094
594.0	6562.312	-61.2431	32.0482	83.64	0.38	6695.9	84.00	0.36	7099.2	1901017	190188
596.0	6562.398	-61.1059	32.0611	83.72	0.36	6707.4	84.08	0.34	7110.7	1914031	190279
598.0	6562.481	-60.9684	32.0738	83.80	0.35	6719.0	84.15	0.33	7122.3	1927067	190366
600.0	6562.560	-60.8306	32.0864	83.89	0.33	6730.6	84.23	0.31	7133.9	1940126	190450
602.0	6562.636	-60.6926	32.0988	83.97	0.32	6742.2	84.31	0.30	7145.5	1953207	190530
604.0	6562.709	-60.5542	32.1111	84.05	0.30	6753.9	84.39	0.28	7157.2	1966311	190606
606.0	6562.778	-60.4156	32.1233	84.14	0.29	6765.6	84.47	0.27	7168.9	1979437	190679
608.0	6562.844	-60.2767	32.1353	84.22	0.27	6777.3	84.54	0.26	7180.6	1992586	190749
610.0	6562.906	-60.1375	32.1471	84.30	0.26	6789.1	84.62	C.24	7192.4	2005757	190816
612.0	6562.965	-59.9981	32.1588	84.39	0.24	6800.9	84.70	0.23	7204.3	2018951	190879
614.0	6563.021	-59.8583	32.1703	84.47	0.23	6812.8	84.78	0.22	7216.2	2032169	190939
616.0	6563.075	-59.7183	32.1817	84.56	0.22	6824.8	84.86	C.20	7228.1	2045409	190996
618.0	6563.125	-59.5780	32.1929	84.64	0.20	6836.7	84.94	0.19	7240.1	2058672	191050
620.0	6563.172	-59.4375	32.2040	84.73	0.19	6848.7	85.02	0.18	7252.1	2071959	191100
622.0	6563.216	-59.2966	32.2149	84.81	0.18	6860.8	85.10	C.17	7264.1	2085268	191148
624.0	6563.257	-59.1555	32.2257	84.90	0.17	6872.8	85.18	C.16	7276.2	2098601	191193
626.0	6563.295	-59.0140	32.2363	84.98	0.15	6884.9	85.26	0.15	7288.3	2111958	191235
628.0	6563.331	-58.8723	32.2467	85.07	0.14	6897.1	85.34	0.13	7300.5	2125338	191274
630.0	6563.364	-58.7303	32.2570	85.15	0.13	6909.3	85.42	0.12	7312.6	2138741	191310
632.0	6563.394	-58.5880	32.2671	85.24	0.12	6921.5	85.50	0.11	7324.9	2152168	191344
634.0	6563.422	-58.4455	32.2771	85.32	0.11	6933.7	85.58	0.10	7337.1	2165619	191375
636.0	6563.447	-58.3026	32.2869	85.41	0.10	6946.0	85.66	0.09	7349.4	2179093	191404
638.0	6563.470	-58.1595	32.2965	85.50	0.09	6958.4	85.74	C.C8	7361.8	2192592	191430
640.0	6563.490	-58.0161	32.3059	85.58	0.08	6970.8	85.82	0.C8	7374.2	2206114	191453
642.0	6563.508	-57.8724	32.3152	85.67	0.07	6983.2	85.91	0.07	7386.6	2219660	191475
644.0	6563.524	-57.7284	32.3244	85.75	0.06	6995.6	85.99	0.06	7399.0	2233231	191494
646.0	6563.538	-57.5841	32.3333	85.84	0.05	7008.2	86.07	C.C5	7411.6	2246825	191511
648.0	6563.550	-57.4395	32.3421	85.93	0.04	7020.7	86.15	0.04	7424.1	2260444	191526
650.0	6563.560	-57.2947	32.3507	86.02	0.04	7033.3	86.23	0.C3	7436.8	2274088	191538
652.0	6563.568	-57.1495	32.3592	86.10	0.03	7046.0	86.31	0.C3	7449.4	2287756	191549
654.0	6563.574	-57.0041	32.3674	86.19	0.02	7058.8	86.40	C.C2	7462.2	2301448	191558
656.0	6563.578	-56.8584	32.3755	86.28	0.01	7071.5	86.48	C.C1	7474.9	2315165	191565
658.0	6563.581	-56.7123	32.3835	86.37	0.01	7084.3	86.56	C.C1	7487.7	2328907	191571
660.0	6563.582	-56.5660	32.3912	86.45	0.00	7097.1	86.64	C.C0	7500.6	2342674	191574
662.0	6563.582	-56.4194	32.3988	86.54	-0.00	7110.0	86.73	-C.00	7513.4	2356466	191577

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
664.0	6563.580	-56.2725	32.4062	86.63	-0.01	7122.9	86.81	-0.C1	7526.3	2370283	191577
666.0	6563.577	-56.1253	32.4134	86.72	-0.01	7135.8	86.89	-0.C1	7539.3	2384125	191577
668.0	6563.573	-55.9779	32.4205	86.81	-0.02	7148.8	86.98	-0.C2	7552.3	2397992	191575
670.0	6563.568	-55.8301	32.4273	86.90	-0.02	7161.9	87.06	-0.C2	7565.3	2411884	191572
672.0	6563.561	-55.6820	32.4340	86.98	-0.03	7174.9	87.14	-0.C3	7578.4	2425802	191568
674.0	6563.554	-55.5337	32.4405	87.07	-0.03	7188.0	87.23	-0.C3	7591.5	2439745	191563
676.0	6563.546	-55.3850	32.4468	87.16	-0.03	7201.2	87.31	-0.C3	7604.6	2453714	191557
678.0	6563.537	-55.2361	32.4530	87.25	-0.04	7214.4	87.40	-0.C3	7617.8	2467708	191550
680.0	6563.528	-55.0868	32.4589	87.34	-0.04	7227.6	87.48	-0.C4	7631.1	2481728	191543
682.0	6563.518	-54.9373	32.4647	87.43	-0.04	7240.9	87.57	-0.C4	7644.3	2495773	191535
684.0	6563.508	-54.7875	32.4702	87.52	-0.04	7254.2	87.65	-0.C4	7657.7	2509845	191527
686.0	6563.498	-54.6373	32.4756	87.61	-0.04	7267.6	87.74	-0.C4	7671.0	2523942	191518
688.0	6563.488	-54.4869	32.4808	87.70	-0.04	7281.0	87.82	-0.C4	7684.4	2538066	191510
690.0	6563.478	-54.3362	32.4858	87.79	-0.04	7294.4	87.91	-0.C3	7697.8	2552215	191502
692.0	6563.469	-54.1852	32.4906	87.88	-0.03	7307.9	87.99	-0.C3	7711.3	2566390	191495
694.0	6563.461	-54.0339	32.4953	87.97	-0.03	7321.4	88.08	-0.C3	7724.8	2580592	191488
696.0	6563.453	-53.8823	32.4997	88.06	-0.03	7335.0	88.16	-0.C3	7738.4	2594820	191482
698.0	6563.447	-53.7304	32.5039	88.15	-0.02	7348.6	88.25	-0.C2	7752.0	2609075	191477
700.0	6563.442	-53.5782	32.5079	88.24	-0.02	7362.2	88.34	-0.C2	7765.7	2623355	191473
702.0	6563.438	-53.4257	32.5118	88.34	-0.01	7375.9	88.42	-0.C1	7779.4	2637663	191471
	S-IVB 1ST GUIDANCE CUTOFF										
703.760	6563.435	-53.2920	32.5150	88.42	-0.01	7388.0	88.50	-0.C1	7791.4	2650206	191469
704.0	6563.435	-53.2729	32.5154	88.43	-0.01	7389.1	88.51	-0.C1	7792.6	2651997	191470
706.0	6563.434	-53.1200	32.5189	88.52	-0.01	7389.6	88.59	-0.00	7793.1	2666342	191469
708.0	6563.433	-52.9670	32.5221	88.61	-0.01	7389.6	88.68	-0.C1	7793.1	2680692	191469
710.0	6563.431	-52.8140	32.5251	88.70	-0.01	7389.6	88.77	-0.01	7793.1	2695039	191469
712.0	6563.430	-52.6610	32.5279	88.79	-0.01	7389.6	88.86	-0.C1	7793.1	2709386	191468
	PARKING ORBIT INSERTION										
713.760	6563.335	-52.5260	32.5303	88.87	-0.01	7389.7	88.93	-0.00	7793.1	2722051	191374

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								
713.760	6563.335	-52.5260	32.5303	32.6999	88.93	-0.00	7793.1	191.374
750.0	6563.310	-49.7529	32.5423	32.7119	90.51	-0.01	7793.3	191.353
800.0	6563.272	-45.9299	32.4476	32.6169	92.68	-0.01	7793.6	191.284
850.0	6563.233	-42.1210	32.2245	32.3933	94.83	-0.01	7793.8	191.169
900.0	6563.193	-38.3372	31.8748	32.0426	96.96	-0.01	7794.0	191.011
950.0	6563.151	-34.5889	31.4012	31.5676	99.04	-0.01	7794.2	190.811
1000.0	6563.110	-30.8851	30.8070	30.9716	101.07	-0.01	7794.4	190.573
1050.0	6563.068	-27.2340	30.0966	30.2589	103.03	-0.01	7794.7	190.299
1100.0	6563.026	-23.6422	29.2748	29.4344	104.92	-0.01	7795.0	189.993
1150.0	6562.985	-20.1147	28.3469	28.5033	106.72	-0.01	7795.2	189.658
1200.0	6562.944	-16.6553	27.3188	27.4715	108.44	-0.01	7795.5	189.300
1250.0	6562.903	-13.2663	26.1965	26.3448	110.06	-0.01	7795.9	188.921
1300.0	6562.863	-9.9484	24.9862	25.1296	111.59	-0.01	7796.2	188.528
1350.0	6562.824	-6.7015	23.6942	23.8320	113.02	-0.01	7796.5	188.125
1400.0	6562.784	-3.5242	22.3267	22.4584	114.35	-0.01	7796.8	187.717
1450.0	6562.745	-0.4142	20.8901	21.0150	115.57	-0.01	7797.2	187.310
1500.0	6562.707	2.6316	19.3905	19.5079	116.70	-0.01	7797.5	186.909
1550.0	6562.669	5.6170	17.8338	17.9431	117.72	-0.01	7797.8	186.518
1600.0	6562.631	8.5462	16.2259	16.3265	118.64	-0.01	7798.1	186.143
1650.0	6562.594	11.4239	14.5724	14.6637	119.46	-0.01	7798.4	185.788
1700.0	6562.557	14.2552	12.8789	12.9604	120.19	-0.01	7798.7	185.458
1750.0	6562.520	17.0453	11.1506	11.2218	120.81	-0.01	7798.9	185.158
1800.0	6562.485	19.7997	9.3928	9.4532	121.34	-0.01	7799.2	184.891
1850.0	6562.449	22.5241	7.6104	7.6596	121.78	-0.01	7799.4	184.660
1900.0	6562.415	25.2241	5.8083	5.8461	122.12	-0.00	7799.6	184.469
1950.0	6562.382	27.9055	3.9913	4.0174	122.37	-0.00	7799.8	184.320
2000.0	6562.351	30.5742	2.1642	2.1784	122.52	-0.00	7799.9	184.216
2050.0	6562.322	33.2359	0.3317	0.3338	122.58	-0.00	7800.1	184.157
2100.0	6562.295	35.8967	-1.5018	-1.5116	122.55	-0.00	7800.2	184.144
2150.0	6562.271	38.5624	-3.3315	-3.3533	122.43	-0.00	7800.2	184.178
2200.0	6562.251	41.2387	-5.1528	-5.1864	122.22	-0.00	7800.3	184.258
2250.0	6562.235	43.9316	-6.9610	-7.0061	121.91	-0.00	7800.3	184.385
2300.0	6562.224	46.6469	-8.7513	-8.8078	121.51	-0.00	7800.2	184.555
2350.0	6562.218	49.3904	-10.5189	-10.5863	121.02	-0.00	7800.2	184.768
2400.0	6562.219	52.1676	-12.2588	-12.3367	120.42	0.00	7800.1	185.021
2450.0	6562.226	54.9840	-13.9659	-14.0537	119.73	0.00	7800.0	185.312
2500.0	6562.242	57.8452	-15.6349	-15.7322	118.95	0.00	7799.8	185.636
2550.0	6562.266	60.7561	-17.2603	-17.3665	118.06	0.00	7799.7	185.991
2600.0	6562.299	63.7217	-18.8366	-18.9511	117.08	0.01	7799.5	186.372
2650.0	6562.343	66.7463	-20.3579	-20.4802	115.99	0.01	7799.3	186.776

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	6562.397	69.8340	-21.8184	-21.9477	114.80	0.01	7799.1	187.198
2750.0	6562.463	72.9879	-23.2118	-23.3475	113.51	0.01	7798.8	187.633
2800.0	6562.541	76.2108	-24.5321	-24.6736	112.11	0.01	7798.6	188.077
2850.0	6562.632	79.5043	-25.7728	-25.9195	110.62	0.01	7798.3	188.525
2900.0	6562.736	82.8691	-26.9278	-27.0790	109.03	0.02	7798.0	188.973
2950.0	6562.854	86.3048	-27.9907	-28.1458	107.35	0.02	7797.8	189.416
3000.0	6562.986	89.8094	-28.9553	-29.1139	105.57	0.02	7797.5	189.850
3050.0	6563.132	93.3800	-29.8159	-29.9774	103.71	0.02	7797.2	190.272
3100.0	6563.293	97.0117	-30.5669	-30.7307	101.77	0.02	7796.9	190.677
3150.0	6563.468	100.6985	-31.2032	-31.3690	99.77	0.03	7796.6	191.062
3200.0	6563.659	104.4329	-31.7204	-31.8877	97.71	0.03	7796.3	191.424
3250.0	6563.862	108.2060	-32.1146	-32.2831	95.60	0.03	7796.0	191.761
3300.0	6564.081	112.0079	-32.3830	-32.5522	93.45	0.03	7795.8	192.070
3350.0	6564.313	115.8277	-32.5236	-32.6931	91.28	0.04	7795.5	192.350
3400.0	6564.559	119.6540	-32.5352	-32.7047	89.11	0.04	7795.3	192.600
3450.0	6564.817	123.4753	-32.4177	-32.5870	86.94	0.04	7795.0	192.818
3500.0	6565.087	127.2801	-32.1722	-32.3408	84.79	0.04	7794.8	193.005
3550.0	6565.368	131.0575	-31.8006	-31.9681	82.67	0.04	7794.5	193.161
3600.0	6565.659	134.7975	-31.3056	-31.4717	80.60	0.04	7794.3	193.287
3650.0	6565.959	138.4908	-30.6910	-30.8552	78.58	0.04	7794.1	193.384
3700.0	6566.267	142.1299	-29.9611	-30.1229	76.64	0.05	7793.9	193.454
3750.0	6566.581	145.7084	-29.1209	-29.2800	74.76	0.05	7793.7	193.498
3800.0	6566.900	149.2215	-28.1760	-28.3317	72.98	0.05	7793.6	193.520
3850.0	6567.223	152.6656	-27.1321	-27.2839	71.28	0.05	7793.4	193.522
3900.0	6567.549	156.0389	-25.9953	-26.1427	69.67	0.05	7793.2	193.507
3950.0	6567.874	159.3407	-24.7719	-24.9143	68.16	0.05	7793.1	193.478
4000.0	6568.200	162.5714	-23.4683	-23.6050	66.75	0.05	7792.9	193.439
4050.0	6568.523	165.7327	-22.0906	-22.2210	65.44	0.05	7792.8	193.394
4100.0	6568.842	168.8270	-20.6451	-20.7687	64.23	0.05	7792.6	193.346
4150.0	6569.156	171.8574	-19.1380	-19.2540	63.13	0.05	7792.5	193.298
4200.0	6569.463	174.8279	-17.5751	-17.6829	62.12	0.04	7792.4	193.255
4250.0	6569.761	177.7428	-15.9623	-16.0614	61.22	0.04	7792.2	193.220
4300.0	6570.050	-179.3931	-14.3052	-14.3949	60.42	0.04	7792.1	193.196
4350.0	6570.328	-176.5748	-12.6093	-12.6891	59.71	0.04	7792.0	193.186
4400.0	6570.594	-173.7969	-10.8797	-10.9491	59.10	0.04	7791.8	193.193
4450.0	6570.846	-171.0540	-9.1216	-9.1802	58.58	0.04	7791.7	193.220
4500.0	6571.083	-168.3404	-7.3399	-7.3874	58.16	0.03	7791.5	193.268
4550.0	6571.305	-165.6504	-5.5396	-5.5756	57.84	0.03	7791.4	193.340
4600.0	6571.511	-162.9783	-3.7253	-3.7496	57.61	0.03	7791.2	193.436
4650.0	6571.700	-160.3183	-1.9018	-1.9142	57.46	0.03	7791.1	193.557
4700.0	6571.871	-157.6645	-0.0736	-0.0740	57.41	0.02	7790.9	193.705
4750.0	6572.023	-155.0110	1.7548	1.7663	57.46	0.02	7790.7	193.878
4800.0	6572.158	-152.3520	3.5787	3.6020	57.59	0.02	7790.6	194.076

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	6572.273	-149.6818	5.3934	5.4285	57.82	0.02	7790.4	194.297
4900.0	6572.370	-146.9944	7.1945	7.2410	58.13	0.01	7790.2	194.541
4950.0	6572.449	-144.2841	8.9771	9.0348	58.55	0.01	7790.1	194.806
5000.0	6572.508	-141.5453	10.7364	10.8050	59.05	0.01	7789.9	195.088
5050.0	6572.550	-138.7722	12.4676	12.5465	59.65	0.00	7789.7	195.385
5100.0	6572.574	-135.9594	14.1654	14.2542	60.35	0.00	7789.6	195.695
5150.0	6572.581	-133.1016	15.8247	15.9229	61.15	-0.00	7789.4	196.012
5200.0	6572.571	-130.1938	17.4401	17.5471	62.04	-0.00	7789.3	196.334
5250.0	6572.545	-127.2311	19.0060	19.1213	63.04	-0.00	7789.1	196.657
5300.0	6572.505	-124.2091	20.5167	20.6395	64.13	-0.01	7789.0	196.977
5350.0	6572.450	-121.1241	21.9663	22.0960	65.33	-0.01	7788.9	197.289
5400.0	6572.382	-117.9726	23.3486	23.4847	66.63	-0.01	7788.8	197.589
5450.0	6572.302	-114.7523	24.6576	24.7994	68.03	-0.01	7788.7	197.873
5500.0	6572.211	-111.4614	25.8869	26.0338	69.53	-0.01	7788.6	198.138
5550.0	6572.110	-108.0994	27.0304	27.1818	71.12	-0.02	7788.6	198.378
5600.0	6572.000	-104.6669	28.0818	28.2370	72.81	-0.02	7788.6	198.591
5650.0	6571.882	-101.1656	29.0350	29.1936	74.59	-0.02	7788.6	198.772
5700.0	6571.757	-97.5988	29.8842	30.0457	76.45	-0.02	7788.6	198.919
5750.0	6571.626	-93.9713	30.6240	30.7878	78.39	-0.02	7788.6	199.029
5800.0	6571.491	-90.2892	31.2493	31.4150	80.40	-0.02	7788.7	199.100
5850.0	6571.351	-86.5599	31.7557	31.9229	82.46	-0.02	7788.8	199.129
5900.0	6571.209	-82.7925	32.1395	32.3078	84.57	-0.02	7788.9	199.116
5950.0	6571.064	-78.9968	32.3978	32.5668	86.71	-0.02	7789.1	199.058
6000.0	6570.918	-75.1837	32.5286	32.6980	88.88	-0.02	7789.2	198.957
6050.0	6570.772	-71.3644	32.5310	32.7004	91.05	-0.02	7789.4	198.811
6100.0	6570.626	-67.5504	32.4047	32.5738	93.21	-0.02	7789.7	198.622
6150.0	6570.480	-63.7532	32.1509	32.3193	95.36	-0.02	7789.9	198.391
6200.0	6570.336	-59.9834	31.7714	31.9387	97.47	-0.02	7790.2	198.119
6250.0	6570.193	-56.2512	31.2691	31.4349	99.53	-0.02	7790.5	197.809
6300.0	6570.053	-52.5655	30.6476	30.8116	101.54	-0.02	7790.8	197.464
6350.0	6569.914	-48.9338	29.9113	30.0729	103.48	-0.02	7791.1	197.085
6400.0	6569.779	-45.3625	29.0652	29.2239	105.35	-0.02	7791.4	196.678
6450.0	6569.646	-41.8563	28.1146	28.2700	107.13	-0.02	7791.8	196.247
6500.0	6569.516	-38.4185	27.0654	27.2170	108.82	-0.02	7792.1	195.794
6550.0	6569.389	-35.0511	25.9238	26.0709	110.42	-0.02	7792.5	195.326
6600.0	6569.265	-31.7547	24.6958	24.8378	111.93	-0.02	7792.9	194.847
6650.0	6569.144	-28.5287	23.3877	23.5241	113.33	-0.02	7793.2	194.361
6700.0	6569.026	-25.3717	22.0059	22.1359	114.63	-0.02	7793.6	193.875
6750.0	6568.910	-22.2810	20.5564	20.6795	115.83	-0.02	7794.0	193.392
6800.0	6568.798	-19.2535	19.0454	19.1609	116.93	-0.02	7794.3	192.919
6850.0	6568.689	-16.2954	17.4788	17.5861	117.93	-0.02	7794.7	192.460
6900.0	6568.582	-13.3722	15.8624	15.9609	118.83	-0.02	7795.0	192.021
6950.0	6568.478	-10.5092	14.2018	14.2909	119.63	-0.02	7795.3	191.605

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	6568.377	-7.6914	12.5023	12.5815	120.33	-0.01	7795.7	191.217
7050.0	6568.278	-4.9134	10.7694	10.8381	120.94	-0.01	7795.9	190.862
7100.0	6568.182	-2.1697	9.0080	9.0659	121.45	-0.01	7796.2	190.543
7150.0	6568.090	0.5452	7.2231	7.2699	121.86	-0.01	7796.4	190.263
7200.0	6568.000	3.2371	5.4197	5.4549	122.18	-0.01	7796.7	190.026
7250.0	6567.914	5.9118	3.6024	3.6259	122.41	-0.01	7796.8	189.833
7300.0	6567.831	8.5750	1.7760	1.7876	122.54	-0.01	7797.0	189.686
7350.0	6567.752	11.2326	-0.0549	-0.0553	122.59	-0.01	7797.1	189.586
7400.0	6567.678	13.8905	-1.8858	-1.8981	122.54	-0.01	7797.2	189.535
7450.0	6567.608	16.5544	-3.7119	-3.7362	122.40	-0.01	7797.3	189.532
7500.0	6567.544	19.2303	-5.5288	-5.5647	122.16	-0.01	7797.4	189.578
7550.0	6567.485	21.9240	-7.3315	-7.3790	121.84	-0.01	7797.4	189.669
7600.0	6567.433	24.6412	-9.1155	-9.1742	121.42	-0.01	7797.4	189.807
7650.0	6567.388	27.3876	-10.8758	-10.9453	120.90	-0.01	7797.3	189.987
7700.0	6567.351	30.1689	-12.6075	-12.6873	120.29	-0.00	7797.2	190.209
7750.0	6567.322	32.9905	-14.3054	-14.3951	119.58	-0.00	7797.1	190.468
7800.0	6567.303	35.8578	-15.9641	-16.0632	118.78	-0.00	7797.0	190.762
7850.0	6567.293	38.7758	-17.5784	-17.6862	117.87	-0.00	7796.9	191.086
7900.0	6567.294	41.7492	-19.1425	-19.2585	116.87	0.00	7796.7	191.437
7950.0	6567.306	44.7823	-20.6506	-20.7742	115.76	0.00	7796.5	191.811
8000.0	6567.331	47.8791	-22.0968	-22.2273	114.55	0.00	7796.3	192.203
8050.0	6567.368	51.0426	-23.4749	-23.6117	113.24	0.01	7796.1	192.609
8100.0	6567.418	54.2754	-24.7788	-24.9212	111.83	0.01	7795.8	193.024
8150.0	6567.483	57.5788	-26.0022	-26.1496	110.32	0.01	7795.6	193.443
8200.0	6567.562	60.9534	-27.1387	-27.2905	108.71	0.01	7795.3	193.862
8250.0	6567.656	64.3985	-28.1821	-28.3379	107.01	0.01	7795.0	194.277
8300.0	6567.765	67.9120	-29.1265	-29.2855	105.22	0.02	7794.8	194.684
8350.0	6567.889	71.4905	-29.9659	-30.1277	103.35	0.02	7794.5	195.078
8400.0	6568.029	75.1290	-30.6950	-30.8591	101.40	0.02	7794.2	195.456
8450.0	6568.185	78.8213	-31.3087	-31.4747	99.39	0.02	7794.0	195.814
8500.0	6568.357	82.5594	-31.8028	-31.9702	97.32	0.03	7793.7	196.151
8550.0	6568.543	86.3345	-32.1736	-32.3421	95.20	0.03	7793.4	196.462
8600.0	6568.745	90.1363	-32.4184	-32.5876	93.05	0.03	7793.1	196.747
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6								
8629.260	6568.861	92.3692	-32.5025	-32.6718	91.79	0.03	7793.0	196.891

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								
8629.260	-12890758	632674	505559	-779.9	-2446.7	-6928.6	8.20	-1.39	-0.43
8630.0	-12891342	630865	500433	-773.8	-2447.7	-6929.0	8.20	-1.39	-0.42
8640.0	-12898670	606319	431124	-691.7	-2461.5	-6932.7	8.21	-1.36	-0.33
8650.0	-12905177	581637	361781	-609.6	-2474.9	-6935.6	8.22	-1.33	-0.24
8660.0	-12910862	556822	292415	-527.4	-2488.0	-6937.6	8.23	-1.30	-0.16
8670.0	-12915724	531877	223033	-445.1	-2500.8	-6938.7	8.23	-1.26	-0.07
8680.0	-12919764	506807	153644	-362.8	-2513.3	-6938.9	8.24	-1.23	0.02
8690.0	-12922980	481612	84257	-280.4	-2525.5	-6938.3	8.24	-1.20	0.11
8700.0	-12925371	456298	14882	-198.0	-2537.3	-6936.7	8.24	-1.17	0.20
8710.0	-12926939	430867	-54474	-115.5	-2548.8	-6934.3	8.24	-1.14	0.28
8720.0	-12927682	405323	-123802	-33.1	-2560.0	-6931.0	8.25	-1.10	0.37
8730.0	-12927600	379668	-193092	49.4	-2570.9	-6926.9	8.25	-1.07	0.46
8740.0	-12926694	353906	-262336	131.8	-2581.4	-6921.8	8.24	-1.04	0.55
8750.0	-12924964	328041	-331526	214.3	-2591.6	-6915.9	8.24	-1.00	0.64
8760.0	-12922409	302075	-400652	296.7	-2601.5	-6909.1	8.24	-0.97	0.72
8770.0	-12919031	276012	-469706	379.0	-2611.0	-6901.5	8.23	-0.94	0.81
8780.0	-12914829	249856	-538679	461.3	-2620.2	-6892.9	8.23	-0.90	0.90
8790.0	-12909804	223609	-607562	543.6	-2629.1	-6883.5	8.22	-0.87	0.98
8800.0	-12903957	197276	-676346	625.8	-2637.6	-6873.3	8.21	-0.83	1.07
8810.0	-12897289	170860	-745024	707.9	-2645.7	-6862.1	8.21	-0.80	1.16
8820.0	-12889800	144363	-813586	789.9	-2653.5	-6850.1	8.20	-0.76	1.24
8830.0	-12881491	117790	-882023	871.8	-2661.0	-6837.2	8.19	-0.73	1.33
8840.0	-12872364	91144	-950328	953.6	-2668.1	-6823.5	8.17	-0.69	1.42
8850.0	-12862419	64429	-1018491	1035.3	-2674.9	-6808.9	8.16	-0.66	1.50
8860.0	-12851657	37648	-1086504	1116.9	-2681.3	-6793.5	8.15	-0.62	1.59
8870.0	-12840081	10804	-1154358	1198.3	-2687.4	-6777.2	8.13	-0.59	1.67
8880.0	-12827692	-16098	-1222044	1279.6	-2693.1	-6760.0	8.12	-0.55	1.76
8890.0	-12814491	-43056	-1289555	1360.7	-2698.4	-6742.0	8.10	-0.52	1.84
8900.0	-12800479	-70065	-1356882	1441.6	-2703.4	-6723.2	8.08	-0.48	1.93
8910.0	-12785659	-97122	-1424016	1522.4	-2708.0	-6703.5	8.07	-0.44	2.01
8920.0	-12770033	-124224	-1490948	1602.9	-2712.3	-6682.9	8.05	-0.41	2.10
8930.0	-12753602	-151366	-1557671	1683.3	-2716.2	-6661.5	8.03	-0.37	2.18
8940.0	-12736368	-178546	-1624176	1763.4	-2719.7	-6639.3	8.00	-0.34	2.26
8950.0	-12718334	-205759	-1690455	1843.3	-2722.9	-6616.3	7.98	-0.30	2.35
8960.0	-12699502	-233002	-1756499	1923.0	-2725.7	-6592.4	7.96	-0.26	2.43
8970.0	-12679874	-260271	-1822300	2002.5	-2728.1	-6567.7	7.93	-0.22	2.51
8980.0	-12659453	-287562	-1887850	2081.7	-2730.2	-6542.2	7.91	-0.19	2.59
8990.0	-12638242	-314873	-1953141	2160.6	-2731.9	-6515.8	7.88	-0.15	2.68
9000.0	-12616242	-342198	-2018164	2239.3	-2733.2	-6488.6	7.85	-0.11	2.76
9010.0	-12593457	-369535	-2082911	2317.7	-2734.1	-6460.7	7.82	-0.08	2.84

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
9020.0	-12569890	-396879	-2147374	2395.7	-2734.7	-6431.9	7.79	-0.04	2.92
9030.0	-12545543	-424228	-2211546	2473.5	-2734.9	-6402.3	7.76	-0.00	3.00
9040.0	-12520420	-451576	-2275417	2551.0	-2734.7	-6371.9	7.73	0.04	3.08
9050.0	-12494524	-478921	-2338981	2628.2	-2734.2	-6340.7	7.70	0.07	3.16
9060.0	-12467858	-506259	-2402229	2705.0	-2733.3	-6308.7	7.67	0.11	3.24
9070.0	-12440425	-533585	-2465153	2781.5	-2732.0	-6276.0	7.63	0.15	3.32
9080.0	-12412230	-560897	-2527745	2857.6	-2730.3	-6242.4	7.60	0.19	3.39
9090.0	-12383274	-588190	-2589998	2933.4	-2728.2	-6208.1	7.56	0.22	3.47
9100.0	-12353563	-615461	-2651904	3008.8	-2725.8	-6173.0	7.52	0.26	3.55
9110.0	-12323099	-642705	-2713455	3083.8	-2723.0	-6137.1	7.48	0.30	3.63
9120.0	-12291887	-669920	-2774643	3158.5	-2719.8	-6100.5	7.44	0.34	3.70
9130.0	-12259931	-697100	-2835462	3232.7	-2716.3	-6063.1	7.41	0.37	3.77
9140.0	-12227234	-724244	-2895902	3306.6	-2712.3	-6024.9	7.37	0.41	3.85
9150.0	-12193800	-751346	-2955958	3380.0	-2708.0	-5986.1	7.32	0.45	3.92
9160.0	-12159634	-778403	-3015621	3453.1	-2703.3	-5946.5	7.28	0.49	4.00
9170.0	-12124740	-805412	-3074885	3525.6	-2698.3	-5906.1	7.24	0.53	4.07
9180.0	-12089118	-832365	-3133714	3597.8	-2692.8	-5864.8	7.19	0.56	4.15
9190.0	-12052781	-859264	-3192154	3669.5	-2687.0	-5823.0	7.14	0.60	4.22
	S-IVB RESTART (ENGINE SOLENOID ACTIVATION)								
9199.200	-12018720	-883959	-3245546	3735.0	-2681.3	-5783.9	7.10	0.64	4.28
9200.0	-12015730	-886103	-3250172	3740.7	-2680.8	-5780.4	7.10	0.64	4.28
9202.0	-12008233	-891465	-3261726	3754.9	-2679.5	-5771.8	7.09	0.65	4.30
9204.0	-12000705	-896825	-3273267	3769.1	-2678.2	-5763.2	7.09	0.65	4.31
9206.0	-11993147	-902184	-3284794	3783.2	-2676.9	-5754.6	7.08	0.66	4.32
	S-IVB RE-IGNITION (STDV OPEN)								
9207.520	-11987382	-906257	-3293546	3794.0	-2675.9	-5748.0	7.07	0.67	4.33
9208.0	-11985559	-907543	-3296308	3797.5	-2675.6	-5746.1	7.58	0.35	3.64
9210.0	-11977939	-912900	-3307808	3815.0	-2676.5	-5742.0	9.86	-1.28	0.36
9212.0	-11970286	-918258	-3319299	3834.8	-2679.1	-5741.8	9.97	-1.31	-0.04
9214.0	-11962595	-923620	-3330786	3854.9	-2681.7	-5742.0	10.06	-1.35	-0.16
9216.0	-11954865	-928987	-3342273	3875.1	-2684.5	-5742.3	10.15	-1.38	-0.20
9218.0	-11947095	-934359	-3353761	3895.5	-2687.2	-5742.7	10.24	-1.41	-0.21
9220.0	-11939287	-939735	-3365246	3916.1	-2690.1	-5743.1	10.33	-1.43	-0.19
9222.0	-11931442	-945114	-3376726	3936.8	-2692.9	-5743.5	10.39	-1.42	-0.17
9224.0	-11923558	-950497	-3388204	3957.6	-2695.8	-5743.8	10.41	-1.38	-0.13
9226.0	-11915631	-955886	-3399683	3978.4	-2698.5	-5744.0	10.38	-1.34	-0.11
9228.0	-11907660	-961283	-3411167	3999.2	-2701.1	-5744.2	10.38	-1.29	-0.09
9230.0	-11899643	-966687	-3422655	4019.9	-2703.7	-5744.4	10.39	-1.28	-0.07
9232.0	-11891583	-972097	-3434144	4040.7	-2706.2	-5744.5	10.41	-1.27	-0.04

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

TIME SEC	XF M	YF M	ZF M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
9234.0	-11883481	-977512	-3445633	4061.6	-2708.7	-5744.5	10.42	-1.26	-0.01
9236.0	-11875338	-982931	-3457123	4082.4	-2711.3	-5744.5	10.43	-1.25	0.01
9238.0	-11867153	-988357	-3468611	4103.3	-2713.8	-5744.5	10.44	-1.25	0.02
9240.0	-11858926	-993787	-3480100	4124.2	-2716.2	-5744.4	10.46	-1.24	0.02
9242.0	-11850658	-999222	-3491589	4145.1	-2718.7	-5744.4	10.47	-1.23	0.02
9244.0	-11842347	-1004662	-3503078	4166.0	-2721.2	-5744.4	10.48	-1.22	0.03
9246.0	-11833994	-1010107	-3514567	4187.0	-2723.7	-5744.3	10.49	-1.21	0.03
9248.0	-11825599	-1015556	-3526055	4208.0	-2726.1	-5744.2	10.51	-1.20	0.05
9250.0	-11817162	-1021011	-3537543	4229.0	-2728.5	-5744.1	10.51	-1.20	0.05
9252.0	-11808683	-1026470	-3549032	4250.1	-2730.9	-5744.0	10.54	-1.18	0.05
9254.0	-11800161	-1031934	-3560520	4271.2	-2733.2	-5743.9	10.56	-1.17	0.05
9256.0	-11791598	-1037403	-3572007	4292.3	-2735.5	-5743.8	10.56	-1.16	0.05
9258.0	-11782992	-1042877	-3583495	4313.4	-2737.9	-5743.7	10.57	-1.16	0.06
9260.0	-11774344	-1048355	-3594982	4334.6	-2740.2	-5743.6	10.58	-1.15	0.06
9262.0	-11765654	-1053837	-3606469	4355.8	-2742.5	-5743.5	10.59	-1.15	0.06
9264.0	-11756921	-1059324	-3617956	4377.0	-2744.7	-5743.3	10.60	-1.14	0.06
9266.0	-11748146	-1064816	-3629442	4398.2	-2747.0	-5743.2	10.62	-1.13	0.06
9268.0	-11739328	-1070312	-3640929	4419.4	-2749.3	-5743.1	10.63	-1.12	0.07
9270.0	-11730468	-1075813	-3652415	4440.7	-2751.5	-5742.9	10.63	-1.11	0.09
9272.0	-11721565	-1081318	-3663900	4462.0	-2753.7	-5742.8	10.64	-1.10	0.09
9274.0	-11712620	-1086828	-3675386	4483.3	-2755.9	-5742.6	10.66	-1.09	0.09
9276.0	-11703632	-1092342	-3686871	4504.6	-2758.1	-5742.4	10.66	-1.08	0.09
9278.0	-11694602	-1097860	-3698355	4525.9	-2760.2	-5742.2	10.65	-1.08	0.10
9280.0	-11685528	-1103383	-3709840	4547.2	-2762.4	-5742.0	10.66	-1.07	0.11
9282.0	-11676413	-1108910	-3721323	4568.6	-2764.5	-5741.8	10.67	-1.07	0.11
9284.0	-11667254	-1114441	-3732807	4589.9	-2766.6	-5741.6	10.69	-1.06	0.11
9286.0	-11658053	-1119976	-3744290	4611.3	-2768.8	-5741.3	10.70	-1.05	0.11
9288.0	-11648809	-1125516	-3755772	4632.7	-2770.9	-5741.1	10.71	-1.05	0.11
9290.0	-11639522	-1131060	-3767254	4654.1	-2772.9	-5740.9	10.72	-1.04	0.11
9292.0	-11630192	-1136608	-3778736	4675.6	-2775.0	-5740.7	10.73	-1.03	0.11
9294.0	-11620820	-1142160	-3790217	4697.1	-2777.1	-5740.4	10.74	-1.02	0.12
9296.0	-11611404	-1147716	-3801697	4718.5	-2779.1	-5740.2	10.74	-1.01	0.13
9298.0	-11601946	-1153276	-3813178	4740.0	-2781.1	-5739.9	10.74	-1.00	0.13
9300.0	-11592444	-1158840	-3824657	4761.5	-2783.1	-5739.7	10.75	-1.00	0.13
9302.0	-11582900	-1164409	-3836136	4783.0	-2785.1	-5739.4	10.77	-1.00	0.13
9304.0	-11573312	-1169981	-3847615	4804.6	-2787.1	-5739.1	10.78	-0.99	0.13
9306.0	-11563681	-1175557	-3859093	4826.1	-2789.1	-5738.9	10.79	-0.99	0.13
9308.0	-11554007	-1181137	-3870570	4847.7	-2791.0	-5738.6	10.80	-0.98	0.13
9310.0	-11544290	-1186721	-3882047	4869.3	-2793.0	-5738.3	10.80	-0.96	0.14
9312.0	-11534530	-1192309	-3893523	4890.9	-2794.9	-5738.0	10.81	-0.95	0.14
9314.0	-11524727	-1197901	-3904999	4912.6	-2796.8	-5737.8	10.82	-0.95	0.14
9316.0	-11514880	-1203496	-3916474	4934.2	-2798.7	-5737.5	10.82	-0.94	0.15
9318.0	-11504990	-1209095	-3927949	4955.9	-2800.6	-5737.2	10.83	-0.94	0.15

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
9320.0	-11495056	-1214698	-3939423	4977.5	-2802.5	-5736.9	10.84	-0.93	0.16
9322.0	-11485080	-1220305	-3950897	4999.2	-2804.3	-5736.5	10.85	-0.93	0.16
9324.0	-11475060	-1225916	-3962369	5020.9	-2806.2	-5736.2	10.86	-0.93	0.16
9326.0	-11464996	-1231530	-3973841	5042.7	-2808.0	-5735.9	10.87	-0.92	0.16
9328.0	-11454889	-1237148	-3985313	5064.4	-2809.8	-5735.6	10.86	-0.90	0.17
9330.0	-11444738	-1242769	-3996784	5086.1	-2811.6	-5735.2	10.86	-0.89	0.17
9332.0	-11434544	-1248394	-4008254	5107.9	-2813.4	-5735.0	10.98	-0.93	0.07
9334.0	-11424306	-1254023	-4019724	5130.1	-2815.4	-5735.1	11.21	-1.02	-0.17
9336.0	-11414024	-1259656	-4031195	5152.8	-2817.5	-5735.7	11.47	-1.13	-0.45
9338.0	-11403695	-1265293	-4042667	5175.9	-2819.9	-5736.8	11.66	-1.21	-0.66
9340.0	-11393320	-1270935	-4054142	5199.3	-2822.3	-5738.2	11.74	-1.23	-0.75
9342.0	-11382898	-1276582	-4065620	5222.8	-2824.8	-5739.8	11.77	-1.22	-0.78
9344.0	-11372428	-1282234	-4077101	5246.4	-2827.1	-5741.3	11.79	-1.20	-0.78
9346.0	-11361912	-1287891	-4088585	5270.0	-2829.3	-5742.9	11.81	-1.19	-0.78
9348.0	-11351348	-1293552	-4100073	5293.6	-2831.5	-5744.5	11.83	-1.18	-0.78
9350.0	-11340737	-1299217	-4111563	5317.3	-2833.7	-5746.0	11.83	-1.18	-0.78
9352.0	-11330079	-1304886	-4123057	5341.0	-2836.0	-5747.6	11.83	-1.18	-0.79
9354.0	-11319373	-1310561	-4134554	5364.6	-2838.4	-5749.2	11.83	-1.19	-0.80
9356.0	-11308621	-1316240	-4146054	5388.3	-2840.8	-5750.8	11.84	-1.20	-0.82
9358.0	-11297820	-1321924	-4157557	5412.0	-2843.2	-5752.4	11.87	-1.19	-0.82
9360.0	-11286972	-1327613	-4169063	5435.9	-2845.5	-5754.0	11.89	-1.19	-0.83
9362.0	-11276077	-1333306	-4180573	5459.8	-2847.9	-5755.4	11.91	-1.19	-0.84
9364.0	-11265133	-1339004	-4192085	5483.8	-2850.2	-5757.0	11.93	-1.18	-0.85
9366.0	-11254142	-1344707	-4203601	5507.6	-2852.6	-5758.7	11.94	-1.18	-0.86
9368.0	-11243103	-1350414	-4215120	5531.4	-2855.0	-5760.6	11.96	-1.17	-0.86
9370.0	-11232016	-1356127	-4226643	5555.2	-2857.4	-5762.5	11.98	-1.17	-0.87
9372.0	-11220882	-1361844	-4238170	5579.1	-2859.7	-5764.3	12.00	-1.16	-0.87
9374.0	-11209700	-1367565	-4249700	5603.1	-2862.0	-5766.1	12.03	-1.15	-0.88
9376.0	-11198469	-1373292	-4261234	5627.2	-2864.3	-5767.8	12.05	-1.15	-0.91
9378.0	-11187191	-1379023	-4272771	5651.3	-2866.6	-5769.7	12.07	-1.15	-0.92
9380.0	-11175864	-1384758	-4284313	5675.4	-2868.8	-5771.5	12.07	-1.13	-0.92
9382.0	-11164489	-1390498	-4295857	5699.6	-2871.1	-5773.4	12.08	-1.12	-0.92
9384.0	-11153066	-1396242	-4307406	5723.8	-2873.3	-5775.2	12.10	-1.12	-0.93
9386.0	-11141594	-1401991	-4318958	5748.0	-2875.6	-5777.1	12.13	-1.12	-0.95
9388.0	-11130074	-1407745	-4330514	5772.3	-2877.8	-5779.0	12.15	-1.12	-0.96
9390.0	-11118505	-1413503	-4342074	5796.6	-2880.1	-5780.9	12.18	-1.12	-0.98
9392.0	-11106888	-1419265	-4353638	5821.0	-2882.3	-5782.9	12.19	-1.12	-1.00
9394.0	-11095221	-1425032	-4365206	5845.4	-2884.5	-5784.9	12.20	-1.11	-1.00
9396.0	-11083506	-1430803	-4376778	5869.8	-2886.8	-5786.9	12.21	-1.10	-1.00
9398.0	-11071742	-1436579	-4388354	5894.2	-2889.0	-5788.9	12.23	-1.09	-1.00
9400.0	-11059929	-1442359	-4399934	5918.7	-2891.1	-5791.0	12.25	-1.09	-1.02
9402.0	-11048067	-1448144	-4411518	5943.4	-2893.3	-5793.1	12.28	-1.10	-1.03
9404.0	-11036156	-1453932	-4423106	5968.3	-2895.5	-5795.4	12.30	-1.10	-1.05

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
9406.0	-11024194	-1459726	-4434699	5993.2	-2897.7	-5797.7	12.32	-1.10	-1.06
9408.0	-11012183	-1465523	-4446297	6018.1	-2899.9	-5800.0	12.34	-1.09	-1.08
9410.0	-11000122	-1471325	-4457899	6043.0	-2902.1	-5802.3	12.36	-1.09	-1.09
9412.0	-10988011	-1477132	-4469506	6067.9	-2904.3	-5804.5	12.39	-1.08	-1.10
9414.0	-10975850	-1482942	-4481117	6092.7	-2906.4	-5806.8	12.41	-1.08	-1.11
9416.0	-10963640	-1488757	-4492733	6117.4	-2908.6	-5809.0	12.44	-1.07	-1.13
9418.0	-10951381	-1494577	-4504353	6142.1	-2910.7	-5811.2	12.46	-1.06	-1.15
9420.0	-10939072	-1500400	-4515978	6166.7	-2912.8	-5813.4	12.48	-1.06	-1.16
9422.0	-10926714	-1506228	-4527607	6191.4	-2914.9	-5815.5	12.51	-1.05	-1.18
9424.0	-10914306	-1512060	-4539240	6216.2	-2917.1	-5817.8	12.53	-1.06	-1.20
9426.0	-10901849	-1517896	-4550878	6241.1	-2919.2	-5820.1	12.56	-1.06	-1.22
9428.0	-10889341	-1523737	-4562520	6266.2	-2921.3	-5822.6	12.58	-1.06	-1.24
9430.0	-10876784	-1529581	-4574168	6291.4	-2923.4	-5825.0	12.60	-1.06	-1.25
9432.0	-10864176	-1535430	-4585821	6316.6	-2925.5	-5827.6	12.62	-1.05	-1.26
9434.0	-10851517	-1541284	-4597478	6341.9	-2927.6	-5830.1	12.65	-1.05	-1.29
9436.0	-10838808	-1547141	-4609141	6367.2	-2929.7	-5832.7	12.67	-1.05	-1.31
9438.0	-10826048	-1553003	-4620809	6392.6	-2931.8	-5835.4	12.69	-1.04	-1.34
9440.0	-10813238	-1558868	-4632483	6418.0	-2933.9	-5838.1	12.71	-1.04	-1.35
9442.0	-10800376	-1564738	-4644161	6443.4	-2935.9	-5840.6	12.74	-1.04	-1.37
9444.0	-10787464	-1570612	-4655845	6468.6	-2937.9	-5843.1	12.76	-1.04	-1.38
9446.0	-10774502	-1576490	-4667534	6494.0	-2939.9	-5845.7	12.79	-1.03	-1.40
9448.0	-10761488	-1582372	-4679228	6519.6	-2942.0	-5848.5	12.82	-1.03	-1.41
9450.0	-10748423	-1588258	-4690928	6545.5	-2944.1	-5851.5	12.84	-1.03	-1.43
9452.0	-10735306	-1594148	-4702634	6571.5	-2946.3	-5854.7	12.86	-1.03	-1.44
9454.0	-10722137	-1600043	-4714346	6597.4	-2948.4	-5857.7	12.89	-1.02	-1.46
9456.0	-10708917	-1605942	-4726065	6623.2	-2950.4	-5860.7	12.91	-1.02	-1.48
9458.0	-10695644	-1611845	-4737789	6649.1	-2952.5	-5863.7	12.96	-1.03	-1.53
9460.0	-10682320	-1617752	-4749520	6675.1	-2954.5	-5866.8	13.01	-1.03	-1.56
9462.0	-10668944	-1623663	-4761256	6701.1	-2956.6	-5869.9	13.04	-1.03	-1.57
9464.0	-10655516	-1629578	-4772999	6727.2	-2958.6	-5873.0	13.06	-1.02	-1.58
9466.0	-10642035	-1635497	-4784748	6753.4	-2960.7	-5876.2	13.11	-1.02	-1.60
9468.0	-10628502	-1641421	-4796504	6779.6	-2962.7	-5879.4	13.14	-1.02	-1.63
9470.0	-10614917	-1647349	-4808266	6805.9	-2964.8	-5882.7	13.16	-1.02	-1.64
9472.0	-10601279	-1653280	-4820035	6832.3	-2966.8	-5886.0	13.17	-1.02	-1.66
9474.0	-10587588	-1659215	-4831810	6858.6	-2968.8	-5889.3	13.20	-1.01	-1.68
9476.0	-10573844	-1665155	-4843592	6885.1	-2970.8	-5892.7	13.25	-1.00	-1.70
9478.0	-10560048	-1671099	-4855381	6911.6	-2972.8	-5896.2	13.29	-0.99	-1.73
9480.0	-10546198	-1677046	-4867177	6938.2	-2974.8	-5899.6	13.34	-1.00	-1.75
9482.0	-10532295	-1682998	-4878980	6965.0	-2976.8	-5903.2	13.38	-1.01	-1.78
9484.0	-10518338	-1688954	-4890790	6991.7	-2978.8	-5906.7	13.40	-1.00	-1.79
9486.0	-10504328	-1694913	-4902607	7018.5	-2980.8	-5910.3	13.43	-1.00	-1.80
9488.0	-10490264	-1700877	-4914431	7045.5	-2982.8	-5914.0	13.48	-1.00	-1.83
9490.0	-10476146	-1706845	-4926263	7072.5	-2984.8	-5917.6	13.54	-1.00	-1.86

