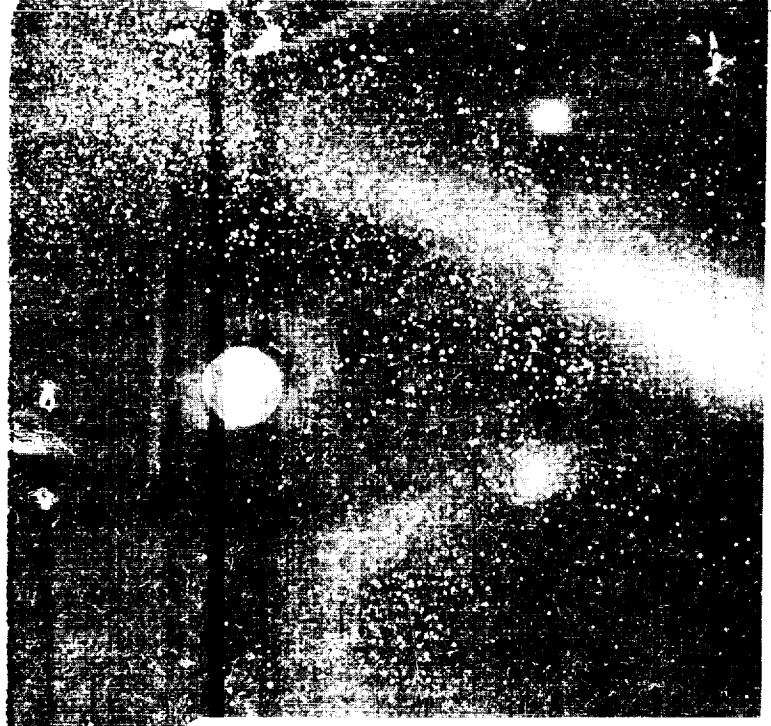

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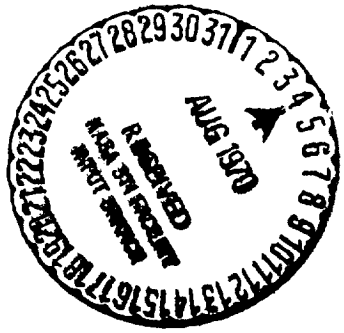
APOLLO/SATURN V
POSTFLIGHT TRAJECTORY
AS-508



JUNE 10, 1970

THE BOEING COMPANY · AEROSPACE GROUP
SOUTHEAST DIVISION

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TRACKING AND FLIGHT RECONSTRUCTION

JUNE 10, 1970

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SATURN ENGINEERING

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ABSTRACT AND LIST OF KEY WORDS

This document presents the postflight trajectory for the Apollo/Saturn V AS-508 flight. Included is an analysis of the orbital and powered flight trajectories of the launch vehicle and the free flight trajectories of the expended S-IC and S-II stages. Trajectory dependent parameters are provided in earth-fixed launch site, launch vehicle navigation, and geographic polar coordinate systems. The time history of the trajectory parameters for the launch vehicle is presented from guidance reference release to Command/Service Module (CSM) separation.

Tables of significant parameters at engine cutoff, stage separation, parking orbit insertion, and translunar injection are included in this document. Figures of such parameters as altitude, surface and cross ranges, and 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-508
Postflight Trajectory
Powered Flight Trajectory
Orbital Trajectory
Spent Stage Trajectory
Apollo 13

CONTENTS

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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 Document D5-15551(I)-8, "Saturn V AS-508 'H-2' Mission Launch Vehicle Operational Flight Trajectory - March Launch Month," December 8, 1969.

4. Boeing Contract Memorandum 5-9400-H-423, "Saturn V AS-508 'H-2' Mission Launch Vehicle Operational Flight Trajectory - April Launch Month," January 5, 1970.

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

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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	3/11/70
R-AERO-P-#17	Tracking and Network Specifications	4/3/70
R-AERO-P-#35b	Transponder Locations	4/3/70
DRL-172F	Operational Trajectory Certified Data	4/3/70
I-MO-#4a	Insertion Point and/or Orbital Elements	4/12/70
I-MO-#4c	Six Seconds Raw Radar	4/12/70
I-MO-#4f	Meteorological Data (Final)	4/17/70
I-MO-#6	IP Raw MP	4/13/70
I-MO-#9	Pulse Radar Bermuda and Merritt Island USB	4/13/70
	Hawaii C-Band	4/21/70
I-MO-#17c	Final Significant Time of Events	5/6/70
I-MO-#18a	Preliminary Guidance Velocities	4/13/70
I-MO-#18c	Orbital Venting Accelerations Data Cards	4/23/70

SECTION 1

SUMMARY AND INTRODUCTION

The Apollo/Saturn V AS-508 vehicle was launched from Launch Complex 39, Pad A at the Kennedy Space Center on April 11, 1970, at 2:13:00 P.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 -16.961 seconds. First motion occurred at 0.3 second. At 12.6 seconds, a roll maneuver was initiated orienting the vehicle to a flight azimuth of 72.043 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 trajectory parameters were close to nominal through S-IC stage burn and through the first portion of the S-II stage burn until the early shutdown of the S-II center engine. The premature S-II center engine cutoff (CECO) caused considerable deviations from nominal for certain launch vehicle trajectory parameters. These deviations were particularly evident at S-II center and outboard engine cutoffs. However, the S-IVB burn time was extended by the guidance unit so that the vehicle achieved near nominal earth parking orbit insertion conditions.

The vehicle was inserted into a parking orbit at 759.83 seconds at an altitude of 191.6 km (103.5 n mi) and a total space-fixed velocity of 7,792.5 m/s (25,565.9 ft/s). The vehicle remained in orbit for approximately one and one-half revolutions. The S-IVB stage was restarted during the second revolution over Australia at 9,346.3 seconds.

At 9,707.15 seconds, the vehicle was injected onto a circumlunar trajectory at an altitude of 337.9 km (182.5 n mi) and a total space-fixed velocity of 10,832.1 m/s (35,538.4 ft/s). At 11,198.9 seconds, the CSM separated from the launch vehicle at an altitude of 6,997.9 km (3,778.6 n mi) and a total space-fixed velocity of 7,628.9 m/s (25,029.2 ft/s).

The impact location of the expended S-IC stage was determined to be 30.177 degrees north latitude and 74.065 degrees west longitude at 546.9 seconds. The impact location of the expended S-II stage was determined to be 31.320 degrees north

SECTION 1 (Continued)

latitude and 33.289 degrees west longitude at 1,258.1 seconds.

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

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

a. Ascent Phase

b. Orbital Phase

c. Second Burn Phase

d. Post TLI Phase

e. Free Flight Phase

The ascent phase, covering the portion of flight from guidance reference release to orbital insertion (759.83 seconds), is discussed in Section 3. This trajectory was established from tracking data provided by external C-band and S-band radars and telemetered onboard data obtained from the ST-124M inertial platform.

The second burn phase, also discussed in Section 3, covers the portion of flight from 8,950 seconds to translunar injection (9,707.15 seconds). This trajectory was established by the integration of the telemetered guidance accelerometer data and constrained to the state vectors obtained from the orbital and post TLI trajectory phases.

The orbital phase, discussed in Section 4, covers the portion of flight from orbital insertion to 8,950 seconds. The orbital trajectory was established from data provided by the radars of the Manned Space Flight Network.

The post translunar injection (TLI) phase, discussed in Section 4, covers the portion of flight from the translunar injection to CSM separation (11,198.9 seconds). This trajectory was established from data provided by the radars of the Manned Space Flight Network.

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

SECTION 1 (Continued)

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

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

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

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

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SECTION 2

COORDINATE SYSTEMS AND LAUNCH PARAMETERS

The time history of Observed Mass Point Trajectory parameters in both metric and English units is tabulated in Appendices B and C, respectively. These tabulations are in earth-fixed launch site, launch vehicle navigation, and geographic polar coordinate systems. These coordinate systems are defined in Reference 1, "Project Apollo Coordinate System Standards," (PACSS) and are designated PACSS10, PACSS13, and PACSS1, respectively. The trajectory symbols and terminology used in this document are defined in Appendix A.

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

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

Geodetic Latitude	28.608422 degrees north
Longitude	80.604133 degrees west

The height of the center of gravity of the launch vehicle above the reference ellipsoid is 59.6 m (195.5 ft).

The azimuth alignments are as follows:

Launch Azimuth	90.0 degrees east of north
Flight Azimuth	72.043 degrees east of north
ST-124M Platform Azimuth	72.043 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 References 3 and 4.

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

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

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

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

The ascent trajectory, from guidance reference release to parking orbit insertion, is 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

3.1.2 (Continued)

inertial acceleration vector is shown in Figure 3-10. The maximum total inertial acceleration and earth-fixed velocity are shown in Table 3-II.