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
9492.0	-10461974	-1712816	-4938102	7099.6	-2986.8	-5921.4	13.57	-1.00	-1.88
9494.0	-10447747	-1718797	-4949948	7126.7	-2988.8	-5925.2	13.61	-0.99	-1.90
9496.0	-10433467	-1724771	-4961802	7154.0	-2990.8	-5929.0	13.64	-0.99	-1.94
9498.0	-10419131	-1730755	-4973664	7181.4	-2992.8	-5932.9	13.69	-1.00	-1.98
9500.0	-10404741	-1736743	-4985534	7208.9	-2994.8	-5936.9	13.73	-1.00	-1.99
9502.0	-10390296	-1742734	-4997412	7236.4	-2996.8	-5940.9	13.78	-0.99	-2.00
9504.0	-10375795	-1748730	-5009298	7264.0	-2998.8	-5944.9	13.83	-0.98	-2.02
9506.0	-10361240	-1754729	-5021192	7291.7	-3000.7	-5949.0	13.88	-0.98	-2.05
9508.0	-10346629	-1760733	-5033094	7319.5	-3002.7	-5953.1	13.93	-0.98	-2.08
9510.0	-10331962	-1766740	-5045004	7347.5	-3004.6	-5957.3	13.98	-0.97	-2.11
9512.0	-10317239	-1772751	-5056923	7375.5	-3006.6	-5961.5	14.03	-0.97	-2.13
9514.0	-10302460	-1778766	-5068850	7403.7	-3008.5	-5965.8	14.09	-0.97	-2.13
9516.0	-10287624	-1784785	-5080786	7431.9	-3010.5	-5970.1	14.14	-0.97	-2.15
9518.0	-10272732	-1790808	-5092731	7460.2	-3012.4	-5974.4	14.20	-0.98	-2.18
9520.0	-10257783	-1796835	-5104684	7488.7	-3014.4	-5978.8	14.26	-0.98	-2.20
9522.0	-10242777	-1802865	-5116646	7517.4	-3016.3	-5983.2	14.32	-0.98	-2.22
9524.0	-10227713	-1808900	-5128616	7546.2	-3018.2	-5987.6	14.38	-0.98	-2.24
9526.0	-10212592	-1814938	-5140596	7575.2	-3020.1	-5991.9	14.44	-0.98	-2.26
9528.0	-10197412	-1820980	-5152584	7604.1	-3022.0	-5996.2	14.51	-0.98	-2.28
9530.0	-10182173	-1827026	-5164581	7633.2	-3023.9	-6000.6	14.57	-0.99	-2.30
9532.0	-10166875	-1833076	-5176587	7662.4	-3025.8	-6005.2	14.64	-0.99	-2.32
9534.0	-10151517	-1839130	-5188602	7691.7	-3027.9	-6009.9	14.70	-1.00	-2.34
9536.0	-10136099	-1845187	-5200626	7721.2	-3029.9	-6014.8	14.77	-1.01	-2.36
9538.0	-10120622	-1951249	-5212661	7750.8	-3031.9	-6019.6	14.85	-1.02	-2.38
9540.0	-10105084	-1857315	-5224705	7780.6	-3033.9	-6024.4	14.92	-1.02	-2.40
9542.0	-10089487	-1863385	-5236758	7810.5	-3035.9	-6029.1	14.99	-1.03	-2.43
9544.0	-10073830	-1869459	-5248821	7840.5	-3038.0	-6033.9	15.07	-1.04	-2.45
9546.0	-10058112	-1875537	-5260894	7870.7	-3040.1	-6038.8	15.14	-1.04	-2.47
9548.0	-10042334	-1881620	-5272978	7901.0	-3042.2	-6043.7	15.21	-1.05	-2.49
9550.0	-10026501	-1887706	-5285068	7931.5	-3044.3	-6048.7	15.28	-1.06	-2.51
	S-IVB 2ND GUIDANCE CUTOFF								
9550.580	-10021900	-1889471	-5288575	7940.4	-3044.9	-6050.2	15.30	-1.06	-2.52
9552.0	-10010624	-1893792	-5297157	7949.4	-3042.9	-6043.7	3.92	1.78	6.27
9554.0	-9994717	-1899874	-5309231	7957.2	-3039.4	-6031.1	3.91	1.78	6.27
9556.0	-9978793	-1905949	-5321283	7965.0	-3035.8	-6018.7	3.89	1.77	6.27
9558.0	-9962853	-1912016	-5333306	7972.7	-3032.3	-6006.1	3.88	1.76	6.28
9560.0	-9946900	-1918078	-5345308	7980.4	-3028.8	-5993.6	3.86	1.75	6.28
	TRANSLUNAR INJECTION								
9560.580	-9942260	-1919830	-5348766	7982.9	-3027.7	-5989.9	3.86	1.76	6.28

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

TIME SEC	XF M	YF M	ZF M	DXF M/S	DYF M/S	DZF M/S	DDXF M/S SQ	DDYF M/S SQ	DDZF M/S SQ
9600.0	-9624719	-2037795	-5579998	8125.0	-2956.5	-5740.4	3.35	1.85	6.37
9650.0	-9214541	-2183262	-5859037	8276.8	-2861.4	-5421.0	2.72	1.94	6.39
9700.0	-8797563	-2323876	-6122118	8397.2	-2762.7	-5102.8	2.10	2.00	6.33
9750.0	-8375320	-2459503	-6369402	8487.7	-2662.2	-4789.7	1.52	2.02	6.19
9800.0	-7949259	-2590086	-6601234	8550.3	-2561.2	-4485.2	0.99	2.01	5.98
9850.0	-7520719	-2715643	-6818113	8587.3	-2461.3	-4192.0	0.50	1.98	5.74
9900.0	-7090905	-2836250	-7020656	8601.7	-2363.4	-3912.1	0.08	1.93	5.46
9950.0	-6660885	-2952035	-7209565	8596.0	-2268.5	-3646.8	-0.29	1.87	5.15
10000.0	-6231588	-3063158	-7385595	8573.2	-2177.1	-3397.0	-0.61	1.79	4.84
10050.0	-5803809	-3169810	-7549533	8535.8	-2089.7	-3163.1	-0.88	1.71	4.52
10100.0	-5378216	-3272198	-7702172	8486.1	-2006.6	-2945.1	-1.10	1.62	4.20
10150.0	-4955363	-3370540	-7844299	8426.5	-1927.9	-2742.6	-1.28	1.53	3.90
10200.0	-4535701	-3465058	-7976679	8358.8	-1853.6	-2555.1	-1.42	1.44	3.60
10250.0	-4119591	-3555974	-8100050	8284.7	-1783.8	-2382.1	-1.54	1.35	3.32
10300.0	-3707316	-3643506	-8215114	8205.6	-1718.2	-2222.7	-1.62	1.27	3.06
10350.0	-3299090	-3727866	-8322533	8122.9	-1656.8	-2076.2	-1.68	1.19	2.81
10400.0	-2895072	-3809256	-8422930	8037.5	-1599.4	-1941.7	-1.73	1.11	2.57
10450.0	-2495371	-3887872	-8516889	7950.3	-1545.8	-1818.4	-1.76	1.04	2.36
10500.0	-2100059	-3963898	-8604949	7862.1	-1495.8	-1705.7	-1.77	0.97	2.16
10550.0	-1709172	-4037506	-8687615	7773.4	-1449.1	-1602.5	-1.77	0.90	1.97
10600.0	-1322720	-4108862	-8765352	7684.7	-1405.6	-1508.4	-1.77	0.84	1.80
10650.0	-940690	-4178118	-8838590	7596.6	-1365.1	-1422.5	-1.76	0.78	1.64
10700.0	-563052	-4245417	-8907726	7509.1	-1327.3	-1344.2	-1.74	0.73	1.49
10750.0	-189760	-4310895	-8973129	7422.7	-1292.2	-1273.0	-1.72	0.68	1.36
10800.0	179241	-4374677	-9035134	7337.5	-1259.5	-1208.3	-1.69	0.63	1.23
10850.0	544015	-4436879	-9094055	7253.7	-1229.0	-1149.5	-1.66	0.59	1.12
10900.0	904636	-4497610	-9150177	7171.4	-1200.6	-1096.3	-1.63	0.55	1.01
10950.0	1261177	-4556973	-9203767	7090.6	-1174.2	-1048.1	-1.60	0.51	0.92
	CSM SEPARATION								
10962.400	1348893	-4571468	-9216646	7070.8	-1168.0	-1037.0	-1.59	0.50	0.89

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									
8629.260	-5939.425	-90.422	-2804.459	3324.6	-129.8	-7047.0	8.35	0.11	3.94
8630.0	-5936.971	-90.518	-2809.676	3330.8	-129.7	-7044.1	8.35	0.11	3.95
8640.0	-5903.246	-91.809	-2879.918	3414.1	-128.6	-7004.1	8.30	0.12	4.05
8650.0	-5868.691	-93.089	-2949.755	3496.9	-127.4	-6963.1	8.25	0.12	4.15
8660.0	-5833.311	-94.357	-3019.178	3579.2	-126.2	-6921.2	8.20	0.12	4.25
8670.0	-5797.110	-95.613	-3088.175	3660.9	-125.0	-6878.2	8.15	0.12	4.34
8680.0	-5760.094	-96.857	-3156.738	3742.2	-123.8	-6834.3	8.10	0.12	4.44
8690.0	-5722.267	-98.089	-3224.858	3823.0	-122.5	-6789.4	8.05	0.12	4.54
8700.0	-5683.636	-99.308	-3292.524	3903.2	-121.3	-6743.6	7.99	0.13	4.63
8710.0	-5644.205	-100.514	-3359.727	3982.8	-120.0	-6696.8	7.94	0.13	4.72
8720.0	-5603.981	-101.708	-3426.457	4061.9	-118.7	-6649.1	7.88	0.13	4.82
8730.0	-5562.968	-102.888	-3492.706	4140.5	-117.4	-6600.5	7.82	0.13	4.91
8740.0	-5521.173	-104.055	-3558.464	4218.4	-116.1	-6550.9	7.76	0.13	5.00
8750.0	-5478.602	-105.209	-3623.721	4295.8	-114.7	-6500.4	7.70	0.13	5.10
8760.0	-5435.260	-106.350	-3688.469	4372.5	-113.4	-6449.0	7.64	0.14	5.19
8770.0	-5391.154	-107.476	-3752.698	4448.6	-112.0	-6396.7	7.58	0.14	5.28
8780.0	-5346.289	-108.589	-3816.400	4524.1	-110.6	-6343.5	7.52	0.14	5.37
8790.0	-5300.673	-109.688	-3879.565	4599.0	-109.2	-6289.4	7.45	0.14	5.45
8800.0	-5254.311	-110.773	-3942.185	4673.2	-107.8	-6234.4	7.39	0.14	5.54
8810.0	-5207.210	-111.843	-4004.251	4746.8	-106.3	-6178.6	7.32	0.14	5.63
8820.0	-5159.377	-112.899	-4065.754	4819.7	-104.9	-6121.9	7.25	0.15	5.72
8830.0	-5110.819	-113.941	-4126.685	4891.9	-103.4	-6064.3	7.19	0.15	5.80
8840.0	-5061.542	-114.968	-4187.037	4963.4	-101.9	-6005.9	7.12	0.15	5.89
8850.0	-5011.552	-115.979	-4246.800	5034.3	-100.4	-5946.6	7.05	0.15	5.97
8860.0	-4960.859	-116.976	-4305.966	5104.4	-98.9	-5886.5	6.97	0.15	6.05
8870.0	-4909.467	-117.957	-4364.527	5173.8	-97.4	-5825.6	6.90	0.15	6.13
8880.0	-4857.385	-118.924	-4422.474	5242.5	-95.8	-5763.8	6.83	0.15	6.22
8890.0	-4804.620	-119.874	-4479.800	5310.4	-94.3	-5701.2	6.75	0.16	6.30
8900.0	-4751.179	-120.809	-4536.497	5377.6	-92.7	-5637.9	6.68	0.16	6.38
8910.0	-4697.071	-121.729	-4592.555	5444.0	-91.1	-5573.7	6.60	0.16	6.45
8920.0	-4642.301	-122.632	-4647.969	5509.7	-89.6	-5508.8	6.53	0.16	6.53
8930.0	-4586.879	-123.520	-4702.729	5574.6	-87.9	-5443.1	6.45	0.16	6.61
8940.0	-4530.812	-124.391	-4756.829	5638.7	-86.3	-5376.6	6.37	0.16	6.69
8950.0	-4474.107	-125.246	-4810.260	5702.0	-84.7	-5309.4	6.29	0.16	6.76
8960.0	-4416.774	-126.085	-4863.015	5764.6	-83.0	-5241.5	6.21	0.16	6.83
8970.0	-4358.819	-126.907	-4915.087	5826.3	-81.4	-5172.8	6.13	0.17	6.91
8980.0	-4300.251	-127.713	-4966.468	5887.1	-79.7	-5103.3	6.05	0.17	6.98
8990.0	-4241.079	-128.501	-5017.151	5947.2	-78.0	-5033.2	5.96	0.17	7.05
9000.0	-4181.310	-129.273	-5067.129	6006.4	-76.3	-4962.3	5.88	0.17	7.12
9010.0	-4120.953	-130.028	-5116.395	6064.8	-74.6	-4890.8	5.79	0.17	7.19

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
9020.0	-4060.016	-130.766	-5164.943	6122.3	-72.9	-4818.6	5.71	0.17	7.26
9030.0	-3998.509	-131.487	-5212.765	6179.0	-71.2	-4745.7	5.62	0.17	7.33
9040.0	-3936.439	-132.190	-5259.854	6234.8	-69.5	-4672.1	5.53	0.17	7.39
9050.0	-3873.816	-132.876	-5306.204	6289.7	-67.7	-4597.9	5.45	0.17	7.46
9060.0	-3810.648	-133.545	-5351.809	6343.8	-66.0	-4523.0	5.36	0.17	7.52
9070.0	-3746.943	-134.195	-5396.662	6396.9	-64.2	-4447.5	5.27	0.18	7.58
9080.0	-3682.712	-134.828	-5440.757	6449.2	-62.4	-4371.3	5.18	0.18	7.64
9090.0	-3617.963	-135.444	-5484.087	6500.5	-60.6	-4294.6	5.09	0.18	7.71
9100.0	-3552.705	-136.041	-5526.647	6550.9	-58.8	-4217.3	4.99	0.18	7.77
9110.0	-3486.948	-136.620	-5568.430	6600.4	-57.0	-4139.3	4.90	0.18	7.82
9120.0	-3420.700	-137.182	-5609.431	6649.0	-55.2	-4060.8	4.81	0.18	7.88
9130.0	-3353.971	-137.725	-5649.644	6696.7	-53.4	-3981.7	4.72	0.18	7.94
9140.0	-3286.770	-138.250	-5689.064	6743.4	-51.6	-3902.1	4.62	0.18	7.99
9150.0	-3219.106	-138.756	-5727.684	6789.2	-49.7	-3821.9	4.53	0.18	8.05
9160.0	-3150.989	-139.244	-5765.500	6834.0	-47.9	-3741.2	4.43	0.18	8.10
9170.0	-3082.429	-139.714	-5802.506	6877.9	-46.0	-3660.0	4.34	0.18	8.15
9180.0	-3013.444	-140.172	-5838.674	6920.7	-44.2	-3578.0	4.24	0.19	8.20
9190.0	-2944.026	-140.605	-5874.043	6962.7	-42.4	-3495.8	4.14	0.19	8.25
	S-IVB RESTART (ENGINE SOLENOID ACTIVATION)								
9199.200	-2879.796	-140.986	-5905.854	7000.3	-40.6	-3419.7	4.05	0.19	8.29
9200.0	-2874.195	-141.019	-5908.588	7003.6	-40.5	-3413.0	4.05	0.19	8.30
9202.0	-2860.177	-141.099	-5915.398	7011.6	-40.1	-3396.4	4.03	0.19	8.30
9204.0	-2846.139	-141.179	-5922.178	7019.7	-39.7	-3379.8	4.01	0.19	8.31
9206.0	-2832.081	-141.259	-5928.926	7027.7	-39.3	-3363.2	4.00	0.19	8.32
	S-IVB RE-IGNITION (STDV OPEN)								
9207.520	-2821.383	-141.319	-5934.034	7033.8	-39.1	-3350.5	3.98	0.19	8.33
9208.0	-2818.003	-141.337	-5935.643	7035.9	-39.0	-3346.6	4.83	0.18	7.98
9210.0	-2803.904	-141.415	-5942.329	7049.5	-38.8	-3332.3	8.75	-0.02	6.21
9212.0	-2789.781	-141.493	-5948.986	7067.3	-38.7	-3320.2	9.04	0.10	5.94
9214.0	-2775.625	-141.569	-5955.617	7085.6	-38.4	-3308.4	9.19	0.11	5.89
9216.0	-2761.434	-141.646	-5962.225	7104.0	-38.2	-3296.6	9.29	0.10	5.90
9218.0	-2747.206	-141.721	-5968.809	7122.7	-38.0	-3284.7	9.38	0.09	5.94
9220.0	-2732.946	-141.797	-5975.367	7141.5	-37.9	-3272.8	9.45	0.07	6.00
9222.0	-2718.655	-141.871	-5981.899	7160.5	-37.7	-3260.7	9.48	0.08	6.06
9224.0	-2704.329	-141.945	-5988.404	7179.4	-37.5	-3248.5	9.46	0.10	6.11
9226.0	-2689.965	-142.019	-5994.886	7198.3	-37.3	-3236.3	9.41	0.13	6.13
9228.0	-2675.557	-142.093	-6001.345	7217.1	-37.0	-3224.0	9.39	0.17	6.16
9230.0	-2661.107	-142.166	-6007.781	7235.9	-36.7	-3211.6	9.38	0.17	6.19
9232.0	-2646.616	-142.239	-6014.193	7254.6	-36.3	-3199.2	9.38	0.17	6.23

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
9234.0	-2632.089	-142.311	-6020.580	7273.4	-36.0	-3186.7	9.37	0.17	6.26
9236.0	-2617.524	-142.383	-6026.941	7292.1	-35.6	-3174.2	9.36	0.17	6.29
9238.0	-2602.921	-142.454	-6033.277	7310.9	-35.3	-3161.6	9.37	0.18	6.31
9240.0	-2588.281	-142.524	-6039.588	7329.6	-34.9	-3148.9	9.37	0.19	6.32
9242.0	-2573.604	-142.594	-6045.874	7348.4	-34.5	-3136.3	9.38	0.19	6.34
9244.0	-2558.889	-142.663	-6052.134	7367.1	-34.2	-3123.6	9.38	0.21	6.35
9246.0	-2544.136	-142.731	-6058.368	7385.9	-33.8	-3110.9	9.38	0.21	6.37
9248.0	-2529.345	-142.798	-6064.578	7404.7	-33.4	-3098.2	9.38	0.21	6.39
9250.0	-2514.517	-142.864	-6070.761	7423.5	-32.9	-3085.3	9.38	0.22	6.41
9252.0	-2499.651	-142.930	-6076.919	7442.3	-32.5	-3072.5	9.40	0.23	6.42
9254.0	-2484.748	-142.994	-6083.051	7461.1	-32.0	-3059.6	9.41	0.24	6.44
9256.0	-2469.807	-143.058	-6089.157	7479.9	-31.5	-3046.7	9.41	0.25	6.45
9258.0	-2454.828	-143.120	-6095.238	7498.7	-31.0	-3033.8	9.41	0.26	6.47
9260.0	-2439.812	-143.182	-6101.293	7517.6	-30.5	-3020.9	9.42	0.26	6.48
9262.0	-2424.758	-143.242	-6107.322	7536.4	-30.0	-3007.9	9.42	0.27	6.49
9264.0	-2409.666	-143.302	-6113.324	7555.2	-29.4	-2994.9	9.42	0.28	6.50
9266.0	-2394.537	-143.360	-6119.301	7574.1	-28.8	-2981.9	9.43	0.28	6.52
9268.0	-2379.370	-143.417	-6125.252	7593.0	-28.3	-2968.9	9.43	0.29	6.54
9270.0	-2364.165	-143.473	-6131.177	7611.8	-27.7	-2955.8	9.42	0.29	6.56
9272.0	-2348.922	-143.528	-6137.075	7630.7	-27.1	-2942.6	9.42	0.30	6.57
9274.0	-2333.642	-143.581	-6142.947	7649.5	-26.5	-2929.5	9.43	0.31	6.58
9276.0	-2318.324	-143.634	-6148.793	7668.4	-25.8	-2916.3	9.43	0.32	6.59
9278.0	-2302.969	-143.685	-6154.612	7687.3	-25.2	-2903.1	9.42	0.32	6.60
9280.0	-2287.575	-143.734	-6160.406	7706.1	-24.6	-2889.9	9.41	0.32	6.61
9282.0	-2272.144	-143.783	-6166.172	7724.9	-23.9	-2876.7	9.42	0.32	6.62
9284.0	-2256.676	-143.830	-6171.912	7743.8	-23.2	-2863.4	9.42	0.33	6.64
9286.0	-2241.169	-143.876	-6177.626	7762.6	-22.6	-2850.1	9.43	0.34	6.65
9288.0	-2225.625	-143.920	-6183.313	7781.5	-21.9	-2836.8	9.44	0.35	6.66
9290.0	-2210.043	-143.963	-6188.973	7800.4	-21.2	-2823.5	9.44	0.36	6.67
9292.0	-2194.423	-144.005	-6194.607	7819.3	-20.4	-2810.1	9.44	0.36	6.69
9294.0	-2178.766	-144.045	-6200.214	7838.2	-19.7	-2796.7	9.44	0.37	6.71
9296.0	-2163.071	-144.084	-6205.794	7857.0	-19.0	-2783.3	9.43	0.38	6.72
9298.0	-2147.338	-144.121	-6211.347	7875.9	-18.2	-2769.9	9.43	0.38	6.73
9300.0	-2131.567	-144.157	-6216.873	7894.8	-17.4	-2756.4	9.43	0.39	6.74
9302.0	-2115.759	-144.191	-6222.372	7913.6	-16.6	-2742.9	9.44	0.39	6.75
9304.0	-2099.912	-144.223	-6227.845	7932.5	-15.8	-2729.4	9.45	0.39	6.76
9306.0	-2084.028	-144.254	-6233.290	7951.5	-15.1	-2715.9	9.46	0.40	6.77
9308.0	-2068.107	-144.283	-6238.708	7970.4	-14.2	-2702.3	9.46	0.41	6.78
9310.0	-2052.147	-144.311	-6244.099	7989.3	-13.4	-2688.8	9.45	0.42	6.80
9312.0	-2036.149	-144.337	-6249.463	8008.2	-12.6	-2675.2	9.45	0.43	6.81
9314.0	-2020.114	-144.361	-6254.800	8027.1	-11.7	-2661.5	9.45	0.43	6.82
9316.0	-2004.041	-144.384	-6260.109	8046.0	-10.8	-2647.9	9.45	0.44	6.83
9318.0	-1987.930	-144.404	-6265.392	8064.9	-9.9	-2634.2	9.45	0.44	6.84

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
9320.0	-1971.781	-144.423	-6270.646	8083.9	-9.1	-2620.5	9.46	0.45	6.86
9322.0	-1955.595	-144.441	-6275.874	8102.8	-8.2	-2606.8	9.46	0.45	6.87
9324.0	-1939.370	-144.456	-6281.074	8121.7	-7.3	-2593.1	9.46	0.45	6.88
9326.0	-1923.108	-144.470	-6286.246	8140.6	-6.3	-2579.3	9.47	0.46	6.89
9328.0	-1906.807	-144.481	-6291.391	8159.6	-5.4	-2565.5	9.45	0.47	6.90
9330.0	-1890.470	-144.491	-6296.508	8178.4	-4.4	-2551.7	9.44	0.48	6.91
9332.0	-1874.094	-144.499	-6301.597	8197.5	-3.5	-2537.9	9.60	0.49	6.88
9334.0	-1857.679	-144.505	-6306.660	8217.0	-2.5	-2524.2	9.92	0.51	6.80
9336.0	-1841.225	-144.509	-6311.695	8237.3	-1.4	-2510.7	10.31	0.52	6.70
9338.0	-1824.730	-144.511	-6316.703	8258.2	-0.4	-2497.4	10.59	0.54	6.62
9340.0	-1808.192	-144.511	-6321.684	8279.5	0.7	-2484.2	10.70	0.56	6.60
9342.0	-1791.612	-144.508	-6326.639	8300.9	1.9	-2471.0	10.74	0.58	6.60
9344.0	-1774.988	-144.503	-6331.568	8322.4	3.1	-2457.8	10.74	0.60	6.62
9346.0	-1758.322	-144.495	-6336.470	8343.9	4.5	-2444.5	10.76	0.61	6.63
9348.0	-1741.613	-144.485	-6341.346	8365.4	5.9	-2431.1	10.77	0.62	6.65
9350.0	-1724.861	-144.472	-6346.195	8386.9	7.3	-2417.8	10.77	0.62	6.66
9352.0	-1708.065	-144.456	-6351.017	8408.4	8.6	-2404.5	10.77	0.63	6.65
9354.0	-1691.227	-144.437	-6355.813	8430.0	9.9	-2391.2	10.78	0.62	6.65
9356.0	-1674.346	-144.416	-6360.582	8451.5	11.1	-2377.9	10.80	0.62	6.64
9358.0	-1657.421	-144.393	-6365.325	8473.2	12.4	-2364.6	10.82	0.63	6.66
9360.0	-1640.453	-144.367	-6370.040	8494.8	13.6	-2351.1	10.83	0.64	6.67
9362.0	-1623.442	-144.338	-6374.729	8516.5	14.9	-2337.5	10.85	0.64	6.68
9364.0	-1606.387	-144.307	-6379.390	8538.3	16.2	-2324.0	10.87	0.65	6.68
9366.0	-1589.288	-144.273	-6384.025	8560.0	17.5	-2310.6	10.88	0.66	6.69
9368.0	-1572.147	-144.237	-6388.633	8581.8	18.8	-2297.4	10.89	0.67	6.70
9370.0	-1554.961	-144.198	-6393.215	8603.6	20.2	-2284.3	10.91	0.68	6.71
9372.0	-1537.732	-144.156	-6397.770	8625.4	21.6	-2271.0	10.93	0.69	6.73
9374.0	-1520.460	-144.112	-6402.299	8647.3	23.0	-2257.5	10.95	0.70	6.74
9376.0	-1503.143	-144.064	-6406.800	8669.2	24.4	-2244.0	10.97	0.71	6.74
9378.0	-1485.783	-144.014	-6411.275	8691.2	25.8	-2230.5	10.99	0.72	6.74
9380.0	-1468.378	-143.961	-6415.722	8713.1	27.3	-2217.0	10.99	0.74	6.75
9382.0	-1450.930	-143.905	-6420.143	8735.1	28.8	-2203.5	10.99	0.75	6.76
9384.0	-1433.438	-143.846	-6424.536	8757.2	30.3	-2190.0	11.02	0.76	6.77
9386.0	-1415.902	-143.784	-6428.903	8779.2	31.8	-2176.5	11.04	0.76	6.78
9388.0	-1398.321	-143.719	-6433.242	8801.3	33.3	-2162.9	11.07	0.77	6.78
9390.0	-1380.696	-143.650	-6437.554	8823.5	34.9	-2149.3	11.09	0.78	6.78
9392.0	-1363.027	-143.579	-6441.839	8845.7	36.5	-2135.8	11.11	0.79	6.79
9394.0	-1345.313	-143.505	-6446.097	8868.0	38.0	-2122.2	11.12	0.79	6.80
9396.0	-1327.555	-143.427	-6450.328	8890.2	39.6	-2108.6	11.12	0.80	6.81
9398.0	-1309.752	-143.346	-6454.532	8912.4	41.3	-2095.0	11.13	0.82	6.82
9400.0	-1291.905	-143.262	-6458.708	8934.8	42.9	-2081.3	11.16	0.82	6.83
9402.0	-1274.013	-143.174	-6462.857	8957.3	44.6	-2067.6	11.18	0.83	6.83
9404.0	-1256.076	-143.083	-6466.979	8980.0	46.4	-2054.0	11.21	0.83	6.83

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
9406.0	-1238.093	-142.989	-6471.073	9002.8	48.1	-2040.3	11.23	0.84	6.84
9408.0	-1220.064	-142.891	-6475.140	9025.6	49.9	-2026.6	11.25	0.85	6.85
9410.0	-1201.990	-142.789	-6479.179	9048.4	51.7	-2012.9	11.27	0.86	6.86
9412.0	-1183.871	-142.684	-6483.191	9071.0	53.4	-1999.2	11.29	0.87	6.87
9414.0	-1165.706	-142.575	-6487.176	9093.7	55.2	-1985.4	11.31	0.89	6.87
9416.0	-1147.496	-142.463	-6491.133	9116.2	57.0	-1971.7	11.34	0.90	6.88
9418.0	-1129.241	-142.347	-6495.063	9138.7	58.8	-1958.0	11.36	0.91	6.89
9420.0	-1110.942	-142.228	-6498.965	9161.2	60.5	-1944.3	11.39	0.92	6.89
9422.0	-1092.597	-142.105	-6502.840	9183.6	62.3	-1930.5	11.41	0.94	6.90
9424.0	-1074.207	-141.979	-6506.687	9206.2	64.1	-1916.8	11.44	0.94	6.90
9426.0	-1055.772	-141.849	-6510.507	9228.9	66.0	-1903.0	11.47	0.95	6.90
9428.0	-1037.291	-141.715	-6514.299	9251.9	67.9	-1889.2	11.50	0.95	6.90
9430.0	-1018.764	-141.577	-6518.064	9274.9	69.8	-1875.4	11.52	0.96	6.91
9432.0	-1000.192	-141.436	-6521.801	9297.9	71.7	-1861.6	11.54	0.98	6.92
9434.0	-981.573	-141.291	-6525.510	9321.0	73.7	-1847.8	11.56	0.99	6.92
9436.0	-962.907	-141.141	-6529.192	9344.2	75.7	-1833.9	11.59	1.00	6.91
9438.0	-944.196	-140.988	-6532.846	9367.5	77.7	-1820.1	11.62	1.02	6.91
9440.0	-925.438	-140.830	-6536.472	9390.7	79.8	-1806.2	11.64	1.03	6.92
9442.0	-906.633	-140.669	-6540.070	9413.9	81.8	-1792.3	11.66	1.04	6.93
9444.0	-887.782	-140.503	-6543.641	9436.9	83.9	-1778.4	11.69	1.05	6.93
9446.0	-868.885	-140.333	-6547.184	9460.0	85.9	-1764.4	11.72	1.06	6.94
9448.0	-849.942	-140.159	-6550.699	9483.4	88.1	-1750.5	11.75	1.07	6.95
9450.0	-830.951	-139.981	-6554.186	9507.3	90.2	-1736.7	11.77	1.08	6.96
9452.0	-811.913	-139.798	-6557.646	9531.3	92.4	-1722.8	11.79	1.09	6.96
9454.0	-792.826	-139.611	-6561.077	9555.1	94.6	-1708.9	11.82	1.10	6.97
9456.0	-773.692	-139.420	-6564.481	9578.8	96.9	-1695.0	11.85	1.11	6.97
9458.0	-754.511	-139.224	-6567.857	9602.6	99.1	-1681.1	11.91	1.12	6.97
9460.0	-735.282	-139.023	-6571.206	9626.4	101.4	-1667.1	11.96	1.13	6.97
9462.0	-716.005	-138.818	-6574.526	9650.4	103.6	-1653.2	11.99	1.14	6.98
9464.0	-696.680	-138.609	-6577.818	9674.4	105.9	-1639.2	12.01	1.16	7.00
9466.0	-677.307	-138.394	-6581.083	9698.5	108.3	-1625.2	12.05	1.17	7.01
9468.0	-657.886	-138.176	-6584.319	9722.6	110.6	-1611.2	12.09	1.18	7.01
9470.0	-638.417	-137.952	-6587.527	9746.8	113.0	-1597.2	12.11	1.18	7.02
9472.0	-618.899	-137.724	-6590.708	9771.1	115.4	-1583.1	12.13	1.20	7.01
9474.0	-599.333	-137.490	-6593.860	9795.4	117.8	-1569.1	12.16	1.21	7.02
9476.0	-579.717	-137.252	-6596.984	9819.7	120.2	-1555.0	12.20	1.24	7.03
9478.0	-560.054	-137.009	-6600.080	9844.2	122.7	-1541.0	12.25	1.25	7.05
9480.0	-540.341	-136.761	-6603.148	9868.7	125.3	-1526.9	12.30	1.26	7.06
9482.0	-520.578	-136.508	-6606.188	9893.4	127.8	-1512.8	12.34	1.27	7.06
9484.0	-500.767	-136.250	-6609.199	9918.1	130.3	-1498.6	12.36	1.28	7.07
9486.0	-480.906	-135.987	-6612.182	9942.8	132.9	-1484.5	12.39	1.29	7.08
9488.0	-460.996	-135.719	-6615.137	9967.7	135.5	-1470.3	12.44	1.30	7.09
9490.0	-441.035	-135.445	-6618.063	9992.6	138.1	-1456.1	12.50	1.31	7.10

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
9492.0	-421.025	-135.166	-6620.961	10017.7	140.7	-1441.5	12.54	1.33	7.11
9494.0	-400.965	-134.882	-6623.831	10042.8	143.4	-1427.7	12.57	1.35	7.12
9496.0	-380.854	-134.593	-6626.672	10068.0	146.1	-1413.4	12.62	1.36	7.12
9498.0	-360.692	-134.298	-6629.484	10093.4	148.9	-1399.1	12.68	1.37	7.12
9500.0	-340.480	-133.997	-6632.268	10118.8	151.6	-1384.9	12.72	1.38	7.14
9502.0	-320.217	-133.691	-6635.024	10144.3	154.4	-1370.5	12.76	1.39	7.16
9504.0	-299.903	-133.379	-6637.751	10169.8	157.2	-1356.2	12.80	1.41	7.18
9506.0	-279.538	-133.062	-6640.449	10195.5	160.1	-1341.9	12.85	1.43	7.20
9508.0	-259.121	-132.739	-6643.118	10221.3	162.9	-1327.4	12.91	1.45	7.21
9510.0	-238.653	-132.410	-6645.758	10247.2	165.9	-1313.0	12.96	1.47	7.22
9512.0	-218.132	-132.076	-6648.370	10273.2	168.8	-1298.5	13.01	1.48	7.24
9514.0	-197.560	-131.735	-6650.952	10299.3	171.8	-1284.0	13.05	1.49	7.27
9516.0	-176.935	-131.389	-6653.506	10325.4	174.8	-1269.4	13.10	1.50	7.29
9518.0	-156.258	-131.036	-6656.030	10351.7	177.8	-1254.8	13.17	1.51	7.31
9520.0	-135.528	-130.678	-6658.525	10378.2	180.8	-1240.2	13.23	1.52	7.33
9522.0	-114.745	-130.313	-6660.991	10404.7	183.9	-1225.5	13.28	1.53	7.35
9524.0	-93.909	-129.942	-6663.427	10431.4	186.9	-1210.6	13.34	1.54	7.38
9526.0	-73.019	-129.565	-6665.833	10458.2	190.1	-1195.6	13.40	1.55	7.40
9528.0	-52.076	-129.182	-6668.209	10484.9	193.2	-1180.5	13.46	1.56	7.42
9530.0	-31.078	-128.792	-6670.554	10511.7	196.4	-1165.5	13.52	1.57	7.45
9532.0	-10.026	-128.396	-6672.869	10538.8	199.5	-1150.6	13.58	1.58	7.47
9534.0	11.082	-127.994	-6675.153	10566.1	202.6	-1135.7	13.65	1.58	7.50
9536.0	32.246	-127.585	-6677.407	10593.5	205.8	-1120.8	13.71	1.59	7.52
9538.0	53.466	-127.169	-6679.630	10621.0	209.1	-1105.8	13.78	1.60	7.55
9540.0	74.740	-126.747	-6681.823	10648.7	212.3	-1090.6	13.85	1.60	7.58
9542.0	96.071	-126.319	-6683.985	10676.4	215.6	-1075.4	13.92	1.61	7.61
9544.0	117.456	-125.884	-6686.117	10704.3	218.8	-1060.1	13.99	1.62	7.64
9546.0	138.898	-125.443	-6688.219	10732.3	222.0	-1044.7	14.06	1.63	7.66
9548.0	160.397	-124.996	-6690.290	10760.5	225.2	-1029.4	14.13	1.63	7.69
9550.0	181.946	-124.542	-6692.332	10788.8	228.5	-1014.0	14.20	1.64	7.72
S-IVB 2ND GUIDANCE CUTOFF									
9550.580	188.203	-124.409	-6692.918	10797.0	229.5	-1009.5	14.22	1.64	7.73
9552.0	203.530	-124.084	-6694.341	10800.8	230.4	-997.0	-0.32	0.20	8.89
9554.0	225.130	-123.622	-6696.317	10800.1	230.7	-979.2	-0.33	0.19	8.88
9556.0	246.733	-123.160	-6698.258	10799.5	231.1	-961.5	-0.35	0.18	8.87
9558.0	268.332	-122.697	-6700.161	10798.8	231.5	-943.8	-0.36	0.16	8.86
9560.0	289.929	-122.233	-6702.033	10798.0	231.8	-926.1	-0.38	0.15	8.86
TRANSLUNAR INJECTION									
9560.580	296.191	-122.099	-6702.548	10797.9	232.0	-920.8	-0.39	0.15	8.85

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
9600.0	721.407	-112.836	-6732.037	10772.1	237.8	-575.6	-0.93	0.14	8.65
9650.0	1258.591	-100.776	-6750.130	10710.0	244.4	-150.9	-1.55	0.12	8.32
9700.0	1791.920	-88.414	-6747.439	10618.5	249.9	255.2	-2.10	0.10	7.91
9750.0	2320.016	-75.799	-6724.977	10501.4	254.5	639.5	-2.57	0.08	7.46
9800.0	2841.704	-62.977	-6683.886	10362.9	258.2	1000.0	-2.96	0.06	6.96
9850.0	3356.011	-49.992	-6625.392	10206.8	261.0	1335.5	-3.27	0.05	6.46
9900.0	3862.162	-36.887	-6550.764	10037.2	263.1	1645.4	-3.51	0.03	5.95
9950.0	4359.566	-23.696	-6461.273	9857.5	264.4	1930.1	-3.68	0.02	5.45
10000.0	4847.798	-10.454	-6358.167	9670.8	265.2	2190.2	-3.79	0.01	4.96
10050.0	5326.579	2.810	-6242.648	9479.9	265.3	2426.8	-3.85	-0.00	4.51
10100.0	5795.755	16.073	-6115.856	9287.0	265.1	2641.3	-3.87	-0.01	4.08
10150.0	6255.273	29.312	-5978.862	9093.9	264.4	2835.1	-3.85	-0.02	3.68
10200.0	6705.168	42.509	-5832.660	8902.2	263.4	3009.9	-3.81	-0.02	3.31
10250.0	7145.539	55.649	-5678.166	8713.2	262.1	3167.1	-3.75	-0.03	2.98
10300.0	7576.542	68.720	-5516.219	8527.6	260.6	3308.2	-3.67	-0.03	2.67
10350.0	7998.369	81.710	-5347.587	8346.2	259.0	3434.8	-3.58	-0.04	2.39
10400.0	8411.243	94.613	-5172.964	8169.6	257.1	3548.0	-3.49	-0.04	2.14
10450.0	8815.410	107.421	-4992.981	7998.0	255.2	3649.3	-3.38	-0.04	1.91
10500.0	9211.126	120.128	-4808.209	7831.6	253.1	3739.8	-3.28	-0.04	1.71
10550.0	9598.658	132.732	-4619.162	7670.6	251.0	3820.5	-3.17	-0.04	1.52
10600.0	9978.273	145.229	-4426.304	7515.0	248.9	3892.4	-3.06	-0.04	1.36
10650.0	10350.243	157.618	-4230.051	7364.7	246.7	3956.4	-2.95	-0.04	1.21
10700.0	10714.833	169.896	-4030.781	7219.8	244.5	4013.3	-2.85	-0.04	1.07
10750.0	11072.305	182.064	-3828.832	7080.0	242.2	4063.7	-2.74	-0.04	0.95
10800.0	11422.915	194.121	-3624.509	6945.2	240.0	4108.3	-2.65	-0.04	0.84
10850.0	11766.911	206.067	-3418.086	6815.4	237.8	4147.8	-2.55	-0.04	0.74
10900.0	12104.534	217.904	-3209.811	6690.3	235.6	4182.5	-2.46	-0.04	0.65
10950.0	12436.015	229.632	-2999.906	6569.7	233.5	4213.0	-2.37	-0.04	0.57
CSM SEPARATION									
10962.400	12517.173	232.521	-2947.592	6540.6	232.9	4219.9	-2.34	-0.04	0.55

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										
8629.260	6568.861	92.3692	-32.5025	91.89	0.03	7389.2	91.79	0.03	7793.0	196891
8630.0	6568.874	92.4257	-32.5040	91.85	0.03	7389.2	91.76	0.03	7793.0	196904
8640.0	6568.917	93.1897	-32.5223	91.39	0.03	7389.2	91.32	0.03	7792.9	196954
8650.0	6568.962	93.9540	-32.5354	90.94	0.03	7389.1	90.89	0.03	7792.9	197003
8660.0	6569.007	94.7184	-32.5433	90.48	0.04	7389.1	90.45	0.03	7792.9	197051
8670.0	6569.053	95.4830	-32.5461	90.02	0.04	7389.0	90.02	0.03	7792.8	197097
8680.0	6569.099	96.2475	-32.5437	89.56	0.04	7389.0	89.58	0.03	7792.8	197142
8690.0	6569.145	97.0119	-32.5362	89.10	0.04	7388.9	89.15	0.03	7792.7	197187
8700.0	6569.193	97.7761	-32.5235	88.64	0.04	7388.9	88.71	0.03	7792.7	197230
8710.0	6569.240	98.5401	-32.5057	88.19	0.04	7388.8	88.28	0.04	7792.6	197271
8720.0	6569.289	99.3036	-32.4827	87.73	0.04	7388.8	87.85	0.04	7792.6	197312
8730.0	6569.338	100.0667	-32.4546	87.27	0.04	7388.7	87.41	0.04	7792.5	197351
8740.0	6569.387	100.8293	-32.4214	86.82	0.04	7388.7	86.98	0.04	7792.5	197389
8750.0	6569.437	101.5912	-32.3830	86.36	0.04	7388.7	86.55	0.04	7792.4	197426
8760.0	6569.487	102.3523	-32.3396	85.91	0.04	7388.6	86.12	0.04	7792.4	197462
8770.0	6569.538	103.1126	-32.2910	85.45	0.04	7388.6	85.69	0.04	7792.4	197497
8780.0	6569.590	103.8721	-32.2374	85.00	0.04	7388.6	85.26	0.04	7792.3	197530
8790.0	6569.642	104.6305	-32.1787	84.55	0.04	7388.5	84.83	0.04	7792.3	197562
8800.0	6569.694	105.3878	-32.1150	84.10	0.04	7388.5	84.41	0.04	7792.2	197593
8810.0	6569.747	106.1439	-32.0462	83.65	0.04	7388.5	83.98	0.04	7792.2	197623
8820.0	6569.800	106.8988	-31.9725	83.21	0.04	7388.5	83.56	0.04	7792.2	197651
8830.0	6569.854	107.6524	-31.8938	82.76	0.04	7388.4	83.14	0.04	7792.1	197679
8840.0	6569.909	108.4045	-31.8101	82.32	0.04	7388.4	82.72	0.04	7792.1	197705
8850.0	6569.963	109.1552	-31.7215	81.88	0.04	7388.4	82.30	0.04	7792.0	197730
8860.0	6570.019	109.9043	-31.6280	81.44	0.04	7388.4	81.88	0.04	7792.0	197754
8870.0	6570.074	110.6517	-31.5296	81.00	0.04	7388.4	81.47	0.04	7792.0	197777
8880.0	6570.130	111.3975	-31.4264	80.56	0.04	7388.3	81.06	0.04	7791.9	197799
8890.0	6570.187	112.1414	-31.3183	80.13	0.04	7388.3	80.65	0.04	7791.9	197819
8900.0	6570.244	112.8835	-31.2055	79.70	0.04	7388.3	80.24	0.04	7791.9	197839
8910.0	6570.301	113.6237	-31.0879	79.27	0.04	7388.3	79.83	0.04	7791.8	197857
8920.0	6570.359	114.3619	-30.9657	78.85	0.04	7388.3	79.43	0.04	7791.8	197874
8930.0	6570.417	115.0981	-30.8387	78.42	0.05	7388.3	79.03	0.04	7791.8	197891
8940.0	6570.475	115.8321	-30.7071	78.00	0.05	7388.3	78.63	0.04	7791.7	197906
8950.0	6570.534	116.5640	-30.5709	77.58	0.05	7388.3	78.24	0.04	7791.7	197920
8960.0	6570.594	117.2936	-30.4301	77.17	0.05	7388.3	77.84	0.04	7791.7	197933
8970.0	6570.653	118.0210	-30.2847	76.76	0.05	7388.3	77.45	0.04	7791.6	197945
8980.0	6570.713	118.7461	-30.1349	76.35	0.05	7388.3	77.07	0.04	7791.6	197957
8990.0	6570.773	119.4688	-29.9807	75.94	0.05	7388.3	76.68	0.04	7791.6	197967
9000.0	6570.834	120.1891	-29.8220	75.54	0.05	7388.3	76.30	0.04	7791.5	197976
9010.0	6570.895	120.9069	-29.6589	75.14	0.05	7388.3	75.93	0.04	7791.5	197985

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
9020.0	6570.956	121.6222	-29.4916	74.74	0.05	7388.3	75.55	0.05	7791.5	197992
9030.0	6571.018	122.3350	-29.3199	74.35	0.05	7388.3	75.18	0.05	7791.4	197999
9040.0	6571.080	123.0451	-29.1440	73.96	0.05	7388.3	74.81	0.05	7791.4	198005
9050.0	6571.142	123.7527	-28.9640	73.58	0.05	7388.3	74.45	0.05	7791.4	198010
9060.0	6571.205	124.4577	-28.7798	73.19	0.05	7388.4	74.09	0.05	7791.3	198014
9070.0	6571.267	125.1599	-28.5914	72.81	0.05	7388.4	73.73	0.05	7791.3	198017
9080.0	6571.330	125.8595	-28.3991	72.44	0.05	7388.4	73.37	0.05	7791.3	198020
9090.0	6571.394	126.5563	-28.2027	72.07	0.05	7388.4	73.02	0.05	7791.3	198022
9100.0	6571.457	127.2504	-28.0024	71.70	0.05	7388.4	72.67	0.05	7791.2	198023
9110.0	6571.521	127.9417	-27.7981	71.33	0.05	7388.4	72.33	0.05	7791.2	198023
9120.0	6571.585	128.6302	-27.5900	70.97	0.05	7388.4	71.99	0.05	7791.2	198023
9130.0	6571.649	129.3159	-27.3781	70.62	0.05	7388.5	71.65	0.05	7791.2	198022
9140.0	6571.713	129.9988	-27.1624	70.26	0.05	7388.5	71.32	0.05	7791.2	198021
9150.0	6571.778	130.6789	-26.9430	69.91	0.05	7388.6	70.99	0.05	7791.2	198019
9160.0	6571.842	131.3561	-26.7200	69.57	0.05	7388.6	70.67	0.05	7791.2	198017
9170.0	6571.907	132.0305	-26.4933	69.23	0.05	7388.7	70.35	0.05	7791.2	198014
9180.0	6571.956	132.7018	-26.2631	68.89	0.05	7388.6	70.03	0.05	7791.1	197993
9190.0	6572.020	133.3705	-26.0293	68.56	0.05	7388.7	69.71	0.05	7791.1	197988
	S-IVB RESTART (ENGINE SOLENOID ACTIVATION)									
9199.200	6572.078	133.9831	-25.8112	68.25	0.05	7388.7	69.43	0.05	7791.0	197983
9200.0	6572.084	134.0363	-25.7921	68.23	0.05	7388.7	69.40	0.05	7791.0	197982
9202.0	6572.097	134.1691	-25.7442	68.16	0.05	7388.7	69.34	0.05	7791.1	197981
9204.0	6572.110	134.3019	-25.6962	68.10	0.05	7388.7	69.28	0.05	7791.1	197980
9206.0	6572.123	134.4346	-25.6480	68.03	0.05	7388.8	69.22	0.05	7791.1	197979
	S-IVB RE-IGNITION (STDV OPEN)									
9207.520	6572.133	134.5354	-25.6113	67.98	0.05	7388.8	69.17	0.05	7791.1	197979
9208.0	6572.136	134.5672	-25.5997	67.97	0.05	7389.0	69.16	0.05	7791.3	197978
9210.0	6572.150	134.6998	-25.5512	67.90	0.05	7395.2	69.10	0.05	7797.5	197978
9212.0	6572.163	134.8323	-25.5026	67.84	0.05	7406.2	69.03	0.05	7808.5	197977
9214.0	6572.177	134.9649	-25.4538	67.77	0.05	7417.7	68.97	0.05	7820.0	197977
9216.0	6572.192	135.0976	-25.4047	67.71	0.05	7429.5	68.91	0.05	7831.7	197977
9218.0	6572.207	135.2303	-25.3555	67.65	0.05	7441.5	68.85	0.05	7843.7	197978
9220.0	6572.223	135.3631	-25.3061	67.58	0.05	7453.6	68.79	0.05	7855.8	197980
9222.0	6572.239	135.4960	-25.2564	67.52	0.05	7465.8	68.73	0.05	7868.0	197981
9224.0	6572.255	135.6289	-25.2066	67.46	0.05	7478.0	68.66	0.05	7880.3	197983
9226.0	6572.271	135.7619	-25.1566	67.39	0.05	7490.2	68.60	0.05	7892.4	197984
9228.0	6572.286	135.8951	-25.1063	67.33	0.05	7502.3	68.54	0.05	7904.6	197985
9230.0	6572.301	136.0284	-25.0558	67.27	0.05	7514.5	68.48	0.05	7916.7	197985
9232.0	6572.315	136.1619	-25.0050	67.21	0.05	7526.6	68.42	0.05	7928.8	197986