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

3.1.3 Targeting Parameters

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

3.2 DATA SOURCES

3.2.1 Ascent Phase

Tracking data and telemetered guidance velocity data were received during the period from first motion through orbital insertion. The time periods for which tracking system coverage was available are shown in Figure 3-11 and itemized in Table 3-VI. The geographic locations of the tracking stations and the ground track for the ascent trajectory are shown in Figure 3-1. The antenna locations for the tracking system and the actual and nominal vehicle center of gravity time history are shown in Figure 3-12.

C-Band and USB tracking data were available from the stations located at Patrick Air Force Base, Merritt Island, Grand Turk Island, and Bermuda Island. The C-Band 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. The USB tracking data were provided as measured parameters in X angle, Y angle, and range rate. These measurements are defined in Reference 1 and designated as PACSS3c.

Comparisons between these data and the ascent trajectory were calculated in PACSS3a and PACSS3c. The position components of the ascent trajectory in PACSS10 were corrected for the differences between the center of gravity (nominal) and the

3.2.1 (Continued)

transponder location. The corrected position components were transformed into the measured parameters of PACSS3a and PACSS3c. Differences or deviations (tracking data minus corresponding parameters derived from the ascent trajectory) were calculated, smoothed, and plotted as functions of time, and are shown in Figures 3-13 through 3-15 for C-Band, and in Figures 3-16 through 3-18 for USB data.

3.2.1.1 C-Band Tracking Data

Patrick (0.18) radar provided tracking data from 27 to 527 seconds. The azimuth angle measurements were of good quality except in the time interval of 27 to 130 seconds, where the measurements were noisy. The Patrick azimuth angles deviated considerably from the trajectory up to 200 seconds. They converged to the trajectory thereafter with a maximum deviation of 0.005 degree. The elevation angle measurements were noisy during the early portion (27 to 90 seconds) and the latter portion (440 to 527 seconds) of tracking. These measurements also deviated considerably from the trajectory up to about 80 seconds and agreed favorably with the trajectory within the time interval from 80 to 527 seconds with a maximum deviation of 0.028 degree. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 85 m (279 ft) from the trajectory. The slant range measurements had a discontinuity at about 175 seconds, indicating a switch from beacon to skin tracking.

Grand Turk (7.18) radar supplied data from 227 to 586 seconds. The azimuth and elevation angle measurements had a characteristic deviation in the time interval of 450 to 500 seconds. The azimuth angle measurements were noisy between 350 and 586 seconds. The elevation angle measurements were noisy throughout the tracking period. Outside the time interval for the characteristic deviation, the azimuth and elevation angle measurements had the maximum deviations of 0.041 and 0.049 degree respectively. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 40 m (131 ft).

Merritt Island (19.18) radar furnished data from 16 to 527 seconds. The azimuth and elevation angle measurements were erratic in the interval from 16 to 190 seconds. The azimuth angle measurements reached a maximum deviation of 0.048 degree and decreased rapidly after 80 seconds with a maximum deviation of 0.005 degree after 210 seconds. The elevation angle measurements deviated a maximum of 0.043 degree from the trajectory at 90 seconds and decreased rapidly thereafter with a maximum deviation of 0.005 degree after 200 seconds.

3.2.1.1 (Continued)

The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 50 m (164 ft).

Bermuda (67.16) radar provided data from 273 to 759 seconds. The elevation angle measurements were noisy from 273 to 370 seconds. The elevation angle measurements agreed favorably with the trajectory with a maximum deviation of 0.040 degree. The azimuth angle measurements were in good agreement with the trajectory with a maximum deviation of 0.015 degree. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 85 m (279 ft).

Bermuda (67.18) radar provided data from 272 to 759 seconds. The azimuth angle measurements were in good agreement with the trajectory, except in the time interval of 530 to 600 seconds where a characteristic deviation occurred, with a maximum deviation of 0.021 degree. The elevation angle measurements were noisy during the early portion (272 to 350 seconds) and the latter portion (680 to 759 seconds) of tracking. The elevation angle measurements agreed favorably with the trajectory with a maximum deviation of 0.020 degree. The slant range measurements were of good quality throughout the tracking period with a maximum deviation of 100 m (328 ft).

3.2.1.2 USB Tracking Data

Merritt Island radar furnished data from 26 to 359 seconds. The X and Y angle measurements were erratic in the time intervals of 26 to 41 seconds, 196 to 214 seconds, and 326 to 332 seconds. The X angle measurements oscillated considerably to about 220 seconds, and agreed favorably thereafter with a maximum deviation of 0.029 degree. The Y angle measurements deviated considerably from the trajectory up to about 180 seconds, but agreed with the trajectory thereafter with a maximum deviation of 0.004 degree. The range rate measurements were erratic in the time intervals of 128 to 140 seconds, 164 to 168 seconds, 196 to 201 seconds, and 326 to 332 seconds. The range rate measurements, excluding the erratic time intervals, agreed with the trajectory with a maximum deviation of 0.4 m/sec (1.3 ft/sec).

Bermuda radar supplied data from 283 to 759 seconds. The X angle measurements were noisy in the time intervals of 283 to 410 seconds, and 700 to 759 seconds. The X angle measurements agreed favorably with the trajectory in the time interval of 283 to 700 seconds with a maximum

3.2.1.2 (Continued)

deviation of 0.020 degree. The Y angle measurements were of good quality and agreed favorably with the trajectory with a maximum deviation of 0.020 degree. The range rate measurements exhibited a characteristic closest approach phenomenon from 535 to 585 seconds, but were consistent with the trajectory outside this interval.

3.2.2 Second Burn Phase

Telemetered guidance velocity data during the S-IVB second burn period were used as generating parameters in reconstructing the second burn trajectory. No tracking data were available during the S-IVB second burn period.

3.3 TRAJECTORY RECONSTRUCTION

3.3.1 Ascent Phase

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

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

a. Inspecting for format and parity errors

b. Time editing

c. Data editing and filtering

d. Refraction correction

e. Reformatting

f. Coordinate transformation

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

The launch phase (from first motion to 20 seconds) was established by integrating the telemetered guidance accelerometer data and constraining it to the early portion of the ascent phase trajectory. The ascent phase (from 20 seconds to orbital insertion at 759.83 seconds) was based on a

3.3.1 (Continued)

composite fit of external tracking data and telemetered onboard guidance velocity data and was constrained to the insertion vector obtained from the orbital analysis as described in Section 4. The reconstructed trajectory is referenced to the vehicle center of gravity.

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

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

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

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

3.3.2 Second Burn Phase

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

The orbital trajectory segment covers the portion of flight from the beginning of S-IVB restart preparations (8,768.1 seconds) to 8,950 seconds. This trajectory segment was obtained from the orbital solution as described in Section 4.

The powered flight trajectory segment covers the time span from 8,950 seconds to translunar injection (9,707.15 seconds). This trajectory segment was established by integrating the telemetered guidance velocities, which were used as generating parameters, and was constrained to the translunar injection vector (obtained from the post TLI trajectory of Section 4). The GATE program was utilized for the solution.

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

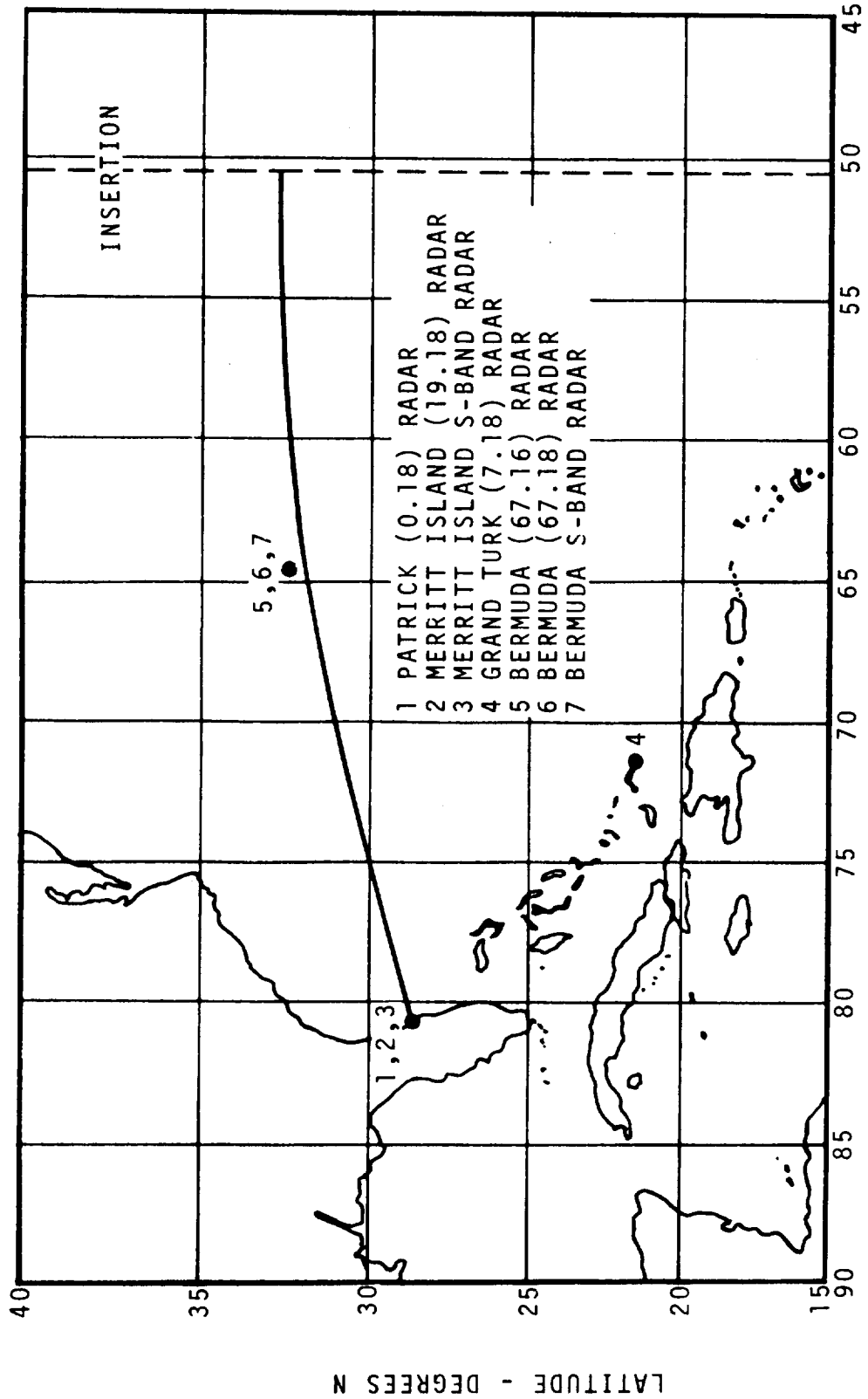

FIGURE 3-1. GROUND TRACK AND TRACKING STATIONS - ASCENT PHASE

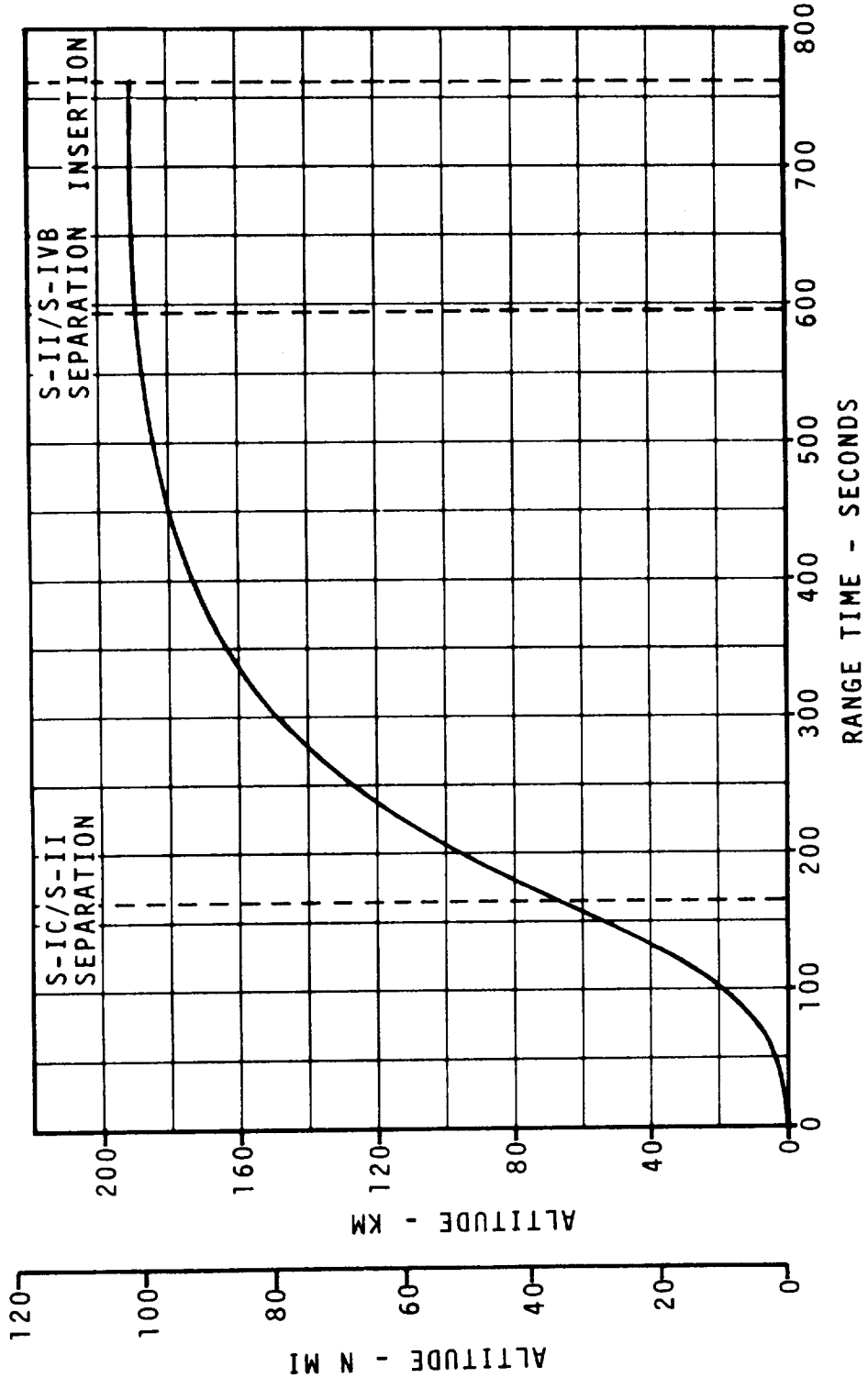

FIGURE 3-2. ALTITUDE - ASCENT PHASE