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	FF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
9234.0	6572.330	136.2954	-24.9541	67.14	0.05	7538.8	68.36	0.05	7941.0	197986
9236.0	6572.345	136.4291	-24.9029	67.08	0.06	7550.9	68.30	0.05	7953.1	197986
9238.0	6572.361	136.5628	-24.8516	67.02	0.06	7563.1	68.24	0.05	7965.3	197987
9240.0	6572.377	136.6966	-24.8000	66.96	0.06	7575.3	68.18	0.06	7977.5	197989
9242.0	6572.394	136.8306	-24.7482	66.90	0.06	7587.6	68.12	0.06	7989.7	197991
9244.0	6572.411	136.9646	-24.6962	66.84	0.07	7599.9	68.06	0.06	8002.1	197993
9246.0	6572.429	137.0988	-24.6439	66.78	0.07	7612.2	68.00	0.07	8014.4	197996
9248.0	6572.448	137.2330	-24.5915	66.72	0.07	7624.6	67.95	0.07	8026.8	198001
9250.0	6572.469	137.3673	-24.5388	66.66	0.08	7637.0	67.89	0.07	8039.2	198006
9252.0	6572.490	137.5018	-24.4860	66.60	0.08	7649.5	67.83	0.08	8051.6	198013
9254.0	6572.513	137.6363	-24.4329	66.54	0.09	7662.0	67.77	0.08	8064.1	198021
9256.0	6572.537	137.7710	-24.3796	66.48	0.09	7674.5	67.71	0.09	8076.7	198030
9258.0	6572.563	137.9057	-24.3261	66.42	0.10	7687.1	67.65	0.10	8089.2	198041
9260.0	6572.591	138.0406	-24.2724	66.36	0.11	7699.7	67.60	0.10	8101.9	198054
9262.0	6572.621	138.1755	-24.2184	66.30	0.11	7712.4	67.54	0.11	8114.5	198068
9264.0	6572.653	138.3106	-24.1642	66.24	0.12	7725.1	67.48	0.12	8127.3	198085
9266.0	6572.686	138.4457	-24.1099	66.18	0.13	7737.9	67.42	0.12	8140.0	198103
9268.0	6572.723	138.5810	-24.0553	66.12	0.14	7750.7	67.37	0.13	8152.8	198124
9270.0	6572.761	138.7163	-24.0005	66.06	0.15	7763.5	67.31	0.14	8165.6	198147
9272.0	6572.802	138.8518	-23.9454	66.00	0.16	7776.3	67.25	0.15	8178.5	198173
9274.0	6572.846	138.9874	-23.8902	65.95	0.17	7789.2	67.20	0.16	8191.4	198202
9276.0	6572.892	139.1231	-23.8347	65.89	0.18	7802.1	67.14	0.17	8204.3	198233
9278.0	6572.942	139.2588	-23.7791	65.83	0.19	7815.1	67.08	0.18	8217.2	198267
9280.0	6572.994	139.3947	-23.7232	65.77	0.20	7828.1	67.03	0.19	8230.2	198304
9282.0	6573.050	139.5307	-23.6671	65.72	0.21	7841.1	66.97	0.20	8243.2	198344
9284.0	6573.110	139.6668	-23.6107	65.66	0.22	7854.1	66.91	0.21	8256.3	198388
9286.0	6573.173	139.8030	-23.5542	65.60	0.24	7867.2	66.86	0.22	8269.4	198436
9288.0	6573.239	139.9393	-23.4974	65.54	0.25	7880.4	66.80	0.24	8282.5	198487
9290.0	6573.310	140.0757	-23.4404	65.49	0.26	7893.6	66.75	0.25	8295.7	198542
9292.0	6573.385	140.2123	-23.3832	65.43	0.28	7906.8	66.69	0.26	8308.9	198601
9294.0	6573.463	140.3489	-23.3258	65.37	0.29	7920.1	66.64	0.28	8322.2	198664
9296.0	6573.546	140.4856	-23.2682	65.32	0.31	7933.3	66.58	0.29	8335.5	198731
9298.0	6573.634	140.6225	-23.2103	65.26	0.32	7946.6	66.53	0.31	8348.8	198803
9300.0	6573.726	140.7594	-23.1523	65.21	0.34	7960.0	66.47	0.32	8362.1	198879
9302.0	6573.823	140.8964	-23.0940	65.15	0.36	7973.4	66.42	0.34	8375.5	198960
9304.0	6573.925	141.0336	-23.0355	65.10	0.37	7986.8	66.36	0.36	8389.0	199046
9306.0	6574.031	141.1709	-22.9767	65.04	0.39	8000.3	66.31	0.37	8402.5	199138
9308.0	6574.144	141.3082	-22.9178	64.99	0.41	8013.8	66.26	0.39	8416.0	199234
9310.0	6574.261	141.4457	-22.8586	64.93	0.43	8027.4	66.20	0.41	8429.6	199336
9312.0	6574.384	141.5833	-22.7992	64.88	0.45	8041.0	66.15	0.43	8443.2	199443
9314.0	6574.513	141.7210	-22.7396	64.82	0.47	8054.6	66.10	0.45	8456.9	199556
9316.0	6574.648	141.8588	-22.6797	64.77	0.49	8068.3	66.04	0.47	8470.5	199675
9318.0	6574.789	141.9967	-22.6197	64.71	0.51	8082.0	65.99	0.49	8484.3	199800

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
9320.0	6574.936	142.1348	-22.5594	64.66	0.53	8095.7	65.94	0.51	8498.0	199931
9322.0	6575.090	142.2729	-22.4989	64.61	0.55	8109.5	65.88	0.53	8511.8	200068
9324.0	6575.250	142.4112	-22.4382	64.55	0.58	8123.3	65.83	0.55	8525.6	200212
9326.0	6575.417	142.5495	-22.3773	64.50	0.60	8137.2	65.78	0.57	8539.5	200363
9328.0	6575.590	142.6880	-22.3161	64.44	0.62	8151.1	65.73	0.59	8553.4	200520
9330.0	6575.771	142.8265	-22.2547	64.39	0.65	8164.9	65.67	0.62	8567.3	200685
9332.0	6575.959	142.9652	-22.1931	64.34	0.67	8179.0	65.62	0.64	8581.4	200857
9334.0	6576.155	143.1040	-22.1313	64.29	0.70	8193.7	65.57	0.66	8596.0	201036
9336.0	6576.358	143.2429	-22.0692	64.23	0.72	8209.0	65.52	0.69	8611.4	201223
9338.0	6576.569	143.3820	-22.0069	64.18	0.75	8225.1	65.47	0.71	8627.5	201418
9340.0	6576.787	143.5212	-21.9444	64.13	0.78	8241.7	65.42	0.74	8644.1	201621
9342.0	6577.015	143.6606	-21.8816	64.08	0.80	8258.5	65.37	0.77	8660.9	201831
9344.0	6577.250	143.8001	-21.8186	64.03	0.83	8275.3	65.32	0.79	8677.7	202051
9346.0	6577.494	143.9398	-21.7554	63.98	0.86	8292.1	65.27	0.82	8694.6	202279
9348.0	6577.747	144.0797	-21.6919	63.93	0.89	8309.0	65.22	0.85	8711.5	202515
9350.0	6578.009	144.2197	-21.6282	63.88	0.92	8325.9	65.17	0.87	8728.4	202761
9352.0	6578.281	144.3598	-21.5642	63.84	0.95	8342.9	65.12	0.90	8745.4	203016
9354.0	6578.561	144.5001	-21.5000	63.79	0.98	8359.9	65.08	0.93	8762.5	203280
9356.0	6578.852	144.6406	-21.4356	63.74	1.01	8377.1	65.03	0.96	8779.7	203554
9358.0	6579.153	144.7812	-21.3709	63.69	1.04	8394.3	64.98	1.00	8796.9	203838
9360.0	6579.464	144.9220	-21.3060	63.64	1.08	8411.5	64.93	1.03	8814.2	204133
9362.0	6579.785	145.0630	-21.2408	63.59	1.11	8428.8	64.88	1.06	8831.5	204437
9364.0	6580.116	145.2041	-21.1754	63.54	1.14	8446.2	64.83	1.09	8848.9	204752
9366.0	6580.458	145.3453	-21.1098	63.49	1.18	8463.7	64.78	1.12	8866.4	205078
9368.0	6580.812	145.4868	-21.0439	63.44	1.21	8481.2	64.73	1.16	8884.0	205415
9370.0	6581.177	145.6284	-20.9778	63.39	1.25	8498.9	64.69	1.20	8901.7	205764
9372.0	6581.555	145.7701	-20.9114	63.35	1.29	8516.5	64.64	1.23	8919.4	206125
9374.0	6581.944	145.9120	-20.8448	63.30	1.33	8534.2	64.59	1.27	8937.1	206498
9376.0	6582.346	146.0541	-20.7779	63.25	1.37	8552.0	64.54	1.30	8954.9	206883
9378.0	6582.760	146.1963	-20.7108	63.20	1.41	8569.9	64.50	1.34	8972.9	207280
9380.0	6583.187	146.3387	-20.6434	63.16	1.45	8587.8	64.45	1.38	8990.8	207690
9382.0	6583.627	146.4813	-20.5758	63.11	1.49	8605.8	64.40	1.42	9008.8	208113
9384.0	6584.079	146.6240	-20.5080	63.06	1.53	8623.8	64.36	1.46	9026.9	208549
9386.0	6584.546	146.7669	-20.4399	63.02	1.57	8641.9	64.31	1.50	9045.0	208999
9388.0	6585.025	146.9100	-20.3715	62.97	1.61	8660.1	64.26	1.54	9063.3	209462
9390.0	6585.519	147.0532	-20.3030	62.93	1.65	8678.4	64.22	1.58	9081.6	209939
9392.0	6586.027	147.1966	-20.2341	62.88	1.70	8696.8	64.17	1.62	9100.0	210430
9394.0	6586.549	147.3402	-20.1651	62.83	1.74	8715.2	64.13	1.66	9118.4	210936
9396.0	6587.086	147.4839	-20.0957	62.79	1.79	8733.6	64.08	1.71	9136.9	211456
9398.0	6587.638	147.6278	-20.0262	62.74	1.83	8752.1	64.04	1.75	9155.4	211991
9400.0	6588.206	147.7718	-19.9564	62.70	1.88	8770.7	63.99	1.80	9174.1	212541
9402.0	6588.788	147.9161	-19.8863	62.65	1.92	8789.5	63.95	1.84	9193.0	213107
9404.0	6589.386	148.0605	-19.8160	62.61	1.97	8808.5	63.90	1.88	9212.0	213688

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
9406.0	6590.000	148.2050	-19.7455	62.57	2.02	8827.7	63.86	1.93	9231.3	214286
9408.0	6590.630	148.3498	-19.6746	62.52	2.07	8846.9	63.82	1.98	9250.5	214899
9410.0	6591.277	148.4947	-19.6036	62.48	2.12	8866.1	63.77	2.02	9269.7	215529
9412.0	6591.940	148.6398	-19.5323	62.44	2.17	8885.2	63.73	2.07	9288.9	216175
9414.0	6592.621	148.7851	-19.4607	62.39	2.22	8904.3	63.69	2.12	9308.0	216839
9416.0	6593.319	148.9305	-19.3890	62.35	2.27	8923.4	63.64	2.17	9327.2	217520
9418.0	6594.034	149.0761	-19.3169	62.30	2.32	8942.5	63.60	2.22	9346.3	218218
9420.0	6594.768	149.2219	-19.2446	62.26	2.38	8961.5	63.56	2.27	9365.4	218935
9422.0	6595.520	149.3678	-19.1721	62.22	2.43	8980.6	63.51	2.33	9384.5	219671
9424.0	6596.291	149.5139	-19.0993	62.18	2.48	8999.8	63.47	2.38	9403.8	220425
9426.0	6597.081	149.6602	-19.0263	62.13	2.54	9019.3	63.43	2.43	9423.3	221197
9428.0	6597.890	149.8066	-18.9530	62.09	2.60	9038.9	63.39	2.48	9443.0	221989
9430.0	6598.718	149.9532	-18.8795	62.05	2.65	9058.7	63.34	2.54	9462.9	222801
9432.0	6599.566	150.1000	-18.8057	62.01	2.71	9078.5	63.30	2.59	9482.7	223632
9434.0	6600.434	150.2470	-18.7317	61.97	2.77	9098.4	63.26	2.65	9502.7	224483
9436.0	6601.322	150.3941	-18.6574	61.93	2.82	9118.4	63.22	2.70	9522.8	225354
9438.0	6602.231	150.5415	-18.5829	61.89	2.88	9138.5	63.18	2.76	9543.0	226246
9440.0	6603.161	150.6890	-18.5081	61.85	2.94	9158.7	63.14	2.82	9563.2	227159
9442.0	6604.112	150.8366	-18.4331	61.80	3.00	9178.8	63.10	2.88	9583.3	228093
9444.0	6605.084	150.9845	-18.3578	61.76	3.06	9198.7	63.06	2.93	9603.4	229049
9446.0	6606.078	151.1325	-18.2823	61.72	3.13	9218.8	63.02	2.99	9623.5	230026
9448.0	6607.095	151.2807	-18.2065	61.69	3.19	9239.3	62.98	3.05	9644.0	231026
9450.0	6608.134	151.4290	-18.1305	61.65	3.25	9260.2	62.94	3.11	9665.0	232048
9452.0	6609.195	151.5776	-18.0542	61.61	3.31	9281.3	62.90	3.18	9686.2	233092
9454.0	6610.280	151.7263	-17.9777	61.57	3.38	9302.2	62.86	3.24	9707.2	234160
9456.0	6611.388	151.8752	-17.9009	61.53	3.44	9323.1	62.82	3.30	9728.1	235251
9458.0	6612.520	152.0243	-17.8239	61.49	3.51	9344.0	62.78	3.36	9749.1	236366
9460.0	6613.676	152.1736	-17.7467	61.45	3.58	9365.1	62.74	3.43	9770.3	237506
9462.0	6614.856	152.3231	-17.6692	61.42	3.64	9386.2	62.71	3.49	9791.5	238669
9464.0	6616.061	152.4727	-17.5914	61.38	3.71	9407.5	62.67	3.56	9812.9	239857
9466.0	6617.292	152.6225	-17.5134	61.34	3.78	9428.9	62.63	3.62	9834.3	241071
9468.0	6618.547	152.7725	-17.4351	61.30	3.85	9450.3	62.59	3.69	9855.8	242309
9470.0	6619.828	152.9227	-17.3566	61.27	3.92	9471.9	62.55	3.76	9877.5	243574
9472.0	6621.135	153.0731	-17.2778	61.23	3.99	9493.5	62.52	3.82	9899.2	244864
9474.0	6622.469	153.2237	-17.1988	61.19	4.06	9515.2	62.48	3.89	9921.0	246181
9476.0	6623.829	153.3744	-17.1196	61.16	4.13	9537.0	62.44	3.96	9942.8	247524
9478.0	6625.216	153.5253	-17.0401	61.12	4.20	9558.9	62.41	4.03	9964.8	248895
9480.0	6626.631	153.6764	-16.9603	61.09	4.27	9580.9	62.37	4.10	9987.0	250293
9482.0	6628.073	153.8277	-16.8803	61.05	4.35	9603.1	62.34	4.17	10009.2	251718
9484.0	6629.543	153.9792	-16.8000	61.02	4.42	9625.3	62.30	4.24	10031.5	253172
9486.0	6631.042	154.1309	-16.7195	60.98	4.50	9647.6	62.27	4.31	10053.9	254654
9488.0	6632.569	154.2827	-16.6388	60.95	4.57	9670.1	62.23	4.39	10076.5	256164
9490.0	6634.125	154.4348	-16.5578	60.91	4.65	9692.6	62.20	4.46	10099.1	257704

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
9492.0	6635.711	154.5870	-16.4765	60.88	4.72	9715.3	62.16	4.53	10121.9	259273
9494.0	6637.326	154.7394	-16.3951	60.85	4.80	9738.1	62.13	4.61	10144.8	260872
9496.0	6638.972	154.8920	-16.3133	60.81	4.88	9761.1	62.09	4.68	10167.8	262501
9498.0	6640.648	155.0448	-16.2313	60.78	4.96	9784.1	62.06	4.76	10191.0	264160
9500.0	6642.354	155.1978	-16.1491	60.75	5.04	9807.3	62.03	4.84	10214.3	265850
9502.0	6644.092	155.3510	-16.0666	60.71	5.12	9830.6	61.99	4.91	10237.6	267571
9504.0	6645.861	155.5043	-15.9839	60.68	5.20	9853.9	61.96	4.99	10261.1	269324
9506.0	6647.662	155.6579	-15.9009	60.65	5.28	9877.4	61.93	5.07	10284.6	271108
9508.0	6649.495	155.8117	-15.8176	60.62	5.36	9901.0	61.89	5.15	10308.4	272925
9510.0	6651.360	155.9656	-15.7342	60.59	5.44	9924.8	61.86	5.22	10332.3	274774
9512.0	6653.258	156.1198	-15.6504	60.55	5.52	9948.8	61.83	5.30	10356.3	276656
9514.0	6655.190	156.2741	-15.5665	60.52	5.60	9972.8	61.80	5.38	10380.4	278571
9516.0	6657.155	156.4286	-15.4823	60.49	5.69	9996.9	61.77	5.46	10404.6	280519
9518.0	6659.153	156.5834	-15.3978	60.46	5.77	10021.1	61.74	5.55	10429.0	282502
9520.0	6661.186	156.7383	-15.3131	60.43	5.86	10045.6	61.71	5.63	10453.6	284518
9522.0	6663.253	156.8934	-15.2281	60.40	5.94	10070.1	61.67	5.71	10478.3	286570
9524.0	6665.355	157.0487	-15.1429	60.37	6.03	10094.9	61.64	5.79	10503.1	288655
9526.0	6667.492	157.2043	-15.0575	60.34	6.11	10119.6	61.61	5.87	10528.0	290776
9528.0	6669.663	157.3600	-14.9718	60.31	6.19	10144.4	61.58	5.95	10552.9	292931
9530.0	6671.870	157.5159	-14.8859	60.28	6.28	10169.4	61.55	6.04	10578.0	295122
9532.0	6674.112	157.6720	-14.7997	60.26	6.37	10194.6	61.52	6.12	10603.3	297347
9534.0	6676.389	157.8284	-14.7132	60.23	6.46	10220.1	61.49	6.21	10628.9	299609
9536.0	6678.703	157.9850	-14.6265	60.20	6.54	10245.7	61.47	6.29	10654.6	301907
9538.0	6681.054	158.1417	-14.5396	60.17	6.63	10271.4	61.44	6.38	10680.5	304242
9540.0	6683.443	158.2987	-14.4524	60.14	6.72	10297.3	61.41	6.46	10706.5	306615
9542.0	6685.869	158.4559	-14.3650	60.11	6.81	10323.3	61.38	6.55	10732.6	309025
9544.0	6688.333	158.6133	-14.2773	60.09	6.90	10349.5	61.35	6.64	10758.9	311474
9546.0	6690.837	158.7709	-14.1894	60.06	6.99	10375.8	61.32	6.72	10785.3	313962
9548.0	6693.380	158.9287	-14.1012	60.03	7.08	10402.3	61.29	6.81	10812.0	316489
9550.0	6695.963	159.0866	-14.0128	60.00	7.17	10429.0	61.27	6.90	10838.8	319056
	S-IVB 2ND GUIDANCE CUTOFF									
9550.580	6696.719	159.1324	-13.9871	60.00	7.20	10436.7	61.26	6.93	10846.6	319808
9552.0	6698.584	159.2446	-13.9242	59.97	7.27	10439.3	61.23	6.99	10849.2	321662
9554.0	6701.241	159.4025	-13.8355	59.93	7.36	10436.9	61.19	7.08	10846.9	324303
9556.0	6703.932	159.5601	-13.7468	59.88	7.46	10434.6	61.15	7.17	10844.7	326979
9558.0	6706.654	159.7175	-13.6581	59.84	7.55	10432.3	61.11	7.26	10842.4	329686
9560.0	6709.415	159.8746	-13.5693	59.80	7.64	10430.0	61.08	7.35	10840.1	332431
	TRANSLUNAR INJECTION									
9560.580	6710.200	159.9201	-13.5435	59.79	7.67	10429.4	61.06	7.38	10839.6	333212

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
9600.0	6771.520	162.9616	-11.7895	59.02	9.52	10378.3	60.36	9.15	10790.1	394251
9650.0	6967.202	166.6707	-9.5643	58.21	11.81	10299.5	59.63	11.35	10713.9	489629
9700.0	6981.886	170.2124	-7.3656	57.58	14.04	10207.1	59.08	13.47	10624.5	604073
9750.0	7114.319	173.5882	-5.2140	57.10	16.19	10102.9	58.69	15.53	10524.0	736330
9800.0	7263.165	176.8018	-3.1266	56.76	18.27	9989.2	58.44	17.50	10414.2	885063
9850.0	7427.054	179.8582	-1.1166	56.56	20.27	9867.8	58.32	19.39	10297.2	1048896
9900.0	7604.614	-177.2364	0.8065	56.46	22.19	9740.6	58.31	21.20	10174.6	1226453
9950.0	7794.512	-174.4752	2.6367	56.45	24.03	9609.2	58.40	22.92	10048.2	1416392
10000.0	7995.470	-171.3514	4.3709	56.53	25.79	9475.2	58.57	24.55	9919.3	1617429
10050.0	8206.285	-169.3577	6.0082	56.68	27.46	9339.8	58.82	26.10	9789.2	1828354
10100.0	8425.837	-166.9871	7.5495	56.89	29.07	9204.0	59.12	27.58	9658.9	2048042
10150.0	8653.098	-164.7329	8.9972	57.15	30.60	9068.9	59.48	28.97	9529.3	2275457
10200.0	8887.126	-162.5885	10.3544	57.45	32.06	8935.0	59.87	30.30	9401.0	2509654
10250.0	9127.069	-160.5476	11.6253	57.78	33.45	8802.9	60.30	31.55	9274.6	2749776
10300.0	9372.160	-158.6043	12.8142	58.14	34.79	8673.2	60.76	32.74	9150.5	2995051
10350.0	9621.708	-156.7530	13.9256	58.51	36.07	8546.2	61.23	33.86	9029.1	3244786
10400.0	9875.096	-154.9883	14.9642	58.91	37.29	8422.0	61.73	34.93	8910.5	3498362
10450.0	10131.775	-153.3054	15.9347	59.31	38.46	8300.8	62.23	35.95	8794.9	3755228
10500.0	10391.254	-151.6996	16.8416	59.72	39.59	8182.8	62.74	36.91	8682.4	4014891
10550.0	10653.099	-150.1666	17.6891	60.14	40.67	8068.1	63.26	37.83	8573.0	4276916
10600.0	10916.922	-148.7023	18.4815	60.56	41.71	7956.5	63.78	38.70	8466.8	4540915
10650.0	11182.384	-147.3029	19.2226	60.98	42.71	7848.2	64.30	39.53	8363.8	4806546
10700.0	11449.179	-145.9648	19.9160	61.40	43.68	7743.1	64.82	40.32	8263.8	5073505
10750.0	11717.041	-144.6847	20.5651	61.82	44.61	7641.1	65.34	41.08	8166.9	5341525
10800.0	11985.730	-143.4596	21.1733	62.23	45.51	7542.2	65.85	41.80	8072.9	5610366
10850.0	12255.039	-142.2864	21.7433	62.64	46.38	7446.3	66.35	42.49	7981.9	5879820
10900.0	12524.790	-141.1626	22.2780	63.04	47.23	7353.3	66.85	43.15	7893.6	6149790
10950.0	12794.789	-140.0854	22.7798	63.43	48.05	7263.2	67.35	43.79	7808.0	6419843
	CSM SEPARATION									
10962.400	12861.778	-139.8262	22.8988	63.53	48.25	7241.3	67.47	43.93	7787.3	6486863

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	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	210	0	0	0.0	0.0	0.0	0.0	0.0	0.0
FIRST MOTION									
0.250	210	0	0	0.0	0.0	0.0	1.97	0.0	0.0
START OF TIME BASE 1									
0.590	214	0	0	1.3	-0.0	0.0	3.29	-0.09	0.05
1.0	215	0	0	3.4	-0.1	0.0	4.96	-0.10	0.11
2.0	219	0	0	9.7	-0.0	0.2	7.15	0.25	0.20
3.0	231	0	0	17.0	0.5	0.4	7.35	0.76	0.22
4.0	251	1	1	24.5	1.3	0.6	7.54	0.88	0.19
5.0	279	3	2	32.1	2.2	0.7	7.74	0.90	0.12
6.0	315	6	2	39.9	3.1	0.8	7.93	0.90	0.03
7.0	359	9	3	47.9	4.0	0.8	8.13	0.90	-0.06
8.0	411	14	4	56.3	4.9	0.7	8.30	0.89	-0.17
9.0	471	19	5	64.6	5.8	0.5	8.46	0.86	-0.27
10.0	538	25	5	72.9	6.6	0.1	8.63	0.78	-0.39
11.0	614	32	5	81.5	7.3	-0.3	8.78	0.51	-0.47
12.0	699	40	4	90.4	7.7	-0.8	8.94	0.23	-0.43
13.0	793	49	3	99.3	7.8	-1.1	9.10	0.06	-0.35
14.0	898	55	2	108.3	7.8	-1.5	9.30	-0.13	-0.27

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
15.0	1008	63	1	117.9	7.6	-1.7	9.49	-0.30	-0.17
16.0	1133	70	-1	127.6	7.2	-1.8	9.70	-0.37	-0.04
17.0	1265	78	-3	137.3	6.8	-1.8	9.91	-0.40	0.10
18.0	1407	84	-5	147.0	6.4	-1.6	10.18	-0.41	0.25
19.0	1559	90	-6	157.3	6.0	-1.3	10.45	-0.39	0.43
20.0	1720	96	-7	167.9	5.7	-0.7	10.74	-0.37	0.62
21.0	1891	102	-8	178.8	5.3	-0.1	10.99	-0.35	0.78
22.0	2076	107	-7	189.9	4.9	0.8	11.24	-0.36	0.95
23.0	2271	112	-6	201.3	4.6	1.8	11.50	-0.39	1.11
24.0	2478	116	-4	212.9	4.2	3.0	11.76	-0.41	1.28
25.0	2697	120	0	224.8	3.7	4.4	12.00	-0.43	1.46
26.0	2928	123	5	237.0	3.3	5.9	12.26	-0.43	1.65
27.0	3171	127	12	249.3	2.9	7.7	12.51	-0.44	1.86
28.0	3427	129	21	262.0	2.4	9.7	12.77	-0.44	2.09
29.0	3695	131	32	274.9	2.0	11.9	13.04	-0.44	2.33
30.0	3977	133	45	288.1	1.6	14.3	13.31	-0.44	2.58
31.0	4271	135	60	301.5	1.1	17.0	13.59	-0.44	2.85
32.0	4580	135	79	315.2	0.7	20.0	13.87	-0.45	3.16
33.0	4902	136	100	329.2	0.2	23.4	14.15	-0.45	3.49
34.0	5238	136	126	343.5	-0.2	27.0	14.43	-0.44	3.85
35.0	5589	136	155	358.1	-0.6	31.1	14.70	-0.42	4.24
36.0	5955	135	188	372.9	-1.0	35.5	14.97	-0.40	4.67
37.0	6335	133	226	388.0	-1.4	40.4	15.25	-0.38	5.11
38.0	6731	132	269	403.4	-1.8	45.7	15.53	-0.36	5.55
39.0	7142	130	317	419.1	-2.2	51.5	15.82	-0.35	6.03
40.0	7569	127	372	435.1	-2.5	57.8	16.11	-0.35	6.53
41.0	8012	125	433	451.3	-2.9	64.6	16.39	-0.35	7.07
42.0	8472	122	502	467.9	-3.2	72.0	16.67	-0.35	7.63
43.0	8948	118	577	484.7	-3.6	79.9	16.93	-0.35	8.21
44.0	9441	115	662	501.7	-3.9	88.4	17.19	-0.35	8.81
45.0	9952	110	754	519.0	-4.3	97.5	17.43	-0.33	9.41
46.0	10480	106	857	536.6	-4.6	107.2	17.67	-0.30	10.00
47.0	11025	101	969	554.4	-4.9	117.5	17.90	-0.27	10.59
48.0	11588	96	1092	572.4	-5.1	128.4	18.13	-0.24	11.19
49.0	12170	91	1226	590.6	-5.4	139.9	18.37	-0.22	11.81
50.0	12770	86	1372	609.1	-5.6	152.0	18.62	-0.22	12.44
51.0	13388	80	1530	627.9	-5.8	164.8	18.87	-0.23	13.13
52.0	14025	74	1702	646.9	-6.1	178.3	19.11	-0.25	13.87
53.0	14682	68	1887	666.1	-6.3	192.6	19.33	-0.27	14.62
54.0	15358	61	2087	685.5	-6.6	207.6	19.53	-0.28	15.40
55.0	16053	55	2303	705.1	-6.9	223.4	19.73	-0.28	16.20
56.0	16768	48	2534	724.9	-7.1	239.9	19.88	-0.27	16.98
57.0	17503	40	2783	744.9	-7.4	257.3	20.03	-0.26	17.78

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
58.0	18258	33	3049	765.0	-7.7	275.5	20.19	-0.24	18.59
59.0	19033	25	3334	785.3	-7.9	294.5	20.34	-0.20	19.41
60.0	19828	17	3638	805.7	-8.1	314.3	20.49	-0.17	20.24
61.0	20644	9	3963	826.3	-8.2	335.0	20.63	-0.13	21.07
62.0	21481	1	4309	847.0	-8.3	356.5	20.75	-0.09	21.92
63.0	22338	-8	4676	867.8	-8.4	378.8	20.87	-0.03	22.74
64.0	23217	-16	5066	888.7	-8.4	401.9	20.91	0.02	23.57
65.0	24116	-24	5480	909.5	-8.3	425.9	20.92	0.08	24.38
66.0	25036	-33	5918	930.5	-8.2	450.7	20.91	0.15	25.17
MACH 1									
66.800	25787	-39	6287	947.2	-8.0	471.1	20.90	0.22	25.81
67.0	25977	-41	6382	951.4	-8.0	476.2	20.90	0.23	25.97
68.0	26938	-49	6871	972.3	-7.7	502.6	20.87	0.29	26.75
69.0	27921	-56	7387	993.1	-7.4	529.8	20.85	0.36	27.59
70.0	28925	-64	7931	1014.0	-7.0	557.8	20.87	0.41	28.49
71.0	29949	-70	8503	1034.9	-6.6	586.8	20.88	0.44	29.43
72.0	30994	-77	9105	1055.8	-6.2	616.7	20.92	0.40	30.42
73.0	32061	-83	9737	1076.7	-5.9	647.7	20.96	0.32	31.47
74.0	33148	-89	10400	1097.7	-5.6	679.7	20.98	0.24	32.60
75.0	34256	-94	11097	1118.7	-5.4	712.8	20.97	0.17	33.74
76.0	35385	-99	11827	1139.6	-5.2	747.2	20.94	0.13	34.91
77.0	36535	-105	12591	1160.5	-5.1	782.7	20.86	0.15	36.12
78.0	37706	-110	13392	1181.3	-4.9	819.4	20.79	0.24	37.31
79.0	38898	-114	14231	1202.0	-4.5	857.3	20.69	0.41	38.51
80.0	40110	-119	15107	1222.7	-4.0	896.4	20.58	0.67	39.73
81.0	41343	-122	16024	1243.2	-3.1	936.8	20.48	0.98	40.94
82.0	42597	-125	16981	1263.7	-1.9	978.3	20.44	1.34	42.09
MAXIMUM DYNAMIC PRESSURE									
82.600	43359	-126	17576	1275.9	-1.1	1003.8	20.44	1.54	42.71
83.0	43871	-126	17981	1284.1	-0.4	1020.9	20.47	1.67	43.12
84.0	45165	-126	19023	1304.7	1.3	1064.5	20.59	1.92	44.06
85.0	46480	-123	20110	1325.4	3.3	1108.9	20.79	2.05	44.92
86.0	47816	-119	21242	1346.3	5.3	1154.2	21.07	2.04	45.69
87.0	49173	-113	22419	1367.6	7.2	1200.3	21.42	1.90	46.36
88.0	50551	-105	23642	1389.2	9.0	1246.9	21.82	1.65	46.99
89.0	51951	-95	24913	1411.2	10.5	1294.3	22.23	1.35	47.63
90.0	53374	-84	26231	1433.6	11.7	1342.2	22.63	1.05	48.29
91.0	54819	-71	27598	1456.4	12.7	1390.9	22.99	0.79	48.99
92.0	56287	-58	29013	1479.6	13.4	1440.2	23.29	0.57	49.75

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
93.0	57778	-45	30478	1503.0	13.8	1490.4	23.53	0.37	50.59
94.0	59293	-31	31994	1526.6	14.1	1541.5	23.69	0.20	51.51
95.0	60831	-17	33562	1550.3	14.2	1593.5	23.78	0.03	52.54
96.0	62393	-2	35182	1574.1	14.2	1646.6	23.78	-0.11	53.67
97.0	63979	12	36855	1597.8	14.0	1700.9	23.72	-0.20	54.93
98.0	65589	26	38584	1621.5	13.8	1756.5	23.62	-0.26	56.19
99.0	67222	39	40369	1645.0	13.5	1813.3	23.49	-0.29	57.45
100.0	68879	53	42211	1668.5	13.2	1871.4	23.34	-0.29	58.74
101.0	70559	66	44112	1691.7	13.0	1930.8	23.21	-0.24	60.01
102.0	72262	79	46073	1714.9	12.7	1991.4	23.09	-0.19	61.24
103.0	73989	91	48095	1738.0	12.6	2053.2	23.00	-0.13	62.42
104.0	75738	104	50180	1760.9	12.5	2116.2	22.94	-0.03	63.58
105.0	77511	116	52328	1783.9	12.5	2180.4	22.92	0.08	64.74
106.0	79306	129	54541	1806.8	12.7	2245.6	22.92	0.20	65.85
107.0	81124	142	56819	1829.7	13.0	2312.1	22.94	0.35	66.95
108.0	82965	155	59165	1852.7	13.4	2379.6	22.99	0.47	68.05
109.0	84829	168	61579	1875.7	13.9	2448.1	23.03	0.56	69.14
110.0	86717	183	64062	1898.7	14.4	2517.8	23.08	0.61	70.22
111.0	88627	197	66615	1921.8	15.0	2588.6	23.11	0.61	71.32
112.0	90560	213	69239	1944.9	15.6	2660.5	23.13	0.58	72.46
113.0	92517	229	71936	1968.1	16.2	2733.5	23.16	0.54	73.59
114.0	94496	245	74707	1991.3	16.7	2807.7	23.20	0.51	74.72
115.0	96499	262	77552	2014.5	17.3	2883.0	23.25	0.51	75.87
116.0	98525	280	80473	2037.8	17.8	2959.4	23.32	0.55	77.06
117.0	100575	298	83471	2061.2	18.4	3037.1	23.40	0.61	78.25
118.0	102648	316	86548	2084.6	19.1	3115.9	23.46	0.69	79.46
119.0	104744	336	89704	2108.0	19.8	3196.0	23.46	0.76	80.70
120.0	106864	356	92940	2131.4	20.5	3277.4	23.40	0.82	82.03
121.0	109007	377	96259	2154.7	21.4	3360.1	23.26	0.84	83.36
122.0	111173	399	99661	2177.9	22.2	3444.1	23.08	0.85	84.68
123.0	113363	421	103147	2200.9	23.0	3529.4	22.90	0.84	86.03
124.0	115575	445	106720	2223.7	23.9	3616.1	22.75	0.83	87.40
125.0	117810	469	110380	2246.5	24.7	3704.3	22.65	0.82	88.87
126.0	120068	494	114129	2269.1	25.5	3794.0	22.61	0.83	90.39
127.0	122348	520	117969	2291.7	26.4	3885.1	22.64	0.86	91.92
128.0	124652	547	121899	2314.4	27.3	3977.8	22.70	0.82	93.36
129.0	126977	575	125923	2337.1	28.2	4071.9	22.80	0.99	94.81
130.0	129326	603	130046	2360.0	29.1	4167.4	22.90	1.00	96.25
131.0	131697	633	134261	2382.9	30.2	4264.3	22.98	1.02	97.68
132.0	134092	664	138574	2406.0	31.2	4362.7	23.06	1.05	99.11
133.0	136509	695	142988	2429.0	32.2	4462.6	23.13	1.02	100.57
134.0	138950	728	147501	2452.2	33.3	4563.9	23.20	1.05	102.03
135.0	141413	762	152117	2475.4	34.3	4666.6	23.27	0.96	103.50

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
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.160	141810	767	152868	2479.2	34.4	4683.2	23.29	0.95	103.74
136.0	143897	797	154831	2492.9	35.2	4762.1	11.84	0.91	82.57
137.0	146397	832	161638	2504.8	36.1	4845.3	11.88	0.77	83.69
138.0	148907	869	166523	2516.7	36.8	4929.5	11.91	0.64	84.79
139.0	151428	906	171492	2528.6	37.4	5014.8	11.94	0.65	85.89
140.0	153962	944	176550	2540.6	38.0	5101.0	12.02	0.49	87.07
141.0	156510	982	181696	2552.6	38.5	5188.6	12.09	0.52	88.28
142.0	159068	1020	186930	2564.7	39.1	5277.5	12.18	0.61	89.43
143.0	161639	1060	192253	2577.0	39.6	5367.4	12.26	0.51	90.54
144.0	164222	1100	197666	2589.3	40.3	5459.2	12.36	0.68	91.69
145.0	166817	1140	203172	2601.6	41.0	5551.3	12.51	0.75	92.97
146.0	169425	1182	208770	2614.2	41.8	5644.9	12.59	0.81	94.09
147.0	172046	1224	214462	2626.8	42.6	5739.6	12.68	0.87	95.28
148.0	174679	1267	220249	2639.6	43.5	5835.5	12.82	0.92	96.54
149.0	177325	1311	226133	2652.5	44.5	5932.7	12.97	0.97	97.82
150.0	179984	1356	232115	2665.5	45.5	6031.2	13.11	1.01	99.15
151.0	182656	1402	238196	2678.7	46.5	6131.0	13.27	1.05	100.47
152.0	185341	1449	244378	2692.0	47.6	6232.1	13.41	1.07	101.81
153.0	188040	1497	250661	2705.5	48.7	6333.9	13.58	1.13	103.13
154.0	190753	1546	257048	2719.2	49.8	6437.8	13.74	1.10	104.45
155.0	193479	1597	263539	2733.0	50.9	6543.0	13.92	1.12	106.08
156.0	196219	1648	270135	2747.0	52.0	6649.7	14.14	1.05	107.51
157.0	198973	1700	276841	2761.3	53.0	6758.0	14.39	1.09	108.94
158.0	201741	1754	283655	2775.8	54.2	6867.8	14.68	1.21	110.60
159.0	204525	1809	290578	2790.6	55.5	6979.3	14.97	1.35	112.23
160.0	207323	1865	297615	2805.8	56.8	7092.3	15.34	1.22	113.81
161.0	210150	1923	304801	2821.3	58.0	7206.9	15.72	1.24	115.39
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
161.630	211902	1959	309292	2831.1	58.7	7278.8	15.96	1.00	116.37
162.0	212975	1981	312045	2831.4	59.1	7306.1	-29.34	0.48	3.45
S-IC/S-II SEPARATION COMMAND									
162.310	213849	1999	314316	2822.3	59.2	7307.1	-29.34	0.46	3.45
164.0	218577	2100	326668	2772.7	59.9	7313.0	-29.33	0.38	3.45
166.0	224068	2221	341321	2717.5	60.8	7325.7	-23.97	0.45	15.27
168.0	229457	2343	356002	2672.0	61.6	7361.4	-22.27	0.52	18.89
170.0	234759	2467	370768	2628.0	62.6	7401.0	-21.00	0.51	22.10

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
172.0	239973	2594	385615	2586.5	63.6	7446.4	-20.76	0.53	22.61
174.0	245105	2722	400554	2545.2	64.7	7492.1	-20.64	0.54	22.97
176.0	250154	2852	415584	2504.0	65.8	7538.2	-20.57	0.53	23.06
178.0	255121	2985	430707	2462.9	66.8	7584.4	-20.50	0.55	23.18
180.0	260006	3120	445922	2422.0	68.0	7630.9	-20.42	0.57	23.28
182.0	264809	3257	461230	2381.2	69.1	7677.6	-20.35	0.59	23.39
184.0	269531	3396	476632	2340.6	70.3	7724.4	-20.28	0.59	23.49
186.0	274172	3538	492128	2300.1	71.5	7771.5	-20.22	0.60	23.58
188.0	278732	3682	507718	2259.7	72.7	7818.7	-20.16	0.60	23.65
190.0	283211	3829	523403	2219.5	73.9	7866.1	-20.07	0.61	23.76
192.0	287610	3978	539183	2179.5	75.1	7913.8	-19.98	0.62	23.89
194.0	291929	4129	555059	2139.6	76.4	7961.7	-19.88	0.62	24.05
196.0	296168	4283	571030	2099.9	77.6	8010.0	-19.78	0.63	24.20
198.0	300329	4440	587099	2060.5	78.9	8058.5	-19.66	0.64	24.34
200.0	304411	4599	603265	2021.1	80.2	8107.4	-19.74	0.65	24.52
202.0	308413	4760	619529	1981.5	81.5	8156.6	-19.82	0.66	24.68
204.0	312337	4924	635891	1942.0	82.8	8206.0	-19.66	0.64	24.73
206.0	316182	5091	652352	1903.2	84.0	8255.3	-19.10	0.58	24.61
208.0	319951	5260	668912	1865.9	85.1	8304.3	-18.18	0.50	24.30
210.0	323647	5432	685569	1830.5	86.0	8352.5	-17.29	0.43	23.96
212.0	327274	5604	702322	1796.7	86.8	8400.1	-16.47	0.40	23.66
214.0	330834	5779	719169	1764.3	87.6	8447.3	-15.93	0.40	23.50
216.0	334332	5955	736111	1732.9	88.4	8494.2	-15.62	0.40	23.45
218.0	337766	6133	753146	1701.8	89.2	8541.1	-15.43	0.41	23.46
220.0	341139	6312	770275	1671.0	90.1	8588.2	-15.41	0.42	23.57
222.0	344450	6493	787499	1640.1	90.9	8635.4	-15.45	0.42	23.72
224.0	347699	6676	804817	1609.2	91.8	8683.0	-15.48	0.42	23.87
226.0	350887	6860	822231	1578.2	92.6	8730.9	-15.50	0.43	24.02
228.0	354012	7046	839741	1547.2	93.5	8779.1	-15.51	0.44	24.15
230.0	357076	7234	857348	1516.2	94.4	8827.5	-15.50	0.46	24.29
232.0	360077	7424	875052	1485.2	95.3	8876.2	-15.48	0.46	24.41
234.0	363017	7615	892853	1454.3	96.2	8925.2	-15.48	0.46	24.53
236.0	365894	7808	910752	1423.3	97.1	8974.4	-15.49	0.46	24.66
238.0	368710	8004	928751	1392.3	98.1	9023.8	-15.50	0.47	24.79
240.0	371463	8201	946848	1361.3	99.0	9073.5	-15.50	0.50	24.94
242.0	374155	8400	965045	1330.3	100.0	9123.6	-15.52	0.51	25.10
244.0	376784	8601	983342	1299.2	101.1	9173.9	-15.52	0.51	25.24
246.0	379352	8804	1001741	1268.2	102.1	9224.5	-15.53	0.51	25.38
248.0	381857	9009	1020241	1237.1	103.1	9275.4	-15.53	0.53	25.52
250.0	384300	9217	1038843	1206.1	104.2	9326.6	-15.53	0.55	25.67
252.0	386682	9426	1057547	1175.0	105.3	9378.1	-15.54	0.55	25.83
254.0	389000	9638	1076355	1143.9	106.4	9429.9	-15.56	0.54	25.95
256.0	391257	9852	1095267	1112.8	107.5	9482.0	-15.58	0.56	26.09

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
258.0	393451	10068	1114283	1081.6	108.6	9534.3	-15.60	0.58	26.25
260.0	395583	10286	1133405	1050.4	109.8	9587.0	-15.62	0.58	26.42
262.0	397653	10507	1152632	1019.1	110.9	9640.0	-15.64	0.58	26.58
264.0	399660	10730	1171965	987.8	112.1	9693.3	-15.64	0.58	26.73
266.0	401604	10955	1191405	956.6	113.3	9746.9	-15.65	0.62	26.91
268.0	403486	11183	1210953	925.2	114.6	9800.9	-15.66	0.64	27.08
270.0	405305	11413	1230609	893.9	115.8	9855.2	-15.67	0.64	27.24
272.0	407062	11646	1250374	862.6	117.1	9909.9	-15.68	0.63	27.38
274.0	408755	11882	1270248	831.2	118.4	9964.8	-15.69	0.64	27.54
276.0	410386	12120	1290233	799.8	119.7	10020.0	-15.72	0.67	27.71
278.0	411955	12361	1310329	768.3	121.1	10075.6	-15.76	0.69	27.90
280.0	413460	12604	1330536	736.7	122.4	10131.6	-15.79	0.68	28.06
282.0	414901	12850	1350855	705.1	123.8	10187.9	-15.83	0.68	28.23
284.0	416280	13099	1371288	673.5	125.2	10244.5	-15.85	0.69	28.40
286.0	417595	13351	1391834	641.7	126.6	10301.5	-15.87	0.71	28.58
288.0	418847	13606	1412494	610.0	128.0	10358.8	-15.88	0.74	28.74
290.0	420035	13863	1433269	578.2	129.5	10416.5	-15.89	0.75	28.91
292.0	421160	14124	1454160	546.4	131.0	10474.5	-15.92	0.75	29.09
294.0	422221	14387	1475167	514.5	132.5	10532.8	-15.96	0.76	29.28
296.0	423218	14654	1496292	482.6	134.0	10591.6	-16.00	0.77	29.46
298.0	424151	14923	1517534	450.5	135.6	10650.7	-16.04	0.78	29.63
300.0	425020	15196	1538894	418.4	137.2	10710.1	-16.08	0.79	29.82
302.0	425824	15472	1560374	386.2	138.7	10769.9	-16.10	0.80	30.00
304.0	426565	15751	1581974	354.0	140.4	10830.1	-16.14	0.81	30.19
306.0	427240	16034	1603695	321.7	142.0	10890.7	-16.17	0.82	30.38
308.0	427851	16319	1625537	289.3	143.6	10951.6	-16.21	0.83	30.57
310.0	428397	16608	1647502	256.8	145.3	11013.0	-16.25	0.84	30.77
312.0	428879	16900	1669590	224.3	147.0	11074.7	-16.30	0.84	30.96
314.0	429295	17196	1691801	191.6	148.7	11136.8	-16.35	0.87	31.16
316.0	429645	17495	1714137	158.9	150.5	11199.3	-16.38	0.90	31.35
318.0	429930	17798	1736599	126.1	152.3	11262.2	-16.41	0.91	31.55
320.0	430149	18104	1759186	93.2	154.1	11325.5	-16.47	0.90	31.76
322.0	430303	18414	1781901	60.2	155.9	11389.3	-16.53	0.90	31.98
324.0	430390	18728	1804744	27.1	157.7	11453.4	-16.59	0.93	32.19
326.0	430411	19045	1827715	-6.1	159.6	11518.0	-16.63	0.95	32.38
328.0	430366	19366	1850816	-39.4	161.5	11583.0	-16.68	0.97	32.58
330.0	430254	19691	1874047	-72.8	163.5	11648.4	-16.73	0.97	32.80
332.0	430074	20020	1897410	-106.4	165.4	11714.2	-16.79	0.98	33.01
334.0	429828	20353	1920904	-140.0	167.4	11780.4	-16.82	1.00	33.21
336.0	429515	20690	1944532	-173.6	169.4	11847.0	-16.86	1.00	33.43
338.0	429134	21030	1968293	-207.5	171.4	11914.1	-16.95	1.02	33.66
340.0	428685	21375	1992188	-241.5	173.5	11981.7	-17.05	1.03	33.90
342.0	428168	21724	2016220	-275.6	175.5	12049.7	-17.11	1.04	34.12

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
344.0	427582	22077	2040387	-309.9	177.6	12118.2	-17.14	1.06	34.34
346.0	426928	22435	2064693	-344.2	179.8	12187.1	-17.20	1.09	34.57
348.0	426205	22797	2089136	-378.7	182.0	12256.5	-17.28	1.11	34.80
350.0	425413	23163	2113719	-413.3	184.2	12326.3	-17.36	1.12	35.04
352.0	424552	23534	2138442	-448.1	186.4	12396.6	-17.44	1.11	35.27
354.0	423621	23909	2163306	-483.1	188.7	12467.4	-17.49	1.11	35.51
356.0	422619	24288	2188312	-518.1	190.9	12538.7	-17.56	1.13	35.77
358.0	421548	24672	2213461	-553.3	193.2	12610.5	-17.65	1.15	36.02
360.0	420406	25061	2238754	-588.7	195.5	12682.8	-17.76	1.17	36.27
362.0	419193	25454	2264192	-624.3	197.9	12755.5	-17.84	1.19	36.51
364.0	417909	25853	2289776	-660.1	200.3	12828.8	-17.90	1.21	36.76
366.0	416553	26256	2315508	-696.0	202.7	12902.6	-17.98	1.23	37.02
368.0	415125	26663	2341387	-732.0	205.2	12976.9	-18.06	1.24	37.28
370.0	413625	27076	2367415	-768.2	207.7	13051.7	-18.12	1.25	37.53
372.0	412052	27494	2393594	-804.5	210.2	13127.0	-18.22	1.27	37.80
374.0	410406	27917	2419924	-841.1	212.7	13202.9	-18.34	1.28	38.07
376.0	408687	28345	2446406	-877.9	215.3	13279.3	-18.45	1.29	38.34
378.0	406895	28778	2473042	-914.9	217.9	13356.3	-18.54	1.31	38.63
380.0	405028	29217	2499832	-952.0	220.6	13433.8	-18.61	1.33	38.91
382.0	403086	29661	2526777	-989.3	223.2	13511.9	-18.71	1.35	39.18
384.0	401070	30110	2553880	-1026.8	225.9	13590.6	-18.78	1.35	39.44
386.0	398979	30564	2581140	-1064.5	228.7	13669.7	-18.86	1.37	39.71
388.0	396812	31025	2608559	-1102.3	231.4	13749.4	-18.97	1.40	40.01
390.0	394570	31490	2636138	-1140.3	234.3	13829.8	-19.09	1.43	40.31
392.0	392251	31962	2663879	-1178.7	237.1	13910.7	-19.21	1.44	40.62
394.0	389855	32439	2691781	-1217.2	240.0	13992.2	-19.32	1.46	40.92
396.0	387382	32922	2719848	-1255.9	243.0	14074.3	-19.41	1.47	41.21
398.0	384831	33411	2748079	-1294.8	245.9	14157.1	-19.51	1.48	41.51
400.0	382202	33906	2776477	-1334.0	248.9	14240.4	-19.62	1.51	41.83
402.0	379495	34407	2805041	-1373.3	252.0	14324.4	-19.73	1.55	42.15
404.0	376709	34914	2833775	-1412.9	255.1	14409.0	-19.85	1.57	42.43
406.0	373843	35427	2862678	-1452.7	258.2	14494.1	-19.99	1.57	42.75
408.0	370898	35947	2891752	-1492.9	261.4	14580.0	-20.13	1.57	43.11
410.0	367872	36473	2920998	-1533.3	264.5	14666.6	-20.27	1.58	43.48
412.0	364765	37005	2950418	-1573.9	267.7	14753.9	-20.38	1.61	43.80
414.0	361576	37544	2980014	-1614.8	271.0	14841.8	-20.50	1.64	44.11
416.0	358305	38089	3009786	-1655.9	274.3	14930.3	-20.62	1.68	44.45
418.0	354952	38641	3039736	-1697.3	277.7	15019.6	-20.76	1.71	44.80
420.0	351516	39200	3069865	-1738.9	281.1	15109.5	-20.89	1.71	45.15
422.0	347996	39765	3100174	-1780.9	284.5	15200.2	-21.05	1.71	45.51
424.0	344392	40338	3130666	-1823.1	288.0	15291.6	-21.21	1.73	45.86
426.0	340704	40917	3161341	-1865.7	291.5	15383.6	-21.37	1.76	46.21
428.0	336929	41504	3192201	-1908.6	295.0	15476.4	-21.51	1.78	46.59

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
430.0	333069	42097	3223247	-1951.8	298.6	15570.0	-21.65	1.80	46.98
432.0	329122	42699	3254482	-1995.2	302.2	15664.3	-21.81	1.82	47.36
434.0	325088	43306	3285905	-2039.0	305.9	15759.5	-21.98	1.83	47.74
436.0	320966	43922	3317520	-2083.1	309.6	15855.3	-22.14	1.84	48.12
438.0	316755	44545	3349327	-2127.6	313.3	15951.9	-22.30	1.88	48.52
440.0	312455	45175	3381328	-2172.3	317.1	16049.4	-22.45	1.93	48.93
442.0	308066	45813	3413525	-2217.4	321.0	16147.7	-22.62	1.97	49.34
444.0	303586	46459	3445919	-2262.8	324.9	16246.7	-22.80	1.99	49.74
446.0	299014	47113	3478513	-2308.6	328.9	16346.6	-22.97	2.00	50.14
448.0	294351	47775	3511306	-2354.7	332.9	16447.3	-23.16	2.02	50.56
450.0	289595	48445	3544302	-2401.2	337.0	16548.9	-23.36	2.06	50.99
452.0	284746	49123	3577502	-2448.3	341.2	16651.1	-23.55	2.10	51.44
454.0	279802	49809	3610908	-2495.5	345.4	16754.4	-23.73	2.12	51.89
456.0	274764	50504	3644522	-2543.2	349.6	16858.6	-23.92	2.14	52.34
458.0	269630	51208	3678344	-2591.2	353.9	16963.7	-24.13	2.16	52.79
460.0	264399	51920	3712379	-2639.7	358.3	17069.7	-24.37	2.15	53.24
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
460.610	262810	52136	3722630	-2654.4	359.6	17101.6	-24.44	2.09	53.37
462.0	259068	52641	3746613	-2689.1	362.4	17162.7	-25.15	1.97	42.06
464.0	253639	53370	3791022	-2740.1	366.1	17247.0	-25.61	1.79	42.26
466.0	248109	54105	3815603	-2791.0	369.6	17331.7	-25.26	1.76	42.45
468.0	242477	54848	3850352	-2841.0	373.2	17416.8	-24.67	1.86	42.69
470.0	236747	55598	3885272	-2889.6	377.0	17502.4	-23.96	1.86	42.95
472.0	230922	56356	3920364	-2936.5	380.7	17589.0	-23.49	1.88	43.19
474.0	225002	57121	3955628	-2983.3	384.5	17675.7	-23.35	1.89	43.52
476.0	218988	57894	3991067	-3030.1	388.3	17763.1	-23.42	1.92	43.86
478.0	212881	58675	4026681	-3077.0	392.2	17851.1	-23.56	1.99	44.19
480.0	206680	59463	4062472	-3124.3	396.2	17939.8	-23.76	2.05	44.50
482.0	200384	60260	4098441	-3172.0	400.4	18029.2	-23.96	2.11	44.82
484.0	193992	61065	4134590	-3220.2	404.7	18119.1	-24.17	2.15	45.15
486.0	187503	61878	4170922	-3268.9	409.0	18209.7	-24.41	2.17	45.47
488.0	180916	62701	4207431	-3318.0	413.3	18301.0	-24.71	2.16	45.80
490.0	174228	63532	4244107	-3368.0	417.6	18393.8	-25.29	2.13	36.18
492.0	167440	64371	4280937	-3419.3	421.9	18452.7	-25.97	2.11	34.26
494.0	160547	65219	4317910	-3471.9	426.1	18521.3	-26.67	2.14	34.35
496.0	153549	66076	4355021	-3525.9	430.4	18590.1	-27.37	2.18	34.43
498.0	146442	66941	4392271	-3581.0	434.8	18659.0	-27.49	2.20	34.52
500.0	139225	67815	4429659	-3635.4	439.2	18728.1	-27.13	2.20	34.61
502.0	131901	68697	4467185	-3689.1	443.6	18797.7	-26.49	2.19	34.71
504.0	124470	69589	4504850	-3741.7	448.0	18867.2	-26.08	2.17	34.84
506.0	116934	70489	4542654	-3793.7	452.3	18937.2	-25.99	2.16	35.06

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
508.0	109295	71398	4580599	-3845.7	456.6	19007.5	-26.03	2.15	35.28
510.0	101551	72316	4618684	-3897.8	460.9	19078.2	-26.11	2.16	35.45
512.0	93703	73242	4656912	-3950.2	465.2	19149.3	-26.29	2.19	35.59
514.0	85750	74177	4695281	-4003.1	469.7	19220.6	-26.57	2.23	35.78
516.0	77691	75120	4733794	-4056.5	474.1	19292.4	-26.87	2.26	35.98
518.0	69524	76073	4772451	-4110.5	478.7	19364.5	-27.12	2.30	36.16
520.0	61248	77035	4811253	-4165.0	483.3	19437.1	-27.35	2.33	36.37
522.0	52864	78007	4850200	-4219.9	488.0	19510.0	-27.58	2.38	36.59
524.0	44368	78988	4889293	-4275.3	492.8	19583.4	-27.81	2.41	36.81
526.0	35762	79978	4928534	-4331.1	497.6	19657.2	-28.03	2.42	37.01
528.0	27044	80978	4967922	-4387.4	502.5	19731.5	-28.25	2.42	37.22
530.0	18212	81988	5007460	-4444.1	507.3	19806.1	-28.45	2.42	37.43
532.0	9267	83007	5047147	-4501.2	512.2	19881.2	-28.65	2.44	37.66
534.0	207	84037	5086985	-4558.7	517.1	19956.8	-28.85	2.46	37.89
536.0	-8968	85076	5126974	-4616.6	522.0	20032.7	-29.03	2.48	38.10
538.0	-18260	86125	5167116	-4674.8	527.0	20109.2	-29.20	2.51	38.31
540.0	-27668	87184	5207411	-4733.4	532.1	20186.0	-29.37	2.54	38.52
542.0	-37194	88253	5247860	-4792.3	537.2	20263.2	-29.56	2.56	38.73
544.0	-46837	89333	5288465	-4851.6	542.3	20340.9	-29.77	2.56	38.93
546.0	-56600	90422	5329224	-4911.5	547.4	20418.8	-29.96	2.57	39.20
548.0	-66483	91522	5370141	-4971.6	552.6	20497.3	-30.14	2.68	39.39
550.0	-76487	92633	5411215	-5032.1	557.9	20576.2	-30.33	2.60	39.50
552.0	-86612	93754	5452447	-5092.9	563.2	20655.3	-30.52	2.73	39.54
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
552.640	-89827	94109	5465468	-5112.2	564.8	20679.9	-30.58	2.24	39.55
	S-II/S-IVB SEPARATION COMMAND								
553.500	-94284	94601	5483459	-5136.3	566.4	20682.0	-26.87	1.60	-6.61
554.0	-96856	94885	5493807	-5149.8	567.2	20678.7	-26.87	1.54	-6.59
556.0	-107211	96023	5535174	-5203.5	570.3	20665.6	-26.87	1.54	-6.55
558.0	-117672	97167	5576500	-5257.5	573.5	20659.2	-27.19	1.62	1.42
560.0	-128243	98317	5617823	-5312.5	577.1	20670.1	-27.80	1.89	8.14
562.0	-138926	99475	5659193	-5369.1	580.9	20689.3	-28.05	1.88	10.61
564.0	-149720	100641	5700594	-5425.5	584.6	20711.5	-28.24	1.81	11.02
566.0	-160628	101814	5742040	-5482.3	588.2	20733.6	-28.54	1.77	10.75
568.0	-171649	102993	5783529	-5539.5	591.7	20755.2	-28.76	1.79	10.73
570.0	-182786	104180	5825060	-5597.1	595.3	20776.8	-28.81	1.84	10.87
572.0	-194038	105375	5866636	-5654.8	599.0	20798.5	-28.84	1.87	10.87
574.0	-205405	106577	5908254	-5712.6	602.8	20820.2	-29.00	1.89	10.87
576.0	-216888	107786	5949917	-5770.8	606.6	20842.0	-29.15	1.94	10.86

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
578.0	-228488	109003	5991622	-5829.1	610.6	20863.7	-29.21	2.02	10.82
580.0	-240205	110229	6033371	-5887.6	614.7	20885.3	-29.23	2.07	10.79
582.0	-252039	111462	6075163	-5946.1	618.8	20906.8	-29.31	2.07	10.77
584.0	-263989	112704	6116998	-6004.9	623.0	20928.3	-29.45	2.06	10.74
586.0	-276058	113954	6158877	-6063.9	627.1	20949.8	-29.57	2.06	10.71
588.0	-288245	115212	6200798	-6123.1	631.2	20971.2	-29.62	2.10	10.69
590.0	-300550	116479	6242761	-6182.3	635.5	20992.6	-29.65	2.15	10.68
592.0	-312974	117754	6284768	-6241.7	639.8	21013.9	-29.70	2.19	10.69
594.0	-325517	119038	6326817	-6301.2	644.2	21035.3	-29.79	2.21	10.70
596.0	-338179	120331	6368909	-6360.8	648.7	21056.7	-29.89	2.23	10.70
598.0	-350961	121633	6411044	-6420.7	653.2	21078.1	-29.98	2.25	10.67
600.0	-363862	122944	6453221	-6480.8	657.7	21099.4	-30.06	2.26	10.63
602.0	-376884	124264	6495441	-6540.9	662.2	21120.6	-30.13	2.26	10.59
604.0	-390026	125593	6537704	-6601.3	666.7	21141.8	-30.22	2.25	10.57
606.0	-403289	126931	6580008	-6661.8	671.2	21162.9	-30.30	2.24	10.56
608.0	-416673	128278	6622355	-6722.5	675.7	21184.0	-30.36	2.25	10.54
610.0	-430179	129633	6664744	-6783.2	680.2	21205.1	-30.40	2.26	10.54
612.0	-443806	130998	6707175	-6844.1	684.8	21226.2	-30.48	2.29	10.55
614.0	-457556	132373	6749649	-6905.2	689.3	21247.3	-30.59	2.30	10.56
616.0	-471427	133756	6792165	-6966.5	694.0	21268.4	-30.69	2.31	10.54
618.0	-485422	135148	6834722	-7027.9	698.6	21289.4	-30.77	2.32	10.48
620.0	-499539	136550	6877322	-7089.5	703.2	21310.3	-30.83	2.32	10.44
622.0	-513780	137961	6919963	-7151.2	707.9	21331.2	-30.89	2.31	10.42
624.0	-528144	139382	6962647	-7213.1	712.5	21352.0	-30.95	2.32	10.41
626.0	-542632	140811	7005371	-7275.0	717.2	21372.8	-31.01	2.34	10.39
628.0	-557244	142250	7048138	-7337.2	721.8	21393.5	-31.10	2.34	10.36
630.0	-571981	143699	7090945	-7399.4	726.5	21414.2	-31.17	2.33	10.33
632.0	-586842	145157	7133794	-7461.8	731.2	21434.9	-31.23	2.33	10.31
634.0	-601828	146624	7176685	-7524.3	735.8	21455.5	-31.29	2.35	10.29
636.0	-616940	148100	7219616	-7587.0	740.6	21476.0	-31.36	2.37	10.28
638.0	-632176	149586	7262589	-7649.8	745.3	21496.6	-31.44	2.36	10.27
640.0	-647539	151081	7305602	-7712.7	750.0	21517.1	-31.51	2.35	10.25
642.0	-663027	152586	7348657	-7775.8	754.7	21537.6	-31.58	2.35	10.23
644.0	-678642	154100	7391753	-7839.0	759.4	21558.0	-31.64	2.34	10.22
646.0	-694384	155624	7434889	-7902.4	764.1	21578.5	-31.71	2.33	10.22
648.0	-710252	157156	7478067	-7965.9	768.8	21598.9	-31.79	2.35	10.22
650.0	-726247	158699	7521285	-8029.6	773.5	21619.3	-31.88	2.36	10.23
652.0	-742370	160250	7564544	-8093.4	778.2	21639.8	-31.96	2.37	10.24
654.0	-758621	161811	7607844	-8157.4	783.0	21660.3	-32.02	2.39	10.23
656.0	-775000	163382	7651185	-8221.5	787.7	21680.7	-32.07	2.40	10.19
658.0	-791507	164962	7694567	-8285.7	792.5	21701.0	-32.11	2.39	10.14
660.0	-808143	166552	7737989	-8349.9	797.3	21721.3	-32.17	2.38	10.10
662.0	-824907	168152	7781452	-8414.4	802.1	21741.5	-32.26	2.37	10.08

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
664.0	-841800	169760	7824955	-8479.0	806.8	21761.6	-32.35	2.39	10.08
666.0	-858823	171379	7868498	-8543.7	811.6	21781.8	-32.39	2.40	10.09
668.0	-875975	173007	7912082	-8608.5	816.4	21802.0	-32.40	2.40	10.08
670.0	-893257	174645	7955706	-8673.3	821.2	21822.1	-32.43	2.39	10.07
672.0	-910669	176292	7999371	-8738.3	826.0	21842.2	-32.52	2.39	10.02
674.0	-928210	177948	8043075	-8803.5	830.8	21862.2	-32.64	2.40	9.99
676.0	-945883	179615	8086819	-8868.9	835.6	21882.2	-32.75	2.42	9.97
678.0	-963686	181291	8130604	-8934.3	840.4	21902.1	-32.75	2.44	10.00
680.0	-981620	182976	8174428	-8999.8	845.3	21922.1	-32.69	2.45	10.02
682.0	-999685	184672	8218292	-9065.1	850.2	21942.2	-32.65	2.45	10.03
684.0	-1017880	186377	8262197	-9130.4	855.1	21962.3	-32.66	2.44	10.03
686.0	-1036207	188092	8306141	-9195.8	860.0	21982.3	-32.68	2.43	10.04
688.0	-1054664	189817	8350126	-9261.1	864.8	22002.4	-32.69	2.43	10.04
690.0	-1073251	191552	8394151	-9326.5	869.7	22022.5	-32.69	2.41	10.04
692.0	-1091970	193296	8438216	-9391.9	874.5	22042.6	-32.71	2.43	10.05
694.0	-1110819	195050	8482321	-9457.3	879.4	22062.6	-32.73	2.47	10.08
696.0	-1129799	196814	8526467	-9522.8	884.4	22082.8	-32.74	2.45	10.09
698.0	-1148910	198587	8570652	-9588.3	889.2	22103.0	-32.75	2.49	10.11
700.0	-1168151	200371	8614878	-9653.8	894.1	22123.2	-32.76	2.50	10.13
702.0	-1187524	202164	8659144	-9719.3	899.0	22143.5	-32.76	2.40	10.15
	S-IVB 1ST GUIDANCE CUTOFF								
703.760	-1204587	203741	8697919	-9776.6	903.2	22161.2	-32.77	2.17	10.17
704.0	-1207028	203967	8703452	-9784.1	903.8	22162.0	-26.38	2.03	-4.17
706.0	-1226645	205778	8747751	-9834.3	907.2	22141.5	-24.95	1.66	-11.18
708.0	-1246366	207596	8792018	-9884.3	910.5	22119.0	-24.92	1.66	-11.23
710.0	-1266184	209420	8836232	-9934.2	913.9	22096.6	-24.90	1.66	-11.26
712.0	-1286102	211251	8880402	-9983.9	917.2	22074.1	-24.87	1.65	-11.32
	PARKING ORBIT INSERTION								
713.760	-1304046	212863	8919231	-10027.7	920.1	22054.1	-24.85	1.65	-11.37

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	3441.322	9.228	-2.994	0.0	413.6	1275.0	-0.07	-0.04	0.01
-16.0	3441.322	9.294	-2.790	-0.1	413.6	1275.0	-0.07	-0.04	0.01
-15.0	3441.322	9.362	-2.581	-0.2	413.5	1275.1	-0.07	-0.04	0.01
-14.0	3441.322	9.430	-2.371	-0.3	413.5	1275.1	-0.07	-0.04	0.01
-13.0	3441.322	9.498	-2.161	-0.3	413.4	1275.1	-0.07	-0.04	0.01
-12.0	3441.322	9.566	-1.951	-0.4	413.4	1275.1	-0.07	-0.04	0.01
-11.0	3441.322	9.635	-1.741	-0.5	413.3	1275.1	-0.07	-0.04	0.01
-10.0	3441.322	9.703	-1.531	-0.6	413.3	1275.1	-0.07	-0.04	0.01
-9.0	3441.321	9.771	-1.321	-0.7	413.2	1275.1	-0.07	-0.04	0.01
-8.0	3441.321	9.839	-1.112	-0.8	413.2	1275.2	-0.07	-0.04	0.01
-7.0	3441.321	9.907	-0.902	-0.9	413.2	1275.2	-0.07	-0.04	0.01
-6.0	3441.321	9.975	-0.692	-0.9	413.1	1275.2	-0.07	-0.04	0.01
-5.0	3441.321	10.043	-0.482	-1.0	413.1	1275.2	-0.07	-0.04	0.01
-4.0	3441.321	10.111	-0.272	-1.1	413.0	1275.2	-0.07	-0.04	0.01
-3.0	3441.321	10.178	-0.062	-1.2	413.0	1275.2	-0.07	-0.04	0.01
-2.0	3441.320	10.246	0.148	-1.3	412.9	1275.2	-0.07	-0.04	0.01
-1.0	3441.320	10.314	0.358	-1.4	412.9	1275.3	-0.07	-0.04	0.01
0.0	3441.320	10.382	0.567	-1.5	412.8	1275.3	-0.07	-0.04	0.01
FIRST MOTION									
0.250	3441.320	10.399	0.620	-1.5	412.8	1275.3	1.90	-0.04	0.01
START OF TIME BASE 1									
0.580	3441.320	10.422	0.689	-0.2	412.8	1275.3	3.22	-0.12	0.06
1.0	3441.320	10.450	0.777	1.8	412.7	1275.3	4.89	-0.13	0.13
2.0	3441.321	10.518	0.987	8.1	412.7	1275.5	7.08	0.22	0.22
3.0	3441.323	10.586	1.197	15.3	413.2	1275.8	7.27	0.73	0.24
4.0	3441.326	10.654	1.407	22.7	414.0	1276.0	7.47	0.85	0.21
5.0	3441.330	10.722	1.617	30.2	414.8	1276.1	7.67	0.87	0.14
6.0	3441.335	10.791	1.827	38.0	415.7	1276.3	7.86	0.87	0.06
7.0	3441.342	10.859	2.037	45.9	416.5	1276.3	8.06	0.87	-0.03
8.0	3441.350	10.928	2.247	54.1	417.4	1276.2	8.22	0.86	-0.14
9.0	3441.360	10.997	2.457	62.3	418.2	1276.0	8.39	0.83	-0.24
10.0	3441.371	11.066	2.667	70.6	419.1	1275.7	8.56	0.75	-0.35
11.0	3441.383	11.135	2.877	79.1	419.7	1275.3	8.71	0.48	-0.43
12.0	3441.396	11.204	3.087	87.9	420.0	1274.9	8.87	0.20	-0.39
13.0	3441.411	11.273	3.297	96.7	420.1	1274.5	9.03	0.03	-0.31
14.0	3441.428	11.342	3.507	105.7	420.1	1274.3	9.23	-0.16	-0.23

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	3441.446	11.411	3.716	115.2	419.8	1274.1	9.42	-0.32	-0.12
16.0	3441.466	11.480	3.926	124.8	419.4	1274.0	9.63	-0.40	0.01
17.0	3441.487	11.549	4.136	134.3	419.0	1274.1	9.84	-0.43	0.15
18.0	3441.510	11.618	4.345	144.0	418.6	1274.3	10.10	-0.44	0.30
19.0	3441.535	11.687	4.555	154.2	418.2	1274.7	10.38	-0.42	0.48
20.0	3441.561	11.756	4.765	164.8	417.8	1275.3	10.66	-0.39	0.67
21.0	3441.588	11.825	4.975	175.5	417.4	1276.0	10.92	-0.37	0.84
22.0	3441.618	11.893	5.185	186.6	417.0	1277.0	11.16	-0.39	1.01
23.0	3441.650	11.962	5.395	197.9	416.6	1278.1	11.43	-0.41	1.17
24.0	3441.683	12.030	5.606	209.4	416.2	1279.3	11.69	-0.44	1.34
25.0	3441.719	12.099	5.816	221.2	415.7	1280.7	11.93	-0.45	1.52
26.0	3441.756	12.167	6.027	233.2	415.2	1282.4	12.18	-0.45	1.72
27.0	3441.796	12.235	6.238	245.5	414.8	1284.2	12.44	-0.46	1.94
28.0	3441.837	12.304	6.450	258.1	414.3	1286.3	12.69	-0.46	2.16
29.0	3441.881	12.372	6.662	270.9	413.8	1288.6	12.96	-0.46	2.40
30.0	3441.926	12.440	6.874	284.0	413.4	1291.1	13.23	-0.46	2.66
31.0	3441.974	12.508	7.087	297.3	412.9	1293.9	13.50	-0.46	2.94
32.0	3442.024	12.576	7.300	311.0	412.4	1297.0	13.79	-0.47	3.25
33.0	3442.076	12.644	7.514	324.9	412.0	1300.4	14.07	-0.47	3.59
34.0	3442.131	12.711	7.728	339.1	411.5	1304.2	14.34	-0.46	3.94
35.0	3442.188	12.779	7.943	353.5	411.0	1308.3	14.61	-0.44	4.34
36.0	3442.247	12.847	8.159	368.3	410.6	1312.9	14.88	-0.42	4.77
37.0	3442.309	12.914	8.375	383.3	410.2	1317.9	15.16	-0.40	5.21
38.0	3442.374	12.982	8.593	398.5	409.8	1323.3	15.44	-0.38	5.66
39.0	3442.440	13.049	8.811	414.1	409.4	1329.2	15.72	-0.37	6.15
40.0	3442.510	13.116	9.030	430.0	409.0	1335.6	16.01	-0.37	6.65
41.0	3442.582	13.184	9.251	446.1	408.6	1342.6	16.29	-0.37	7.19
42.0	3442.657	13.251	9.472	462.5	408.3	1350.0	16.56	-0.38	7.76
43.0	3442.734	13.318	9.695	479.2	407.9	1358.1	16.82	-0.38	8.34
44.0	3442.815	13.385	9.919	496.1	407.5	1366.7	17.07	-0.37	8.94
45.0	3442.898	13.452	10.145	513.3	407.1	1376.0	17.31	-0.35	9.55
46.0	3442.983	13.519	10.372	530.7	406.8	1385.8	17.54	-0.32	10.14
47.0	3443.072	13.586	10.601	548.3	406.5	1396.2	17.77	-0.30	10.73
48.0	3443.164	13.653	10.832	566.2	406.2	1407.3	18.00	-0.27	11.34
49.0	3443.259	13.720	11.064	584.3	405.9	1418.9	18.23	-0.25	11.96
50.0	3443.356	13.787	11.299	602.7	405.7	1431.2	18.48	-0.25	12.60
51.0	3443.457	13.853	11.535	621.3	405.4	1444.2	18.72	-0.26	13.29
52.0	3443.561	13.920	11.774	640.1	405.1	1457.9	18.96	-0.28	14.03
53.0	3443.668	13.987	12.015	659.1	404.8	1472.3	19.17	-0.31	14.79
54.0	3443.778	14.053	12.259	678.4	404.5	1487.5	19.37	-0.32	15.57
55.0	3443.891	14.120	12.505	697.8	404.2	1503.5	19.56	-0.32	16.38
56.0	3444.008	14.186	12.754	717.4	403.9	1520.2	19.71	-0.31	17.17
57.0	3444.127	14.253	13.005	737.2	403.6	1537.8	19.85	-0.30	17.97

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	3444.250	14.319	13.260	757.1	403.2	1556.2	20.00	-0.28	18.78
59.0	3444.376	14.386	13.518	777.2	403.0	1575.4	20.14	-0.25	19.61
60.0	3444.506	14.452	13.779	797.4	402.7	1595.4	20.28	-0.23	20.44
61.0	3444.639	14.518	14.043	817.7	402.5	1616.3	20.42	-0.19	21.27
62.0	3444.775	14.584	14.311	838.2	402.3	1638.0	20.53	-0.14	22.13
63.0	3444.915	14.651	14.582	858.9	402.2	1660.5	20.64	-0.09	22.96
64.0	3445.058	14.717	14.857	879.4	402.1	1683.9	20.67	-0.04	23.79
65.0	3445.204	14.783	15.136	900.0	402.1	1708.1	20.67	0.01	24.60
66.0	3445.354	14.849	15.420	920.7	402.2	1733.1	20.65	0.08	25.40
MACH 1									
66.800	3445.476	14.902	15.649	937.2	402.3	1753.6	20.64	0.14	26.04
67.0	3445.507	14.915	15.707	941.3	402.3	1758.9	20.63	0.15	26.20
68.0	3445.664	14.982	15.998	961.9	402.5	1785.4	20.60	0.21	26.99
69.0	3445.824	15.048	16.295	982.5	402.7	1812.9	20.57	0.27	27.82
70.0	3445.987	15.114	16.595	1003.1	403.0	1841.1	20.58	0.32	28.73
71.0	3446.154	15.180	16.901	1023.7	403.3	1870.4	20.58	0.34	29.68
72.0	3446.324	15.247	17.211	1044.2	403.6	1900.6	20.60	0.30	30.67
73.0	3446.498	15.313	17.526	1064.8	403.8	1931.8	20.64	0.22	31.72
74.0	3446.675	15.380	17.847	1085.5	404.0	1964.0	20.64	0.13	32.85
75.0	3446.855	15.446	18.173	1106.1	404.1	1997.5	20.62	0.05	34.01
76.0	3447.039	15.513	18.504	1126.7	404.1	2032.1	20.57	0.01	35.18
77.0	3447.226	15.579	18.842	1147.2	404.2	2067.9	20.49	0.02	36.38
78.0	3447.416	15.646	19.185	1167.6	404.2	2104.9	20.40	0.10	37.58
79.0	3447.610	15.712	19.535	1187.9	404.4	2143.0	20.29	0.27	38.79
80.0	3447.807	15.779	19.891	1208.1	404.8	2182.5	20.16	0.52	40.01
81.0	3448.008	15.846	20.253	1228.2	405.5	2223.1	20.05	0.82	41.22
82.0	3448.212	15.912	20.622	1248.2	406.5	2264.9	19.99	1.18	42.38
MAXIMUM DYNAMIC PRESSURE									
82.600	3448.336	15.953	20.847	1260.2	407.3	2290.5	19.98	1.37	43.00
83.0	3448.419	15.979	20.999	1268.2	407.9	2307.8	20.01	1.50	43.42
84.0	3448.629	16.047	21.382	1288.3	409.5	2351.7	20.11	1.74	44.36
85.0	3448.843	16.114	21.773	1308.5	411.2	2396.4	20.30	1.86	45.22
86.0	3449.060	16.182	22.171	1328.9	413.0	2442.0	20.56	1.86	46.00
87.0	3449.280	16.250	22.577	1349.6	414.8	2488.4	20.90	1.70	46.68
88.0	3449.504	16.319	22.990	1370.7	416.3	2535.4	21.29	1.45	47.31
89.0	3449.732	16.387	23.411	1392.2	417.6	2583.0	21.69	1.15	47.96
90.0	3449.962	16.456	23.840	1414.0	418.7	2631.3	22.08	0.84	48.63
91.0	3450.197	16.525	24.277	1436.3	419.4	2680.3	22.42	0.58	49.33
92.0	3450.435	16.594	24.723	1458.8	419.9	2730.0	22.71	0.35	50.09

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
93.0	3450.677	16.663	25.176	1481.6	420.1	2780.5	22.93	0.14	50.94
94.0	3450.923	16.732	25.638	1504.6	420.1	2832.0	23.08	-0.04	51.87
95.0	3451.172	16.801	26.108	1527.7	420.0	2884.4	23.15	-0.22	52.90
96.0	3451.426	16.871	26.587	1550.8	419.7	2937.9	23.14	-0.37	54.04
97.0	3451.683	16.940	27.075	1573.9	419.3	2992.5	23.05	-0.46	55.29
98.0	3451.944	17.009	27.572	1596.9	418.8	3048.5	22.94	-0.53	56.55
99.0	3452.209	17.077	28.079	1619.7	418.2	3105.6	22.79	-0.57	57.83
100.0	3452.477	17.146	28.595	1642.4	417.6	3164.1	22.62	-0.58	59.12
101.0	3452.749	17.215	29.120	1665.0	417.1	3223.9	22.47	-0.54	60.39
102.0	3453.025	17.283	29.656	1687.4	416.5	3284.9	22.33	-0.50	61.62
103.0	3453.305	17.352	30.202	1709.6	416.0	3347.1	22.22	-0.45	62.80
104.0	3453.588	17.420	30.758	1731.8	415.6	3410.5	22.14	-0.36	63.97
105.0	3453.875	17.489	31.324	1753.9	415.3	3475.0	22.10	-0.27	65.14
106.0	3454.165	17.557	31.902	1776.0	415.1	3540.7	22.08	-0.15	66.25
107.0	3454.459	17.625	32.490	1798.1	415.0	3607.5	22.08	-0.02	67.35
108.0	3454.757	17.694	33.089	1820.1	415.1	3675.4	22.10	0.10	68.46
109.0	3455.058	17.762	33.700	1842.2	415.2	3744.4	22.13	0.18	69.55
110.0	3455.363	17.830	34.322	1864.4	415.3	3814.5	22.15	0.21	70.64
111.0	3455.672	17.899	34.955	1886.5	415.5	3885.7	22.17	0.20	71.74
112.0	3455.984	17.967	35.601	1908.6	415.7	3958.1	22.16	0.17	72.88
113.0	3456.300	18.036	36.258	1930.8	415.8	4031.5	22.17	0.11	74.02
114.0	3456.620	18.104	36.928	1952.9	415.9	4106.1	22.18	0.07	75.15
115.0	3456.943	18.172	37.610	1975.1	416.0	4181.8	22.22	0.06	76.31
116.0	3457.270	18.241	38.304	1997.4	416.1	4258.7	22.26	0.09	77.50
117.0	3457.600	18.309	39.012	2019.7	416.2	4336.8	22.32	0.14	78.70
118.0	3457.935	18.378	39.732	2042.0	416.4	4416.1	22.35	0.20	79.91
119.0	3458.273	18.447	40.465	2064.3	416.6	4496.7	22.32	0.26	81.16
120.0	3458.614	18.515	41.212	2086.5	416.8	4578.5	22.24	0.30	82.49
121.0	3458.959	18.584	41.973	2108.6	417.1	4661.7	22.07	0.31	83.82
122.0	3459.308	18.652	42.747	2130.6	417.4	4746.2	21.87	0.30	85.15
123.0	3459.661	18.721	43.535	2152.3	417.7	4832.0	21.66	0.28	86.50
124.0	3460.017	18.790	44.337	2173.9	418.0	4919.1	21.48	0.25	87.87
125.0	3460.376	18.859	45.154	2195.3	418.2	5007.8	21.35	0.23	89.34
126.0	3460.739	18.928	45.986	2216.7	418.4	5097.9	21.29	0.23	90.87
127.0	3461.106	18.996	46.832	2237.9	418.7	5189.6	21.28	0.24	92.40
128.0	3461.476	19.065	47.694	2259.2	418.9	5282.7	21.32	0.19	93.85
129.0	3461.849	19.134	48.571	2280.5	419.1	5377.3	21.39	0.34	95.30
130.0	3462.227	19.203	49.464	2301.9	419.5	5473.3	21.45	0.33	96.74
131.0	3462.607	19.272	50.373	2323.4	419.8	5570.8	21.51	0.33	98.18
132.0	3462.991	19.341	51.298	2344.9	420.1	5669.7	21.56	0.35	99.62
133.0	3463.379	19.411	52.239	2366.5	420.4	5770.0	21.59	0.30	101.08
134.0	3463.770	19.480	53.197	2388.1	420.8	5871.9	21.63	0.32	102.55
135.0	3464.165	19.549	54.172	2409.7	421.0	5975.1	21.67	0.21	104.02

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
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
135.160	3464.229	19.560	54.330	2413.2	421.0	5991.8	21.68	0.20	104.26
136.0	3464.563	19.619	55.164	2425.6	421.2	6071.1	10.41	0.23	82.99
137.0	3464.963	19.688	56.170	2436.0	421.4	6154.7	10.42	0.07	84.11
138.0	3465.365	19.757	57.190	2446.4	421.3	6239.3	10.43	-0.08	85.21
139.0	3465.768	19.826	58.223	2456.8	421.3	6325.1	10.44	-0.08	86.31
140.0	3466.173	19.896	59.271	2467.3	421.1	6411.7	10.49	-0.25	87.50
141.0	3466.580	19.965	60.334	2477.8	420.8	6499.7	10.53	-0.23	88.71
142.0	3466.989	20.034	61.411	2488.3	420.7	6589.0	10.59	-0.16	89.86
143.0	3467.399	20.103	62.503	2498.9	420.4	6679.4	10.65	-0.28	90.97
144.0	3467.811	20.173	63.610	2509.6	420.3	6771.6	10.72	-0.12	92.13
145.0	3468.225	20.242	64.732	2520.3	420.2	6864.2	10.84	-0.07	93.41
146.0	3468.641	20.311	65.870	2531.1	420.2	6958.2	10.89	-0.02	94.53
147.0	3469.058	20.380	67.022	2542.1	420.1	7053.4	10.95	0.02	95.73
148.0	3469.478	20.449	68.191	2553.1	420.2	7149.8	11.07	0.06	96.99
149.0	3469.899	20.518	69.376	2564.2	420.2	7247.4	11.18	0.09	98.28
150.0	3470.322	20.588	70.577	2575.4	420.3	7346.4	11.29	0.11	99.60
151.0	3470.746	20.657	71.794	2586.7	420.5	7446.6	11.41	0.14	100.93
152.0	3471.173	20.726	73.028	2598.2	420.6	7548.2	11.53	0.14	102.28
153.0	3471.602	20.795	74.279	2609.8	420.8	7650.5	11.66	0.18	103.60
154.0	3472.032	20.864	75.547	2621.5	420.9	7754.8	11.79	0.14	104.92
155.0	3472.465	20.934	76.832	2633.3	421.0	7860.6	11.94	0.13	106.56
156.0	3472.899	21.003	78.134	2645.3	421.2	7967.7	12.12	0.05	107.99
157.0	3473.335	21.072	79.455	2657.5	421.2	8076.5	12.33	0.07	109.43
158.0	3473.774	21.142	80.793	2670.0	421.3	8186.8	12.58	0.16	111.10
159.0	3474.214	21.211	82.150	2682.6	421.5	8298.8	12.84	0.28	112.73
160.0	3474.657	21.280	83.525	2695.6	421.7	8412.3	13.17	0.14	114.32
161.0	3475.104	21.350	84.925	2708.9	421.8	8527.4	13.51	0.13	115.91
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
161.630	3475.380	21.394	85.801	2717.4	421.9	8599.6	13.73	-0.11	116.89
162.0	3475.550	21.419	86.335	2716.9	421.9	8627.0	-30.34	-0.09	3.47
S-IC/S-II SEPARATION COMMAND									
162.310	3475.698	21.441	86.776	2707.5	421.9	8628.1	-30.34	-0.11	3.47
164.0	3476.434	21.558	89.176	2656.2	421.6	8634.0	-30.34	-0.19	3.46
166.0	3477.299	21.697	92.022	2598.9	421.3	8646.8	-25.11	-0.19	15.33
169.0	3478.146	21.835	94.874	2551.1	420.8	8682.6	-23.45	-0.14	18.97
170.0	3478.979	21.974	97.739	2504.5	420.4	8722.4	-22.23	-0.17	22.18

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
172.0	3479.796	22.112	100.617	2460.6	420.1	8768.0	-22.01	-0.16	22.69
174.0	3480.599	22.250	103.511	2416.8	419.7	8813.8	-21.89	-0.16	23.04
176.0	3481.387	22.388	106.420	2373.0	419.4	8860.0	-21.83	-0.17	23.12
178.0	3482.161	22.526	109.343	2329.4	419.0	8906.4	-21.77	-0.17	23.23
180.0	3482.920	22.664	112.283	2285.9	418.7	8953.0	-21.71	-0.15	23.33
182.0	3483.666	22.802	115.237	2242.5	418.4	8999.7	-21.64	-0.14	23.43
184.0	3484.397	22.940	118.207	2199.3	418.1	9046.7	-21.58	-0.15	23.52
186.0	3485.114	23.077	121.193	2156.1	417.8	9093.8	-21.53	-0.15	23.60
188.0	3485.816	23.215	124.194	2113.1	417.5	9141.1	-21.48	-0.15	23.67
190.0	3486.505	23.352	127.211	2070.2	417.2	9188.6	-21.40	-0.15	23.78
192.0	3487.179	23.489	130.243	2027.4	416.8	9236.3	-21.32	-0.15	23.90
194.0	3487.839	23.627	133.291	1984.8	416.5	9284.2	-21.24	-0.15	24.05
196.0	3488.486	23.764	136.355	1942.4	416.2	9332.5	-21.14	-0.16	24.19
198.0	3489.118	23.901	139.435	1900.2	415.9	9381.0	-21.03	-0.16	24.33
200.0	3489.737	24.037	142.531	1858.0	415.5	9429.9	-21.12	-0.16	24.50
202.0	3490.341	24.174	145.643	1815.6	415.2	9479.0	-21.22	-0.15	24.65
204.0	3490.932	24.311	148.771	1773.3	414.9	9528.4	-21.07	-0.18	24.70
206.0	3491.509	24.447	151.915	1731.6	414.4	9577.7	-20.52	-0.24	24.57
208.0	3492.072	24.584	155.076	1691.4	413.9	9626.5	-19.60	-0.32	24.27
210.0	3492.622	24.720	158.253	1653.2	413.1	9674.7	-18.71	-0.39	23.94
212.0	3493.160	24.856	161.445	1616.5	412.3	9722.4	-17.90	-0.42	23.65
214.0	3493.687	24.991	164.653	1581.2	411.4	9769.5	-17.36	-0.43	23.48
216.0	3494.201	25.126	167.876	1546.8	410.6	9816.4	-17.06	-0.43	23.43
218.0	3494.705	25.261	171.115	1512.8	409.7	9863.3	-16.88	-0.43	23.44
220.0	3495.197	25.396	174.370	1479.1	408.8	9910.3	-16.87	-0.43	23.54
222.0	3495.679	25.531	177.639	1445.3	407.9	9957.5	-16.92	-0.43	23.68
224.0	3496.149	25.665	180.925	1411.4	407.0	10005.0	-16.96	-0.44	23.83
226.0	3496.608	25.799	184.226	1377.4	406.1	10052.8	-16.99	-0.44	23.97
228.0	3497.055	25.932	187.543	1343.3	405.3	10100.9	-17.01	-0.44	24.10
230.0	3497.492	26.065	190.875	1309.3	404.4	10149.2	-17.01	-0.43	24.23
232.0	3497.917	26.198	194.224	1275.2	403.5	10197.8	-17.01	-0.43	24.35
234.0	3498.332	26.331	197.589	1241.2	402.6	10246.6	-17.02	-0.44	24.46
236.0	3498.734	26.463	200.970	1207.1	401.7	10295.7	-17.04	-0.45	24.59
238.0	3499.126	26.595	204.367	1173.0	400.8	10345.0	-17.05	-0.45	24.71
240.0	3499.507	26.727	207.780	1138.8	399.9	10394.5	-17.07	-0.43	24.85
242.0	3499.876	26.859	211.210	1104.6	399.0	10444.4	-17.10	-0.42	25.00
244.0	3500.234	26.990	214.656	1070.3	398.1	10494.6	-17.11	-0.44	25.14
246.0	3500.580	27.121	218.118	1036.1	397.2	10545.0	-17.13	-0.44	25.27
248.0	3500.916	27.251	221.598	1001.8	396.3	10595.7	-17.14	-0.44	25.40
250.0	3501.240	27.382	225.094	967.4	395.4	10646.7	-17.15	-0.43	25.55
252.0	3501.553	27.512	228.607	933.1	394.6	10697.9	-17.18	-0.43	25.70
254.0	3501.854	27.641	232.136	898.6	393.7	10749.4	-17.21	-0.45	25.82
256.0	3502.144	27.771	235.683	864.2	392.8	10801.2	-17.24	-0.44	25.95

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
258.0	3502.423	27.900	239.247	829.6	391.9	10853.3	-17.27	-0.43	26.11
260.0	3502.690	28.029	242.828	795.0	391.0	10905.7	-17.30	-0.43	26.26
262.0	3502.946	28.157	246.426	760.3	390.1	10958.4	-17.33	-0.45	26.42
264.0	3503.191	28.285	250.042	725.6	389.2	11011.4	-17.35	-0.45	26.57
266.0	3503.424	28.413	253.675	690.9	388.3	11064.7	-17.37	-0.43	26.74
268.0	3503.646	28.541	257.326	656.1	387.4	11118.3	-17.40	-0.41	26.91
270.0	3503.856	28.669	260.995	621.2	386.6	11172.3	-17.42	-0.42	27.06
272.0	3504.055	28.796	264.681	586.3	385.7	11226.6	-17.43	-0.44	27.19
274.0	3504.242	28.922	268.385	551.4	384.8	11281.1	-17.46	-0.44	27.34
276.0	3504.418	29.049	272.108	516.4	384.0	11336.0	-17.51	-0.42	27.51
278.0	3504.582	29.175	275.848	481.3	383.1	11391.2	-17.55	-0.41	27.69
280.0	3504.734	29.301	279.607	446.1	382.2	11446.8	-17.60	-0.43	27.85
282.0	3504.876	29.427	283.384	410.8	381.4	11502.6	-17.65	-0.44	28.00
284.0	3505.005	29.552	287.179	375.4	380.5	11558.8	-17.69	-0.44	28.17
286.0	3505.123	29.677	290.993	340.0	379.6	11615.3	-17.72	-0.43	28.34
288.0	3505.229	29.802	294.826	304.5	378.7	11672.2	-17.74	-0.41	28.50
290.0	3505.323	29.927	298.677	268.9	377.9	11729.4	-17.77	-0.41	28.66
292.0	3505.406	30.051	302.547	233.3	377.0	11786.9	-17.81	-0.42	28.84
294.0	3505.477	30.175	306.437	197.5	376.2	11844.7	-17.87	-0.42	29.02
296.0	3505.536	30.299	310.345	161.7	375.3	11903.0	-17.92	-0.42	29.19
298.0	3505.583	30.422	314.273	125.8	374.5	11961.5	-17.97	-0.42	29.36
300.0	3505.619	30.545	318.219	89.8	373.6	12020.4	-18.02	-0.42	29.53
302.0	3505.642	30.668	322.186	53.6	372.7	12079.7	-18.07	-0.42	29.71
304.0	3505.654	30.790	326.172	17.4	371.9	12139.3	-18.12	-0.42	29.89
306.0	3505.654	30.913	330.177	-18.9	371.0	12199.3	-18.16	-0.42	30.07
308.0	3505.641	31.035	334.203	-55.3	370.1	12259.6	-18.21	-0.42	30.26
310.0	3505.617	31.156	338.248	-91.9	369.3	12320.3	-18.28	-0.43	30.45
312.0	3505.581	31.278	342.313	-128.5	368.4	12381.4	-18.34	-0.43	30.63
314.0	3505.533	31.399	346.399	-165.3	367.5	12442.9	-18.40	-0.42	30.82
316.0	3505.472	31.520	350.505	-202.2	366.7	12504.7	-18.45	-0.40	31.01
318.0	3505.399	31.640	354.631	-239.2	365.9	12566.9	-18.49	-0.40	31.20
320.0	3505.315	31.761	358.778	-276.2	365.0	12629.6	-18.56	-0.42	31.40
322.0	3505.218	31.881	362.945	-313.5	364.2	12692.6	-18.65	-0.43	31.62
324.0	3505.108	32.000	367.134	-350.9	363.3	12756.1	-18.72	-0.41	31.82
326.0	3504.987	32.120	371.343	-388.5	362.5	12819.9	-18.78	-0.40	32.00
328.0	3504.853	32.239	375.573	-426.1	361.7	12884.1	-18.84	-0.40	32.19
330.0	3504.706	32.358	379.825	-463.9	360.9	12948.7	-18.91	-0.41	32.41
332.0	3504.547	32.477	384.098	-501.8	360.0	13013.7	-18.98	-0.40	32.60
334.0	3504.376	32.595	388.392	-539.9	359.2	13079.2	-19.03	-0.40	32.80
336.0	3504.192	32.713	392.708	-578.1	358.4	13145.0	-19.09	-0.41	33.02
338.0	3503.995	32.831	397.046	-616.4	357.5	13211.3	-19.20	-0.40	33.24
340.0	3503.786	32.948	401.405	-654.9	356.7	13278.0	-19.31	-0.41	33.47
342.0	3503.564	33.066	405.787	-693.7	355.9	13345.2	-19.39	-0.41	33.68