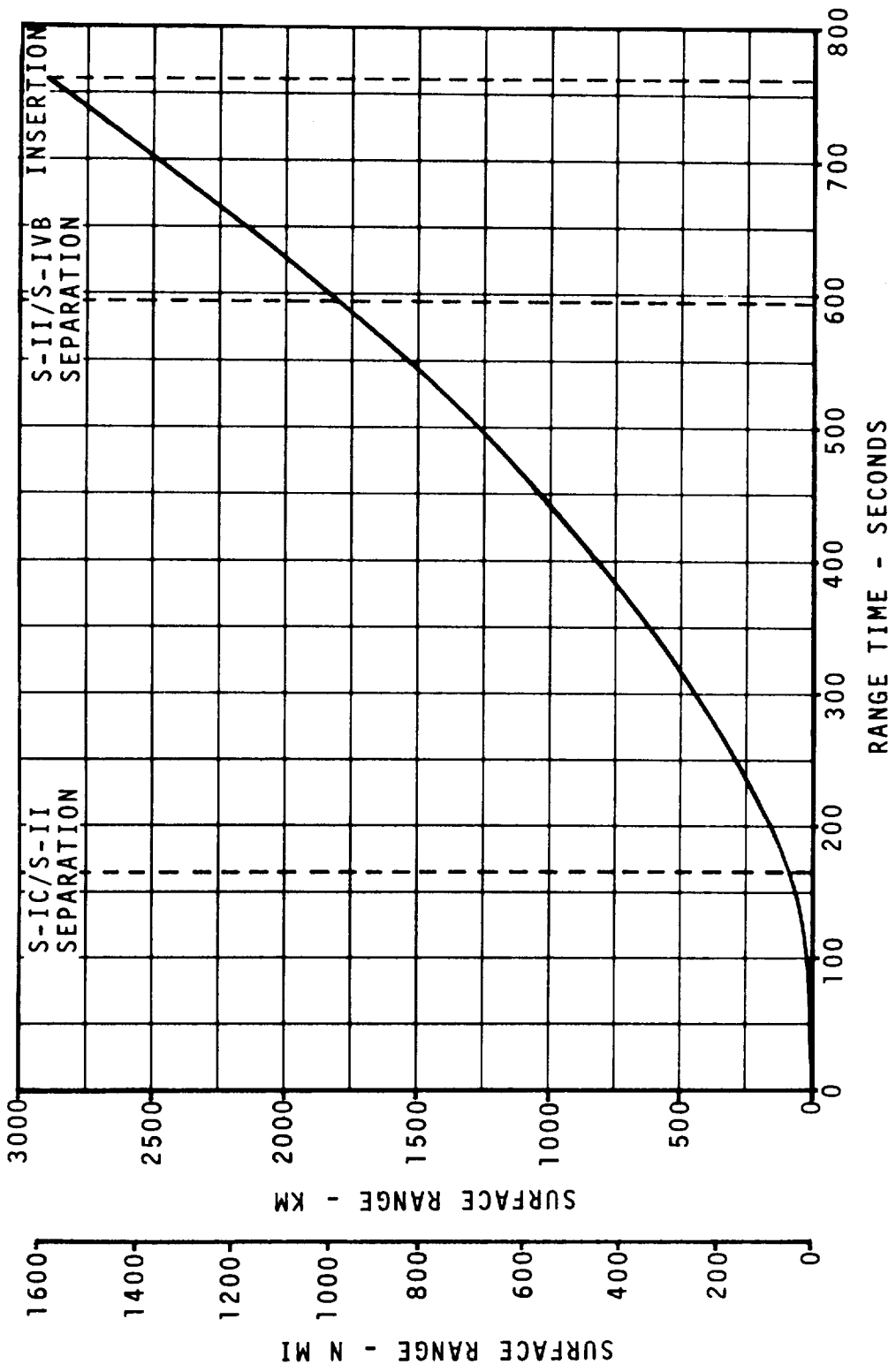

FIGURE 3-3. SURFACE RANGE - ASCENT PHASE

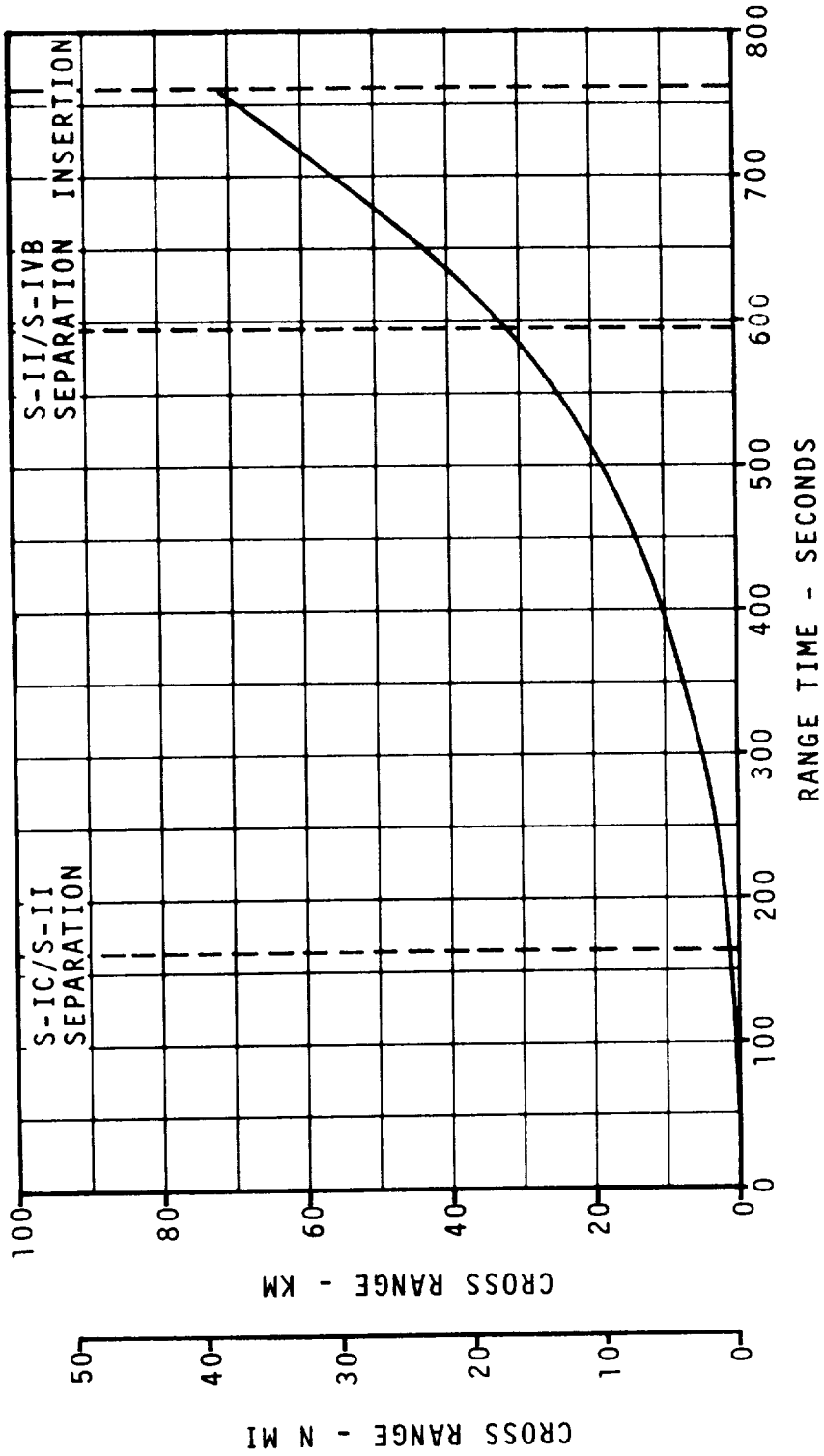

FIGURE 3-4. CROSS RANGE - ASCENT PHASE

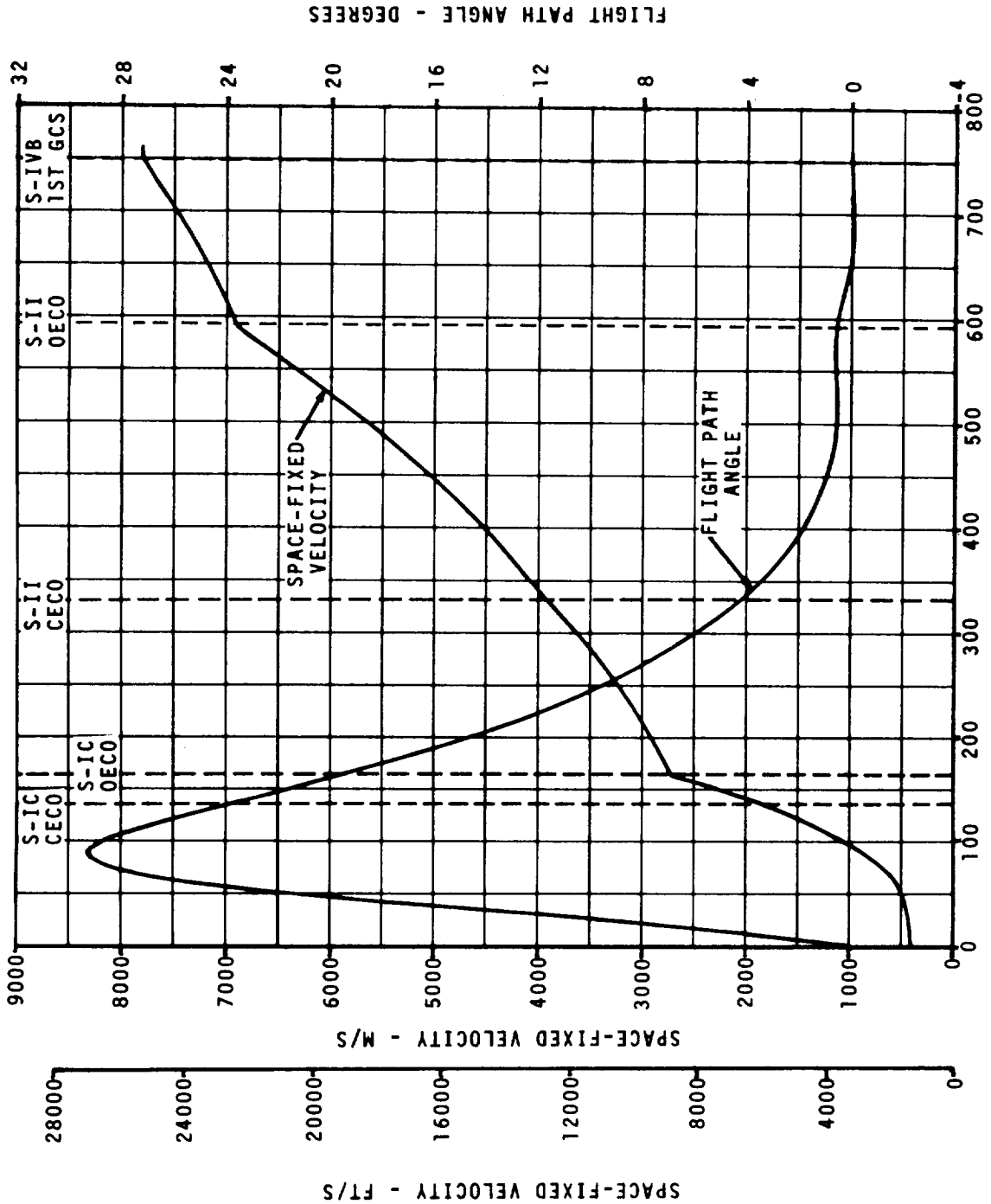