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
344.0	3503.329	33.183	410.190	-732.5	355.0	13412.7	-19.44	-0.40	33.89
346.0	3503.082	33.299	414.617	-771.5	354.2	13480.8	-19.51	-0.39	34.12
348.0	3502.821	33.416	419.065	-810.7	353.4	13549.2	-19.61	-0.38	34.34
350.0	3502.548	33.532	423.536	-850.1	352.6	13618.1	-19.71	-0.38	34.57
352.0	3502.262	33.648	428.030	-889.6	351.8	13687.5	-19.81	-0.41	34.79
354.0	3501.962	33.764	432.547	-929.4	351.0	13757.3	-19.88	-0.42	35.02
356.0	3501.650	33.879	437.087	-969.2	350.1	13827.7	-19.96	-0.41	35.27
358.0	3501.324	33.994	441.650	-1009.3	349.3	13898.4	-20.07	-0.40	35.51
360.0	3500.985	34.109	446.237	-1049.6	348.5	13969.7	-20.20	-0.40	35.75
362.0	3500.633	34.224	450.847	-1090.2	347.7	14041.5	-20.30	-0.39	35.99
364.0	3500.268	34.338	455.480	-1130.9	346.9	14113.7	-20.38	-0.38	36.23
366.0	3499.889	34.452	460.138	-1171.8	346.1	14186.4	-20.48	-0.38	36.48
368.0	3499.496	34.566	464.820	-1212.9	345.3	14259.6	-20.58	-0.38	36.72
370.0	3499.090	34.679	469.525	-1254.2	344.5	14333.3	-20.66	-0.39	36.97
372.0	3498.670	34.793	474.255	-1295.7	343.7	14407.6	-20.77	-0.38	37.23
374.0	3498.237	34.906	479.010	-1337.4	342.9	14482.3	-20.92	-0.39	37.49
376.0	3497.790	35.018	483.789	-1379.4	342.1	14557.6	-21.05	-0.39	37.75
378.0	3497.329	35.131	488.594	-1421.7	341.3	14633.4	-21.15	-0.38	38.03
380.0	3496.854	35.243	493.423	-1464.2	340.6	14709.7	-21.25	-0.38	38.30
382.0	3496.365	35.355	498.277	-1506.8	339.8	14786.6	-21.37	-0.38	38.56
384.0	3495.862	35.467	503.157	-1549.7	339.0	14864.0	-21.46	-0.39	38.81
386.0	3495.345	35.578	508.063	-1592.7	338.2	14941.9	-21.56	-0.39	39.07
388.0	3494.813	35.689	512.994	-1636.0	337.4	15020.3	-21.69	-0.37	39.36
390.0	3494.268	35.800	517.951	-1679.6	336.6	15099.4	-21.84	-0.36	39.65
392.0	3493.708	35.911	522.934	-1723.5	335.9	15179.0	-21.98	-0.36	39.95
394.0	3493.133	36.021	527.943	-1767.6	335.2	15259.2	-22.11	-0.36	40.24
396.0	3492.544	36.132	532.979	-1812.0	334.4	15340.0	-22.22	-0.36	40.52
398.0	3491.940	36.242	538.042	-1856.6	333.7	15421.3	-22.34	-0.37	40.81
400.0	3491.322	36.351	543.131	-1901.5	332.9	15503.3	-22.48	-0.36	41.12
402.0	3490.688	36.461	548.248	-1946.6	332.2	15585.8	-22.61	-0.34	41.43
404.0	3490.040	36.570	553.392	-1992.0	331.5	15669.0	-22.76	-0.33	41.70
406.0	3489.377	36.679	558.563	-2037.8	330.8	15752.7	-22.91	-0.35	42.00
408.0	3488.699	36.788	563.762	-2083.8	330.1	15837.1	-23.08	-0.37	42.36
410.0	3488.005	36.896	568.989	-2130.2	329.3	15922.1	-23.24	-0.37	42.71
412.0	3487.296	37.004	574.244	-2176.8	328.5	16007.9	-23.38	-0.36	43.03
414.0	3486.572	37.112	579.527	-2223.8	327.8	16094.3	-23.52	-0.35	43.32
416.0	3485.832	37.220	584.839	-2271.0	327.1	16181.2	-23.67	-0.32	43.65
418.0	3485.077	37.328	590.180	-2318.6	326.4	16268.9	-23.83	-0.32	43.98
420.0	3484.306	37.435	595.549	-2366.5	325.8	16357.2	-23.99	-0.34	44.33
422.0	3483.519	37.542	600.948	-2414.7	325.0	16446.3	-24.17	-0.35	44.68
424.0	3482.716	37.649	606.376	-2463.3	324.3	16536.0	-24.36	-0.35	45.01
426.0	3481.898	37.756	611.834	-2512.2	323.6	16626.3	-24.55	-0.34	45.35
428.0	3481.062	37.862	617.322	-2561.5	322.9	16717.4	-24.71	-0.34	45.71

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
430.0	3480.211	37.968	622.839	-2611.2	322.2	16809.3	-24.88	-0.34	46.09
432.0	3479.343	38.074	628.388	-2661.2	321.5	16901.8	-25.07	-0.35	46.46
434.0	3478.459	38.180	633.966	-2711.6	320.8	16995.1	-25.26	-0.35	46.82
436.0	3477.558	38.285	639.576	-2762.3	320.0	17089.2	-25.46	-0.36	47.19
438.0	3476.641	38.391	645.216	-2813.5	319.3	17184.0	-25.64	-0.34	47.58
440.0	3475.706	38.496	650.888	-2865.0	318.6	17279.6	-25.82	-0.32	47.98
442.0	3474.755	38.600	656.592	-2916.9	318.0	17375.9	-26.02	-0.30	48.37
444.0	3473.786	38.705	662.327	-2969.2	317.4	17473.1	-26.23	-0.30	48.76
446.0	3472.800	38.809	668.095	-3021.9	316.7	17571.0	-26.43	-0.31	49.15
448.0	3471.796	38.913	673.895	-3075.1	316.1	17669.7	-26.65	-0.31	49.55
450.0	3470.775	39.017	679.727	-3128.7	315.5	17769.2	-26.88	-0.29	49.97
452.0	3469.737	39.121	685.592	-3182.8	314.9	17869.4	-27.10	-0.28	50.40
454.0	3468.680	39.225	691.491	-3237.3	314.3	17970.6	-27.31	-0.28	50.84
456.0	3467.606	39.328	697.423	-3292.2	313.7	18072.7	-27.54	-0.28	51.27
458.0	3466.513	39.431	703.389	-3347.5	313.1	18175.7	-27.78	-0.28	51.70
460.0	3465.402	39.534	709.389	-3403.4	312.5	18279.5	-28.05	-0.32	52.14
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
460.610	3465.064	39.565	711.198	-3420.3	312.3	18310.8	-28.13	-0.39	52.26
462.0	3464.272	39.637	715.421	-3459.8	311.9	18370.4	-28.52	-0.33	40.94
464.0	3463.124	39.740	721.481	-3517.6	311.0	18452.4	-28.99	-0.53	41.10
466.0	3461.957	39.842	727.569	-3575.4	309.8	18534.8	-28.66	-0.57	41.30
468.0	3460.770	39.943	733.683	-3632.2	308.7	18617.6	-28.10	-0.48	41.54
470.0	3459.566	40.045	739.825	-3687.8	307.7	18701.0	-27.41	-0.48	41.82
472.0	3458.343	40.146	745.995	-3741.7	306.7	18785.3	-26.97	-0.48	42.06
474.0	3457.103	40.247	752.192	-3795.6	305.7	18869.8	-26.85	-0.48	42.38
476.0	3455.844	40.347	758.417	-3849.4	304.8	18954.9	-26.94	-0.47	42.72
478.0	3454.568	40.447	764.670	-3903.5	303.8	19040.7	-27.11	-0.43	43.03
480.0	3453.275	40.547	770.952	-3958.0	303.0	19127.0	-27.33	-0.38	43.33
482.0	3451.963	40.647	777.262	-4012.9	302.2	19214.1	-27.57	-0.35	43.63
484.0	3450.633	40.746	783.601	-4068.3	301.5	19301.6	-27.80	-0.32	43.94
486.0	3449.284	40.845	789.969	-4124.4	300.9	19389.8	-28.07	-0.32	44.25
488.0	3447.918	40.944	796.366	-4181.0	300.2	19478.7	-28.39	-0.36	44.56
490.0	3446.532	41.043	802.790	-4238.1	299.5	19559.0	-28.69	-0.24	34.91
492.0	3445.127	41.142	809.237	-4296.1	299.1	19625.4	-29.32	-0.24	32.97
494.0	3443.703	41.240	815.708	-4355.6	298.6	19691.4	-30.04	-0.22	33.02
496.0	3442.259	41.338	822.200	-4416.4	298.1	19757.5	-30.75	-0.21	33.08
498.0	3440.795	41.436	828.715	-4478.3	297.7	19823.7	-30.89	-0.20	33.15
500.0	3439.311	41.534	835.251	-4539.6	297.2	19890.1	-30.54	-0.20	33.23
502.0	3437.807	41.632	841.809	-4600.2	296.8	19956.9	-29.92	-0.22	33.34
504.0	3436.283	41.729	848.389	-4659.7	296.3	20023.8	-29.53	-0.25	33.48
506.0	3434.739	41.827	854.991	-4718.8	295.8	20091.0	-29.45	-0.28	33.69

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
508.0	3433.176	41.924	861.615	-4777.7	295.1	20158.6	-29.52	-0.30	33.90
510.0	3431.594	42.021	868.261	-4836.9	294.5	20226.5	-29.61	-0.30	34.06
512.0	3429.992	42.118	874.930	-4896.4	293.9	20294.8	-29.81	-0.29	34.18
514.0	3428.371	42.215	881.622	-4956.4	293.3	20363.4	-30.10	-0.27	34.35
516.0	3426.729	42.311	888.336	-5017.0	292.8	20432.3	-30.43	-0.25	34.53
518.0	3425.068	42.407	895.073	-5078.1	292.3	20501.5	-30.70	-0.23	34.70
520.0	3423.386	42.504	901.832	-5139.9	291.8	20571.1	-30.94	-0.21	34.89
522.0	3421.684	42.600	908.615	-5202.1	291.4	20641.1	-31.20	-0.19	35.09
524.0	3419.962	42.695	915.421	-5264.8	291.0	20711.5	-31.45	-0.17	35.29
526.0	3418.218	42.791	922.250	-5328.0	290.6	20782.3	-31.69	-0.18	35.48
528.0	3416.454	42.887	929.102	-5391.7	290.2	20853.5	-31.93	-0.20	35.66
530.0	3414.669	42.982	935.978	-5455.8	289.7	20925.0	-32.15	-0.21	35.86
532.0	3412.862	43.077	942.878	-5520.4	289.3	20997.0	-32.36	-0.21	36.07
534.0	3411.034	43.173	949.801	-5585.4	288.8	21069.4	-32.58	-0.21	36.28
536.0	3409.185	43.268	956.748	-5650.9	288.4	21142.1	-32.79	-0.21	36.48
538.0	3407.314	43.362	963.719	-5716.7	288.0	21215.3	-32.98	-0.19	36.67
540.0	3405.422	43.457	970.714	-5782.9	287.6	21288.9	-33.17	-0.18	36.86
542.0	3403.507	43.552	977.734	-5849.5	287.2	21362.8	-33.38	-0.18	37.05
544.0	3401.571	43.646	984.778	-5916.6	286.8	21437.1	-33.61	-0.19	37.24
546.0	3399.612	43.741	991.846	-5984.2	286.3	21511.6	-33.82	-0.21	37.49
548.0	3397.632	43.835	998.939	-6052.1	286.0	21586.7	-34.03	-0.11	37.66
550.0	3395.628	43.929	1006.057	-6120.4	285.6	21662.2	-34.24	-0.21	37.74
552.0	3393.602	44.023	1013.200	-6189.2	285.3	21737.7	-34.44	-0.10	37.77
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
552.640	3392.959	44.053	1015.457	-6210.9	285.1	21761.2	-34.50	-0.59	37.77
	S-II/S-IVB SEPARATION COMMAND								
553.500	3392.068	44.093	1018.571	-6237.4	284.9	21761.9	-29.19	-0.26	-8.24
554.0	3391.554	44.117	1020.363	-6252.0	284.8	21757.8	-29.19	-0.32	-8.23
556.0	3389.486	44.210	1027.526	-6310.4	284.1	21741.4	-29.19	-0.32	-8.19
558.0	3387.400	44.304	1034.681	-6369.4	283.4	21731.8	-29.78	-0.41	-0.25
560.0	3385.293	44.397	1041.834	-6429.9	282.7	21739.2	-30.63	-0.29	6.44
562.0	3383.166	44.490	1048.994	-6492.3	282.0	21755.0	-30.97	-0.36	8.88
564.0	3381.019	44.582	1056.158	-6554.6	281.2	21773.8	-31.18	-0.44	9.27
566.0	3378.851	44.675	1063.328	-6617.4	280.2	21792.4	-31.47	-0.49	8.98
568.0	3376.662	44.767	1070.504	-6680.6	279.2	21810.5	-31.69	-0.48	8.94
570.0	3374.453	44.859	1077.686	-6744.1	278.3	21828.4	-31.75	-0.43	9.07
572.0	3372.223	44.950	1084.874	-6807.8	277.4	21846.6	-31.79	-0.41	9.05
574.0	3369.971	45.041	1092.068	-6871.6	276.6	21864.7	-31.95	-0.39	9.04
576.0	3367.699	45.132	1099.268	-6935.7	275.8	21882.8	-32.10	-0.35	9.01

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
578.0	3365.405	45.223	1106.474	-7000.0	275.1	21900.8	-32.16	-0.27	8.96
580.0	3363.091	45.313	1113.686	-7064.4	274.6	21918.7	-32.18	-0.23	8.92
582.0	3360.755	45.404	1120.903	-7129.0	274.1	21936.6	-32.26	-0.24	8.89
584.0	3358.398	45.494	1128.127	-7193.7	273.5	21954.3	-32.41	-0.26	8.84
586.0	3356.019	45.584	1135.356	-7258.7	273.0	21972.0	-32.53	-0.26	8.80
588.0	3353.619	45.673	1142.591	-7323.9	272.5	21989.6	-32.59	-0.23	8.76
590.0	3351.197	45.763	1149.832	-7389.2	272.0	22007.1	-32.62	-0.18	8.75
592.0	3348.755	45.852	1157.079	-7454.6	271.7	22024.6	-32.68	-0.15	8.74
594.0	3346.290	45.942	1164.331	-7520.1	271.3	22042.1	-32.77	-0.13	8.73
596.0	3343.804	46.031	1171.590	-7585.8	271.1	22059.6	-32.87	-0.13	8.72
598.0	3341.296	46.120	1178.854	-7651.7	270.8	22077.0	-32.97	-0.11	8.68
600.0	3338.767	46.209	1186.123	-7717.8	270.5	22094.4	-33.05	-0.10	8.62
602.0	3336.215	46.298	1193.399	-7784.1	270.3	22111.6	-33.12	-0.11	8.57
604.0	3333.642	46.387	1200.680	-7850.5	270.0	22128.7	-33.21	-0.13	8.53
606.0	3331.047	46.476	1207.966	-7917.1	269.7	22145.8	-33.29	-0.14	8.51
608.0	3328.430	46.565	1215.259	-7983.8	269.4	22162.8	-33.35	-0.14	8.48
610.0	3325.791	46.653	1222.556	-8050.6	269.1	22179.7	-33.40	-0.13	8.46
612.0	3323.130	46.742	1229.860	-8117.6	268.8	22196.7	-33.48	-0.12	8.46
614.0	3320.447	46.830	1237.169	-8184.8	268.6	22213.6	-33.60	-0.10	8.45
616.0	3317.742	46.919	1244.483	-8252.1	268.3	22230.5	-33.70	-0.10	8.41
618.0	3315.015	47.007	1251.803	-8319.7	268.1	22247.3	-33.77	-0.10	8.34
620.0	3312.265	47.095	1259.129	-8387.4	267.8	22264.0	-33.84	-0.11	8.29
622.0	3309.493	47.183	1266.460	-8455.2	267.6	22280.5	-33.90	-0.12	8.25
624.0	3306.699	47.271	1273.797	-8523.2	267.3	22297.0	-33.96	-0.12	8.23
626.0	3303.882	47.359	1281.139	-8591.2	267.0	22313.5	-34.03	-0.11	8.19
628.0	3301.043	47.447	1288.486	-8659.5	266.8	22329.9	-34.12	-0.11	8.15
630.0	3298.182	47.535	1295.839	-8727.9	266.5	22346.2	-34.19	-0.13	8.11
632.0	3295.298	47.623	1303.197	-8796.4	266.2	22362.4	-34.25	-0.14	8.07
634.0	3292.391	47.710	1310.560	-8865.0	265.9	22378.5	-34.32	-0.12	8.04
636.0	3289.462	47.798	1317.929	-8933.8	265.7	22394.6	-34.39	-0.10	8.02
638.0	3286.510	47.885	1325.303	-9002.8	265.4	22410.6	-34.47	-0.12	7.99
640.0	3283.535	47.972	1332.682	-9071.9	265.1	22426.6	-34.55	-0.13	7.95
642.0	3280.537	48.060	1340.067	-9141.1	264.8	22442.5	-34.61	-0.14	7.92
644.0	3277.517	48.147	1347.456	-9210.5	264.5	22458.3	-34.68	-0.16	7.90
646.0	3274.474	48.234	1354.851	-9280.0	264.1	22474.1	-34.75	-0.17	7.88
648.0	3271.408	48.321	1362.251	-9349.7	263.7	22489.9	-34.84	-0.17	7.86
650.0	3268.319	48.407	1369.657	-9419.5	263.4	22505.6	-34.93	-0.16	7.86
652.0	3265.207	48.494	1377.067	-9489.6	263.0	22521.4	-35.01	-0.15	7.85
654.0	3262.072	48.581	1384.483	-9559.7	262.7	22537.1	-35.08	-0.14	7.83
656.0	3258.914	48.667	1391.904	-9630.0	262.3	22552.7	-35.13	-0.14	7.78
658.0	3255.732	48.753	1399.330	-9700.4	262.0	22568.3	-35.16	-0.15	7.71
660.0	3252.528	48.839	1406.761	-9770.9	261.6	22583.6	-35.23	-0.17	7.66
662.0	3249.300	48.925	1414.197	-9841.5	261.3	22599.0	-35.32	-0.18	7.62

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
664.0	3246.049	49.011	1421.638	-9912.4	260.9	22614.2	-35.41	-0.17	7.60
666.0	3242.774	49.097	1429.084	-9983.3	260.5	22629.4	-35.46	-0.17	7.60
668.0	3239.477	49.183	1436.535	-10054.3	260.1	22644.7	-35.47	-0.17	7.58
670.0	3236.155	49.268	1443.992	-10125.4	259.7	22659.8	-35.50	-0.19	7.55
672.0	3232.811	49.354	1451.453	-10196.6	259.3	22674.9	-35.59	-0.20	7.49
674.0	3229.443	49.439	1458.919	-10268.0	258.8	22689.8	-35.71	-0.19	7.44
676.0	3226.051	49.524	1466.390	-10339.6	258.4	22704.7	-35.83	-0.18	7.40
678.0	3222.636	49.609	1473.866	-10411.3	258.0	22719.6	-35.83	-0.16	7.42
680.0	3219.197	49.694	1481.346	-10483.0	257.7	22734.4	-35.77	-0.16	7.44
682.0	3215.735	49.779	1488.832	-10554.7	257.3	22749.3	-35.74	-0.16	7.43
684.0	3212.249	49.863	1496.323	-10626.2	256.9	22764.2	-35.75	-0.18	7.42
686.0	3208.740	49.948	1503.818	-10697.8	256.5	22779.1	-35.77	-0.19	7.41
688.0	3205.206	50.032	1511.318	-10769.5	256.1	22793.9	-35.78	-0.21	7.40
690.0	3201.650	50.117	1518.824	-10841.1	255.6	22808.8	-35.79	-0.22	7.39
692.0	3198.070	50.201	1526.334	-10912.8	255.1	22823.6	-35.81	-0.21	7.38
694.0	3194.466	50.284	1533.849	-10984.5	254.6	22838.3	-35.84	-0.18	7.40
696.0	3190.838	50.368	1541.369	-11056.3	254.3	22853.2	-35.85	-0.21	7.40
698.0	3187.187	50.452	1548.893	-11128.1	253.8	22868.0	-35.86	-0.17	7.40
700.0	3183.513	50.535	1556.423	-11200.0	253.3	22882.8	-35.87	-0.17	7.41
702.0	3179.814	50.619	1563.957	-11271.8	252.8	22897.6	-35.88	-0.28	7.42
S-IVB 1ST GUIDANCE CUTOFF									
703.760	3176.557	50.691	1570.557	-11334.7	252.3	22910.6	-35.89	-0.51	7.43
704.0	3176.092	50.702	1571.497	-11342.8	252.2	22910.8	-28.88	-0.20	-6.62
706.0	3172.350	50.785	1579.033	-11397.6	251.5	22885.5	-27.13	-0.37	-13.58
708.0	3168.589	50.867	1586.563	-11452.1	250.7	22858.3	-27.10	-0.37	-13.64
710.0	3164.811	50.950	1594.082	-11506.4	249.9	22831.1	-27.07	-0.37	-13.68
712.0	3161.014	51.032	1601.592	-11560.6	249.1	22803.7	-27.04	-0.37	-13.74
PARKING ORBIT INSERTION									
713.760	3157.604	51.102	1608.191	-11608.2	248.4	22779.5	-27.01	-0.37	-13.80

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
GUIDANCE REFERENCE RELEASE											
-16.968	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-16.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-15.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-14.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-13.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-12.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-11.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-10.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-9.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-8.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-7.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-6.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-5.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-4.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-3.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-2.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
-1.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
0.0	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
FIRST MOTION											
0.250	3441.336	-80.6209	28.4658	0.0	90.00	0.0	90.00	0.0	1340.4	0.0	210
START OF TIME BASE 1											
0.580	3441.336	-80.6209	28.4658	20.82	88.53	1.3	90.00	0.06	1340.4	-0.000	214
1.0	3441.336	-80.6209	28.4658	17.49	88.61	3.4	90.00	0.14	1340.5	-0.000	215
2.0	3441.337	-80.6209	28.4658	57.97	88.59	9.7	89.99	0.41	1340.7	-0.000	219
3.0	3441.339	-80.6209	28.4658	116.50	87.90	17.1	90.01	0.73	1341.1	-0.000	231
4.0	3441.342	-80.6209	28.4658	136.03	86.74	24.5	90.04	1.05	1341.6	0.000	251
5.0	3441.347	-80.6209	28.4658	141.76	86.01	32.2	90.08	1.37	1342.2	0.000	279
6.0	3441.353	-80.6209	28.4658	145.92	85.56	40.1	90.11	1.70	1342.8	0.001	315
7.0	3441.360	-80.6209	28.4658	149.68	85.30	48.1	90.15	2.05	1343.3	0.001	359
8.0	3441.369	-80.6208	28.4657	153.30	85.15	56.5	90.18	2.40	1343.8	0.002	411
9.0	3441.379	-80.6208	28.4657	156.84	85.04	64.8	90.22	2.75	1344.2	0.003	471
10.0	3441.390	-80.6208	28.4657	160.47	84.96	73.2	90.26	3.11	1344.6	0.004	538
11.0	3441.402	-80.6208	28.4657	163.91	85.05	81.9	90.29	3.48	1344.9	0.005	614
12.0	3441.416	-80.6208	28.4657	167.22	85.29	90.7	90.31	3.85	1345.2	0.006	699
13.0	3441.431	-80.6208	28.4657	169.97	85.61	99.6	90.32	4.23	1345.5	0.007	793
14.0	3441.449	-80.6208	28.4656	172.48	85.98	108.6	90.32	4.62	1345.9	0.009	898

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	3441.467	-80.6208	28.4656	174.55	86.40	118.2	90.32	5.03	1346.4	0.010	1008
16.0	3441.487	-80.6208	28.4656	175.96	86.82	127.8	90.30	5.44	1347.1	0.011	1133
17.0	3441.509	-80.6208	28.4656	176.42	87.21	137.4	90.28	5.84	1347.9	0.012	1265
18.0	3441.533	-80.6208	28.4656	175.69	87.58	147.1	90.27	6.26	1349.0	0.013	1407
19.0	3441.558	-80.6208	28.4655	173.43	87.91	157.4	90.24	6.69	1350.4	0.014	1559
20.0	3441.584	-80.6209	28.4655	168.43	88.21	168.0	90.22	7.14	1352.1	0.015	1720
21.0	3441.612	-80.6208	28.4655	160.83	88.45	178.9	90.19	7.59	1354.0	0.016	1891
22.0	3441.643	-80.6208	28.4655	149.70	88.63	190.0	90.17	8.05	1356.2	0.017	2076
23.0	3441.675	-80.6208	28.4655	135.67	88.72	201.4	90.14	8.52	1358.7	0.017	2271
24.0	3441.709	-80.6208	28.4655	120.40	88.70	213.0	90.10	9.00	1361.5	0.018	2478
25.0	3441.745	-80.6208	28.4655	106.48	88.59	224.9	90.07	9.48	1364.6	0.018	2697
26.0	3441.783	-80.6207	28.4655	95.59	88.38	237.0	90.03	9.97	1368.0	0.019	2928
27.0	3441.823	-80.6207	28.4655	87.70	88.11	249.5	89.99	10.47	1371.7	0.019	3171
28.0	3441.865	-80.6207	28.4655	82.02	87.80	262.2	89.94	10.98	1375.8	0.020	3427
29.0	3441.909	-80.6206	28.4655	77.96	87.46	275.2	89.89	11.49	1380.2	0.021	3695
30.0	3441.956	-80.6206	28.4655	75.12	87.10	288.4	89.84	12.00	1385.1	0.022	3977
31.0	3442.004	-80.6206	28.4655	73.03	86.72	302.0	89.79	12.52	1390.3	0.023	4271
32.0	3442.055	-80.6205	28.4655	71.51	86.31	315.9	89.73	13.05	1396.0	0.024	4580
33.0	3442.108	-80.6204	28.4655	70.43	85.89	330.1	89.67	13.58	1402.3	0.026	4902
34.0	3442.163	-80.6204	28.4656	69.64	85.45	344.6	89.60	14.11	1409.0	0.029	5238
35.0	3442.221	-80.6203	28.4656	69.11	84.98	359.5	89.53	14.65	1416.2	0.033	5589
36.0	3442.281	-80.6202	28.4656	68.75	84.50	374.6	89.46	15.18	1424.0	0.037	5955
37.0	3442.344	-80.6201	28.4657	68.54	83.99	390.1	89.38	15.72	1432.5	0.042	6335
38.0	3442.409	-80.6199	28.4657	68.43	83.47	406.0	89.30	16.25	1441.5	0.049	6731
39.0	3442.476	-80.6198	28.4658	68.39	82.93	422.3	89.21	16.78	1451.2	0.056	7142
40.0	3442.547	-80.6196	28.4658	68.40	82.37	438.9	89.12	17.32	1461.5	0.065	7569
41.0	3442.620	-80.6195	28.4659	68.43	81.79	456.0	89.02	17.85	1472.6	0.074	8012
42.0	3442.695	-80.6193	28.4659	68.48	81.19	473.4	88.92	18.37	1484.3	0.085	8472
43.0	3442.774	-80.6190	28.4660	68.55	80.57	491.2	88.81	18.89	1496.8	0.097	8948
44.0	3442.855	-80.6188	28.4661	68.63	79.94	509.5	88.70	19.40	1510.0	0.111	9441
45.0	3442.939	-80.6185	28.4662	68.72	79.29	528.1	88.58	19.91	1524.0	0.126	9952
46.0	3443.026	-80.6182	28.4663	68.83	78.64	547.2	88.45	20.40	1538.7	0.143	10480
47.0	3443.115	-80.6179	28.4664	68.95	77.97	566.7	88.33	20.89	1554.2	0.161	11025
48.0	3443.208	-80.6175	28.4665	69.08	77.29	586.6	88.19	21.37	1570.4	0.181	11588
49.0	3443.304	-80.6171	28.4667	69.20	76.61	607.0	88.06	21.84	1587.3	0.204	12170
50.0	3443.402	-80.6167	28.4668	69.32	75.93	627.8	87.92	22.30	1605.1	0.228	12770
51.0	3443.504	-80.6163	28.4670	69.43	75.23	649.2	87.77	22.75	1623.6	0.254	13388
52.0	3443.609	-80.6158	28.4671	69.54	74.53	671.0	87.63	23.18	1642.9	0.282	14026
53.0	3443.717	-80.6152	28.4673	69.63	73.82	693.4	87.47	23.60	1663.1	0.312	14682
54.0	3443.828	-80.6146	28.4675	69.71	73.10	716.3	87.31	24.01	1684.2	0.345	15358
55.0	3443.943	-80.6140	28.4677	69.79	72.37	739.7	87.14	24.41	1706.1	0.381	16053
56.0	3444.060	-80.6133	28.4679	69.87	71.63	763.6	86.98	24.78	1728.8	0.419	16768
57.0	3444.181	-80.6126	28.4682	69.94	70.89	788.1	86.80	25.15	1752.4	0.460	17503

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

TIME SEC	GC DIST NM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
58.0	3444.305	-80.6118	28.4684	70.02	70.14	813.2	86.63	25.49	1776.9	0.504	18258
59.0	3444.433	-80.6110	28.4687	70.10	69.39	838.7	86.45	25.82	1802.3	0.551	19033
60.0	3444.564	-80.6101	28.4690	70.17	68.64	864.9	86.27	26.14	1828.5	0.601	19829
61.0	3444.698	-80.6091	28.4693	70.26	67.88	891.6	86.09	26.43	1855.5	0.654	20645
62.0	3444.836	-80.6081	28.4696	70.34	67.13	919.0	85.90	26.71	1883.5	0.711	21482
63.0	3444.977	-80.6070	28.4699	70.42	66.37	946.9	85.72	26.98	1912.2	0.772	22339
64.0	3445.121	-80.6059	28.4703	70.50	65.62	975.4	85.54	27.23	1941.8	0.836	23217
65.0	3445.269	-80.6047	28.4707	70.59	64.87	1004.4	85.35	27.46	1972.1	0.904	24117
66.0	3445.421	-80.6034	28.4711	70.68	64.12	1033.9	85.17	27.67	2003.2	0.976	25037
MACH 1											
66.800	3445.544	-80.6023	28.4714	70.75	63.52	1057.9	85.03	27.82	2028.6	1.037	25788
67.0	3445.575	-80.6020	28.4715	70.77	63.37	1063.9	84.99	27.86	2035.1	1.053	25978
68.0	3445.734	-80.6006	28.4719	70.86	62.63	1094.5	84.81	28.04	2067.6	1.133	26940
69.0	3445.895	-80.5990	28.4724	70.95	61.89	1125.6	84.64	28.20	2101.0	1.218	27923
70.0	3446.060	-80.5974	28.4729	71.04	61.15	1157.3	84.46	28.35	2135.0	1.308	28926
71.0	3446.229	-80.5958	28.4734	71.12	60.42	1189.7	84.28	28.47	2170.0	1.402	29951
72.0	3446.401	-80.5940	28.4739	71.20	59.68	1222.7	84.11	28.59	2205.8	1.501	30997
73.0	3446.576	-80.5921	28.4745	71.27	58.95	1256.5	83.93	28.69	2242.5	1.605	32063
74.0	3446.755	-80.5902	28.4750	71.32	58.21	1291.1	83.74	28.77	2280.1	1.714	33151
75.0	3446.938	-80.5881	28.4756	71.37	57.47	1326.5	83.56	28.84	2318.7	1.828	34259
76.0	3447.123	-80.5860	28.4763	71.41	56.73	1362.7	83.37	28.89	2358.4	1.948	35389
77.0	3447.313	-80.5837	28.4770	71.45	55.99	1399.8	83.19	28.92	2399.0	2.074	36539
78.0	3447.505	-80.5813	28.4776	71.49	55.24	1437.7	83.00	28.94	2440.7	2.206	37711
79.0	3447.701	-80.5789	28.4784	71.53	54.49	1476.5	82.82	28.94	2483.4	2.343	38903
80.0	3447.901	-80.5763	28.4791	71.59	53.74	1516.1	82.64	28.93	2527.2	2.487	40116
81.0	3448.104	-80.5736	28.4799	71.66	52.99	1556.7	82.47	28.90	2572.0	2.638	41350
82.0	3448.310	-80.5707	28.4807	71.74	52.25	1598.1	82.32	28.86	2617.9	2.795	42604
MAXIMUM DYNAMIC PRESSURE											
82.600	3448.436	-80.5690	28.4813	71.80	51.81	1623.4	82.23	28.83	2645.8	2.893	43366
83.0	3448.520	-80.5678	28.4816	71.84	51.51	1640.5	82.17	28.81	2664.7	2.959	43878
84.0	3448.733	-80.5647	28.4825	71.94	50.79	1683.8	82.02	28.75	2712.5	3.131	45174
85.0	3448.949	-80.5615	28.4834	72.04	50.09	1728.1	81.89	28.69	2761.2	3.309	46490
86.0	3449.169	-80.5581	28.4844	72.14	49.40	1773.4	81.75	28.62	2810.7	3.495	47827
87.0	3449.392	-80.5547	28.4853	72.23	48.74	1819.6	81.62	28.56	2861.0	3.688	49185
88.0	3449.619	-80.5510	28.4864	72.30	48.10	1866.8	81.48	28.50	2912.1	3.889	50565
89.0	3449.850	-80.5473	28.4874	72.36	47.49	1914.9	81.35	28.44	2963.9	4.097	51966
90.0	3450.084	-80.5434	28.4885	72.40	46.91	1963.9	81.21	28.39	3016.4	4.314	53390
91.0	3450.322	-80.5393	28.4896	72.43	46.35	2013.9	81.06	28.34	3069.7	4.538	54837
92.0	3450.564	-80.5351	28.4908	72.44	45.80	2064.8	80.92	28.29	3123.7	4.770	56307

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
93.0	3450.809	-80.5308	28.4920	72.45	45.27	2116.7	80.77	28.24	3178.5	5.011	57800
94.0	3451.059	-80.5263	28.4933	72.45	44.76	2169.5	80.62	28.19	3234.2	5.259	59317
95.0	3451.312	-80.5216	28.4945	72.44	44.25	2223.3	80.47	28.13	3290.9	5.516	60858
96.0	3451.569	-80.5168	28.4959	72.42	43.76	2278.0	80.32	28.07	3348.5	5.782	62423
97.0	3451.831	-80.5119	28.4973	72.41	43.26	2333.8	80.17	28.00	3407.1	6.056	64012
98.0	3452.096	-80.5068	28.4987	72.39	42.77	2390.5	80.02	27.92	3466.8	6.340	65624
99.0	3452.365	-80.5015	28.5002	72.37	42.28	2448.3	79.87	27.83	3527.5	6.632	67261
100.0	3452.638	-80.4960	28.5017	72.36	41.78	2507.2	79.73	27.74	3589.4	6.934	68922
101.0	3452.915	-80.4904	28.5033	72.34	41.30	2567.1	79.58	27.64	3652.3	7.245	70606
102.0	3453.196	-80.4846	28.5049	72.33	40.81	2628.0	79.44	27.53	3716.3	7.567	72313
103.0	3453.480	-80.4786	28.5066	72.32	40.33	2690.0	79.31	27.41	3781.4	7.898	74044
104.0	3453.769	-80.4725	28.5083	72.31	39.85	2753.1	79.17	27.29	3847.5	8.239	75798
105.0	3454.061	-80.4661	28.5101	72.31	39.38	2817.1	79.05	27.17	3914.6	8.591	77576
106.0	3454.357	-80.4596	28.5119	72.31	38.92	2882.3	78.92	27.04	3982.8	8.954	79377
107.0	3454.657	-80.4528	28.5138	72.31	38.46	2948.5	78.80	26.91	4052.1	9.327	81201
108.0	3454.961	-80.4459	28.5157	72.31	38.02	3015.8	78.69	26.78	4122.4	9.711	83049
109.0	3455.268	-80.4388	28.5177	72.32	37.58	3084.1	78.58	26.65	4193.7	10.106	84920
110.0	3455.580	-80.4314	28.5198	72.33	37.15	3153.5	78.47	26.51	4266.0	10.512	86815
111.0	3455.895	-80.4239	28.5219	72.34	36.72	3224.0	78.37	26.38	4339.4	10.930	88733
112.0	3456.214	-80.4161	28.5241	72.35	36.31	3295.6	78.26	26.24	4413.8	11.359	90675
113.0	3456.537	-80.4082	28.5263	72.36	35.90	3368.3	78.16	26.10	4489.3	11.800	92640
114.0	3456.864	-80.4000	28.5286	72.37	35.50	3442.2	78.07	25.96	4565.8	12.253	94630
115.0	3457.195	-80.3916	28.5309	72.37	35.11	3517.1	77.97	25.82	4643.5	12.718	96643
116.0	3457.530	-80.3830	28.5333	72.38	34.72	3593.2	77.87	25.68	4722.2	13.196	98680
117.0	3457.869	-80.3741	28.5358	72.39	34.34	3670.5	77.78	25.54	4802.1	13.686	100741
118.0	3458.212	-80.3650	28.5383	72.40	33.97	3749.0	77.69	25.40	4883.2	14.189	102826
119.0	3458.558	-80.3557	28.5409	72.41	33.60	3828.7	77.61	25.26	4965.4	14.704	104936
120.0	3458.909	-80.3462	28.5436	72.42	33.24	3909.6	77.52	25.12	5048.8	15.233	107070
121.0	3459.264	-80.3364	28.5463	72.43	32.88	3991.7	77.44	24.97	5133.4	15.775	109228
122.0	3459.623	-80.3263	28.5491	72.44	32.53	4075.0	77.36	24.83	5219.2	16.331	111410
123.0	3459.985	-80.3160	28.5520	72.45	32.18	4159.5	77.28	24.68	5306.1	16.900	113616
124.0	3460.352	-80.3055	28.5549	72.46	31.83	4245.2	77.21	24.52	5394.3	17.484	115846
125.0	3460.722	-80.2947	28.5579	72.47	31.49	4332.3	77.13	24.37	5483.8	18.081	118100
126.0	3461.097	-80.2836	28.5609	72.48	31.14	4420.8	77.06	24.21	5574.7	18.693	120378
127.0	3461.475	-80.2723	28.5641	72.49	30.81	4510.8	76.98	24.06	5667.1	19.319	122679
128.0	3461.857	-80.2607	28.5673	72.50	30.48	4602.2	76.91	23.90	5760.8	19.961	125005
129.0	3462.243	-80.2489	28.5706	72.51	30.15	4695.0	76.85	23.75	5855.9	20.617	127354
130.0	3462.633	-80.2367	28.5739	72.53	29.83	4789.3	76.78	23.59	5952.5	21.289	129728
131.0	3463.027	-80.2243	28.5774	72.54	29.51	4885.1	76.71	23.44	6050.5	21.977	132126
132.0	3463.425	-80.2116	28.5809	72.55	29.20	4982.3	76.65	23.28	6149.8	22.680	134548
133.0	3463.827	-80.1985	28.5845	72.56	28.90	5080.9	76.59	23.13	6250.6	23.399	136995
134.0	3464.233	-80.1852	28.5881	72.57	28.60	5181.1	76.53	22.98	6352.8	24.135	139467
135.0	3464.644	-80.1716	28.5919	72.58	28.31	5282.7	76.47	22.83	6456.5	24.887	141963

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
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
135.160	3464.710	-80.1694	28.5925	72.58	28.26	5299.0	76.46	22.81	6473.2	25.009	142365
136.0	3465.057	-80.1577	28.5957	72.59	28.01	5375.3	76.42	22.66	6551.3	25.655	144481
137.0	3465.474	-80.1436	28.5996	72.60	27.73	5454.5	76.38	22.50	6632.6	26.438	147017
138.0	3465.893	-80.1292	28.6036	72.61	27.45	5534.9	76.33	22.33	6715.0	27.233	149566
139.0	3466.314	-80.1145	28.6076	72.62	27.18	5616.4	76.29	22.17	6798.6	28.042	152126
140.0	3466.737	-80.0996	28.6117	72.63	26.91	5698.8	76.24	22.00	6882.9	28.865	154702
141.0	3467.163	-80.0845	28.6159	72.63	26.64	5782.6	76.20	21.84	6968.7	29.703	157293
142.0	3467.590	-80.0691	28.6201	72.64	26.38	5867.8	76.16	21.68	7055.8	30.554	159897
143.0	3468.021	-80.0534	28.6244	72.65	26.12	5954.1	76.12	21.53	7143.9	31.420	162516
144.0	3468.453	-80.0374	28.6288	72.66	25.86	6042.2	76.08	21.37	7233.9	32.301	165149
145.0	3468.888	-80.0212	28.6332	72.67	25.61	6130.9	76.04	21.21	7324.3	33.196	167796
146.0	3469.326	-80.0047	28.6377	72.68	25.37	6221.0	76.00	21.06	7416.2	34.106	170459
147.0	3469.766	-79.9880	28.6423	72.69	25.13	6312.3	75.97	20.91	7509.3	35.031	173136
148.0	3470.209	-79.9710	28.6470	72.70	24.89	6404.9	75.93	20.76	7603.5	35.972	175829
149.0	3470.653	-79.9536	28.6517	72.71	24.65	6498.9	75.90	20.62	7699.1	36.928	178537
150.0	3471.100	-79.9360	28.6565	72.72	24.42	6594.2	75.87	20.47	7796.1	37.900	181261
151.0	3471.550	-79.9181	28.6614	72.73	24.20	6690.8	75.83	20.33	7894.3	38.887	184000
152.0	3472.003	-79.8999	28.6663	72.74	23.98	6788.9	75.80	20.19	7993.9	39.891	186756
153.0	3472.458	-79.8815	28.6714	72.76	23.76	6887.8	75.77	20.05	8094.3	40.911	189528
154.0	3472.917	-79.8627	28.6765	72.77	23.55	6988.7	75.74	19.91	8196.8	41.948	192318
155.0	3473.378	-79.8436	28.6817	72.78	23.34	7091.1	75.71	19.78	8300.6	43.001	195123
156.0	3473.841	-79.8242	28.6870	72.79	23.13	7195.0	75.69	19.65	8405.9	44.071	197947
157.0	3474.308	-79.8045	28.6923	72.81	22.93	7300.6	75.66	19.52	8512.9	45.159	200787
158.0	3474.777	-79.7844	28.6978	72.82	22.73	7407.8	75.63	19.39	8621.5	46.264	203646
159.0	3475.250	-79.7641	28.7033	72.83	22.53	7516.8	75.60	19.26	8731.8	47.386	206523
160.0	3475.726	-79.7434	28.7089	72.85	22.34	7627.4	75.58	19.14	8843.7	48.527	209419
161.0	3476.207	-79.7222	28.7146	72.86	22.16	7739.7	75.55	19.02	8957.3	49.692	212348
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
161.630	3476.505	-79.7090	28.7182	72.87	22.04	7810.2	75.54	18.95	9028.6	50.419	214165
162.0	3476.688	-79.7010	28.7204	72.87	21.98	7835.7	75.53	18.90	9054.6	50.865	215278
	S-IC/S-II SEPARATION COMMAND										
162.310	3476.837	-79.6943	28.7222	72.88	21.92	7833.4	75.54	18.85	9052.8	51.233	216186
164.0	3477.644	-79.6580	28.7320	72.90	21.60	7821.2	75.56	18.57	9043.1	53.234	221101
166.0	3478.584	-79.6149	28.7436	72.93	21.23	7813.7	75.58	18.24	9038.7	55.606	226823
168.0	3479.509	-79.5718	28.7552	72.96	20.87	7831.6	75.59	17.93	9059.4	57.982	232453
170.0	3480.421	-79.5284	28.7668	72.98	20.51	7854.0	75.60	17.63	9084.6	60.371	238007

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
172.0	3481.320	-79.4848	28.7785	73.01	20.15	7883.1	75.61	17.33	9116.4	62.772	243486
174.0	3482.209	-79.4409	28.7902	73.04	19.80	7912.9	75.62	17.04	9148.7	65.187	248894
176.0	3483.085	-79.3968	28.8020	73.06	19.45	7943.5	75.63	16.74	9181.9	67.616	254232
178.0	3483.950	-79.3524	28.8139	73.09	19.11	7974.6	75.64	16.46	9215.5	70.059	259500
180.0	3484.804	-79.3077	28.8258	73.12	18.77	8006.3	75.65	16.17	9249.7	72.516	264698
182.0	3485.646	-79.2627	28.8377	73.15	18.43	8038.7	75.67	15.89	9284.4	74.987	269828
184.0	3486.477	-79.2175	28.8497	73.18	18.10	8071.6	75.68	15.61	9319.6	77.472	274889
186.0	3487.296	-79.1720	28.8617	73.21	17.77	8105.0	75.69	15.33	9355.3	79.972	279883
188.0	3488.105	-79.1263	28.8738	73.23	17.44	8139.0	75.70	15.06	9391.5	82.486	284809
190.0	3488.903	-79.0802	28.8859	73.26	17.12	8173.6	75.71	14.79	9428.1	85.015	289668
192.0	3489.689	-79.0339	28.8981	73.29	16.81	8208.8	75.73	14.52	9465.4	87.558	294460
194.0	3490.465	-78.9873	28.9104	73.32	16.49	8244.6	75.74	14.26	9503.1	90.116	299187
196.0	3491.230	-78.9404	28.9226	73.35	16.18	8281.0	75.75	14.00	9541.6	92.689	303849
198.0	3491.985	-78.8932	28.9350	73.38	15.88	8318.1	75.77	13.74	9580.6	95.277	308446
200.0	3492.729	-78.8458	28.9474	73.41	15.58	8355.9	75.78	13.49	9620.1	97.879	312979
202.0	3493.462	-78.7981	28.9598	73.44	15.28	8394.2	75.79	13.24	9660.3	100.497	317448
204.0	3494.185	-78.7500	28.9723	73.47	14.98	8433.1	75.81	12.99	9700.9	103.130	321853
206.0	3494.897	-78.7017	28.9848	73.50	14.69	8472.3	75.82	12.75	9741.8	105.779	326195
208.0	3495.600	-78.6531	28.9974	73.53	14.42	8511.7	75.83	12.51	9782.8	108.443	330477
210.0	3496.293	-78.6042	29.0100	73.56	14.16	8551.2	75.85	12.30	9823.7	111.121	334702
212.0	3496.977	-78.5550	29.0227	73.58	13.92	8590.6	75.86	12.09	9864.4	113.815	338873
214.0	3497.654	-78.5055	29.0355	73.61	13.69	8630.0	75.87	11.90	9905.2	116.523	342995
216.0	3498.322	-78.4558	29.0482	73.64	13.47	8669.6	75.88	11.71	9946.0	119.245	347069
218.0	3498.983	-78.4057	29.0611	73.66	13.25	8709.5	75.90	11.53	9987.0	121.983	351098
220.0	3499.636	-78.3554	29.0739	73.69	13.04	8749.7	75.91	11.35	10028.3	124.734	355082
222.0	3500.282	-78.3048	29.0869	73.72	12.83	8790.3	75.92	11.18	10070.1	127.500	359021
224.0	3500.921	-78.2540	29.0998	73.75	12.62	8831.4	75.94	11.00	10112.2	130.281	362915
226.0	3501.553	-78.2028	29.1129	73.77	12.41	8872.9	75.95	10.83	10154.8	133.077	366766
228.0	3502.177	-78.1514	29.1259	73.80	12.21	8914.9	75.96	10.65	10197.9	135.888	370572
230.0	3502.794	-78.0997	29.1390	73.83	12.01	8957.3	75.98	10.48	10241.3	138.713	374334
232.0	3503.403	-78.0476	29.1522	73.86	11.81	9000.1	75.99	10.31	10285.1	141.554	378053
234.0	3504.006	-77.9953	29.1654	73.89	11.61	9043.4	76.01	10.15	10329.4	144.410	381728
236.0	3504.602	-77.9427	29.1787	73.92	11.42	9087.0	76.02	9.98	10374.0	147.281	385361
238.0	3505.190	-77.8898	29.1920	73.95	11.22	9131.1	76.04	9.82	10419.0	150.168	388950
240.0	3505.771	-77.8366	29.2053	73.97	11.03	9175.6	76.05	9.66	10464.4	153.070	392497
242.0	3506.346	-77.7831	29.2187	74.00	10.84	9220.6	76.07	9.50	10510.2	155.987	396002
244.0	3506.913	-77.7293	29.2322	74.03	10.66	9266.0	76.09	9.34	10556.5	158.920	399464
246.0	3507.474	-77.6752	29.2456	74.06	10.47	9311.9	76.10	9.19	10603.2	161.869	402885
248.0	3508.028	-77.6208	29.2592	74.09	10.29	9358.2	76.12	9.03	10650.3	164.834	406264
250.0	3508.575	-77.5661	29.2728	74.12	10.11	9404.9	76.14	8.88	10697.8	167.815	409602
252.0	3509.115	-77.5111	29.2864	74.16	9.94	9452.0	76.15	8.73	10745.8	170.813	412899
254.0	3509.649	-77.4557	29.3001	74.19	9.76	9499.6	76.17	8.58	10794.1	173.826	416155
256.0	3510.176	-77.4001	29.3138	74.22	9.59	9547.6	76.19	8.44	10842.9	176.855	419370