FIGURE 3-5. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - ASCENT PHASE

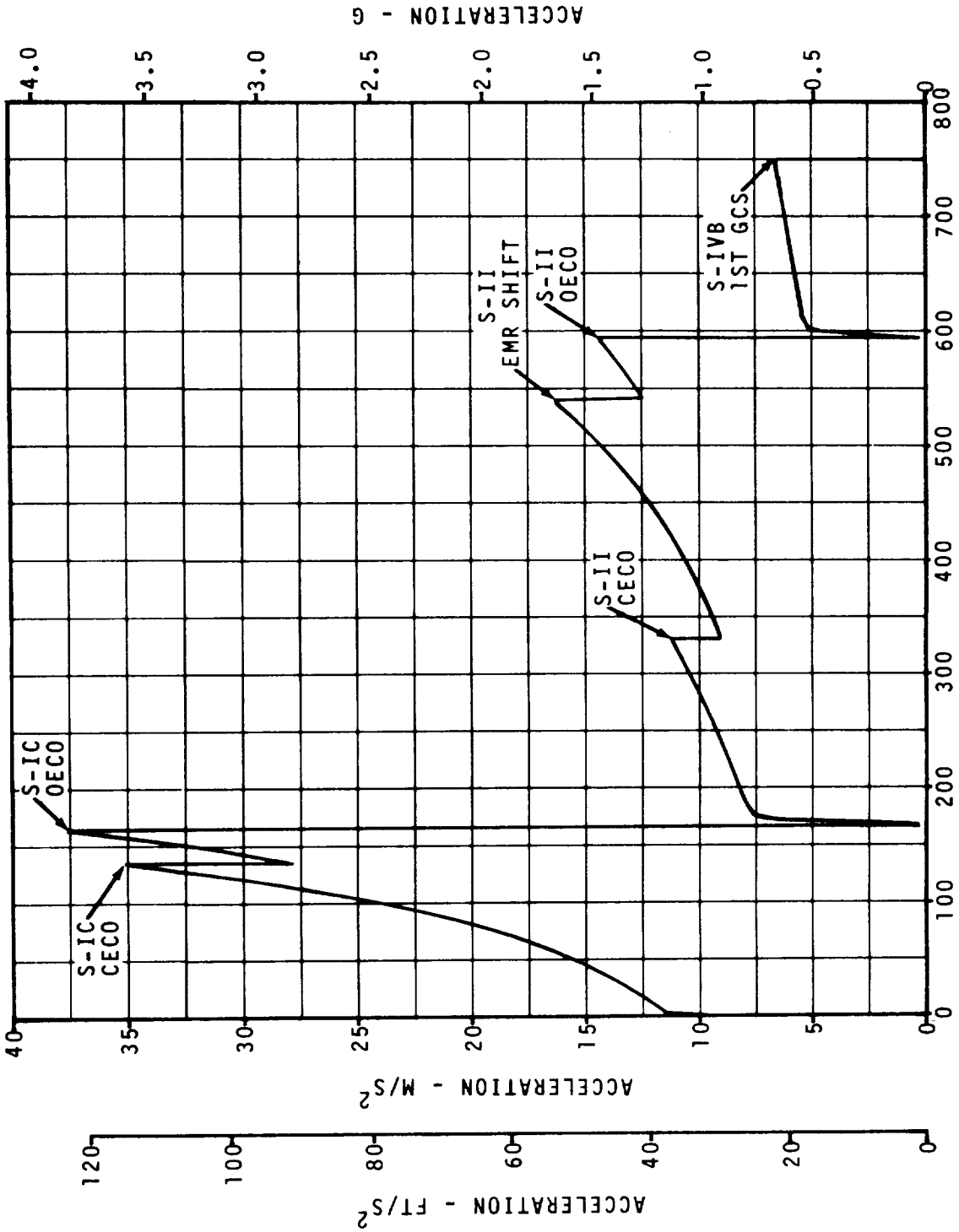

FIGURE 3-6. TOTAL INERTIAL ACCELERATION - ASCENT PHASE

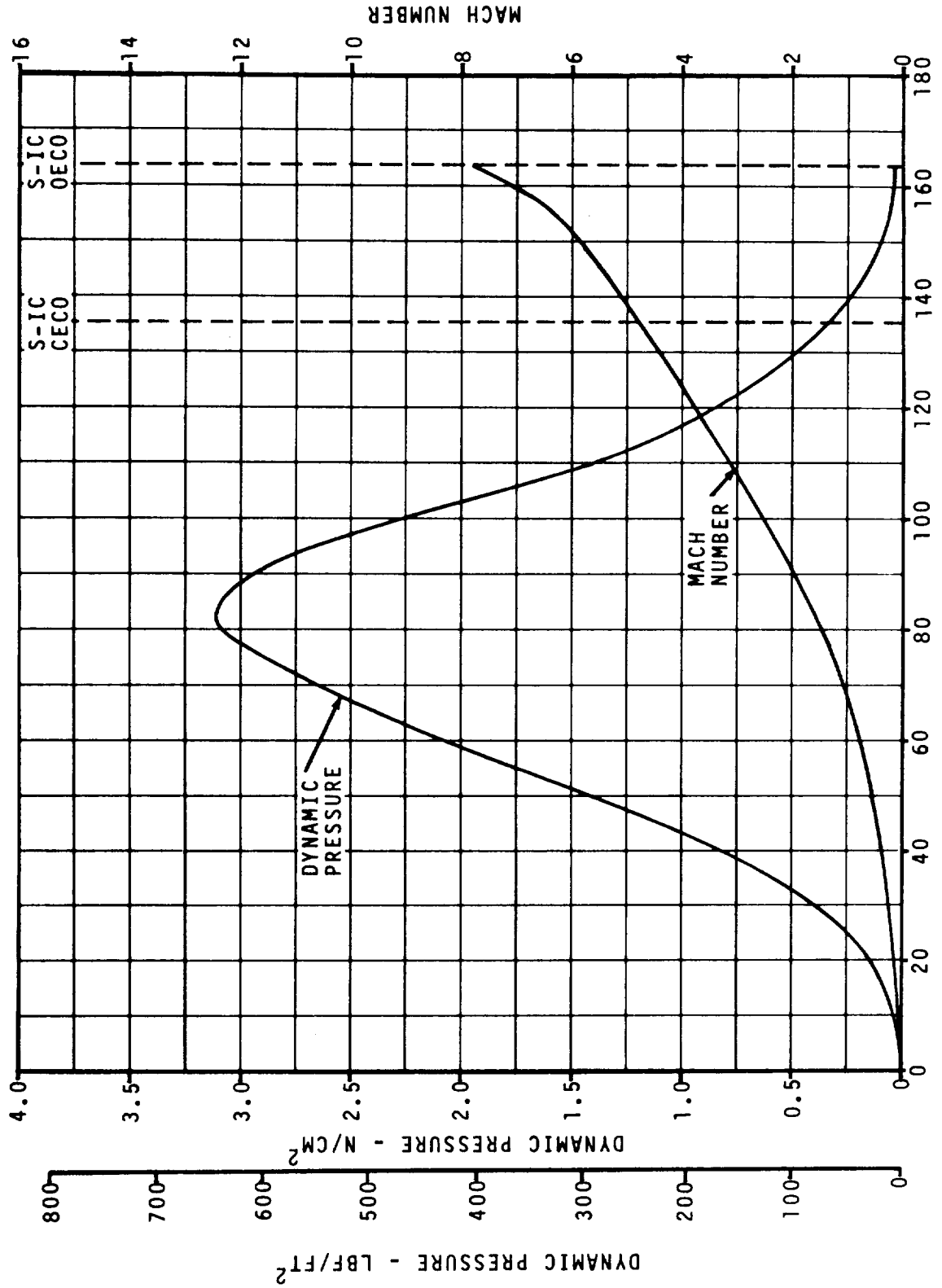

FIGURE 3-7. MACH NUMBER AND DYNAMIC PRESSURE - S-IC PHASE

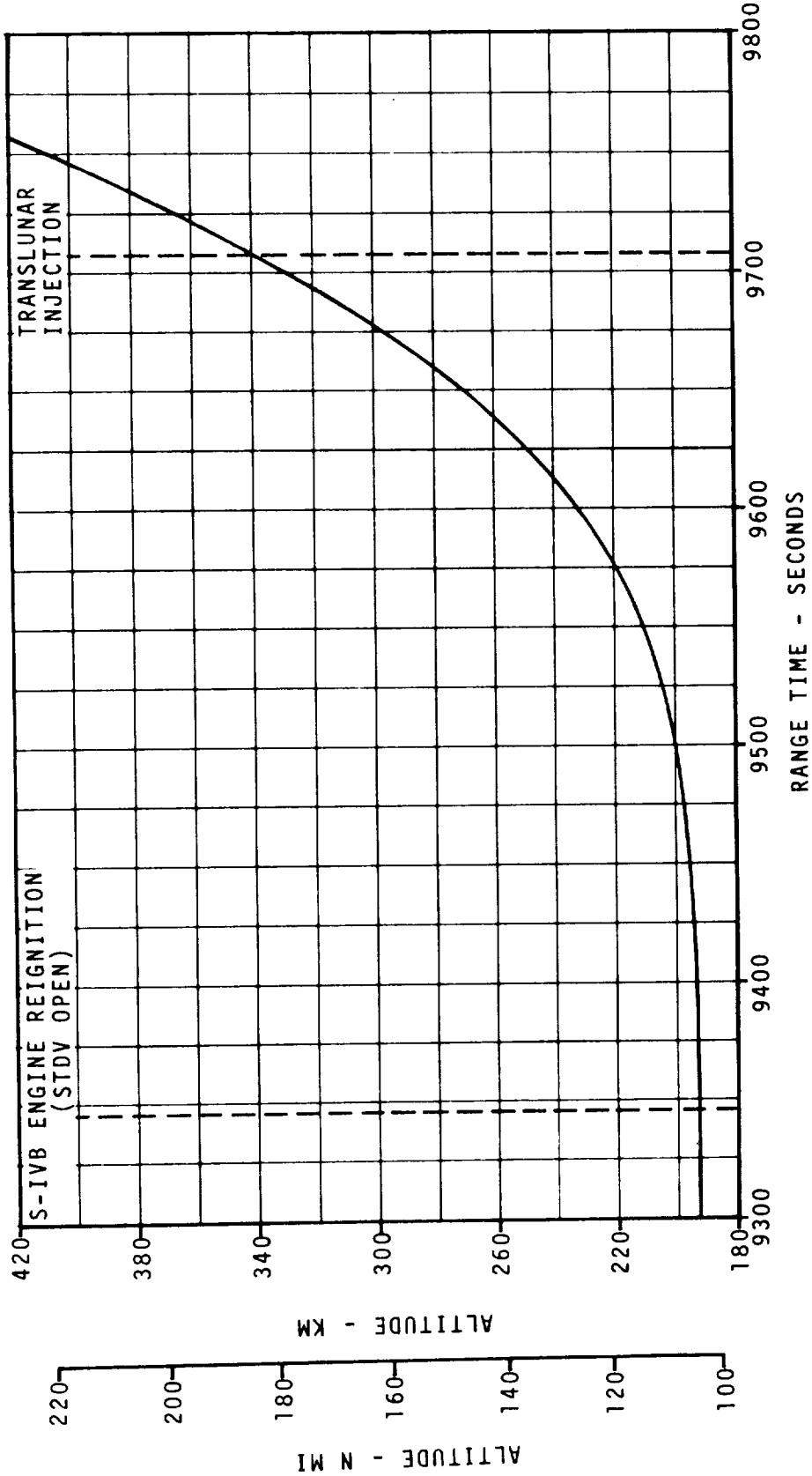

FIGURE 3-8. ALTITUDE - SECOND BURN PHASE

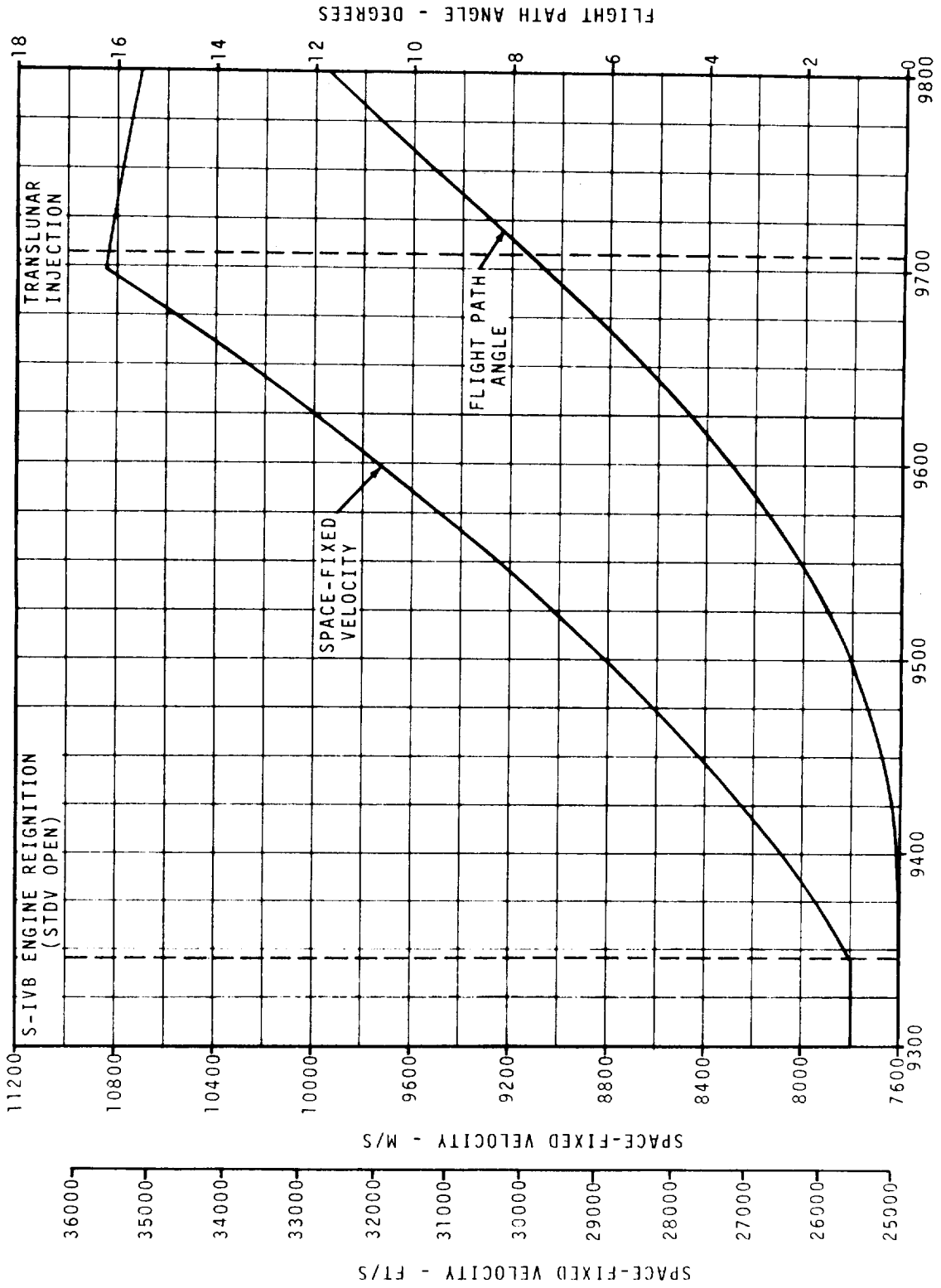

FIGURE 3-9. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - SECOND BURN PHASE