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
258.0	3510.696	-77.3441	29.3276	74.25	9.42	9596.1	76.21	8.29	10892.0	179.902	422546
260.0	3511.209	-77.2878	29.3414	74.28	9.25	9645.0	76.22	8.15	10941.6	182.964	425681
262.0	3511.716	-77.2312	29.3553	74.31	9.08	9694.3	76.24	8.00	10991.6	186.043	428777
264.0	3512.217	-77.1742	29.3692	74.34	8.92	9744.1	76.26	7.86	11042.1	189.139	431833
266.0	3512.711	-77.1169	29.3832	74.38	8.76	9794.4	76.28	7.73	11093.0	192.252	434849
268.0	3513.199	-77.0593	29.3972	74.41	8.60	9845.1	76.30	7.59	11144.4	195.382	437827
270.0	3513.680	-77.0014	29.4113	74.44	8.44	9896.4	76.32	7.45	11196.3	198.529	440766
272.0	3514.155	-76.9431	29.4254	74.47	8.28	9948.0	76.34	7.32	11248.5	201.694	443667
274.0	3514.624	-76.8845	29.4396	74.51	8.13	10000.1	76.36	7.19	11301.1	204.875	446529
276.0	3515.086	-76.8255	29.4538	74.54	7.98	10052.6	76.38	7.06	11354.2	208.074	449354
278.0	3515.542	-76.7663	29.4681	74.57	7.83	10105.6	76.40	6.93	11407.8	211.291	452141
280.0	3515.992	-76.7066	29.4824	74.61	7.68	10159.1	76.42	6.81	11461.8	214.525	454891
282.0	3516.436	-76.6466	29.4967	74.64	7.54	10213.0	76.44	6.68	11516.3	217.778	457604
284.0	3516.874	-76.5863	29.5112	74.68	7.39	10267.4	76.46	6.56	11571.2	221.048	460280
286.0	3517.306	-76.5256	29.5256	74.71	7.25	10322.2	76.48	6.43	11626.5	224.336	462919
288.0	3517.732	-76.4646	29.5401	74.74	7.11	10377.5	76.51	6.31	11682.3	227.643	465522
290.0	3518.152	-76.4032	29.5547	74.78	6.97	10433.3	76.53	6.20	11738.5	230.968	468089
292.0	3518.566	-76.3414	29.5693	74.81	6.84	10489.5	76.55	6.08	11795.2	234.311	470621
294.0	3518.974	-76.2793	29.5839	74.85	6.71	10546.2	76.57	5.96	11852.4	237.673	473117
296.0	3519.377	-76.2168	29.5986	74.89	6.57	10603.4	76.60	5.85	11910.0	241.054	475578
298.0	3519.773	-76.1539	29.6133	74.92	6.44	10661.1	76.62	5.74	11968.0	244.454	478004
300.0	3520.164	-76.0907	29.6281	74.96	6.32	10719.2	76.64	5.63	12026.6	247.872	480395
302.0	3520.550	-76.0271	29.6430	74.99	6.19	10777.8	76.67	5.52	12085.5	251.310	482752
304.0	3520.930	-75.9631	29.6579	75.03	6.07	10836.8	76.69	5.41	12145.0	254.767	485075
306.0	3521.304	-75.8988	29.6728	75.07	5.94	10896.4	76.71	5.30	12204.9	258.243	487364
308.0	3521.672	-75.8340	29.6878	75.10	5.82	10956.4	76.74	5.20	12265.3	261.739	489620
310.0	3522.036	-75.7689	29.7028	75.14	5.70	11016.9	76.76	5.10	12326.2	265.254	491842
312.0	3522.393	-75.7034	29.7179	75.18	5.59	11077.9	76.79	5.00	12387.6	268.790	494032
314.0	3522.746	-75.6375	29.7330	75.22	5.47	11139.5	76.81	4.90	12449.4	272.345	496189
316.0	3523.093	-75.5712	29.7482	75.25	5.36	11201.5	76.84	4.80	12511.7	275.920	498313
318.0	3523.434	-75.5045	29.7634	75.29	5.25	11264.0	76.87	4.70	12574.5	279.516	500406
320.0	3523.771	-75.4374	29.7787	75.33	5.14	11327.0	76.89	4.60	12637.9	283.132	502467
322.0	3524.102	-75.3699	29.7940	75.37	5.03	11390.5	76.92	4.51	12701.7	286.768	504496
324.0	3524.428	-75.3020	29.8093	75.41	4.92	11454.6	76.95	4.42	12766.1	290.426	506494
326.0	3524.749	-75.2337	29.8247	75.45	4.82	11519.1	76.97	4.33	12830.9	294.104	508461
328.0	3525.065	-75.1649	29.8402	75.49	4.72	11584.2	77.00	4.24	12896.2	297.803	510397
330.0	3525.376	-75.0958	29.8557	75.53	4.61	11649.7	77.03	4.15	12962.1	301.523	512303
332.0	3525.682	-75.0262	29.8712	75.57	4.51	11715.8	77.06	4.06	13028.4	305.264	514179
334.0	3525.983	-74.9563	29.8868	75.61	4.42	11782.4	77.08	3.97	13095.2	309.027	516025
336.0	3526.280	-74.8858	29.9025	75.65	4.32	11849.5	77.11	3.89	13162.6	312.811	517842
338.0	3526.571	-74.8150	29.9182	75.69	4.23	11917.2	77.14	3.81	13230.5	316.618	519630
340.0	3526.858	-74.7437	29.9339	75.73	4.13	11985.4	77.17	3.72	13298.9	320.446	521389
342.0	3527.140	-74.6720	29.9497	75.77	4.04	12054.1	77.20	3.64	13367.9	324.296	523119

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
344.0	3527.417	-74.5999	29.9655	75.81	3.95	12123.4	77.23	3.56	13437.4	328.168	524821
346.0	3527.690	-74.5273	29.9814	75.86	3.86	12193.3	77.26	3.49	13507.5	332.063	526495
348.0	3527.958	-74.4543	29.9973	75.90	3.78	12263.7	77.29	3.41	13578.1	335.980	528141
350.0	3528.222	-74.3808	30.0132	75.94	3.69	12334.6	77.32	3.34	13649.2	339.920	529760
352.0	3528.481	-74.3068	30.0293	75.98	3.61	12406.1	77.35	3.26	13720.9	343.883	531352
354.0	3528.736	-74.2325	30.0453	76.03	3.53	12478.2	77.39	3.19	13793.2	347.869	532917
356.0	3528.986	-74.1576	30.0614	76.07	3.45	12550.8	77.42	3.12	13866.0	351.878	534456
358.0	3529.232	-74.0823	30.0775	76.11	3.37	12624.1	77.45	3.05	13939.4	355.911	535969
360.0	3529.474	-74.0065	30.0937	76.16	3.29	12697.9	77.48	2.98	14013.4	359.967	537456
362.0	3529.712	-73.9303	30.1100	76.20	3.21	12772.3	77.51	2.91	14088.0	364.047	538917
364.0	3529.945	-73.8535	30.1262	76.25	3.14	12847.3	77.55	2.85	14163.2	368.151	540353
366.0	3530.175	-73.7763	30.1426	76.29	3.06	12922.9	77.58	2.78	14238.9	372.280	541764
368.0	3530.400	-73.6986	30.1589	76.34	2.99	12999.1	77.62	2.72	14315.3	376.432	543151
370.0	3530.622	-73.6205	30.1753	76.38	2.92	13075.9	77.65	2.65	14392.2	380.609	544513
372.0	3530.839	-73.5418	30.1918	76.43	2.85	13153.4	77.68	2.59	14469.8	384.811	545852
374.0	3531.053	-73.4626	30.2083	76.47	2.79	13231.4	77.72	2.53	14548.0	389.037	547167
376.0	3531.262	-73.3830	30.2248	76.52	2.72	13310.0	77.75	2.47	14626.8	393.289	548459
378.0	3531.468	-73.3028	30.2414	76.56	2.65	13389.4	77.79	2.42	14706.2	397.566	549729
380.0	3531.670	-73.2221	30.2580	76.61	2.59	13469.3	77.83	2.36	14786.3	401.868	550975
382.0	3531.869	-73.1409	30.2746	76.66	2.53	13549.9	77.86	2.30	14867.0	406.196	552200
384.0	3532.064	-73.0593	30.2913	76.71	2.47	13631.2	77.90	2.25	14948.4	410.550	553402
386.0	3532.256	-72.9770	30.3081	76.75	2.41	13713.0	77.93	2.20	15030.3	414.931	554584
388.0	3532.444	-72.8943	30.3249	76.80	2.35	13795.5	77.97	2.15	15112.9	419.337	555744
390.0	3532.628	-72.8110	30.3417	76.85	2.30	13878.7	78.01	2.10	15196.2	423.770	556884
392.0	3532.810	-72.7272	30.3585	76.90	2.24	13962.5	78.05	2.05	15280.2	428.229	558004
394.0	3532.988	-72.6429	30.3755	76.95	2.19	14047.1	78.09	2.00	15364.9	432.716	559104
396.0	3533.162	-72.5580	30.3924	77.00	2.13	14132.4	78.12	1.95	15450.2	437.229	560184
398.0	3533.334	-72.4726	30.4094	77.05	2.08	14218.3	78.16	1.91	15536.3	441.770	561245
400.0	3533.503	-72.3866	30.4264	77.10	2.03	14304.9	78.20	1.86	15623.0	446.339	562288
402.0	3533.668	-72.3001	30.4435	77.15	1.99	14392.3	78.24	1.82	15710.4	450.935	563313
404.0	3533.831	-72.2130	30.4605	77.20	1.94	14480.3	78.28	1.78	15798.6	455.559	564319
406.0	3533.991	-72.1253	30.4777	77.25	1.89	14569.1	78.32	1.74	15887.4	460.212	565309
408.0	3534.148	-72.0371	30.4948	77.30	1.85	14658.6	78.36	1.70	15977.0	464.893	566281
410.0	3534.302	-71.9483	30.5121	77.35	1.80	14748.9	78.41	1.66	16067.4	469.602	567237
412.0	3534.454	-71.8589	30.5293	77.40	1.76	14840.0	78.45	1.62	16158.6	474.341	568176
414.0	3534.602	-71.7689	30.5466	77.46	1.72	14931.8	78.49	1.58	16250.5	479.109	569100
416.0	3534.749	-71.6784	30.5639	77.51	1.68	15024.4	78.53	1.55	16343.1	483.906	570008
418.0	3534.893	-71.5872	30.5812	77.56	1.64	15117.7	78.57	1.51	16436.5	488.733	570902
420.0	3535.034	-71.4955	30.5986	77.62	1.61	15211.9	78.62	1.48	16530.7	493.589	571781
422.0	3535.174	-71.4031	30.6160	77.67	1.57	15306.8	78.66	1.45	16625.7	498.476	572646
424.0	3535.311	-71.3102	30.6335	77.72	1.54	15402.5	78.71	1.42	16721.6	503.394	573497
426.0	3535.446	-71.2166	30.6510	77.78	1.50	15499.1	78.75	1.39	16818.2	508.342	574336
428.0	3535.579	-71.1224	30.6685	77.83	1.47	15596.5	78.79	1.36	16915.6	513.321	575162

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
430.0	3535.709	-71.0275	30.6860	77.89	1.44	15694.7	78.84	1.33	17013.9	518.331	575975
432.0	3535.838	-70.9321	30.7036	77.94	1.41	15793.8	78.89	1.30	17113.1	523.373	576777
434.0	3535.965	-70.8360	30.7212	78.00	1.38	15893.8	78.93	1.28	17213.1	528.446	577567
436.0	3536.090	-70.7392	30.7388	78.05	1.35	15994.6	78.98	1.25	17313.9	533.552	578347
438.0	3536.214	-70.6418	30.7565	78.11	1.33	16096.3	79.02	1.23	17415.7	538.689	579117
440.0	3536.336	-70.5438	30.7742	78.17	1.30	16198.9	79.07	1.20	17518.4	543.860	579877
442.0	3536.456	-70.4450	30.7919	78.23	1.28	16302.4	79.12	1.18	17621.9	549.063	580627
444.0	3536.575	-70.3457	30.8097	78.28	1.25	16406.8	79.17	1.16	17726.4	554.299	581369
446.0	3536.693	-70.2456	30.8274	78.34	1.23	16512.1	79.22	1.14	17831.8	559.569	582103
448.0	3536.809	-70.1449	30.8452	78.40	1.21	16618.3	79.27	1.12	17938.1	564.872	582829
450.0	3536.924	-70.0434	30.8631	78.46	1.19	16725.6	79.31	1.11	18045.3	570.210	583548
452.0	3537.038	-69.9413	30.8809	78.52	1.17	16833.5	79.36	1.09	18153.4	575.582	584261
454.0	3537.151	-69.8385	30.8988	78.58	1.16	16942.7	79.42	1.07	18262.6	580.988	584968
456.0	3537.264	-69.7350	30.9167	78.64	1.14	17052.9	79.47	1.06	18372.8	586.430	585669
458.0	3537.375	-69.6307	30.9346	78.70	1.13	17164.1	79.52	1.05	18484.1	591.906	586365
460.0	3537.486	-69.5258	30.9525	78.76	1.11	17276.3	79.57	1.03	18596.3	597.419	587057
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
460.610	3537.519	-69.4941	30.9579	78.78	1.11	17310.1	79.59	1.03	18630.2	599.079	587263
462.0	3537.595	-69.4201	30.9705	78.82	1.09	17375.9	79.62	1.01	18695.9	602.965	587740
464.0	3537.703	-69.3139	30.9884	78.89	1.06	17467.1	79.68	0.99	18787.3	608.541	588414
466.0	3537.808	-69.2070	31.0064	78.95	1.03	17558.9	79.73	0.96	18879.0	614.147	589074
468.0	3537.912	-69.0995	31.0243	79.01	1.01	17650.9	79.78	0.94	18971.1	619.782	589722
470.0	3538.014	-68.9914	31.0423	79.07	0.99	17743.4	79.83	0.93	19063.6	625.447	590361
472.0	3538.115	-68.8828	31.0602	79.13	0.99	17836.5	79.89	0.92	19156.8	631.141	590996
474.0	3538.216	-68.7735	31.0781	79.19	0.98	17929.8	79.94	0.91	19250.2	636.864	591629
476.0	3538.317	-68.6636	31.0960	79.26	0.97	18023.8	80.00	0.91	19344.2	642.618	592261
478.0	3538.418	-68.5531	31.1139	79.32	0.97	18118.6	80.05	0.91	19439.0	648.401	592895
480.0	3538.519	-68.4419	31.1318	79.38	0.97	18214.2	80.11	0.90	19534.6	654.215	593529
482.0	3538.621	-68.3302	31.1497	79.45	0.97	18310.5	80.17	0.90	19631.0	660.059	594166
484.0	3538.723	-68.2178	31.1675	79.51	0.97	18407.5	80.22	0.90	19728.0	665.934	594805
486.0	3538.825	-68.1047	31.1854	79.58	0.97	18505.3	80.28	0.90	19825.9	671.840	595448
488.0	3538.928	-67.9910	31.2032	79.65	0.96	18603.9	80.34	0.90	19924.6	677.777	596092
490.0	3539.031	-67.8767	31.2210	79.71	0.96	18694.5	80.40	0.90	20015.2	683.743	596734
492.0	3539.132	-67.7619	31.2388	79.78	0.94	18771.6	80.46	0.88	20092.3	689.736	597372
494.0	3539.233	-67.6465	31.2565	79.85	0.92	18848.7	80.52	0.86	20169.5	695.755	598003
496.0	3539.332	-67.5306	31.2742	79.92	0.90	18926.4	80.58	0.84	20247.2	701.798	598623
498.0	3539.429	-67.4142	31.2918	79.99	0.88	19004.5	80.64	0.82	20325.4	707.866	599232
500.0	3539.524	-67.2973	31.3094	80.06	0.86	19082.7	80.71	0.80	20403.7	713.959	599828
502.0	3539.617	-67.1798	31.3269	80.13	0.84	19161.4	80.77	0.79	20482.4	720.077	600415
504.0	3539.710	-67.0618	31.3444	80.20	0.83	19239.9	80.83	0.78	20560.9	726.219	600995
506.0	3539.801	-66.9433	31.3618	80.26	0.82	19318.7	80.89	0.77	20639.8	732.387	601571

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
508.0	3539.892	-66.8242	31.3792	80.33	0.82	19398.0	80.96	C.76	20719.1	738.580	602143
510.0	3539.983	-66.7046	31.3965	80.40	0.81	19477.8	81.02	0.76	20798.9	744.798	602714
512.0	3540.074	-66.5845	31.4138	80.48	0.81	19558.0	81.08	0.76	20879.2	751.042	603284
514.0	3540.164	-66.4638	31.4310	80.55	0.80	19638.7	81.15	0.75	20959.9	757.311	603853
516.0	3540.255	-66.3426	31.4481	80.62	0.80	19719.9	81.21	0.75	21041.2	763.606	604421
518.0	3540.345	-66.2209	31.4652	80.69	0.79	19801.8	81.28	0.74	21123.1	769.927	604988
520.0	3540.435	-66.0986	31.4823	80.76	0.79	19884.2	81.34	0.74	21205.5	776.274	605554
522.0	3540.525	-65.9757	31.4992	80.83	0.78	19967.1	81.41	0.74	21288.6	782.647	606119
524.0	3540.615	-65.8523	31.5162	80.91	0.78	20050.7	81.47	0.73	21372.2	789.047	606684
526.0	3540.705	-65.7283	31.5330	80.98	0.78	20134.9	81.54	0.73	21456.4	795.473	607249
528.0	3540.795	-65.6038	31.5498	81.05	0.77	20219.6	81.61	0.73	21541.2	801.926	607813
530.0	3540.885	-65.4787	31.5665	81.13	0.77	20304.9	81.67	C.72	21626.5	808.406	608378
532.0	3540.975	-65.3530	31.5831	81.20	0.77	20390.8	81.74	0.72	21712.5	814.914	608943
534.0	3541.065	-65.2267	31.5997	81.28	0.77	20477.3	81.81	0.72	21799.0	821.449	609510
536.0	3541.156	-65.0999	31.6162	81.35	0.77	20564.4	81.88	0.72	21886.2	828.011	610078
538.0	3541.246	-64.9725	31.6327	81.43	0.77	20652.1	81.95	0.72	21973.9	834.601	610648
540.0	3541.338	-64.8444	31.6490	81.50	0.77	20740.4	82.01	0.72	22062.2	841.219	611220
542.0	3541.430	-64.7158	31.6653	81.58	0.77	20829.2	82.08	C.72	22151.0	847.866	611796
544.0	3541.522	-64.5866	31.6815	81.65	0.77	20918.6	82.15	C.73	22240.5	854.540	612375
546.0	3541.615	-64.4568	31.6976	81.73	0.77	21008.3	82.22	0.73	22330.3	861.243	612958
548.0	3541.709	-64.3264	31.7137	81.81	0.78	21098.9	82.29	0.73	22420.9	867.975	613546
550.0	3541.804	-64.1954	31.7297	81.88	0.78	21190.0	82.36	C.74	22512.0	874.736	614139
552.0	3541.899	-64.0638	31.7455	81.96	0.79	21281.3	82.44	0.74	22603.4	881.525	614738
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
552.640	3541.929	-64.0222	31.7505	81.99	0.79	21309.9	82.46	0.74	22632.0	883.670	614927
	S-II/S-IVB SEPARATION COMMAND										
553.500	3541.971	-63.9647	31.7574	82.02	0.77	21317.8	82.49	0.73	22639.9	886.634	615187
554.0	3541.995	-63.9316	31.7613	82.04	0.77	21317.9	82.51	C.72	22640.0	888.339	615336
556.0	3542.087	-63.7993	31.7770	82.12	0.73	21318.2	82.58	0.69	22640.4	895.158	615914
558.0	3542.175	-63.6670	31.7925	82.20	0.70	21325.4	82.66	C.66	22647.7	901.975	616464
560.0	3542.259	-63.5346	31.8078	82.28	0.68	21349.6	82.73	0.64	22671.9	908.796	616992
562.0	3542.341	-63.4019	31.8230	82.36	0.66	21382.5	82.80	0.62	22704.9	915.628	617508
564.0	3542.421	-63.2690	31.8381	82.43	0.64	21418.3	82.88	C.60	22740.7	922.469	618009
566.0	3542.499	-63.1358	31.8530	82.51	0.62	21454.2	82.95	C.59	22776.6	929.322	618498
568.0	3542.574	-63.0024	31.8679	82.59	0.60	21489.9	83.02	C.57	22812.4	936.186	618974
570.0	3542.648	-62.8687	31.8825	82.67	0.59	21525.7	83.10	C.55	22848.2	943.061	619436
572.0	3542.719	-62.7347	31.8971	82.75	0.57	21561.8	83.17	C.53	22884.4	949.948	619886
574.0	3542.788	-62.6005	31.9115	82.83	0.55	21598.2	83.24	C.52	22920.8	956.846	620322
576.0	3542.855	-62.4659	31.9258	82.91	0.53	21634.6	83.32	C.50	22957.3	963.755	620745

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
578.0	3542.920	-62.3312	31.9400	82.99	0.51	21671.3	83.39	0.48	22993.9	970.677	621155
580.0	3542.983	-62.1961	31.9540	83.07	0.50	21708.0	83.47	0.47	23030.7	977.609	621552
582.0	3543.044	-62.0608	31.9679	83.15	0.48	21744.8	83.54	0.45	23067.5	984.554	621936
584.0	3543.102	-61.9252	31.9816	83.23	0.46	21781.7	83.62	0.43	23104.5	991.510	622308
586.0	3543.159	-61.7893	31.9952	83.31	0.44	21818.7	83.69	0.42	23141.6	998.478	622667
588.0	3543.213	-61.6532	32.0087	83.39	0.43	21855.9	83.77	0.40	23178.8	1005.457	623013
590.0	3543.266	-61.5168	32.0220	83.47	0.41	21893.2	83.85	0.39	23216.1	1012.449	623346
592.0	3543.316	-61.3801	32.0351	83.55	0.39	21930.6	83.92	0.37	23253.6	1019.452	623668
594.0	3543.365	-61.2431	32.0482	83.64	0.38	21968.3	84.00	0.36	23291.2	1026.467	623977
596.0	3543.412	-61.1059	32.0611	83.72	0.36	22006.0	84.08	0.34	23329.0	1033.494	624275
598.0	3543.456	-60.9684	32.0738	83.80	0.35	22044.0	84.15	0.33	23367.0	1040.533	624561
600.0	3543.499	-60.8306	32.0864	83.89	0.33	22082.0	84.23	0.31	23405.1	1047.584	624835
602.0	3543.540	-60.6926	32.0988	83.97	0.32	22120.2	84.31	0.30	23443.3	1054.647	625097
604.0	3543.579	-60.5542	32.1111	84.05	0.30	22158.4	84.39	0.28	23481.5	1061.723	625349
606.0	3543.617	-60.4156	32.1233	84.14	0.29	22196.8	84.47	0.27	23519.9	1068.810	625589
608.0	3543.652	-60.2767	32.1353	84.22	0.27	22235.3	84.54	0.26	23558.5	1075.910	625818
610.0	3543.686	-60.1375	32.1471	84.30	0.26	22274.0	84.62	0.24	23597.2	1083.022	626036
612.0	3543.718	-59.9981	32.1588	84.39	0.24	22312.8	84.70	0.23	23636.0	1090.147	626243
614.0	3543.748	-59.8583	32.1703	84.47	0.23	22351.8	84.78	0.22	23675.0	1097.283	626440
616.0	3543.777	-59.7183	32.1817	84.56	0.22	22391.0	84.86	0.20	23714.2	1104.432	626627
618.0	3543.804	-59.5780	32.1929	84.64	0.20	22430.3	84.94	0.19	23753.6	1111.594	626803
620.0	3543.829	-59.4375	32.2040	84.73	0.19	22469.6	85.02	0.18	23792.9	1118.768	626970
622.0	3543.853	-59.2966	32.2149	84.81	0.18	22509.1	85.10	0.17	23832.4	1125.955	627126
624.0	3543.875	-59.1555	32.2257	84.90	0.17	22548.7	85.18	0.16	23872.0	1133.154	627273
626.0	3543.896	-59.0140	32.2363	84.98	0.15	22588.4	85.26	0.15	23911.8	1140.366	627411
628.0	3543.915	-58.8723	32.2467	85.07	0.14	22628.3	85.34	0.13	23951.6	1147.591	627539
630.0	3543.933	-58.7303	32.2570	85.15	0.13	22668.2	85.42	0.12	23991.6	1154.828	627659
632.0	3543.949	-58.5880	32.2671	85.24	0.12	22708.3	85.50	0.11	24031.7	1162.078	627769
634.0	3543.964	-58.4455	32.2771	85.32	0.11	22748.5	85.58	0.10	24071.9	1169.341	627871
636.0	3543.978	-58.3026	32.2869	85.41	0.10	22788.8	85.66	0.09	24112.3	1176.616	627965
638.0	3543.990	-58.1595	32.2965	85.50	0.09	22829.3	85.74	0.08	24152.8	1183.905	628050
640.0	3544.001	-58.0161	32.3059	85.58	0.08	22869.9	85.82	0.08	24193.4	1191.206	628128
642.0	3544.011	-57.8724	32.3152	85.67	0.07	22910.7	85.91	0.07	24234.2	1198.521	628198
644.0	3544.020	-57.7284	32.3244	85.75	0.06	22951.6	85.99	0.06	24275.1	1205.848	628261
646.0	3544.027	-57.5841	32.3333	85.84	0.05	22992.6	86.07	0.05	24316.1	1213.189	628316
648.0	3544.034	-57.4395	32.3421	85.93	0.04	23033.9	86.15	0.04	24357.4	1220.542	628365
650.0	3544.039	-57.2947	32.3507	86.02	0.04	23075.3	86.23	0.03	24398.8	1227.909	628407
652.0	3544.043	-57.1495	32.3592	86.10	0.03	23116.9	86.31	0.03	24440.4	1235.289	628442
654.0	3544.046	-57.0041	32.3674	86.19	0.02	23158.7	86.40	0.02	24482.2	1242.683	628471
656.0	3544.049	-56.8584	32.3755	86.28	0.01	23200.6	86.48	0.01	24524.1	1250.089	628495
658.0	3544.050	-56.7123	32.3835	86.37	0.01	23242.5	86.56	0.01	24566.1	1257.509	628513
660.0	3544.051	-56.5660	32.3912	86.45	0.00	23284.6	86.64	0.00	24608.1	1264.943	628525
662.0	3544.051	-56.4194	32.3988	86.54	-0.00	23326.7	86.73	-0.00	24650.3	1272.390	628532

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
664.0	3544.050	-56.2725	32.4062	86.63	-0.01	23369.0	86.81	-0.01	24692.6	1279.850	628535
666.0	3544.048	-56.1253	32.4134	86.72	-0.01	23411.5	86.89	-0.01	24735.1	1287.324	628533
668.0	3544.046	-55.9779	32.4205	86.81	-0.02	23454.2	86.98	-0.02	24777.8	1294.812	628527
670.0	3544.043	-55.8301	32.4273	86.90	-0.02	23496.9	87.06	-0.02	24820.5	1302.313	628517
672.0	3544.040	-55.6820	32.4340	86.98	-0.03	23539.8	87.14	-0.03	24863.4	1309.828	628504
674.0	3544.036	-55.5337	32.4405	87.07	-0.03	23582.8	87.23	-0.03	24906.4	1317.357	628487
676.0	3544.031	-55.3850	32.4468	87.16	-0.03	23625.9	87.31	-0.03	24949.5	1324.899	628468
678.0	3544.027	-55.2361	32.4530	87.25	-0.04	23669.2	87.40	-0.03	24992.8	1332.456	628445
680.0	3544.021	-55.0868	32.4589	87.34	-0.04	23712.7	87.48	-0.04	25036.3	1340.026	628421
682.0	3544.016	-54.9373	32.4647	87.43	-0.04	23756.3	87.57	-0.04	25079.9	1347.610	628395
684.0	3544.011	-54.7875	32.4702	87.52	-0.04	23799.9	87.65	-0.04	25123.5	1355.208	628368
686.0	3544.005	-54.6373	32.4756	87.61	-0.04	23843.7	87.74	-0.04	25167.4	1362.820	628341
688.0	3544.000	-54.4869	32.4808	87.70	-0.04	23887.7	87.82	-0.04	25211.3	1370.446	628314
690.0	3543.995	-54.3362	32.4858	87.79	-0.04	23931.8	87.91	-0.03	25255.4	1378.086	628289
692.0	3543.990	-54.1852	32.4906	87.88	-0.03	23976.0	87.99	-0.03	25299.6	1385.740	628264
694.0	3543.985	-54.0339	32.4953	87.97	-0.03	24020.3	88.08	-0.03	25343.9	1393.408	628242
696.0	3543.981	-53.8823	32.4997	88.06	-0.03	24064.8	88.16	-0.03	25388.5	1401.091	628222
698.0	3543.978	-53.7304	32.5039	88.15	-0.02	24109.5	88.25	-0.02	25433.1	1408.788	628205
700.0	3543.975	-53.5782	32.5079	88.24	-0.02	24154.3	88.34	-0.02	25477.9	1416.499	628193
702.0	3543.973	-53.4257	32.5118	88.34	-0.01	24199.3	88.42	-0.01	25522.9	1424.224	628184
	S-IVB 1ST GUIDANCE CUTOFF										
703.760	3543.972	-53.2920	32.5150	88.42	-0.01	24238.8	88.50	-0.01	25562.4	1430.997	628180
704.0	3543.972	-53.2729	32.5154	88.43	-0.01	24242.5	88.51	-0.01	25566.2	1431.964	628181
706.0	3543.971	-53.1200	32.5189	88.52	-0.01	24244.2	88.59	-0.00	25567.8	1439.710	628180
708.0	3543.970	-52.9670	32.5221	88.61	-0.01	24244.2	88.68	-0.01	25567.8	1447.458	628179
710.0	3543.969	-52.8140	32.5251	88.70	-0.01	24244.3	88.77	-0.01	25567.9	1455.204	628178
712.0	3543.969	-52.6610	32.5279	88.79	-0.01	24244.3	88.86	-0.01	25567.9	1462.951	628176
	PARKING ORBIT INSERTION										
713.760	3543.917	-52.5260	32.5303	88.87	-0.01	24244.3	88.93	-0.00	25567.9	1469.790	627869

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								
713.760	3543.917	-52.5260	32.5303	32.6999	88.93	-0.00	25567.9	103.334
750.0	3543.904	-49.7529	32.5423	32.7119	90.51	-0.01	25568.5	103.322
800.0	3543.884	-45.9299	32.4476	32.6169	92.68	-0.01	25569.6	103.285
850.0	3543.862	-42.1210	32.2245	32.3933	94.83	-0.01	25570.2	103.223
900.0	3543.840	-38.3372	31.8748	32.0426	96.96	-0.01	25570.8	103.138
950.0	3543.818	-34.5889	31.4012	31.5676	99.04	-0.01	25571.5	103.030
1000.0	3543.796	-30.8851	30.8070	30.9716	101.07	-0.01	25572.3	102.901
1050.0	3543.773	-27.2340	30.0966	30.2589	103.03	-0.01	25573.1	102.753
1100.0	3543.751	-23.6422	29.2748	29.4344	104.92	-0.01	25574.0	102.588
1150.0	3543.728	-20.1147	28.3469	28.5033	106.72	-0.01	25574.9	102.407
1200.0	3543.706	-16.6553	27.3188	27.4715	108.44	-0.01	25575.9	102.214
1250.0	3543.684	-13.2663	26.1965	26.3448	110.06	-0.01	25577.0	102.009
1300.0	3543.663	-9.9484	24.9862	25.1296	111.59	-0.01	25578.0	101.797
1350.0	3543.641	-6.7015	23.6942	23.8320	113.02	-0.01	25579.1	101.579
1400.0	3543.620	-3.5242	22.3267	22.4584	114.35	-0.01	25580.1	101.359
1450.0	3543.599	-0.4142	20.8901	21.0150	115.57	-0.01	25581.2	101.139
1500.0	3543.578	2.6316	19.3905	19.5079	116.70	-0.01	25582.3	100.923
1550.0	3543.558	5.6170	17.8338	17.9431	117.72	-0.01	25583.3	100.711
1600.0	3543.537	8.5462	16.2259	16.3265	118.64	-0.01	25584.3	100.509
1650.0	3543.517	11.4239	14.5724	14.6637	119.46	-0.01	25585.3	100.317
1700.0	3543.497	14.2552	12.8789	12.9604	120.19	-0.01	25586.2	100.139
1750.0	3543.478	17.0453	11.1506	11.2218	120.81	-0.01	25587.1	99.977
1800.0	3543.458	19.7997	9.3928	9.4532	121.34	-0.01	25587.9	99.833
1850.0	3543.439	22.5241	7.6104	7.6596	121.78	-0.01	25588.6	99.709
1900.0	3543.421	25.2241	5.8083	5.8461	122.12	-0.00	25589.3	99.605
1950.0	3543.403	27.9055	3.9913	4.0174	122.37	-0.00	25589.9	99.525
2000.0	3543.386	30.5742	2.1642	2.1784	122.52	-0.00	25590.4	99.469
2050.0	3543.370	33.2359	0.3317	0.3338	122.58	-0.00	25590.8	99.437
2100.0	3543.356	35.8967	-1.5018	-1.5116	122.55	-0.00	25591.1	99.430
2150.0	3543.343	38.5624	-3.3315	-3.3533	122.43	-0.00	25591.3	99.448
2200.0	3543.332	41.2387	-5.1528	-5.1864	122.22	-0.00	25591.4	99.492
2250.0	3543.323	43.9316	-6.9610	-7.0061	121.91	-0.00	25591.4	99.560
2300.0	3543.317	46.6469	-8.7513	-8.8078	121.51	-0.00	25591.3	99.652
2350.0	3543.314	49.3904	-10.5189	-10.5863	121.02	-0.00	25591.1	99.767
2400.0	3543.315	52.1676	-12.2588	-12.3367	120.42	0.00	25590.9	99.904
2450.0	3543.319	54.9840	-13.9659	-14.0537	119.73	0.00	25590.5	100.060
2500.0	3543.327	57.8452	-15.6349	-15.7322	118.95	0.00	25590.0	100.236
2550.0	3543.340	60.7561	-17.2603	-17.3665	118.06	0.00	25589.5	100.427
2600.0	3543.358	63.7217	-18.8366	-18.9511	117.08	0.01	25588.9	100.633
2650.0	3543.382	66.7463	-20.3579	-20.4802	115.99	0.01	25588.2	100.851

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	3543.411	69.8340	-21.8184	-21.9477	114.80	0.01	25587.5	101.079
2750.0	3543.447	72.9879	-23.2118	-23.3475	113.51	0.01	25586.7	101.314
2800.0	3543.489	76.2108	-24.5321	-24.6736	112.11	0.01	25585.9	101.553
2850.0	3543.538	79.5043	-25.7728	-25.9195	110.62	0.01	25585.0	101.795
2900.0	3543.594	82.8691	-26.9278	-27.0790	109.03	0.02	25584.1	102.037
2950.0	3543.657	86.3048	-27.9907	-28.1458	107.35	0.02	25583.2	102.276
3000.0	3543.729	89.8094	-28.9553	-29.1139	105.57	0.02	25582.2	102.511
3050.0	3543.808	93.3800	-29.8159	-29.9774	103.71	0.02	25581.3	102.739
3100.0	3543.894	97.0117	-30.5669	-30.7307	101.77	0.02	25580.4	102.957
3150.0	3543.989	100.6985	-31.2032	-31.3690	99.77	0.03	25579.4	103.165
3200.0	3544.092	104.4329	-31.7204	-31.8877	97.71	0.03	25578.5	103.361
3250.0	3544.202	108.2060	-32.1146	-32.2831	95.60	0.03	25577.6	103.543
3300.0	3544.320	112.0079	-32.3830	-32.5522	93.45	0.03	25576.7	103.710
3350.0	3544.446	115.8277	-32.5236	-32.6931	91.28	0.04	25575.8	103.861
3400.0	3544.578	119.6540	-32.5352	-32.7047	89.11	0.04	25575.0	103.995
3450.0	3544.718	123.4753	-32.4177	-32.5870	86.94	0.04	25574.2	104.113
3500.0	3544.863	127.2801	-32.1722	-32.3408	84.79	0.04	25573.4	104.214
3550.0	3545.015	131.0575	-31.8006	-31.9681	82.67	0.04	25572.6	104.299
3600.0	3545.172	134.7975	-31.3056	-31.4717	80.60	0.04	25571.9	104.367
3650.0	3545.334	138.4908	-30.6910	-30.8552	78.58	0.04	25571.3	104.419
3700.0	3545.500	142.1299	-29.9611	-30.1229	76.64	0.05	25570.6	104.457
3750.0	3545.670	145.7084	-29.1209	-29.2800	74.76	0.05	25570.0	104.481
3800.0	3545.842	149.2215	-28.1760	-28.3317	72.98	0.05	25569.4	104.492
3850.0	3546.017	152.6656	-27.1321	-27.2839	71.28	0.05	25568.9	104.493
3900.0	3546.192	156.0389	-25.9953	-26.1427	69.67	0.05	25568.3	104.485
3950.0	3546.368	159.3407	-24.7719	-24.9143	68.16	0.05	25567.8	104.470
4000.0	3546.544	162.5714	-23.4683	-23.6050	66.75	0.05	25567.3	104.449
4050.0	3546.718	165.7327	-22.0906	-22.2210	65.44	0.05	25566.9	104.424
4100.0	3546.891	168.8270	-20.6451	-20.7687	64.23	0.05	25566.4	104.398
4150.0	3547.060	171.8574	-19.1380	-19.2540	63.13	0.05	25566.0	104.373
4200.0	3547.226	174.8279	-17.5751	-17.6829	62.12	0.04	25565.5	104.349
4250.0	3547.387	177.7428	-15.9623	-16.0614	61.22	0.04	25565.1	104.330
4300.0	3547.543	-179.3931	-14.3052	-14.3949	60.42	0.04	25564.6	104.317
4350.0	3547.693	-176.5748	-12.6093	-12.6891	59.71	0.04	25564.2	104.312
4400.0	3547.837	-173.7969	-10.8797	-10.9491	59.10	0.04	25563.7	104.316
4450.0	3547.973	-171.0540	-9.1216	-9.1802	58.58	0.04	25563.2	104.330
4500.0	3548.101	-168.3404	-7.3399	-7.3874	58.16	0.03	25562.8	104.356
4550.0	3548.221	-165.6504	-5.5396	-5.5756	57.84	0.03	25562.3	104.395
4600.0	3548.332	-162.9783	-3.7253	-3.7496	57.61	0.03	25561.8	104.447
4650.0	3548.434	-160.3183	-1.9018	-1.9142	57.46	0.03	25561.2	104.513
4700.0	3548.526	-157.6645	-0.0736	-0.0740	57.41	0.02	25560.7	104.592
4750.0	3548.609	-155.0110	1.7548	1.7663	57.46	0.02	25560.2	104.686
4800.0	3548.681	-152.3520	3.5787	3.6020	57.59	0.02	25559.6	104.792

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	3548.744	-149.6818	5.3934	5.4285	57.82	0.02	25559.1	104.912
4900.0	3548.796	-146.9944	7.1945	7.2410	58.13	0.01	25558.5	105.044
4950.0	3548.838	-144.2841	8.9771	9.0348	58.55	0.01	25557.9	105.187
5000.0	3548.871	-141.5453	10.7364	10.8050	59.05	0.01	25557.4	105.339
5050.0	3548.893	-138.7722	12.4676	12.5465	59.65	0.00	25556.8	105.500
5100.0	3548.906	-135.9594	14.1654	14.2542	60.35	0.00	25556.3	105.667
5150.0	3548.910	-133.1016	15.8247	15.9229	61.15	-0.00	25555.8	105.838
5200.0	3548.904	-130.1938	17.4401	17.5471	62.04	-0.00	25555.3	106.012
5250.0	3548.891	-127.2311	19.0060	19.1213	63.04	-0.00	25554.8	106.187
5300.0	3548.869	-124.2091	20.5167	20.6395	64.13	-0.01	25554.4	106.359
5350.0	3548.839	-121.1241	21.9663	22.0960	65.33	-0.01	25554.0	106.528
5400.0	3548.803	-117.9726	23.3486	23.4847	66.63	-0.01	25553.7	106.690
5450.0	3548.759	-114.7523	24.6576	24.7994	68.03	-0.01	25553.5	106.843
5500.0	3548.710	-111.4614	25.8869	26.0338	69.53	-0.01	25553.2	106.986
5550.0	3548.656	-108.0994	27.0304	27.1818	71.12	-0.02	25553.1	107.116
5600.0	3548.596	-104.6669	28.0818	28.2370	72.81	-0.02	25553.0	107.230
5650.0	3548.532	-101.1656	29.0350	29.1936	74.59	-0.02	25553.0	107.328
5700.0	3548.465	-97.5988	29.8842	30.0457	76.45	-0.02	25553.1	107.408
5750.0	3548.394	-93.9713	30.6240	30.7878	78.39	-0.02	25553.2	107.467
5800.0	3548.321	-90.2892	31.2493	31.4150	80.40	-0.02	25553.5	107.505
5850.0	3548.246	-86.5599	31.7557	31.9229	82.46	-0.02	25553.8	107.521
5900.0	3548.169	-82.7925	32.1395	32.3078	84.57	-0.02	25554.2	107.514
5950.0	3548.091	-78.9968	32.3978	32.5668	86.71	-0.02	25554.7	107.483
6000.0	3548.012	-75.1837	32.5286	32.6980	88.88	-0.02	25555.2	107.428
6050.0	3547.933	-71.3644	32.5310	32.7004	91.05	-0.02	25555.9	107.350
6100.0	3547.854	-67.5504	32.4047	32.5738	93.21	-0.02	25556.6	107.248
6150.0	3547.775	-63.7532	32.1509	32.3193	95.36	-0.02	25557.4	107.123
6200.0	3547.698	-59.9834	31.7714	31.9387	97.47	-0.02	25558.3	106.976
6250.0	3547.621	-56.2512	31.2691	31.4349	99.53	-0.02	25559.2	106.808
6300.0	3547.545	-52.5655	30.6476	30.8116	101.54	-0.02	25560.2	106.622
6350.0	3547.470	-48.9338	29.9113	30.0729	103.48	-0.02	25561.3	106.418
6400.0	3547.397	-45.3625	29.0652	29.2239	105.35	-0.02	25562.4	106.198
6450.0	3547.325	-41.8563	28.1146	28.2700	107.13	-0.02	25563.6	105.965
6500.0	3547.255	-38.4185	27.0654	27.2170	108.82	-0.02	25564.7	105.720
6550.0	3547.186	-35.0511	25.9238	26.0709	110.42	-0.02	25565.9	105.468
6600.0	3547.119	-31.7547	24.6958	24.8378	111.93	-0.02	25567.2	105.209
6650.0	3547.054	-28.5287	23.3877	23.5241	113.33	-0.02	25568.4	104.947
6700.0	3546.990	-25.3717	22.0059	22.1359	114.63	-0.02	25569.6	104.684
6750.0	3546.928	-22.2810	20.5564	20.6795	115.83	-0.02	25570.8	104.423
6800.0	3546.867	-19.2535	19.0454	19.1609	116.93	-0.02	25572.0	104.168
6850.0	3546.808	-16.2854	17.4788	17.5861	117.93	-0.02	25573.1	103.920
6900.0	3546.750	-13.3722	15.8624	15.9609	118.83	-0.02	25574.2	103.683
6950.0	3546.694	-10.5092	14.2018	14.2909	119.63	-0.02	25575.3	103.458

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	3546.640	-7.6914	12.5023	12.5815	120.33	-0.01	25576.3	103.249
7050.0	3546.586	-4.9134	10.7694	10.8381	120.94	-0.01	25577.2	103.057
7100.0	3546.535	-2.1697	9.0080	9.0659	121.45	-0.01	25578.1	102.885
7150.0	3546.485	0.5452	7.2231	7.2699	121.86	-0.01	25578.9	102.734
7200.0	3546.436	3.2371	5.4197	5.4549	122.18	-0.01	25579.6	102.606
7250.0	3546.390	5.9118	3.6024	3.6259	122.41	-0.01	25580.2	102.501
7300.0	3546.345	8.5750	1.7760	1.7876	122.54	-0.01	25580.7	102.422
7350.0	3546.303	11.2326	-0.0549	-0.0553	122.59	-0.01	25581.2	102.369
7400.0	3546.262	13.8905	-1.8858	-1.8981	122.54	-0.01	25581.5	102.341
7450.0	3546.225	16.5544	-3.7119	-3.7362	122.40	-0.01	25581.7	102.339
7500.0	3546.190	19.2303	-5.5288	-5.5647	122.16	-0.01	25581.9	102.364
7550.0	3546.158	21.9240	-7.3315	-7.3790	121.84	-0.01	25581.9	102.413
7600.0	3546.130	24.6412	-9.1155	-9.1742	121.42	-0.01	25581.9	102.487
7650.0	3546.106	27.3876	-10.8758	-10.9453	120.90	-0.01	25581.7	102.585
7700.0	3546.086	30.1689	-12.6075	-12.6873	120.29	-0.00	25581.5	102.704
7750.0	3546.070	32.9905	-14.3054	-14.3951	119.58	-0.00	25581.1	102.844
7800.0	3546.060	35.8578	-15.9641	-16.0632	118.78	-0.00	25580.7	103.003
7850.0	3546.054	38.7758	-17.5784	-17.6862	117.87	-0.00	25580.2	103.178
7900.0	3546.055	41.7492	-19.1425	-19.2585	116.87	0.00	25579.7	103.368
7950.0	3546.062	44.7823	-20.6506	-20.7742	115.76	0.00	25579.0	103.570
8000.0	3546.075	47.8791	-22.0968	-22.2273	114.55	0.00	25578.4	103.781
8050.0	3546.095	51.0426	-23.4749	-23.6117	113.24	0.01	25577.6	104.001
8100.0	3546.122	54.2754	-24.7788	-24.9212	111.83	0.01	25576.8	104.225
8150.0	3546.157	57.5788	-26.0022	-26.1496	110.32	0.01	25576.0	104.451
8200.0	3546.200	60.9534	-27.1387	-27.2905	108.71	0.01	25575.2	104.677
8250.0	3546.250	64.3985	-28.1821	-28.3379	107.01	0.01	25574.3	104.901
8300.0	3546.309	67.9120	-29.1265	-29.2855	105.22	0.02	25573.4	105.121
8350.0	3546.376	71.4905	-29.9659	-30.1277	103.35	0.02	25572.5	105.334
8400.0	3546.452	75.1290	-30.6950	-30.8591	101.40	0.02	25571.6	105.538
8450.0	3546.536	78.8213	-31.3087	-31.4747	99.39	0.02	25570.7	105.731
8500.0	3546.629	82.5594	-31.8028	-31.9702	97.32	0.03	25569.8	105.913
8550.0	3546.730	86.3345	-32.1736	-32.3421	95.20	0.03	25568.9	106.081
8600.0	3546.839	90.1363	-32.4184	-32.5876	93.05	0.03	25568.1	106.235
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6								
8629.260	3546.901	92.3692	-32.5025	-32.6718	91.79	0.03	25567.6	106.313

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								
8629.260	-42292512	2075703	1658660	-2558.6	-8027.2	-22731.8	26.90	-4.57	-1.40
8630.0	-42294428	2069766	1641839	-2538.7	-8030.6	-22732.8	26.91	-4.56	-1.37
8640.0	-42318469	1989234	1414447	-2269.5	-8075.7	-22745.1	26.94	-4.46	-1.09
8650.0	-42339817	1908256	1186947	-2000.0	-8119.7	-22754.5	26.96	-4.36	-0.80
8660.0	-42358469	1826843	959366	-1730.3	-8162.8	-22761.1	26.99	-4.25	-0.51
8670.0	-42374422	1745005	731735	-1460.3	-8204.8	-22764.7	27.01	-4.15	-0.22
8680.0	-42387675	1662751	504082	-1190.2	-8245.7	-22765.5	27.02	-4.04	0.07
8690.0	-42398226	1580093	276435	-919.9	-8285.6	-22763.3	27.03	-3.94	0.36
8700.0	-42406073	1497042	48825	-649.5	-8324.5	-22758.3	27.04	-3.83	0.65
8710.0	-42411215	1413607	-178721	-379.0	-8362.3	-22750.4	27.05	-3.73	0.93
8720.0	-42413653	1329800	-406174	-108.5	-8399.0	-22739.6	27.05	-3.62	1.22
8730.0	-42413386	1245630	-633505	162.0	-8434.7	-22726.0	27.05	-3.51	1.51
8740.0	-42410413	1161110	-860684	432.5	-8469.2	-22709.4	27.05	-3.40	1.80
8750.0	-42404736	1076250	-1087684	702.9	-8502.7	-22690.0	27.04	-3.29	2.08
8760.0	-42396355	991060	-1314475	973.3	-8535.0	-22667.8	27.03	-3.18	2.37
8770.0	-42385271	905552	-1541029	1243.5	-8566.3	-22642.6	27.02	-3.07	2.66
8780.0	-42371485	819738	-1767318	1513.6	-8596.5	-22614.6	27.00	-2.96	2.94
8790.0	-42355000	733627	-1993312	1783.5	-8625.5	-22583.8	26.98	-2.85	3.23
8800.0	-42335817	647232	-2218984	2053.1	-8653.4	-22550.1	26.95	-2.73	3.51
8810.0	-42313939	560563	-2444304	2322.5	-8680.2	-22513.5	26.92	-2.62	3.80
8820.0	-42289368	473632	-2669245	2591.6	-8705.8	-22474.1	26.89	-2.51	4.08
8830.0	-42262108	386450	-2893778	2860.3	-8730.3	-22431.9	26.86	-2.39	4.36
8840.0	-42232163	299029	-3117874	3128.7	-8753.7	-22386.9	26.82	-2.28	4.65
8850.0	-42199535	211381	-3341505	3396.7	-8775.9	-22339.0	26.78	-2.16	4.93
8860.0	-42164229	123516	-3564644	3664.3	-8796.9	-22288.3	26.74	-2.05	5.21
8870.0	-42126250	35447	-3787262	3931.4	-8816.8	-22234.8	26.69	-1.93	5.49
8880.0	-42085602	-52815	-4009332	4198.0	-8835.5	-22178.5	26.64	-1.81	5.77
8890.0	-42042291	-141259	-4230824	4464.1	-8853.0	-22119.5	26.58	-1.69	6.05
8900.0	-41996321	-229872	-4451712	4729.7	-8869.4	-22057.6	26.52	-1.57	6.33
8910.0	-41947700	-318642	-4671967	4994.6	-8884.5	-21993.0	26.46	-1.46	6.60
8920.0	-41896432	-407558	-4891563	5258.9	-8898.5	-21925.6	26.40	-1.34	6.88
8930.0	-41842524	-496608	-5110470	5522.5	-8911.3	-21855.5	26.33	-1.22	7.15
8940.0	-41785983	-585780	-5328663	5785.5	-8922.9	-21782.6	26.26	-1.10	7.43
8950.0	-41726817	-675062	-5546112	6047.7	-8933.3	-21706.9	26.18	-0.98	7.70
8960.0	-41665032	-764441	-5762792	6309.1	-8942.5	-21628.6	26.11	-0.86	7.97
8970.0	-41600636	-853907	-5978675	6569.8	-8950.4	-21547.5	26.03	-0.74	8.24
8980.0	-41533639	-943446	-6193734	6829.6	-8957.2	-21463.8	25.94	-0.62	8.51
8990.0	-41464047	-1033047	-6407942	7088.6	-8962.8	-21377.3	25.85	-0.49	8.78
9000.0	-41391869	-1122697	-6621272	7346.7	-8967.1	-21288.2	25.76	-0.37	9.05
9010.0	-41317116	-1212385	-6833697	7603.9	-8970.2	-21196.4	25.67	-0.25	9.31

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
9020.0	-41239795	-1302098	-7045191	7860.1	-8972.1	-21102.0	25.57	-0.13	9.58
9030.0	-41159918	-1391823	-7255727	8115.3	-8972.8	-21004.9	25.47	-0.01	9.84
9040.0	-41077493	-1481549	-7465280	8369.5	-8972.2	-20905.2	25.37	0.12	10.10
9050.0	-40992532	-1571264	-7673822	8622.6	-8970.4	-20802.8	25.26	0.24	10.36
9060.0	-40905045	-1660954	-7881328	8874.7	-8967.4	-20697.9	25.15	0.36	10.62
9070.0	-40815043	-1750608	-8087771	9125.6	-8963.2	-20590.4	25.04	0.49	10.88
9080.0	-40722537	-1840213	-8293127	9375.4	-8957.7	-20480.3	24.92	0.61	11.14
9090.0	-40627539	-1929757	-8497369	9624.0	-8950.9	-20367.7	24.80	0.73	11.39
9100.0	-40530060	-2019228	-8700472	9871.4	-8943.0	-20252.5	24.68	0.86	11.64
9110.0	-40430114	-2108613	-8902411	10117.6	-8933.8	-20134.8	24.55	0.98	11.90
9120.0	-40327713	-2197899	-9103160	10362.5	-8923.3	-20014.6	24.43	1.11	12.15
9130.0	-40222868	-2287075	-9302695	10606.1	-8911.6	-19892.0	24.30	1.23	12.38
9140.0	-40115595	-2376128	-9500991	10848.4	-8898.8	-19766.9	24.16	1.35	12.63
9150.0	-40005904	-2465046	-9698024	11089.4	-8884.6	-19639.3	24.03	1.48	12.88
9160.0	-39893812	-2553816	-9893770	11328.9	-8869.2	-19509.4	23.89	1.60	13.12
9170.0	-39779330	-2642426	-10088204	11567.1	-8852.6	-19377.0	23.74	1.72	13.36
9180.0	-39662460	-2730857	-10281215	11803.8	-8834.7	-19241.6	23.60	1.85	13.61
9190.0	-39543244	-2819109	-10472947	12039.0	-8815.6	-19104.3	23.44	1.97	13.84
	S-IVB RESTART (ENGINE SOLENOID ACTIVATION)								
9199.200	-39431495	-2900126	-10648115	12254.0	-8796.8	-18975.9	23.30	2.09	14.04
9200.0	-39421685	-2907164	-10663293	12272.6	-8795.2	-18964.7	23.29	2.10	14.06
9202.0	-39397088	-2924753	-10701201	12319.2	-8790.9	-18936.5	23.27	2.12	14.10
9204.0	-39372392	-2942339	-10739065	12365.7	-8786.7	-18908.2	23.24	2.15	14.14
9206.0	-39347594	-2959923	-10776884	12412.2	-8782.3	-18879.9	23.22	2.17	14.18
	S-IVB RE-IGNITION (STDV OPEN)								
9207.520	-39328681	-2973283	-10805596	12447.4	-8779.0	-18858.3	23.20	2.19	14.21
9208.0	-39322697	-2977502	-10814657	12458.9	-8778.2	-18851.9	24.88	1.15	11.95
9210.0	-39297698	-2995079	-10852387	12516.5	-8781.1	-18838.5	32.35	-4.19	1.18
9212.0	-39272589	-3012659	-10890087	12581.5	-8789.6	-18837.8	32.71	-4.29	-0.14
9214.0	-39247358	-3030250	-10927775	12647.2	-8798.3	-18838.5	33.01	-4.42	-0.53
9216.0	-39221997	-3047858	-10965463	12713.6	-8807.3	-18839.7	33.31	-4.54	-0.66
9218.0	-39196506	-3065482	-11003152	12780.5	-8816.4	-18841.0	33.61	-4.63	-0.68
9220.0	-39170889	-3083120	-11040833	12848.0	-8825.7	-18842.3	33.90	-4.69	-0.64
9222.0	-39145151	-3100768	-11078498	12916.0	-8835.1	-18843.5	34.10	-4.66	-0.56
9224.0	-39119284	-3118429	-11116154	12984.3	-8844.3	-18844.5	34.15	-4.54	-0.44
9226.0	-39093278	-3136110	-11153815	13052.5	-8853.3	-18845.2	34.06	-4.39	-0.36
9228.0	-39067124	-3153815	-11191491	13120.6	-8861.9	-18845.9	34.06	-4.24	-0.29
9230.0	-39040821	-3171544	-11229181	13188.7	-8870.3	-18846.3	34.10	-4.19	-0.21
9232.0	-39014377	-3189293	-11266877	13257.0	-8878.6	-18846.6	34.14	-4.17	-0.13

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
9234.0	-38987797	-3207059	-11304572	13325.3	-8887.0	-18846.8	34.18	-4.14	-0.04
9236.0	-38961081	-3224841	-11342265	13393.7	-8895.2	-18846.8	34.22	-4.11	0.03
9238.0	-38934228	-3242640	-11379959	13462.2	-8903.4	-18846.7	34.26	-4.09	0.05
9240.0	-38907237	-3260455	-11417652	13530.7	-8911.5	-18846.6	34.30	-4.06	0.06
9242.0	-38880109	-3278287	-11455345	13599.3	-8919.6	-18846.5	34.35	-4.03	0.07
9244.0	-38852842	-3296135	-11493038	13668.0	-8927.9	-18846.3	34.39	-3.99	0.08
9246.0	-38825439	-3313998	-11530730	13736.9	-8935.9	-18846.1	34.43	-3.98	0.11
9248.0	-38797895	-3331878	-11568422	13805.7	-8943.8	-18845.8	34.47	-3.95	0.16
9250.0	-38770214	-3349774	-11606113	13874.8	-8951.7	-18845.5	34.49	-3.92	0.17
9252.0	-38742396	-3367685	-11643804	13943.9	-8959.5	-18845.2	34.57	-3.88	0.16
9254.0	-38714439	-3385611	-11681494	14013.1	-8967.2	-18844.8	34.63	-3.85	0.17
9256.0	-38686343	-3403554	-11719183	14082.3	-8974.9	-18844.5	34.66	-3.82	0.18
9258.0	-38658109	-3421511	-11756872	14151.7	-8982.5	-18844.1	34.69	-3.79	0.19
9260.0	-38629737	-3439483	-11794560	14221.1	-8990.1	-18843.8	34.73	-3.78	0.19
9262.0	-38601225	-3457471	-11832247	14290.6	-8997.6	-18843.4	34.75	-3.76	0.19
9264.0	-38572574	-3475474	-11869934	14360.1	-9005.1	-18843.0	34.79	-3.73	0.20
9266.0	-38543784	-3493491	-11907619	14429.8	-9012.5	-18842.6	34.84	-3.69	0.21
9268.0	-38514855	-3511524	-11945304	14499.5	-9019.9	-18842.1	34.88	-3.66	0.24
9270.0	-38485786	-3529571	-11982988	14569.3	-9027.2	-18841.6	34.89	-3.64	0.28
9272.0	-38456578	-3547632	-12020670	14639.1	-9034.4	-18841.0	34.92	-3.61	0.29
9274.0	-38427230	-3565708	-12058352	14709.0	-9041.6	-18840.5	34.96	-3.58	0.28
9276.0	-38397742	-3583799	-12096032	14778.9	-9048.8	-18839.9	34.98	-3.56	0.29
9278.0	-38368114	-3601903	-12133711	14848.8	-9055.8	-18839.3	34.96	-3.54	0.33
9280.0	-38338347	-3620022	-12171389	14918.7	-9062.9	-18838.6	34.96	-3.52	0.35
9282.0	-38308439	-3638155	-12209066	14988.7	-9069.9	-18837.9	35.01	-3.51	0.36
9284.0	-38278392	-3656302	-12246741	15058.8	-9076.9	-18837.2	35.06	-3.48	0.37
9286.0	-38248204	-3674463	-12284414	15128.9	-9083.9	-18836.4	35.10	-3.45	0.37
9288.0	-38217876	-3692637	-12322087	15199.2	-9090.8	-18835.7	35.14	-3.43	0.36
9290.0	-38187407	-3710826	-12359757	15269.5	-9097.6	-18835.0	35.18	-3.40	0.35
9292.0	-38156798	-3729028	-12397426	15339.9	-9104.4	-18834.3	35.20	-3.38	0.37
9294.0	-38126049	-3747243	-12435094	15410.3	-9111.1	-18833.5	35.22	-3.34	0.41
9296.0	-38095157	-3765472	-12472760	15480.8	-9117.7	-18832.6	35.23	-3.31	0.44
9298.0	-38064125	-3783714	-12510425	15551.2	-9124.3	-18831.8	35.23	-3.29	0.44
9300.0	-38032952	-3801969	-12548088	15621.7	-9130.9	-18830.9	35.27	-3.28	0.44
9302.0	-38001639	-3820238	-12585748	15692.3	-9137.4	-18830.0	35.32	-3.27	0.44
9304.0	-37970182	-3838519	-12623408	15763.0	-9144.0	-18829.2	35.37	-3.26	0.44
9306.0	-37938586	-3856814	-12661065	15833.9	-9150.5	-18828.3	35.40	-3.25	0.43
9308.0	-37906847	-3875121	-12698721	15904.6	-9157.0	-18827.4	35.42	-3.22	0.44
9310.0	-37874967	-3893441	-12736375	15975.5	-9163.3	-18826.5	35.44	-3.16	0.46
9312.0	-37842945	-3911774	-12774027	16046.4	-9169.6	-18825.6	35.46	-3.13	0.47
9314.0	-37810782	-3930120	-12811677	16117.3	-9175.9	-18824.6	35.48	-3.12	0.46
9316.0	-37778476	-3948478	-12849325	16188.3	-9182.1	-18823.7	35.51	-3.10	0.48
9318.0	-37746029	-3966848	-12886972	16259.4	-9188.3	-18822.7	35.54	-3.08	0.50

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
9320.0	-37713439	-3985231	-12924616	16330.5	-9194.4	-18821.7	35.58	-3.06	0.51
9322.0	-37680707	-4003626	-12962259	16401.7	-9200.5	-18820.7	35.60	-3.05	0.53
9324.0	-37647832	-4022033	-12999899	16472.9	-9206.6	-18819.6	35.63	-3.04	0.53
9326.0	-37614815	-4040452	-13037537	16544.2	-9212.6	-18818.6	35.66	-3.01	0.51
9328.0	-37581655	-4058883	-13075173	16615.4	-9218.6	-18817.5	35.63	-2.96	0.54
9330.0	-37548353	-4077326	-13112807	16686.7	-9224.4	-18816.3	35.64	-2.92	0.57
9332.0	-37514908	-4095781	-13150439	16758.4	-9230.4	-18815.6	36.02	-3.05	0.21
9334.0	-37481319	-4114248	-13188070	16831.2	-9236.8	-18815.9	36.76	-3.34	-0.55
9336.0	-37447583	-4132729	-13225704	16905.5	-9243.9	-18817.9	37.63	-3.71	-1.49
9338.0	-37413696	-4151224	-13263343	16981.4	-9251.6	-18821.6	38.25	-3.98	-2.17
9340.0	-37379657	-4169735	-13300991	17058.2	-9259.6	-18826.2	38.51	-4.04	-2.46
9342.0	-37345463	-4188262	-13338648	17135.3	-9267.6	-18831.3	38.62	-3.99	-2.55
9344.0	-37311115	-4206805	-13376316	17212.6	-9275.2	-18836.4	38.67	-3.94	-2.55
9346.0	-37276613	-4225363	-13413994	17290.0	-9282.5	-18841.5	38.76	-3.90	-2.57
9348.0	-37241955	-4243935	-13451682	17367.6	-9289.7	-18846.6	38.81	-3.88	-2.57
9350.0	-37207142	-4262522	-13489380	17445.2	-9297.0	-18851.8	38.81	-3.87	-2.55
9352.0	-37172174	-4281123	-13527089	17522.8	-9304.5	-18856.9	38.80	-3.87	-2.58
9354.0	-37137051	-4299740	-13564808	17600.5	-9312.3	-18862.1	38.82	-3.90	-2.63
9356.0	-37101772	-4318373	-13602537	17678.1	-9320.1	-18867.5	38.85	-3.93	-2.70
9358.0	-37066338	-4337021	-13640278	17755.9	-9328.0	-18872.8	38.94	-3.91	-2.70
9360.0	-37030748	-4355685	-13678029	17834.2	-9335.8	-18877.9	39.00	-3.90	-2.72
9362.0	-36995001	-4374364	-13715789	17912.8	-9343.4	-18882.6	39.07	-3.89	-2.75
9364.0	-36959097	-4393058	-13753559	17991.4	-9351.1	-18887.6	39.13	-3.88	-2.78
9366.0	-36923036	-4411768	-13791340	18069.7	-9358.8	-18893.3	39.18	-3.86	-2.81
9368.0	-36886819	-4430493	-13829133	18147.6	-9366.7	-18899.5	39.24	-3.84	-2.84
9370.0	-36850445	-4449235	-13866938	18225.6	-9374.5	-18905.8	39.31	-3.83	-2.86
9372.0	-36813916	-4467991	-13904756	18304.1	-9382.2	-18911.8	39.38	-3.81	-2.86
9374.0	-36777229	-4486763	-13942585	18382.8	-9389.7	-18917.5	39.46	-3.79	-2.89
9376.0	-36740384	-4505550	-13980426	18461.9	-9397.2	-18923.4	39.53	-3.77	-2.97
9378.0	-36703382	-4524352	-14018279	18541.0	-9404.7	-18929.3	39.58	-3.76	-3.01
9380.0	-36666220	-4543169	-14056143	18620.1	-9412.2	-18935.4	39.60	-3.72	-3.03
9382.0	-36628901	-4562001	-14094020	18699.4	-9419.6	-18941.4	39.63	-3.68	-3.03
9384.0	-36591423	-4580848	-14131909	18778.7	-9427.0	-18947.5	39.71	-3.67	-3.06
9386.0	-36553786	-4599709	-14169810	18858.2	-9434.3	-18953.7	39.80	-3.69	-3.10
9388.0	-36515990	-4618585	-14207724	18937.9	-9441.7	-18960.0	39.87	-3.69	-3.16
9390.0	-36478034	-4637476	-14245650	19017.7	-9449.1	-18966.4	39.95	-3.68	-3.23
9392.0	-36439919	-4656381	-14283590	19097.6	-9456.4	-18972.8	39.99	-3.67	-3.27
9394.0	-36401644	-4675301	-14321542	19177.7	-9463.7	-18979.4	40.04	-3.65	-3.28
9396.0	-36363208	-4694236	-14359507	19257.7	-9471.0	-18985.9	40.06	-3.61	-3.27
9398.0	-36324613	-4713185	-14397486	19337.9	-9478.2	-18992.5	40.12	-3.58	-3.29
9400.0	-36285856	-4732149	-14435477	19418.4	-9485.4	-18999.2	40.20	-3.58	-3.34
9402.0	-36246939	-4751127	-14473483	19499.4	-9492.6	-19006.3	40.27	-3.60	-3.40
9404.0	-36207859	-4770119	-14511502	19580.9	-9499.8	-19013.6	40.34	-3.61	-3.45

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
9406.0	-36168615	-4789126	-14549537	19662.8	-9507.0	-19021.3	40.41	-3.61	-3.49
9408.0	-36129208	-4808147	-14587587	19744.6	-9514.2	-19028.9	40.49	-3.59	-3.53
9410.0	-36089637	-4827183	-14625653	19826.2	-9521.3	-19036.4	40.57	-3.57	-3.57
9412.0	-36049903	-4846232	-14663733	19907.7	-9528.5	-19043.8	40.64	-3.55	-3.61
9414.0	-36010006	-4865296	-14701828	19989.0	-9535.5	-19051.1	40.72	-3.53	-3.66
9416.0	-35969947	-4884375	-14739937	20070.2	-9542.6	-19058.4	40.80	-3.51	-3.71
9418.0	-35929725	-4903467	-14778061	20151.3	-9549.6	-19065.6	40.88	-3.49	-3.76
9420.0	-35889342	-4922573	-14816200	20232.1	-9556.5	-19072.7	40.96	-3.47	-3.81
9422.0	-35848797	-4941693	-14854352	20313.0	-9563.5	-19079.8	41.04	-3.46	-3.87
9424.0	-35808090	-4960827	-14892519	20394.3	-9570.4	-19087.2	41.12	-3.47	-3.93
9426.0	-35767219	-4979974	-14930701	20476.1	-9577.3	-19094.9	41.20	-3.48	-3.99
9428.0	-35726185	-4999136	-14968899	20558.5	-9584.3	-19102.9	41.27	-3.49	-4.07
9430.0	-35684985	-5018312	-15007113	20641.1	-9591.3	-19111.0	41.35	-3.48	-4.11
9432.0	-35643620	-5037501	-15045343	20723.9	-9598.2	-19119.3	41.42	-3.45	-4.15
9434.0	-35602090	-5056705	-15083590	20806.7	-9605.1	-19127.7	41.49	-3.45	-4.22
9436.0	-35560393	-5075922	-15121854	20889.8	-9612.0	-19136.2	41.56	-3.44	-4.31
9438.0	-35518530	-5095153	-15160135	20973.1	-9618.9	-19144.9	41.63	-3.43	-4.39
9440.0	-35476501	-5114397	-15198434	21056.6	-9625.7	-19153.7	41.70	-3.41	-4.43
9442.0	-35434304	-5133655	-15236750	21139.7	-9632.4	-19162.2	41.78	-3.41	-4.48
9444.0	-35391942	-5152927	-15275082	21222.5	-9638.9	-19170.3	41.88	-3.40	-4.54
9446.0	-35349414	-5172211	-15313431	21305.6	-9645.4	-19178.7	41.97	-3.39	-4.58
9448.0	-35306719	-5191508	-15351797	21389.6	-9652.2	-19187.8	42.06	-3.38	-4.63
9450.0	-35263855	-5210820	-15390183	21474.6	-9659.2	-19197.8	42.13	-3.37	-4.68
9452.0	-35220820	-5230145	-15428589	21559.9	-9666.3	-19208.2	42.21	-3.37	-4.74
9454.0	-35177615	-5249485	-15467015	21645.0	-9673.2	-19218.2	42.28	-3.36	-4.79
9456.0	-35134240	-5268838	-15505462	21729.7	-9679.9	-19227.9	42.37	-3.35	-4.87
9458.0	-35090696	-5288204	-15543927	21814.6	-9686.6	-19237.8	42.53	-3.37	-5.01
9460.0	-35046982	-5307584	-15582413	21899.8	-9693.4	-19247.9	42.68	-3.38	-5.11
9462.0	-35003097	-5326978	-15620919	21985.2	-9700.1	-19258.1	42.77	-3.37	-5.15
9464.0	-34959041	-5346385	-15659445	22070.8	-9706.8	-19268.5	42.85	-3.34	-5.18
9466.0	-34914813	-5365805	-15697993	22156.7	-9713.5	-19278.9	43.01	-3.33	-5.26
9468.0	-34870414	-5385239	-15736561	22242.8	-9720.2	-19289.5	43.12	-3.35	-5.33
9470.0	-34825842	-5404686	-15775151	22329.1	-9726.9	-19300.2	43.18	-3.36	-5.38
9472.0	-34781097	-5424146	-15813762	22415.5	-9733.6	-19311.1	43.21	-3.34	-5.44
9474.0	-34736180	-5443620	-15852395	22502.1	-9740.2	-19322.0	43.30	-3.31	-5.51
9476.0	-34691089	-5463107	-15891050	22588.8	-9746.8	-19333.1	43.46	-3.27	-5.59
9478.0	-34645824	-5482607	-15929728	22675.9	-9753.3	-19344.3	43.60	-3.26	-5.66
9480.0	-34600385	-5502120	-15968428	22763.2	-9759.9	-19355.8	43.76	-3.29	-5.75
9482.0	-34554771	-5521647	-16007151	22850.9	-9766.5	-19367.3	43.89	-3.30	-5.83
9484.0	-34508981	-5541196	-16045897	22938.7	-9773.0	-19379.0	43.95	-3.29	-5.86
9486.0	-34463016	-5560739	-16084667	23026.7	-9779.6	-19390.8	44.05	-3.27	-5.91
9488.0	-34416874	-5580305	-16123461	23115.0	-9786.2	-19402.7	44.22	-3.28	-6.01
9490.0	-34370556	-5599884	-16162278	23203.6	-9792.7	-19414.8	44.41	-3.29	-6.11

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
9492.0	-34324060	-5619476	-16201120	23292.5	-9799.3	-19427.1	44.51	-3.27	-6.17
9494.0	-34277386	-5639081	-16239987	23381.7	-9805.8	-19439.5	44.64	-3.25	-6.25
9496.0	-34230533	-5658699	-16278878	23471.2	-9812.3	-19452.2	44.77	-3.26	-6.38
9498.0	-34183501	-5678330	-16317796	23561.0	-9818.9	-19465.0	44.91	-3.28	-6.48
9500.0	-34136288	-5697974	-16356739	23651.2	-9825.4	-19478.0	45.06	-3.29	-6.53
9502.0	-34088896	-5717632	-16395708	23741.4	-9832.0	-19491.1	45.21	-3.26	-6.57
9504.0	-34041322	-5737302	-16434703	23831.9	-9838.4	-19504.3	45.38	-3.22	-6.63
9506.0	-33993568	-5756985	-16473725	23922.8	-9844.9	-19517.7	45.54	-3.21	-6.71
9508.0	-33945631	-5776682	-16512774	24014.1	-9851.3	-19531.2	45.71	-3.20	-6.82
9510.0	-33897511	-5796391	-16551850	24105.9	-9857.7	-19544.9	45.88	-3.20	-6.91
9512.0	-33849207	-5816112	-16590954	24197.9	-9864.1	-19558.8	46.05	-3.19	-6.97
9514.0	-33800719	-5835847	-16630086	24290.2	-9870.4	-19572.8	46.22	-3.19	-7.00
9516.0	-33752046	-5855594	-16669245	24382.8	-9876.9	-19586.9	46.39	-3.19	-7.05
9518.0	-33703188	-5875354	-16708433	24475.8	-9883.2	-19601.1	46.59	-3.20	-7.15
9520.0	-33654143	-5895127	-16747650	24569.3	-9889.6	-19615.5	46.79	-3.21	-7.22
9522.0	-33604910	-5914913	-16786895	24663.3	-9896.1	-19629.9	46.99	-3.21	-7.27
9524.0	-33555489	-5934711	-16826169	24758.0	-9902.4	-19644.3	47.18	-3.21	-7.34
9526.0	-33505878	-5954522	-16865472	24853.0	-9908.5	-19658.4	47.38	-3.22	-7.41
9528.0	-33456076	-5974345	-16904803	24947.9	-9914.6	-19672.6	47.60	-3.23	-7.48
9530.0	-33406080	-5994181	-16944162	25043.3	-9920.8	-19687.1	47.81	-3.24	-7.55
9532.0	-33355889	-6014029	-16983551	25139.1	-9927.3	-19702.1	48.02	-3.26	-7.62
9534.0	-33305502	-6033890	-17022971	25235.3	-9934.0	-19717.7	48.23	-3.29	-7.68
9536.0	-33254918	-6053764	-17062422	25332.0	-9940.6	-19733.4	48.46	-3.31	-7.75
9538.0	-33204138	-6073652	-17101905	25429.1	-9947.2	-19749.2	48.71	-3.33	-7.82
9540.0	-33153161	-6093553	-17141419	25526.8	-9953.7	-19765.0	48.95	-3.36	-7.89
9542.0	-33101989	-6113467	-17180965	25624.9	-9960.4	-19780.7	49.19	-3.38	-7.96
9544.0	-33050621	-6133395	-17220541	25723.5	-9967.1	-19796.4	49.43	-3.40	-8.03
9546.0	-32999055	-6153337	-17260151	25822.5	-9974.0	-19812.3	49.67	-3.42	-8.10
9548.0	-32947290	-6173294	-17299796	25922.1	-9980.8	-19828.5	49.90	-3.45	-8.17
9550.0	-32895343	-6193261	-17339463	26022.1	-9987.7	-19844.9	50.14	-3.47	-8.24
	S-IVB 2ND GUIDANCE CUTOFF								
9550.580	-32880248	-6199051	-17350967	26051.1	-9989.7	-19849.6	50.21	-3.47	-8.26
9552.0	-32843252	-6213227	-17379123	26080.6	-9983.4	-19828.4	12.87	5.85	20.55
9554.0	-32791066	-6233181	-17418737	26106.2	-9971.7	-19787.2	12.82	5.83	20.57
9556.0	-32738821	-6253113	-17458277	26131.8	-9960.1	-19746.3	12.77	5.80	20.58
9558.0	-32686523	-6273019	-17497723	26157.3	-9948.5	-19705.1	12.72	5.77	20.59
9560.0	-32634187	-6292907	-17537100	26182.6	-9937.0	-19663.9	12.67	5.76	20.61
	TRANSLUNAR INJECTION								
9560.580	-32618964	-6298653	-17548445	26190.5	-9933.4	-19652.0	12.65	5.76	20.62

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
9600.0	-31577161	-6685680	-18307080	26656.9	-9699.8	-18833.2	11.00	6.08	20.89
9650.0	-30231434	-7162932	-19222562	27154.8	-9387.8	-17785.5	8.92	6.38	20.97
9700.0	-28863396	-7624266	-20085689	27549.9	-9064.0	-16741.4	6.90	6.56	20.75
9750.0	-27478083	-8069234	-20896986	27846.8	-8734.1	-15714.3	5.00	6.63	20.29
9800.0	-26080247	-8497656	-21657590	28052.0	-8403.0	-14715.3	3.24	6.60	19.64
9850.0	-24674274	-8909588	-22369136	28173.7	-8075.1	-13753.3	1.66	6.50	18.82
9900.0	-23264123	-9305283	-23033649	28220.7	-7754.0	-12834.9	0.25	6.33	17.90
9950.0	-21853296	-9685153	-23653428	28202.2	-7442.5	-11964.6	-0.96	6.12	16.90
10000.0	-20444943	-10049731	-24230956	28127.3	-7142.7	-11145.1	-2.01	5.87	15.87
10050.0	-19041368	-10399639	-24768808	28004.4	-6855.9	-10377.7	-2.88	5.60	14.83
10100.0	-17645065	-10735558	-25269593	27841.6	-6583.2	-9662.3	-3.61	5.31	13.79
10150.0	-16257752	-11058203	-25735888	27646.0	-6325.0	-8997.9	-4.20	5.02	12.79
10200.0	-14880909	-11368301	-26170207	27423.8	-6081.4	-8382.9	-4.67	4.73	11.82
10250.0	-13515719	-11666581	-26574967	27180.7	-5852.2	-7815.2	-5.04	4.44	10.90
10300.0	-12163109	-11953760	-26952472	26921.4	-5637.2	-7292.3	-5.32	4.16	10.03
10350.0	-10823785	-12230530	-27304897	26649.9	-5435.8	-6811.5	-5.53	3.90	9.21
10400.0	-9498267	-12497560	-27634286	26369.7	-5247.5	-6370.4	-5.67	3.64	8.45
10450.0	-8186914	-12755486	-27942547	26083.7	-5071.6	-5966.0	-5.76	3.40	7.74
10500.0	-6889958	-13004914	-28231460	25794.2	-4907.4	-5596.0	-5.81	3.17	7.08
10550.0	-5607521	-13246412	-28502673	25503.2	-4754.3	-5257.7	-5.82	2.96	6.46
10600.0	-4339633	-13480518	-28757715	25212.4	-4611.6	-4948.7	-5.81	2.75	5.90
10650.0	-3086253	-13707735	-28997997	24923.1	-4478.6	-4666.9	-5.76	2.57	5.38
10700.0	-1847282	-13928534	-29224823	24636.3	-4354.8	-4410.2	-5.71	2.39	4.90
10750.0	-622572	-14143356	-29439397	24352.8	-4239.5	-4176.5	-5.63	2.23	4.45
10800.0	589060	-14352613	-29642828	24073.2	-4132.1	-3964.1	-5.55	2.07	4.05
10850.0	1784827	-14556688	-29836136	23798.2	-4032.1	-3771.4	-5.45	1.93	3.67
10900.0	2967964	-14755933	-30020266	23528.1	-3939.0	-3596.7	-5.35	1.80	3.32
10950.0	4137721	-14950730	-30196084	23263.1	-3852.4	-3438.7	-5.25	1.67	3.00
	CSM SEPARATION								
10962.400	4425502	-14998255	-30238339	23198.3	-3832.0	-3402.3	-5.22	1.64	2.93

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									
8629.260	-3207.033	-48.824	-1514.286	10907.5	-425.9	-23120.2	27.41	0.37	12.94
8630.0	-3205.708	-48.876	-1517.104	10927.8	-425.6	-23110.7	27.40	0.38	12.97
8640.0	-3187.498	-49.573	-1555.031	11201.0	-421.8	-22979.4	27.24	0.38	13.29
8650.0	-3168.840	-50.264	-1592.740	11472.6	-418.0	-22844.9	27.08	0.39	13.61
8660.0	-3149.736	-50.949	-1630.225	11742.6	-414.1	-22707.2	26.92	0.39	13.93
8670.0	-3130.189	-51.627	-1667.481	12011.0	-410.1	-22566.3	26.75	0.40	14.25
8680.0	-3110.202	-52.299	-1704.502	12277.6	-406.1	-22422.2	26.58	0.40	14.57
8690.0	-3089.777	-52.964	-1741.284	12542.6	-402.0	-22275.0	26.40	0.41	14.88
8700.0	-3068.918	-53.622	-1777.821	12805.7	-397.9	-22124.7	26.22	0.41	15.19
8710.0	-3047.627	-54.273	-1814.107	13067.1	-393.7	-21971.2	26.04	0.42	15.50
8720.0	-3025.908	-54.918	-1850.139	13326.6	-389.4	-21814.7	25.86	0.43	15.81
8730.0	-3003.763	-55.555	-1885.910	13584.2	-385.1	-21655.1	25.67	0.43	16.11
8740.0	-2981.195	-56.185	-1921.417	13840.0	-380.8	-21492.5	25.47	0.44	16.42
8750.0	-2958.208	-56.808	-1956.653	14093.7	-376.4	-21326.8	25.28	0.44	16.72
8760.0	-2934.806	-57.424	-1991.614	14345.5	-371.9	-21158.2	25.07	0.45	17.01
8770.0	-2910.990	-58.033	-2026.295	14595.3	-367.4	-20986.6	24.87	0.45	17.31
8780.0	-2886.765	-58.634	-2060.691	14843.0	-362.8	-20812.0	24.66	0.46	17.60
8790.0	-2862.134	-59.227	-2094.798	15088.6	-358.2	-20634.5	24.45	0.46	17.89
8800.0	-2837.101	-59.813	-2128.610	15332.1	-353.6	-20454.2	24.24	0.47	18.18
8810.0	-2811.669	-60.391	-2162.123	15573.5	-348.8	-20270.9	24.02	0.47	18.47
8820.0	-2785.841	-60.961	-2195.332	15812.6	-344.1	-20084.9	23.80	0.48	18.75
8830.0	-2759.621	-61.523	-2228.232	16049.6	-339.3	-19896.0	23.58	0.48	19.03
8840.0	-2733.014	-62.078	-2260.819	16284.2	-334.4	-19704.3	23.35	0.49	19.31
8850.0	-2706.022	-62.624	-2293.088	16516.6	-329.5	-19509.8	23.12	0.49	19.58
8860.0	-2678.649	-63.162	-2325.036	16746.7	-324.5	-19312.6	22.88	0.50	19.86
8870.0	-2650.900	-63.692	-2356.656	16974.4	-319.5	-19112.7	22.65	0.50	20.13
8880.0	-2622.778	-64.214	-2387.945	17199.7	-314.5	-18910.1	22.41	0.50	20.39
8890.0	-2594.287	-64.727	-2418.899	17422.6	-309.4	-18704.9	22.16	0.51	20.66
8900.0	-2565.432	-65.232	-2449.512	17643.1	-304.2	-18497.0	21.91	0.51	20.92
8910.0	-2536.215	-65.728	-2479.782	17861.0	-299.0	-18286.6	21.67	0.52	21.18
8920.0	-2506.642	-66.216	-2509.702	18076.5	-293.8	-18073.5	21.41	0.52	21.43
8930.0	-2476.716	-66.695	-2539.271	18289.4	-288.5	-17858.0	21.16	0.53	21.68
8940.0	-2446.443	-67.166	-2568.482	18499.7	-283.2	-17639.9	20.90	0.53	21.93
8950.0	-2415.825	-67.629	-2597.332	18707.5	-277.9	-17419.4	20.64	0.53	22.18
8960.0	-2384.867	-68.080	-2625.818	18912.6	-272.5	-17196.4	20.37	0.54	22.42
8970.0	-2353.574	-68.524	-2653.934	19115.0	-267.0	-16971.0	20.10	0.54	22.66
8980.0	-2321.950	-68.959	-2681.678	19314.9	-261.5	-16743.2	19.83	0.55	22.90
8990.0	-2289.999	-69.385	-2709.045	19511.8	-256.0	-16513.1	19.56	0.55	23.13
9000.0	-2257.727	-69.802	-2736.031	19706.1	-250.5	-16280.7	19.28	0.55	23.36
9010.0	-2225.137	-70.210	-2762.633	19897.7	-244.9	-16045.9	19.01	0.56	23.59

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
9020.0	-2192.233	-70.608	-2788.846	20086.4	-239.3	-15809.0	18.72	0.56	23.81
9030.0	-2159.022	-70.997	-2814.668	20272.3	-233.6	-15569.8	18.44	0.56	24.03
9040.0	-2125.507	-71.377	-2840.094	20455.4	-227.9	-15328.4	18.15	0.57	24.25
9050.0	-2091.693	-71.747	-2865.121	20635.6	-222.2	-15084.9	17.87	0.57	24.46
9060.0	-2057.585	-72.108	-2889.746	20812.9	-216.4	-14839.2	17.57	0.57	24.67
9070.0	-2023.188	-72.460	-2913.964	20987.2	-210.6	-14591.5	17.28	0.58	24.88
9080.0	-1988.506	-72.802	-2937.774	21158.6	-204.8	-14341.7	16.98	0.58	25.08
9090.0	-1953.544	-73.134	-2961.170	21327.1	-198.9	-14089.9	16.69	0.58	25.28
9100.0	-1918.307	-73.456	-2984.150	21492.5	-193.0	-13836.1	16.38	0.59	25.48
9110.0	-1882.801	-73.769	-3006.712	21655.0	-187.1	-13580.4	16.08	0.59	25.67
9120.0	-1847.030	-74.072	-3028.850	21814.3	-181.2	-13322.8	15.78	0.59	25.86
9130.0	-1810.999	-74.365	-3050.564	21970.7	-175.2	-13063.4	15.48	0.59	26.04
9140.0	-1774.714	-74.649	-3071.849	22124.0	-169.2	-12802.1	15.17	0.60	26.22
9150.0	-1738.178	-74.922	-3092.702	22274.2	-163.2	-12539.1	14.86	0.60	26.40
9160.0	-1701.398	-75.186	-3113.121	22421.3	-157.1	-12274.3	14.54	0.60	26.57
9170.0	-1664.378	-75.440	-3133.103	22565.3	-151.0	-12007.7	14.23	0.60	26.74
9180.0	-1627.130	-75.687	-3152.631	22705.8	-145.1	-11739.0	13.91	0.61	26.91
9190.0	-1589.647	-75.920	-3171.730	22843.4	-139.0	-11469.1	13.58	0.61	27.07
	S-IVB RESTART (ENGINE SOLENOID ACTIVATION)								
9199.200	-1554.966	-76.127	-3188.906	22966.9	-133.3	-11219.4	13.30	0.62	27.20
9200.0	-1551.941	-76.144	-3190.382	22977.6	-132.8	-11197.6	13.28	0.62	27.22
9202.0	-1544.372	-76.188	-3194.060	23004.1	-131.6	-11143.1	13.22	0.62	27.25
9204.0	-1536.792	-76.231	-3197.720	23030.5	-130.3	-11088.6	13.16	0.62	27.28
9206.0	-1529.201	-76.274	-3201.364	23056.8	-129.1	-11034.0	13.11	0.62	27.30
	S-IVB RE-IGNITION (STDV OPEN)								
9207.520	-1523.425	-76.306	-3204.122	23076.6	-128.1	-10992.5	13.06	0.63	27.33
9208.0	-1521.600	-76.316	-3204.991	23083.5	-127.8	-10979.6	15.84	0.57	26.18
9210.0	-1513.987	-76.358	-3208.601	23128.2	-127.2	-10932.6	28.70	-0.05	20.37
9212.0	-1506.361	-76.400	-3212.195	23186.7	-126.8	-10893.0	29.67	0.34	19.49
9214.0	-1498.718	-76.441	-3215.776	23246.6	-126.1	-10854.2	30.15	0.37	19.33
9216.0	-1491.055	-76.483	-3219.344	23307.2	-125.4	-10815.5	30.49	0.34	19.37
9218.0	-1483.373	-76.523	-3222.899	23368.5	-124.7	-10776.7	30.76	0.29	19.50
9220.0	-1475.673	-76.564	-3226.440	23430.3	-124.2	-10737.5	30.99	0.23	19.69
9222.0	-1467.956	-76.604	-3229.967	23492.4	-123.7	-10697.9	31.10	0.25	19.89
9224.0	-1460.221	-76.644	-3233.480	23554.6	-123.2	-10657.9	31.05	0.32	20.05
9226.0	-1452.465	-76.684	-3236.980	23616.5	-122.4	-10617.7	30.89	0.43	20.11
9228.0	-1444.685	-76.724	-3240.467	23678.2	-121.4	-10577.4	30.81	0.55	20.21
9230.0	-1436.883	-76.764	-3243.942	23739.8	-120.3	-10536.8	30.78	0.57	20.32
9232.0	-1429.059	-76.803	-3247.404	23801.3	-119.2	-10496.1	30.76	0.56	20.43

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
9234.0	-1421.214	-76.842	-3250.853	23862.8	-118.1	-10455.1	30.74	0.56	20.53
9236.0	-1413.350	-76.881	-3254.288	23924.3	-116.9	-10414.0	30.72	0.56	20.64
9238.0	-1405.465	-76.919	-3257.709	23985.8	-115.8	-10372.6	30.73	0.59	20.69
9240.0	-1397.560	-76.957	-3261.117	24047.3	-114.6	-10331.2	30.75	0.61	20.74
9242.0	-1389.635	-76.995	-3264.511	24108.8	-113.3	-10289.7	30.76	0.64	20.79
9244.0	-1381.689	-77.032	-3267.891	24170.4	-112.2	-10248.1	30.78	0.67	20.84
9246.0	-1373.723	-77.068	-3271.257	24232.0	-110.9	-10206.4	30.79	0.68	20.91
9248.0	-1365.737	-77.105	-3274.610	24293.5	-109.5	-10164.6	30.79	0.69	20.98
9250.0	-1357.730	-77.141	-3277.949	24355.2	-108.1	-10122.5	30.78	0.71	21.02
9252.0	-1349.704	-77.176	-3281.274	24416.9	-106.6	-10080.4	30.83	0.76	21.08
9254.0	-1341.656	-77.211	-3284.585	24478.6	-105.0	-10038.2	30.87	0.80	21.14
9256.0	-1333.589	-77.245	-3287.882	24540.3	-103.4	-9995.9	30.87	0.82	21.18
9258.0	-1325.501	-77.279	-3291.165	24602.1	-101.7	-9953.5	30.87	0.84	21.22
9260.0	-1317.393	-77.312	-3294.434	24663.9	-100.0	-9911.0	30.89	0.86	21.25
9262.0	-1309.265	-77.345	-3297.690	24725.7	-98.3	-9868.5	30.90	0.87	21.29
9264.0	-1301.116	-77.377	-3300.931	24787.6	-96.5	-9825.9	30.92	0.90	21.33
9266.0	-1292.946	-77.408	-3304.158	24849.4	-94.6	-9783.2	30.94	0.93	21.39
9268.0	-1284.757	-77.439	-3307.371	24911.3	-92.8	-9740.3	30.94	0.95	21.46
9270.0	-1276.547	-77.469	-3310.571	24973.2	-90.8	-9697.4	30.91	0.97	21.51
9272.0	-1268.317	-77.499	-3313.755	25035.1	-88.9	-9654.3	30.92	0.99	21.55
9274.0	-1260.066	-77.528	-3316.926	25096.9	-86.8	-9611.2	30.95	1.02	21.59
9276.0	-1251.795	-77.556	-3320.083	25158.8	-84.8	-9568.0	30.93	1.04	21.62
9278.0	-1243.504	-77.583	-3323.225	25220.7	-82.7	-9524.7	30.89	1.04	21.65
9280.0	-1235.192	-77.610	-3326.353	25282.5	-80.6	-9481.4	30.87	1.05	21.69
9282.0	-1226.860	-77.637	-3329.467	25344.2	-78.4	-9438.0	30.89	1.07	21.73
9284.0	-1218.507	-77.662	-3332.566	25406.1	-76.3	-9394.5	30.92	1.09	21.79
9286.0	-1210.135	-77.687	-3335.651	25468.0	-74.1	-9350.8	30.94	1.12	21.83
9288.0	-1201.741	-77.711	-3338.722	25529.9	-71.8	-9307.2	30.96	1.15	21.86
9290.0	-1193.328	-77.734	-3341.778	25591.8	-69.5	-9263.4	30.98	1.18	21.89
9292.0	-1184.894	-77.756	-3344.820	25653.8	-67.1	-9219.6	30.98	1.19	21.94
9294.0	-1176.439	-77.778	-3347.848	25715.8	-64.6	-9175.6	30.96	1.22	22.00
9296.0	-1167.965	-77.799	-3350.860	25777.7	-62.2	-9131.6	30.93	1.24	22.05
9298.0	-1159.470	-77.819	-3353.859	25839.6	-59.7	-9087.5	30.93	1.26	22.07
9300.0	-1150.954	-77.838	-3356.843	25901.5	-57.1	-9043.3	30.95	1.27	22.10
9302.0	-1142.418	-77.857	-3359.812	25963.4	-54.6	-8999.1	30.98	1.28	22.14
9304.0	-1133.862	-77.874	-3362.767	26025.4	-52.0	-8954.8	31.01	1.29	22.18
9306.0	-1125.285	-77.891	-3365.707	26087.5	-49.4	-8910.4	31.03	1.31	22.21
9308.0	-1116.688	-77.907	-3368.633	26149.5	-46.7	-8865.9	31.02	1.33	22.25
9310.0	-1108.071	-77.922	-3371.544	26211.6	-44.0	-8821.4	31.01	1.38	22.30
9312.0	-1099.433	-77.936	-3374.440	26273.6	-41.2	-8776.8	31.01	1.41	22.34
9314.0	-1090.774	-77.949	-3377.322	26335.7	-38.4	-8732.1	31.01	1.42	22.36
9316.0	-1082.096	-77.961	-3380.189	26397.7	-35.5	-8687.3	31.02	1.43	22.40
9318.0	-1073.396	-77.972	-3383.041	26459.8	-32.6	-8642.5	31.02	1.45	22.45