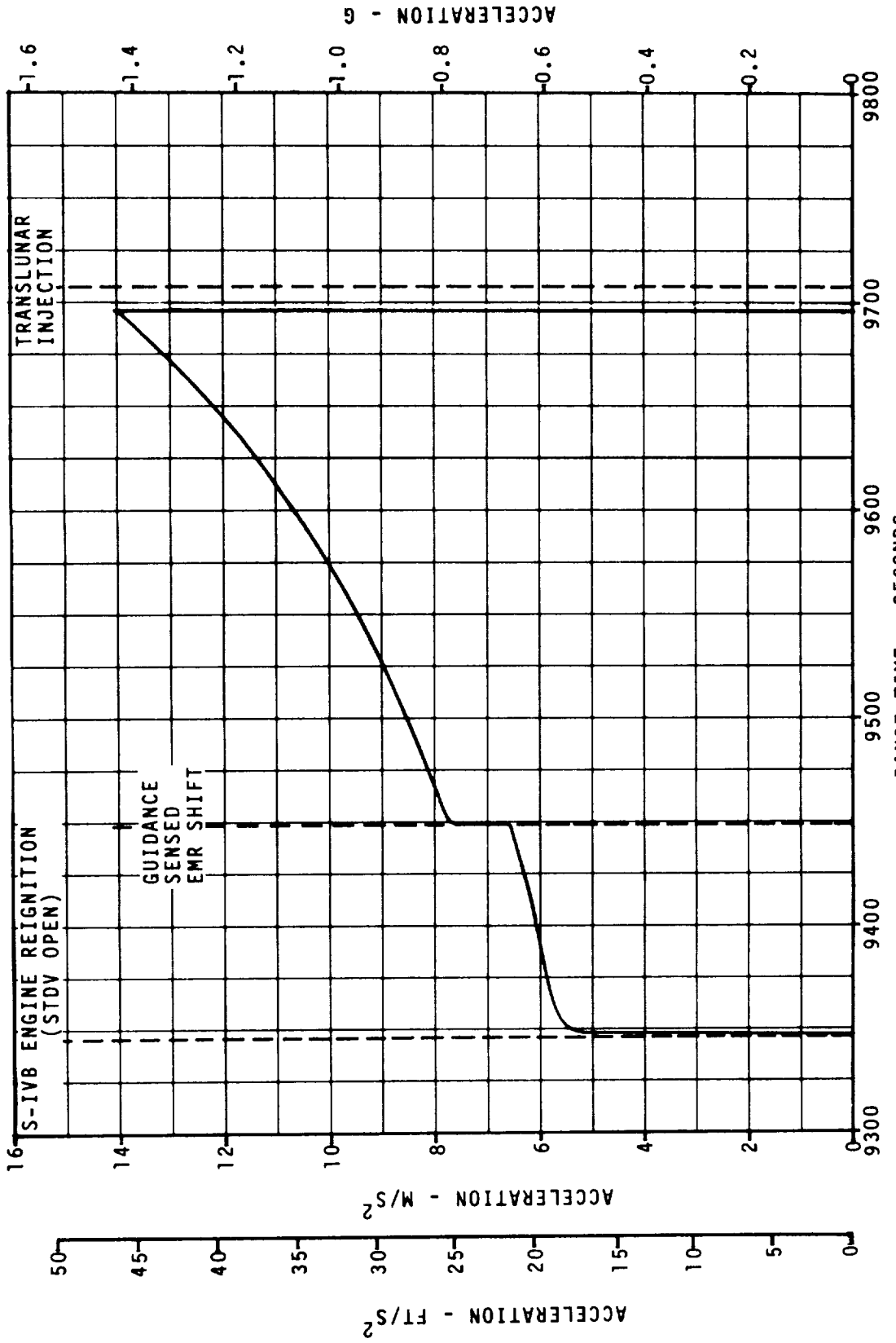

FIGURE 3-10. TOTAL INERTIAL ACCELERATION - SECOND BURN PHASE

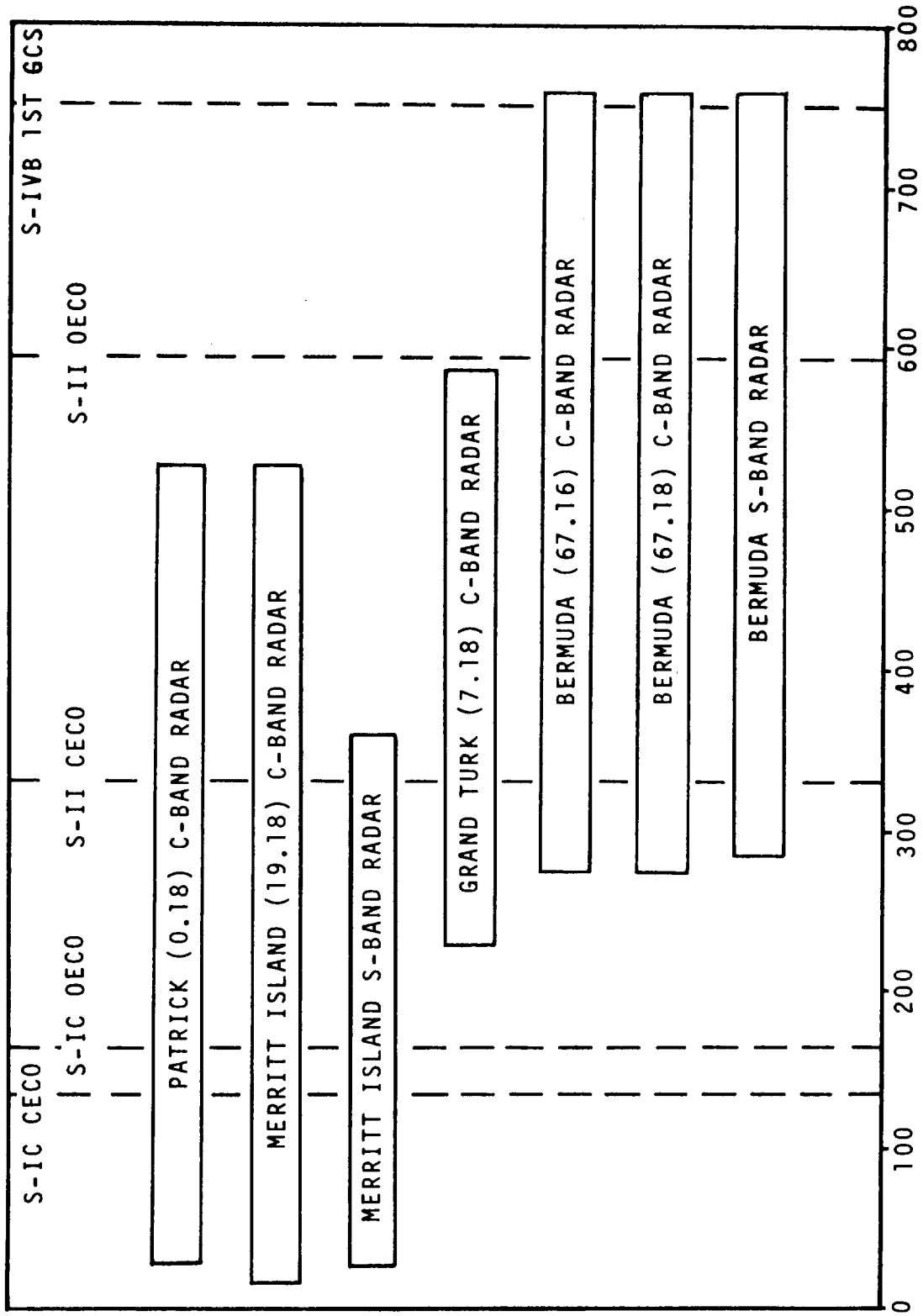

FIGURE 3-11. AVAILABLE TRACKING DATA - ASCENT PHASE

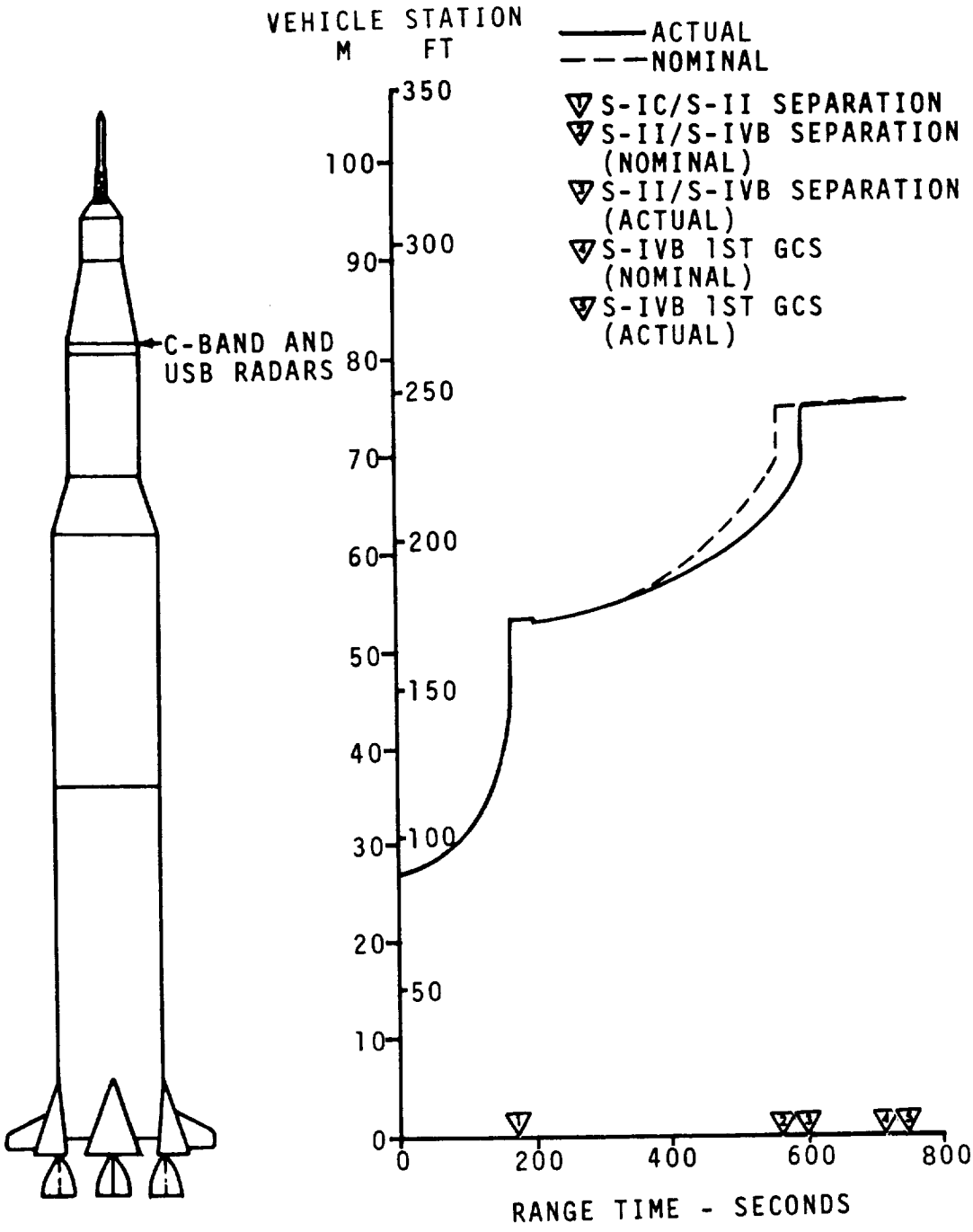