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
9320.0	-1064.677	-77.982	-3385.878	26521.9	-29.7	-8597.5	31.03	1.47	22.50
9322.0	-1055.937	-77.992	-3388.701	26583.9	-26.8	-8552.5	31.03	1.47	22.54
9324.0	-1047.176	-78.000	-3391.508	26646.0	-23.8	-8507.4	31.05	1.48	22.57
9326.0	-1038.395	-78.007	-3394.301	26708.2	-20.8	-8462.2	31.06	1.51	22.59
9328.0	-1029.594	-78.014	-3397.079	26770.2	-17.7	-8417.0	31.00	1.55	22.63
9330.0	-1020.772	-78.019	-3399.842	26832.1	-14.6	-8371.7	30.98	1.57	22.67
9332.0	-1011.930	-78.023	-3402.590	26894.7	-11.4	-8326.5	31.49	1.61	22.58
9334.0	-1003.067	-78.027	-3405.324	26958.8	-8.1	-8281.6	32.56	1.67	22.32
9336.0	-994.182	-78.029	-3408.042	27025.1	-4.7	-8237.3	33.83	1.72	21.98
9338.0	-985.275	-78.030	-3410.747	27093.7	-1.2	-8193.6	34.74	1.76	21.72
9340.0	-976.346	-78.029	-3413.436	27163.6	2.4	-8150.2	35.11	1.83	21.64
9342.0	-967.393	-78.028	-3416.112	27234.0	6.2	-8106.9	35.23	1.92	21.65
9344.0	-958.417	-78.025	-3418.773	27304.5	10.3	-8063.5	35.25	1.97	21.71
9346.0	-949.418	-78.021	-3421.420	27374.9	14.8	-8019.9	35.31	2.02	21.77
9348.0	-940.396	-78.016	-3424.053	27445.4	19.5	-7976.2	35.35	2.04	21.82
9350.0	-931.350	-78.008	-3426.671	27516.0	24.0	-7932.4	35.33	2.05	21.85
9352.0	-922.282	-78.000	-3429.275	27586.6	28.3	-7888.7	35.32	2.05	21.83
9354.0	-913.190	-77.990	-3431.864	27657.3	32.4	-7845.1	35.37	2.05	21.80
9356.0	-904.074	-77.978	-3434.440	27728.1	36.5	-7801.5	35.43	2.05	21.78
9358.0	-894.936	-77.966	-3437.000	27799.1	40.6	-7757.9	35.49	2.07	21.84
9360.0	-885.774	-77.952	-3439.547	27870.2	44.7	-7713.7	35.54	2.09	21.87
9362.0	-876.588	-77.936	-3442.078	27941.4	48.8	-7669.0	35.59	2.11	21.90
9364.0	-867.379	-77.920	-3444.595	28012.7	53.0	-7624.5	35.65	2.14	21.93
9366.0	-858.147	-77.901	-3447.098	28084.1	57.4	-7580.7	35.70	2.17	21.95
9368.0	-848.891	-77.882	-3449.586	28155.5	61.7	-7537.5	35.74	2.20	21.98
9370.0	-839.612	-77.861	-3452.060	28227.0	66.2	-7494.4	35.80	2.23	22.02
9372.0	-830.309	-77.838	-3454.519	28298.6	70.8	-7450.7	35.85	2.26	22.08
9374.0	-820.982	-77.814	-3456.965	28370.3	75.4	-7406.5	35.92	2.29	22.11
9376.0	-811.632	-77.789	-3459.395	28442.2	80.1	-7362.2	36.01	2.34	22.11
9378.0	-802.259	-77.761	-3461.811	28514.3	84.8	-7318.0	36.06	2.37	22.12
9380.0	-792.861	-77.733	-3464.213	28586.4	89.6	-7273.7	36.06	2.41	22.14
9382.0	-783.440	-77.702	-3466.600	28658.6	94.5	-7229.4	36.07	2.45	22.17
9384.0	-773.995	-77.671	-3468.972	28730.8	99.4	-7185.1	36.14	2.48	22.21
9386.0	-764.526	-77.637	-3471.330	28803.2	104.4	-7140.6	36.23	2.49	22.24
9388.0	-755.033	-77.602	-3473.673	28875.8	109.4	-7096.1	36.32	2.51	22.25
9390.0	-745.516	-77.565	-3476.001	28948.5	114.5	-7051.6	36.40	2.55	22.26
9392.0	-735.976	-77.526	-3478.315	29021.4	119.6	-7007.1	36.44	2.58	22.26
9394.0	-726.411	-77.486	-3480.614	29094.3	124.8	-6962.6	36.48	2.61	22.30
9396.0	-716.822	-77.444	-3482.899	29167.3	130.1	-6917.9	36.47	2.64	22.34
9398.0	-707.210	-77.401	-3485.168	29240.3	135.4	-6873.2	36.52	2.67	22.38
9400.0	-697.573	-77.355	-3487.423	29313.6	140.8	-6828.4	36.60	2.70	22.40
9402.0	-687.912	-77.308	-3489.664	29387.5	146.4	-6783.6	36.69	2.71	22.41
9404.0	-678.227	-77.259	-3491.889	29462.0	152.1	-6738.7	36.77	2.73	22.41

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
9406.0	-668.517	-77.208	-3494.100	29536.9	157.9	-6693.8	36.84	2.75	22.43
9408.0	-658.782	-77.155	-3496.296	29611.7	163.7	-6648.8	36.90	2.79	22.46
9410.0	-649.023	-77.100	-3498.477	29686.3	169.5	-6603.9	36.97	2.83	22.50
9412.0	-639.239	-77.043	-3500.643	29760.6	175.4	-6558.9	37.04	2.86	22.53
9414.0	-629.431	-76.985	-3502.795	29834.8	181.2	-6513.9	37.12	2.91	22.55
9416.0	-619.599	-76.924	-3504.931	29908.9	187.0	-6468.9	37.20	2.95	22.57
9418.0	-609.742	-76.861	-3507.053	29982.7	192.8	-6423.9	37.27	2.99	22.59
9420.0	-599.860	-76.797	-3509.160	30056.3	198.5	-6378.9	37.35	3.03	22.61
9422.0	-589.955	-76.731	-3511.252	30129.9	204.4	-6333.8	37.44	3.07	22.63
9424.0	-580.025	-76.663	-3513.330	30204.0	210.3	-6288.7	37.53	3.10	22.64
9426.0	-570.071	-76.592	-3515.392	30278.7	216.4	-6243.5	37.62	3.11	22.65
9428.0	-560.092	-76.520	-3517.440	30353.9	222.6	-6198.2	37.72	3.13	22.64
9430.0	-550.089	-76.446	-3519.473	30429.5	228.9	-6152.9	37.79	3.16	22.67
9432.0	-540.060	-76.369	-3521.491	30505.1	235.3	-6107.6	37.85	3.21	22.70
9434.0	-530.007	-76.291	-3523.493	30580.8	241.8	-6062.2	37.94	3.25	22.70
9436.0	-519.928	-76.210	-3525.481	30656.8	248.3	-6016.8	38.03	3.29	22.68
9438.0	-509.825	-76.127	-3527.454	30733.1	255.0	-5971.4	38.11	3.34	22.68
9440.0	-499.696	-76.042	-3529.412	30809.5	261.7	-5925.9	38.18	3.37	22.71
9442.0	-489.543	-75.955	-3531.356	30885.5	268.5	-5880.3	38.27	3.40	22.72
9444.0	-479.364	-75.866	-3533.284	30960.9	275.2	-5834.5	38.36	3.43	22.75
9446.0	-469.160	-75.774	-3535.197	31036.7	282.0	-5788.8	38.45	3.47	22.78
9448.0	-458.932	-75.680	-3537.094	31113.6	288.9	-5743.2	38.54	3.50	22.81
9450.0	-448.678	-75.584	-3538.977	31191.9	296.0	-5697.7	38.61	3.53	22.83
9452.0	-438.398	-75.485	-3540.845	31270.6	303.3	-5652.3	38.69	3.56	22.84
9454.0	-428.092	-75.384	-3542.698	31348.8	310.5	-5606.7	38.77	3.60	22.86
9456.0	-417.760	-75.281	-3544.536	31426.6	317.8	-5561.0	38.87	3.64	22.86
9458.0	-407.403	-75.175	-3546.359	31504.5	325.1	-5515.3	39.07	3.68	22.85
9460.0	-397.020	-75.067	-3548.167	31582.8	332.5	-5469.6	39.24	3.72	22.87
9462.0	-386.612	-74.956	-3549.960	31661.4	340.0	-5423.8	39.32	3.75	22.91
9464.0	-376.177	-74.843	-3551.738	31740.2	347.6	-5378.0	39.39	3.80	22.95
9466.0	-365.717	-74.727	-3553.500	31819.1	355.2	-5332.0	39.55	3.85	22.99
9468.0	-355.230	-74.609	-3555.248	31898.4	362.9	-5286.0	39.68	3.87	23.01
9470.0	-344.718	-74.488	-3556.980	31977.8	370.7	-5240.0	39.75	3.88	23.02
9472.0	-334.179	-74.365	-3558.697	32057.4	378.5	-5194.0	39.79	3.92	23.01
9474.0	-323.614	-74.239	-3560.400	32137.1	386.4	-5148.0	39.88	3.99	23.03
9476.0	-313.022	-74.110	-3562.086	32217.0	394.5	-5101.9	40.03	4.06	23.08
9478.0	-302.405	-73.979	-3563.758	32297.2	402.7	-5055.7	40.18	4.11	23.12
9480.0	-291.761	-73.845	-3565.415	32377.8	410.9	-5009.4	40.35	4.13	23.15
9482.0	-281.090	-73.709	-3567.056	32458.6	419.2	-4963.1	40.48	4.16	23.17
9484.0	-270.393	-73.569	-3568.682	32539.7	427.6	-4916.7	40.55	4.19	23.20
9486.0	-259.669	-73.427	-3570.293	32620.9	436.0	-4870.3	40.63	4.22	23.23
9488.0	-248.918	-73.282	-3571.888	32702.4	444.5	-4823.8	40.82	4.27	23.27
9490.0	-238.140	-73.135	-3573.468	32784.2	453.1	-4777.3	41.02	4.31	23.31

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
9492.0	-227.335	-72.984	-3575.033	32866.4	461.8	-4730.6	41.13	4.36	23.34
9494.0	-216.504	-72.831	-3576.583	32948.8	470.6	-4683.9	41.25	4.42	23.37
9496.0	-205.645	-72.674	-3578.117	33031.6	479.4	-4637.2	41.42	4.46	23.35
9498.0	-194.758	-72.515	-3579.635	33114.7	488.4	-4590.3	41.59	4.49	23.36
9500.0	-183.845	-72.353	-3581.138	33198.2	497.5	-4543.5	41.73	4.52	23.42
9502.0	-172.903	-72.187	-3582.626	33281.8	506.6	-4496.6	41.85	4.57	23.50
9504.0	-161.935	-72.019	-3584.099	33365.6	515.8	-4449.6	42.00	4.64	23.57
9506.0	-150.938	-71.848	-3585.555	33449.7	525.1	-4402.4	42.17	4.69	23.62
9508.0	-139.914	-71.673	-3586.997	33534.4	534.6	-4355.1	42.35	4.75	23.65
9510.0	-128.862	-71.496	-3588.422	33619.4	544.2	-4307.7	42.52	4.81	23.69
9512.0	-117.782	-71.315	-3589.833	33704.7	553.8	-4260.2	42.68	4.85	23.75
9514.0	-106.674	-71.131	-3591.227	33790.3	563.6	-4212.6	42.83	4.88	23.85
9516.0	-95.537	-70.944	-3592.606	33876.1	573.4	-4164.8	42.99	4.91	23.92
9518.0	-84.372	-70.754	-3593.969	33962.4	583.2	-4116.9	43.20	4.95	23.97
9520.0	-73.179	-70.560	-3595.316	34049.1	593.2	-4068.8	43.40	4.98	24.04
9522.0	-61.957	-70.363	-3596.647	34136.2	603.2	-4020.5	43.57	5.02	24.13
9524.0	-50.707	-70.163	-3597.963	34223.8	613.3	-3971.7	43.75	5.06	24.20
9526.0	-39.427	-69.960	-3599.262	34311.5	623.6	-3922.4	43.95	5.09	24.28
9528.0	-28.119	-69.753	-3600.545	34399.1	633.9	-3873.2	44.15	5.12	24.36
9530.0	-16.781	-69.542	-3601.811	34487.3	644.2	-3823.9	44.36	5.15	24.44
9532.0	-5.413	-69.328	-3603.061	34576.2	654.5	-3774.9	44.56	5.18	24.51
9534.0	5.984	-69.111	-3604.294	34665.7	664.9	-3726.0	44.77	5.20	24.59
9536.0	17.411	-68.890	-3605.511	34755.6	675.3	-3677.1	44.99	5.22	24.68
9538.0	28.869	-68.666	-3606.712	34845.9	686.0	-3627.8	45.22	5.24	24.78
9540.0	40.357	-68.438	-3607.896	34936.6	696.6	-3578.2	45.45	5.26	24.88
9542.0	51.874	-68.207	-3609.063	35027.6	707.2	-3528.2	45.68	5.29	24.97
9544.0	63.421	-67.972	-3610.214	35119.1	717.7	-3478.0	45.91	5.32	25.06
9546.0	74.999	-67.734	-3611.349	35211.0	728.3	-3427.6	46.14	5.34	25.14
9548.0	86.607	-67.492	-3612.468	35303.5	739.0	-3377.2	46.37	5.36	25.24
9550.0	98.243	-67.247	-3613.570	35396.4	749.8	-3326.7	46.59	5.39	25.33
S-IVB 2ND GUIDANCE CUTOFF									
9550.580	101.621	-67.176	-3613.886	35423.4	752.9	-3312.0	46.66	5.39	25.36
9552.0	109.897	-67.000	-3614.655	35435.7	755.8	-3271.0	-1.04	0.66	29.15
9554.0	121.561	-66.751	-3615.722	35433.5	757.0	-3212.7	-1.10	0.62	29.13
9556.0	133.225	-66.501	-3616.770	35431.4	758.3	-3154.6	-1.14	0.58	29.10
9558.0	144.888	-66.251	-3617.797	35429.0	759.4	-3096.5	-1.19	0.54	29.07
9560.0	156.549	-66.001	-3618.808	35426.6	760.5	-3038.4	-1.25	0.51	29.06
TRANSLUNAR INJECTION									
9560.580	159.930	-65.928	-3619.086	35426.2	761.1	-3021.2	-1.27	0.51	29.05

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
9600.0	389.529	-60.927	-3635.009	35341.5	780.3	-1888.4	-3.04	0.46	28.39
9650.0	679.585	-54.415	-3644.779	35137.9	801.8	-495.1	-5.09	0.39	27.30
9700.0	967.559	-47.740	-3643.326	34837.6	820.0	837.1	-6.90	0.33	25.97
9750.0	1252.708	-40.928	-3631.197	34453.5	835.1	2098.2	-8.44	0.27	24.46
9800.0	1534.397	-34.005	-3609.009	33998.9	847.1	3280.9	-9.72	0.21	22.85
9850.0	1812.101	-26.994	-3577.425	33487.0	856.4	4381.5	-10.73	0.15	21.18
9900.0	2085.401	-19.917	-3537.129	32930.5	863.1	5398.3	-11.51	0.11	19.51
9950.0	2353.977	-12.795	-3488.808	32340.9	867.5	6332.2	-12.06	0.06	17.87
10000.0	2617.601	-5.645	-3433.135	31728.5	869.9	7185.6	-12.43	0.03	16.29
10050.0	2876.123	1.517	-3370.760	31102.0	870.6	7961.9	-12.63	-0.01	14.79
10100.0	3129.457	8.679	-3302.298	30469.0	869.7	8665.7	-12.69	-0.04	13.38
10150.0	3377.577	15.827	-3228.327	29835.6	867.5	9301.7	-12.64	-0.06	12.08
10200.0	3620.501	22.953	-3149.384	29206.8	864.2	9875.0	-12.51	-0.08	10.88
10250.0	3858.283	30.048	-3065.964	28586.5	860.1	10390.7	-12.31	-0.09	9.77
10300.0	4091.005	37.106	-2978.520	27977.7	855.1	10853.8	-12.05	-0.11	8.77
10350.0	4318.774	44.120	-2887.466	27382.7	849.6	11268.9	-11.76	-0.12	7.86
10400.0	4541.708	51.087	-2793.177	26803.1	843.6	11640.6	-11.43	-0.13	7.03
10450.0	4759.941	58.003	-2695.994	26240.0	837.2	11972.9	-11.10	-0.13	6.28
10500.0	4973.610	64.864	-2596.225	25694.2	830.5	12269.7	-10.75	-0.14	5.61
10550.0	5182.860	71.670	-2494.148	25165.9	823.5	12534.5	-10.39	-0.14	5.00
10600.0	5387.837	78.418	-2390.013	24655.4	816.5	12770.4	-10.04	-0.14	4.45
10650.0	5588.684	85.107	-2284.045	24162.4	809.3	12980.4	-9.69	-0.15	3.96
10700.0	5785.547	91.736	-2176.448	23686.9	802.0	13166.9	-9.34	-0.15	3.51
10750.0	5978.566	98.306	-2067.404	23228.3	794.8	13332.3	-9.00	-0.15	3.11
10800.0	6167.881	104.817	-1957.078	22786.2	787.5	13478.8	-8.68	-0.14	2.75
10850.0	6353.624	111.267	-1845.619	22360.2	780.3	13608.1	-8.36	-0.14	2.43
10900.0	6535.925	117.659	-1733.159	21949.7	773.1	13722.1	-8.06	-0.14	2.14
10950.0	6714.911	123.991	-1619.820	21554.1	766.0	13822.2	-7.76	-0.14	1.87
CSM SEPARATION									
10962.400	6758.733	125.552	-1591.572	21458.6	764.3	13844.8	-7.69	-0.14	1.81

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										
8629.260	3546.901	92.3692	-32.5025	91.89	0.03	24242.8	91.79	0.03	25567.6	645968
8630.0	3546.903	92.4257	-32.5040	91.85	0.03	24242.9	91.76	0.03	25567.6	646010
8640.0	3546.932	93.1897	-32.5223	91.39	0.03	24242.7	91.32	0.03	25567.4	646174
8650.0	3546.956	93.9540	-32.5354	90.94	0.03	24242.5	90.89	0.03	25567.3	646335
8660.0	3546.980	94.7184	-32.5433	90.48	0.04	24242.3	90.45	0.03	25567.1	646491
8670.0	3547.005	95.4830	-32.5461	90.02	0.04	24242.2	90.02	0.03	25567.0	646644
8680.0	3547.030	96.2475	-32.5437	89.56	0.04	24242.0	89.58	0.03	25566.8	646793
8690.0	3547.055	97.0119	-32.5362	89.10	0.04	24241.9	89.15	0.03	25566.7	646938
8700.0	3547.080	97.7761	-32.5235	88.64	0.04	24241.7	88.71	0.03	25566.5	647079
8710.0	3547.106	98.5401	-32.5057	88.19	0.04	24241.6	88.28	0.04	25566.3	647216
8720.0	3547.132	99.3036	-32.4827	87.73	0.04	24241.4	87.85	0.04	25566.2	647349
8730.0	3547.159	100.0667	-32.4546	87.27	0.04	24241.3	87.41	0.04	25566.0	647478
8740.0	3547.185	100.8293	-32.4214	86.82	0.04	24241.1	86.98	0.04	25565.9	647603
8750.0	3547.212	101.5912	-32.3830	86.36	0.04	24241.0	86.55	0.04	25565.8	647724
8760.0	3547.239	102.3523	-32.3396	85.91	0.04	24240.9	86.12	0.04	25565.6	647841
8770.0	3547.267	103.1126	-32.2910	85.45	0.04	24240.8	85.69	0.04	25565.5	647955
8780.0	3547.295	103.8721	-32.2374	85.00	0.04	24240.7	85.26	0.04	25565.3	648064
8790.0	3547.323	104.6305	-32.1787	84.55	0.04	24240.6	84.83	0.04	25565.2	648169
8800.0	3547.351	105.3878	-32.1150	84.10	0.04	24240.5	84.41	0.04	25565.1	648271
8810.0	3547.380	106.1439	-32.0462	83.65	0.04	24240.4	83.98	0.04	25564.9	648369
8820.0	3547.408	106.8988	-31.9725	83.21	0.04	24240.3	83.56	0.04	25564.8	648462
8830.0	3547.437	107.6524	-31.8938	82.76	0.04	24240.3	83.14	0.04	25564.7	648552
8840.0	3547.467	108.4045	-31.8101	82.32	0.04	24240.2	82.72	0.04	25564.6	648638
8850.0	3547.496	109.1552	-31.7215	81.88	0.04	24240.1	82.30	0.04	25564.4	648721
8860.0	3547.526	109.9043	-31.6280	81.44	0.04	24240.1	81.88	0.04	25564.3	648799
8870.0	3547.556	110.6517	-31.5296	81.00	0.04	24240.0	81.47	0.04	25564.2	648874
8880.0	3547.587	111.3975	-31.4264	80.56	0.04	24240.0	81.06	0.04	25564.1	648945
8890.0	3547.617	112.1414	-31.3183	80.13	0.04	24240.0	80.65	0.04	25564.0	649013
8900.0	3547.648	112.8835	-31.2055	79.70	0.04	24239.9	80.24	0.04	25563.8	649077
8910.0	3547.679	113.6237	-31.0879	79.27	0.04	24239.9	79.83	0.04	25563.7	649137
8920.0	3547.710	114.3619	-30.9657	78.85	0.04	24239.9	79.43	0.04	25563.6	649194
8930.0	3547.741	115.0981	-30.8387	78.42	0.05	24239.9	79.03	0.04	25563.5	649247
8940.0	3547.773	115.8321	-30.7071	78.00	0.05	24239.8	78.63	0.04	25563.4	649297
8950.0	3547.805	116.5640	-30.5709	77.58	0.05	24239.8	78.24	0.04	25563.3	649344
8960.0	3547.837	117.2936	-30.4301	77.17	0.05	24239.8	77.84	0.04	25563.2	649387
8970.0	3547.869	118.0210	-30.2847	76.76	0.05	24239.8	77.45	0.04	25563.1	649427
8980.0	3547.901	118.7461	-30.1349	76.35	0.05	24239.8	77.07	0.04	25563.0	649464
8990.0	3547.934	119.4688	-29.9807	75.94	0.05	24239.8	76.68	0.04	25562.9	649498
9000.0	3547.967	120.1891	-29.8220	75.54	0.05	24239.8	76.30	0.04	25562.8	649528
9010.0	3547.999	120.9069	-29.6589	75.14	0.05	24239.9	75.93	0.04	25562.7	649556

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
9020.0	3548.033	121.6222	-29.4916	74.74	0.05	24239.9	75.55	0.05	25562.6	649581
9030.0	3548.066	122.3350	-29.3199	74.35	0.05	24239.9	75.18	0.05	25562.5	649603
9040.0	3548.099	123.0451	-29.1440	73.96	0.05	24239.9	74.81	0.05	25562.4	649622
9050.0	3548.133	123.7527	-28.9640	73.58	0.05	24240.0	74.45	0.05	25562.3	649638
9060.0	3548.167	124.4577	-28.7798	73.19	0.05	24240.0	74.09	0.05	25562.2	649652
9070.0	3548.200	125.1599	-28.5914	72.81	0.05	24240.0	73.73	0.05	25562.1	649663
9080.0	3548.234	125.8595	-28.3991	72.44	0.05	24240.1	73.37	0.05	25562.0	649671
9090.0	3548.269	126.5563	-28.2027	72.07	0.05	24240.1	73.02	0.05	25561.9	649678
9100.0	3548.303	127.2504	-28.0024	71.70	0.05	24240.2	72.67	0.05	25561.8	649682
9110.0	3548.337	127.9417	-27.7981	71.33	0.05	24240.2	72.33	0.05	25561.7	649683
9120.0	3548.372	128.6302	-27.5900	70.97	0.05	24240.3	71.99	0.05	25561.6	649683
9130.0	3548.406	129.3159	-27.3781	70.62	0.05	24240.4	71.65	0.05	25561.6	649680
9140.0	3548.441	129.9988	-27.1624	70.26	0.05	24240.6	71.32	0.05	25561.6	649675
9150.0	3548.476	130.6789	-26.9430	69.91	0.05	24240.8	70.99	0.05	25561.6	649669
9160.0	3548.511	131.3561	-26.7200	69.57	0.05	24240.9	70.67	0.05	25561.7	649661
9170.0	3548.546	132.0305	-26.4933	69.23	0.05	24241.1	70.35	0.05	25561.7	649651
9180.0	3548.572	132.7018	-26.2631	68.89	0.05	24240.9	70.03	0.05	25561.3	649584
9190.0	3548.607	133.3705	-26.0293	68.56	0.05	24241.0	69.71	0.05	25561.3	649567
S-IVB RESTART (ENGINE SOLENOID ACTIVATION)										
9199.200	3548.638	133.9831	-25.8112	68.25	0.05	24241.1	69.43	0.05	25561.2	649549
9200.0	3548.641	134.0363	-25.7921	68.23	0.05	24241.1	69.40	0.05	25561.2	649549
9202.0	3548.648	134.1691	-25.7442	68.16	0.05	24241.1	69.34	0.05	25561.2	649545
9204.0	3548.655	134.3019	-25.6962	68.10	0.05	24241.2	69.28	0.05	25561.2	649542
9206.0	3548.662	134.4346	-25.6480	68.03	0.05	24241.3	69.22	0.05	25561.3	649539
S-IVB RE-IGNITION (STDV OPEN)										
9207.520	3548.668	134.5354	-25.6113	67.98	0.05	24241.4	69.17	0.05	25561.4	649536
9208.0	3548.670	134.5672	-25.5997	67.97	0.05	24242.1	69.16	0.05	25562.0	649536
9210.0	3548.677	134.6998	-25.5512	67.90	0.05	24262.3	69.10	0.05	25582.2	649533
9212.0	3548.684	134.8323	-25.5026	67.84	0.05	24298.4	69.03	0.05	25618.3	649531
9214.0	3548.692	134.9649	-25.4538	67.77	0.05	24336.2	68.97	0.05	25656.1	649530
9216.0	3548.700	135.0976	-25.4047	67.71	0.05	24374.9	68.91	0.05	25694.7	649532
9218.0	3548.708	135.2303	-25.3555	67.65	0.05	24414.2	68.85	0.05	25734.0	649534
9220.0	3548.716	135.3631	-25.3061	67.58	0.05	24454.0	68.79	0.05	25773.7	649539
9222.0	3548.725	135.4960	-25.2564	67.52	0.05	24494.1	68.73	0.05	25813.8	649545
9224.0	3548.734	135.6289	-25.2066	67.46	0.05	24534.2	68.66	0.05	25853.9	649551
9226.0	3548.742	135.7619	-25.1566	67.39	0.05	24574.2	68.60	0.05	25893.8	649555
9228.0	3548.750	135.8951	-25.1063	67.33	0.05	24614.0	68.54	0.05	25933.6	649558
9230.0	3548.758	136.0284	-25.0558	67.27	0.05	24653.8	68.48	0.05	25973.4	649559
9232.0	3548.766	136.1619	-25.0050	67.21	0.05	24693.6	68.42	0.05	26013.2	649559

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
9234.0	3549.774	136.2954	-24.9541	67.14	0.05	24733.5	68.36	0.05	26053.0	649559
9236.0	3548.782	136.4291	-24.9029	67.08	0.06	24773.3	68.30	0.05	26092.9	649561
9238.0	3548.791	136.5628	-24.8516	67.02	0.06	24813.3	68.24	0.05	26132.8	649564
9240.0	3548.800	136.6966	-24.8000	66.96	0.06	24853.4	68.18	0.06	26172.9	649569
9242.0	3548.809	136.8306	-24.7482	66.90	0.06	24893.6	68.12	0.06	26213.1	649575
9244.0	3548.818	136.9646	-24.6962	66.84	0.07	24934.0	68.06	0.06	26253.5	649584
9246.0	3548.828	137.0988	-24.6439	66.78	0.07	24974.5	68.00	0.07	26293.9	649595
9248.0	3548.838	137.2330	-24.5915	66.72	0.07	25015.1	67.95	0.07	26334.5	649609
9250.0	3548.849	137.3673	-24.5388	66.66	0.08	25055.9	67.89	0.07	26375.3	649626
9252.0	3548.861	137.5018	-24.4860	66.60	0.08	25096.7	67.83	0.08	26416.1	649648
9254.0	3548.873	137.6363	-24.4329	66.54	0.09	25137.7	67.77	0.08	26457.1	649674
9256.0	3548.886	137.7710	-24.3796	66.48	0.09	25178.9	67.71	0.09	26498.2	649705
9258.0	3548.900	137.9057	-24.3261	66.42	0.10	25220.2	67.65	0.10	26539.5	649740
9260.0	3548.915	138.0406	-24.2724	66.36	0.11	25261.6	67.60	0.10	26580.9	649782
9262.0	3548.931	138.1755	-24.2184	66.30	0.11	25303.2	67.54	0.11	26622.5	649830
9264.0	3548.948	138.3106	-24.1642	66.24	0.12	25344.9	67.48	0.12	26664.2	649884
9266.0	3548.967	138.4457	-24.1099	66.18	0.13	25386.8	67.42	0.12	26706.1	649945
9268.0	3548.986	138.5810	-24.0553	66.12	0.14	25428.7	67.37	0.13	26748.0	650014
9270.0	3549.007	138.7163	-24.0005	66.06	0.15	25470.8	67.31	0.14	26790.1	650090
9272.0	3549.029	138.8518	-23.9454	66.00	0.16	25512.9	67.25	0.15	26832.2	650174
9274.0	3549.053	138.9874	-23.8902	65.95	0.17	25555.2	67.20	0.16	26874.5	650267
9276.0	3549.078	139.1231	-23.8347	65.89	0.18	25597.6	67.14	0.17	26916.9	650370
9278.0	3549.105	139.2588	-23.7791	65.83	0.19	25640.1	67.08	0.18	26959.4	650482
9280.0	3549.133	139.3947	-23.7232	65.77	0.20	25682.6	67.03	0.19	27002.0	650604
9282.0	3549.163	139.5307	-23.6671	65.72	0.21	25725.3	66.97	0.20	27044.6	650737
9284.0	3549.195	139.6668	-23.6107	65.66	0.22	25768.1	66.91	0.21	27087.5	650881
9286.0	3549.229	139.8030	-23.5542	65.60	0.24	25811.1	66.86	0.22	27130.4	651036
9288.0	3549.265	139.9393	-23.4974	65.54	0.25	25854.2	66.80	0.24	27173.6	651204
9290.0	3549.303	140.0757	-23.4404	65.49	0.26	25897.5	66.75	0.25	27216.9	651384
9292.0	3549.344	140.2123	-23.3832	65.43	0.28	25940.9	66.69	0.26	27260.3	651577
9294.0	3549.386	140.3489	-23.3258	65.37	0.29	25984.4	66.64	0.28	27303.8	651784
9296.0	3549.431	140.4856	-23.2682	65.32	0.31	26028.0	66.58	0.29	27347.4	652005
9298.0	3549.478	140.6225	-23.2103	65.26	0.32	26071.6	66.53	0.31	27391.1	652241
9300.0	3549.528	140.7594	-23.1523	65.21	0.34	26115.4	66.47	0.32	27434.9	652491
9302.0	3549.580	140.8964	-23.0940	65.15	0.36	26159.4	66.42	0.34	27478.8	652757
9304.0	3549.635	141.0336	-23.0355	65.10	0.37	26203.5	66.36	0.36	27523.0	653040
9306.0	3549.693	141.1709	-22.9767	65.04	0.39	26247.8	66.31	0.37	27567.3	653338
9308.0	3549.754	141.3082	-22.9178	64.99	0.41	26292.2	66.26	0.39	27611.7	653654
9310.0	3549.817	141.4457	-22.8586	64.93	0.43	26336.7	66.20	0.41	27656.2	653988
9312.0	3549.884	141.5833	-22.7992	64.88	0.45	26381.3	66.15	0.43	27700.9	654340
9314.0	3549.953	141.7210	-22.7396	64.82	0.47	26426.0	66.10	0.45	27745.6	654711
9316.0	3550.026	141.8588	-22.6797	64.77	0.49	26470.8	66.04	0.47	27790.5	655101
9318.0	3550.102	141.9967	-22.6197	64.71	0.51	26515.8	65.99	0.49	27835.5	655510

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-FL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
9320.0	3550.181	142.1348	-22.5594	64.66	0.53	26560.8	65.94	0.51	27880.6	655941
9322.0	3550.264	142.2729	-22.4989	64.61	0.55	26606.0	65.88	0.53	27925.8	656392
9324.0	3550.351	142.4112	-22.4382	64.55	0.58	26651.4	65.83	0.55	27971.2	656864
9326.0	3550.441	142.5495	-22.3773	64.50	0.60	26696.8	65.78	0.57	28016.7	657359
9328.0	3550.535	142.6880	-22.3161	64.44	0.62	26742.3	65.73	0.59	28062.3	657876
9330.0	3550.632	142.9265	-22.2547	64.39	0.65	26787.8	65.67	0.62	28107.8	658416
9332.0	3550.734	142.9652	-22.1931	64.34	0.67	26834.1	65.62	0.64	28154.1	658980
9334.0	3550.839	143.1040	-22.1313	64.29	0.70	26882.1	65.57	0.66	28202.1	659568
9336.0	3550.949	143.2429	-22.0692	64.23	0.72	26932.5	65.52	0.69	28252.6	660181
9338.0	3551.063	143.3820	-22.0069	64.18	0.75	26985.4	65.47	0.71	28305.6	660820
9340.0	3551.181	143.5212	-21.9444	64.13	0.78	27039.8	65.42	0.74	28360.0	661485
9342.0	3551.304	143.6606	-21.8816	64.08	0.80	27094.7	65.37	0.77	28415.0	662177
9344.0	3551.431	143.8001	-21.8186	64.03	0.83	27149.8	65.32	0.79	28470.2	662896
9346.0	3551.563	143.9398	-21.7554	63.98	0.86	27205.0	65.27	0.82	28525.5	663644
9348.0	3551.699	144.0797	-21.6919	63.93	0.89	27260.4	65.22	0.85	28581.0	664420
9350.0	3551.841	144.2197	-21.6282	63.88	0.92	27315.9	65.17	0.87	28636.6	665226
9352.0	3551.987	144.3598	-21.5642	63.84	0.95	27371.7	65.12	0.90	28692.4	666062
9354.0	3552.139	144.5001	-21.5000	63.79	0.98	27427.6	65.08	0.93	28748.5	666929
9356.0	3552.296	144.6406	-21.4356	63.74	1.01	27483.8	65.03	0.96	28804.8	667828
9358.0	3552.458	144.7812	-21.3709	63.69	1.04	27540.3	64.98	1.00	28861.3	668761
9360.0	3552.626	144.9220	-21.3060	63.64	1.08	27596.9	64.93	1.03	28918.0	669727
9362.0	3552.799	145.0630	-21.2408	63.59	1.11	27653.6	64.88	1.06	28974.8	670726
9364.0	3552.978	145.2041	-21.1754	63.54	1.14	27710.6	64.83	1.09	29031.9	671759
9366.0	3553.163	145.3453	-21.1098	63.49	1.18	27767.9	64.78	1.12	29089.3	672827
9368.0	3553.354	145.4868	-21.0439	63.44	1.21	27825.6	64.73	1.16	29147.0	673933
9370.0	3553.551	145.6284	-20.9778	63.39	1.25	27883.4	64.69	1.20	29205.0	675078
9372.0	3553.755	145.7701	-20.9114	63.35	1.29	27941.3	64.64	1.23	29263.0	676262
9374.0	3553.966	145.9120	-20.8448	63.30	1.33	27999.4	64.59	1.27	29321.2	677486
9376.0	3554.183	146.0541	-20.7779	63.25	1.37	28057.8	64.54	1.30	29379.7	678749
9378.0	3554.406	146.1963	-20.7108	63.20	1.41	28116.5	64.50	1.34	29438.5	680053
9380.0	3554.637	146.3387	-20.6434	63.16	1.45	28175.3	64.45	1.38	29497.5	681399
9382.0	3554.874	146.4813	-20.5758	63.11	1.49	28234.3	64.40	1.42	29556.6	682786
9384.0	3555.118	146.6240	-20.5080	63.06	1.53	28293.4	64.36	1.46	29615.8	684217
9386.0	3555.370	146.7669	-20.4399	63.02	1.57	28352.8	64.31	1.50	29675.3	685692
9388.0	3555.629	146.9100	-20.3715	62.97	1.61	28412.5	64.26	1.54	29735.1	687211
9390.0	3555.896	147.0532	-20.3030	62.93	1.65	28472.5	64.22	1.58	29795.3	688776
9392.0	3556.170	147.1966	-20.2341	62.88	1.70	28532.7	64.17	1.62	29855.6	690387
9394.0	3556.452	147.3402	-20.1651	62.83	1.74	28593.1	64.13	1.66	29916.1	692046
9396.0	3556.742	147.4839	-20.0957	62.79	1.79	28653.6	64.08	1.71	29976.8	693753
9398.0	3557.040	147.6278	-20.0262	62.74	1.83	28714.2	64.04	1.75	30037.5	695509
9400.0	3557.346	147.7718	-19.9564	62.70	1.88	28775.3	63.99	1.80	30098.7	697314
9402.0	3557.661	147.9161	-19.8863	62.65	1.92	28837.0	63.95	1.84	30160.6	699170
9404.0	3557.984	148.0605	-19.8160	62.61	1.97	28899.4	63.90	1.88	30223.2	701078

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
9406.0	3558.315	148.2050	-19.7455	62.57	2.02	28962.3	63.86	1.93	30286.3	703037
9408.0	3558.656	148.3498	-19.6746	62.52	2.07	29025.3	63.82	1.98	30349.4	705049
9410.0	3559.005	148.4947	-19.6036	62.48	2.12	29088.1	63.77	2.02	30412.4	707115
9412.0	3559.363	148.6398	-19.5323	62.44	2.17	29150.9	63.73	2.07	30475.3	709236
9414.0	3559.730	148.7851	-19.4607	62.39	2.22	29213.6	63.69	2.12	30538.2	711413
9416.0	3560.107	148.9305	-19.3890	62.35	2.27	29276.2	63.64	2.17	30601.0	713647
9418.0	3560.494	149.0761	-19.3169	62.30	2.32	29338.8	63.60	2.22	30663.8	715940
9420.0	3560.890	149.2219	-19.2446	62.26	2.38	29401.2	63.56	2.27	30726.4	718292
9422.0	3561.296	149.3678	-19.1721	62.22	2.43	29463.8	63.51	2.33	30789.2	720704
9424.0	3561.712	149.5139	-19.0993	62.18	2.48	29526.9	63.47	2.38	30852.4	723178
9426.0	3562.139	149.6602	-19.0263	62.13	2.54	29590.7	63.43	2.43	30916.4	725713
9428.0	3562.575	149.8066	-18.9530	62.09	2.60	29655.2	63.39	2.48	30981.1	728312
9430.0	3563.023	149.9532	-18.8795	62.05	2.65	29720.1	63.34	2.54	31046.1	730974
9432.0	3563.480	150.1000	-18.8057	62.01	2.71	29785.1	63.30	2.59	31111.4	733700
9434.0	3563.949	150.2470	-18.7317	61.97	2.77	29850.4	63.26	2.65	31176.8	736493
9436.0	3564.429	150.3941	-18.6574	61.93	2.82	29916.0	63.22	2.70	31242.7	739352
9438.0	3564.920	150.5415	-18.5829	61.89	2.88	29982.0	63.18	2.76	31308.9	742278
9440.0	3565.422	150.6890	-18.5081	61.85	2.94	30048.3	63.14	2.82	31375.4	745273
9442.0	3565.935	150.8366	-18.4331	61.80	3.00	30114.1	63.10	2.88	31441.4	748338
9444.0	3566.460	150.9845	-18.3578	61.76	3.06	30179.6	63.06	2.93	31507.1	751473
9446.0	3566.997	151.1325	-18.2823	61.72	3.13	30245.4	63.02	2.99	31573.2	754679
9448.0	3567.546	151.2807	-18.2065	61.69	3.19	30312.6	62.98	3.05	31640.6	757958
9450.0	3568.107	151.4290	-18.1305	61.65	3.25	30381.2	62.94	3.11	31709.4	761311
9452.0	3568.680	151.5776	-18.0542	61.61	3.31	30450.3	62.90	3.18	31778.8	764738
9454.0	3569.266	151.7263	-17.9777	61.57	3.38	30519.1	62.86	3.24	31847.8	768242
9456.0	3569.864	151.8752	-17.9009	61.53	3.44	30587.5	62.82	3.30	31916.4	771822
9458.0	3570.475	152.0243	-17.8239	61.49	3.51	30656.1	62.78	3.36	31985.3	775480
9460.0	3571.099	152.1736	-17.7467	61.45	3.58	30725.3	62.74	3.43	32054.7	779218
9462.0	3571.737	152.3231	-17.6692	61.42	3.64	30794.8	62.71	3.49	32124.4	783035
9464.0	3572.387	152.4727	-17.5914	61.38	3.71	30864.5	62.67	3.56	32194.4	786934
9466.0	3573.052	152.6225	-17.5134	61.34	3.78	30934.6	62.63	3.62	32264.8	790915
9468.0	3573.729	152.7725	-17.4351	61.30	3.85	31005.0	62.59	3.69	32335.4	794978
9470.0	3574.421	152.9227	-17.3566	61.27	3.92	31075.7	62.55	3.76	32406.4	799126
9472.0	3575.127	153.0731	-17.2778	61.23	3.99	31146.7	62.52	3.82	32477.6	803360
9474.0	3575.847	153.2237	-17.1988	61.19	4.06	31217.9	62.48	3.89	32549.1	807680
9476.0	3576.581	153.3744	-17.1196	61.16	4.13	31289.3	62.44	3.96	32620.8	812087
9478.0	3577.331	153.5253	-17.0401	61.12	4.20	31361.2	62.41	4.03	32693.0	816584
9480.0	3578.094	153.6764	-16.9603	61.09	4.27	31433.5	62.37	4.10	32765.6	821170
9482.0	3578.873	153.8277	-16.8803	61.05	4.35	31506.2	62.34	4.17	32838.6	825847
9484.0	3579.667	153.9792	-16.8000	61.02	4.42	31579.2	62.30	4.24	32911.8	830616
9486.0	3580.476	154.1309	-16.7195	60.98	4.50	31652.4	62.27	4.31	32985.3	835478
9488.0	3581.301	154.2827	-16.6388	60.95	4.57	31726.0	62.23	4.39	33059.2	840434
9490.0	3582.141	154.4348	-16.5578	60.91	4.65	31800.0	62.20	4.46	33133.6	845485

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
9492.0	3582.997	154.5870	-16.4765	60.88	4.72	31874.4	62.16	4.53	33208.3	850633
9494.0	3583.869	154.7394	-16.3951	60.85	4.80	31949.2	62.13	4.61	33283.4	855878
9496.0	3584.759	154.8920	-16.3133	60.81	4.88	32024.4	62.09	4.68	33358.9	861222
9498.0	3585.663	155.0448	-16.2313	60.78	4.96	32100.2	62.06	4.76	33434.9	866666
9500.0	3586.584	155.1978	-16.1491	60.75	5.04	32176.2	62.03	4.84	33511.3	872211
9502.0	3587.522	155.3510	-16.0666	60.71	5.12	32252.6	61.99	4.91	33588.0	877858
9504.0	3588.478	155.5043	-15.9839	60.68	5.20	32329.2	61.96	4.99	33664.9	883608
9506.0	3589.450	155.6579	-15.9009	60.65	5.28	32406.2	61.93	5.07	33742.3	889463
9508.0	3590.440	155.8117	-15.8176	60.62	5.36	32483.8	61.89	5.15	33820.2	895423
9510.0	3591.447	155.9656	-15.7342	60.59	5.44	32561.8	61.86	5.22	33898.6	901489
9512.0	3592.472	156.1198	-15.6504	60.55	5.52	32640.3	61.83	5.30	33977.4	907663
9514.0	3593.515	156.2741	-15.5664	60.52	5.60	32719.0	61.80	5.38	34056.5	913946
9516.0	3594.576	156.4286	-15.4823	60.49	5.69	32798.1	61.77	5.46	34136.0	920338
9518.0	3595.655	156.5834	-15.3978	60.46	5.77	32877.7	61.74	5.55	34216.0	926843
9520.0	3596.753	156.7383	-15.3131	60.43	5.86	32957.7	61.71	5.63	34296.5	933460
9522.0	3597.869	156.8934	-15.2281	60.40	5.94	33038.5	61.67	5.71	34377.5	940189
9524.0	3599.004	157.0487	-15.1429	60.37	6.03	33119.6	61.64	5.79	34458.9	947032
9526.0	3600.158	157.2043	-15.0575	60.34	6.11	33200.9	61.61	5.87	34540.6	953989
9528.0	3601.330	157.3600	-14.9718	60.31	6.19	33282.2	61.58	5.95	34622.3	961060
9530.0	3602.521	157.5159	-14.8859	60.28	6.28	33364.2	61.55	6.04	34704.7	968246
9532.0	3603.732	157.6720	-14.7997	60.26	6.37	33447.0	61.52	6.12	34787.8	975549
9534.0	3604.962	157.8284	-14.7132	60.23	6.46	33530.5	61.49	6.21	34871.7	982969
9536.0	3606.211	157.9850	-14.6265	60.20	6.54	33614.5	61.47	6.29	34956.1	990509
9538.0	3607.481	158.1417	-14.5396	60.17	6.63	33698.9	61.44	6.38	35041.0	998170
9540.0	3608.770	158.2987	-14.4524	60.14	6.72	33783.8	61.41	6.46	35126.2	1005954
9542.0	3610.080	158.4559	-14.3650	60.11	6.81	33869.1	61.38	6.55	35212.0	1013862
9544.0	3611.411	158.6133	-14.2773	60.09	6.90	33955.0	61.35	6.64	35298.2	1021897
9546.0	3612.763	158.7709	-14.1894	60.06	6.99	34041.3	61.32	6.72	35384.9	1030059
9548.0	3614.136	158.9287	-14.1012	60.03	7.08	34128.3	61.29	6.81	35472.3	1038351
9550.0	3615.531	159.0866	-14.0128	60.00	7.17	34215.9	61.27	6.90	35560.3	1046773
	S-IVB 2ND GUIDANCE CUTOFF									
9550.580	3615.939	159.1324	-13.9871	60.00	7.20	34241.2	61.26	6.93	35585.8	1049239
9552.0	3616.946	159.2446	-13.9242	59.97	7.27	34249.5	61.23	6.99	35594.3	1055321
9554.0	3618.381	159.4025	-13.8355	59.93	7.36	34241.9	61.19	7.08	35586.9	1063988
9556.0	3619.934	159.5601	-13.7468	59.88	7.46	34234.3	61.15	7.17	35579.6	1072767
9558.0	3621.303	159.7175	-13.6581	59.84	7.55	34226.7	61.11	7.26	35572.2	1081646
9560.0	3622.794	159.8746	-13.5693	59.80	7.64	34219.0	61.08	7.35	35564.8	1090654
	TRANSLUNAR INJECTION									
9560.590	3623.218	159.9201	-13.5435	59.79	7.67	34217.2	61.06	7.38	35563.0	1093217

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
9600.0	3656.328	162.9616	-11.7885	59.02	9.52	34049.4	60.36	9.15	35400.5	1293474
9650.0	3707.992	166.6707	-9.5643	58.21	11.81	33791.1	59.63	11.35	35150.5	1606395
9700.0	3769.917	170.2124	-7.3656	57.58	14.04	33487.7	59.08	13.47	34857.3	1981867
9750.0	3841.425	173.5882	-5.2140	57.10	16.19	33146.1	58.69	15.53	34527.4	2415782
9800.0	3921.796	176.9018	-3.1266	56.76	18.27	32773.0	58.44	17.50	34167.3	2903751
9850.0	4010.288	179.8582	-1.1166	56.56	20.27	32374.7	58.32	19.39	33783.3	3441259
9900.0	4106.163	-177.2364	0.8065	56.46	22.19	31957.3	58.31	21.20	33381.2	4023795
9950.0	4208.700	-174.4752	2.6367	56.45	24.03	31526.3	58.40	22.92	32966.4	4646954
10000.0	4317.208	-171.8514	4.3709	56.53	25.78	31086.6	58.57	24.55	32543.6	5306525
10050.0	4431.039	-169.3577	6.0082	56.68	27.46	30642.3	58.82	26.10	32116.8	5998536
10100.0	4549.599	-166.9871	7.5495	56.89	29.07	30196.9	59.12	27.58	31689.3	6719298
10150.0	4672.299	-164.7329	8.9972	57.15	30.60	29753.5	59.48	28.97	31264.0	7465410
10200.0	4798.664	-162.5885	10.3544	57.45	32.06	29314.2	59.87	30.30	30843.1	8233772
10250.0	4928.223	-160.5476	11.6253	57.78	33.45	28881.1	60.30	31.55	30428.5	9021574
10300.0	5060.561	-158.6043	12.8142	58.14	34.79	28455.5	60.76	32.74	30021.4	9826281
10350.0	5195.307	-156.7530	13.9256	58.51	36.07	28038.6	61.23	33.86	29623.0	10645623
10400.0	5332.125	-154.9883	14.9642	58.91	37.29	27631.1	61.73	34.93	29233.9	11477567
10450.0	5470.721	-153.3054	15.9347	59.31	38.46	27233.7	62.23	35.95	28854.6	12320301
10500.0	5610.828	-151.6996	16.8416	59.72	39.59	26846.5	62.74	36.91	28485.5	13172214
10550.0	5752.213	-150.1666	17.6891	60.14	40.67	26470.0	63.26	37.83	28126.8	14031875
10600.0	5894.667	-148.7023	18.4815	60.56	41.71	26104.1	63.78	38.70	27778.4	14898014
10650.0	6038.004	-147.3029	19.2226	60.98	42.71	25748.8	64.30	39.53	27440.3	15769507
10700.0	6182.062	-145.9648	19.9160	61.40	43.68	25403.9	64.82	40.32	27112.3	16645358
10750.0	6326.696	-144.6847	20.5651	61.82	44.61	25069.4	65.34	41.08	26794.3	17524686
10800.0	6471.777	-143.4596	21.1733	62.23	45.51	24744.9	65.85	41.80	26486.0	18406712
10850.0	6617.191	-142.2864	21.7433	62.64	46.38	24430.2	66.35	42.49	26187.2	19290747
10900.0	6762.840	-141.1626	22.2780	63.04	47.23	24125.2	66.85	43.15	25897.6	20176180
10950.0	6908.633	-140.0854	22.7798	63.43	48.05	23829.3	67.35	43.78	25616.8	21062475
	CSM SEPARATION									
10962.400	6944.805	-139.8262	22.8988	63.53	48.25	23757.6	67.47	43.93	25548.7	21282359