FIGURE 3-12. ANTENNA LOCATIONS AND CENTER OF GRAVITY

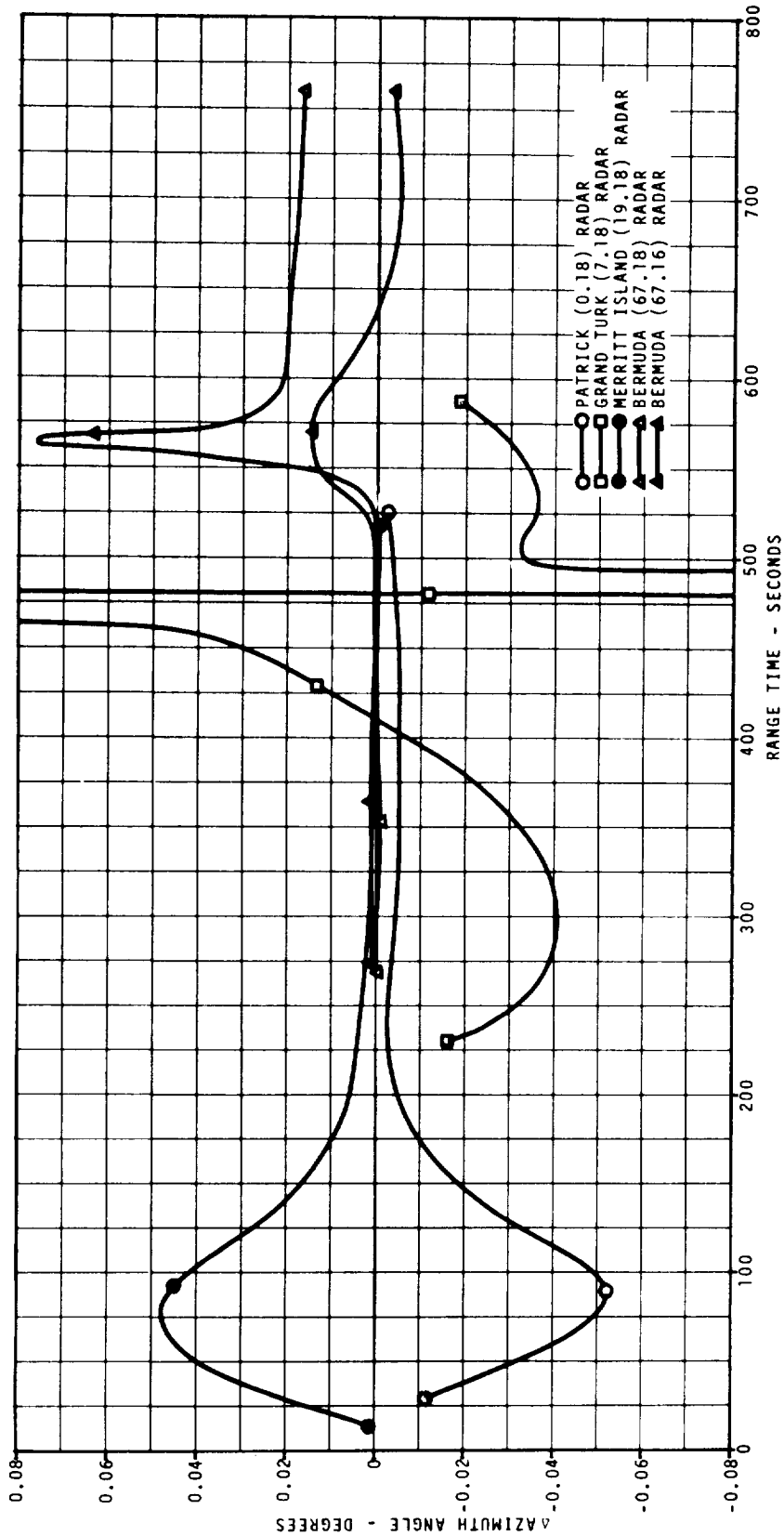

FIGURE 3-13. AZIMUTH ANGLE TRACKING DEVIATIONS - ASCENT PHASE

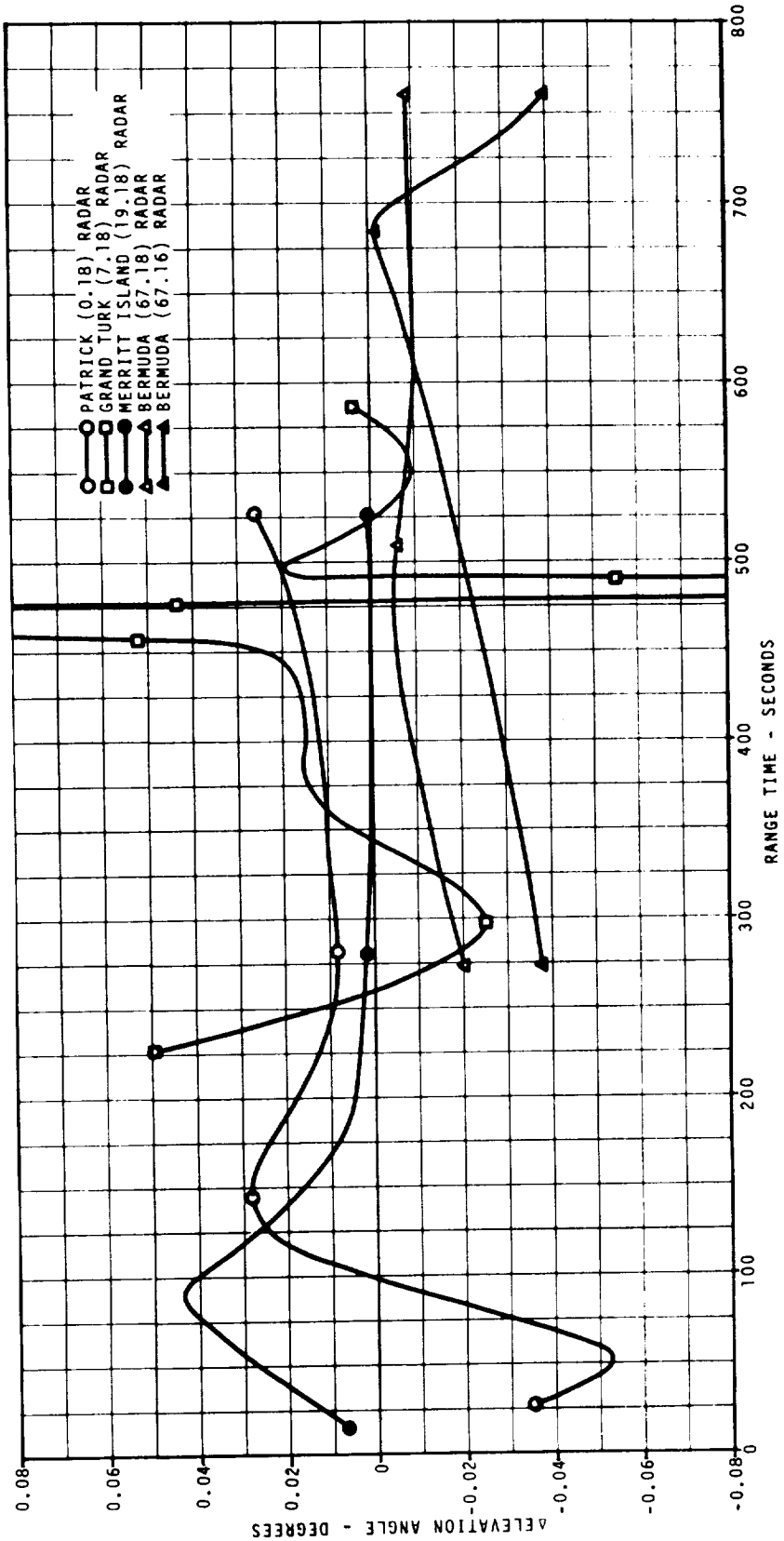

FIGURE 3-14. ELEVATION ANGLE TRACKING DEVIATIONS - ASCENT PHASE

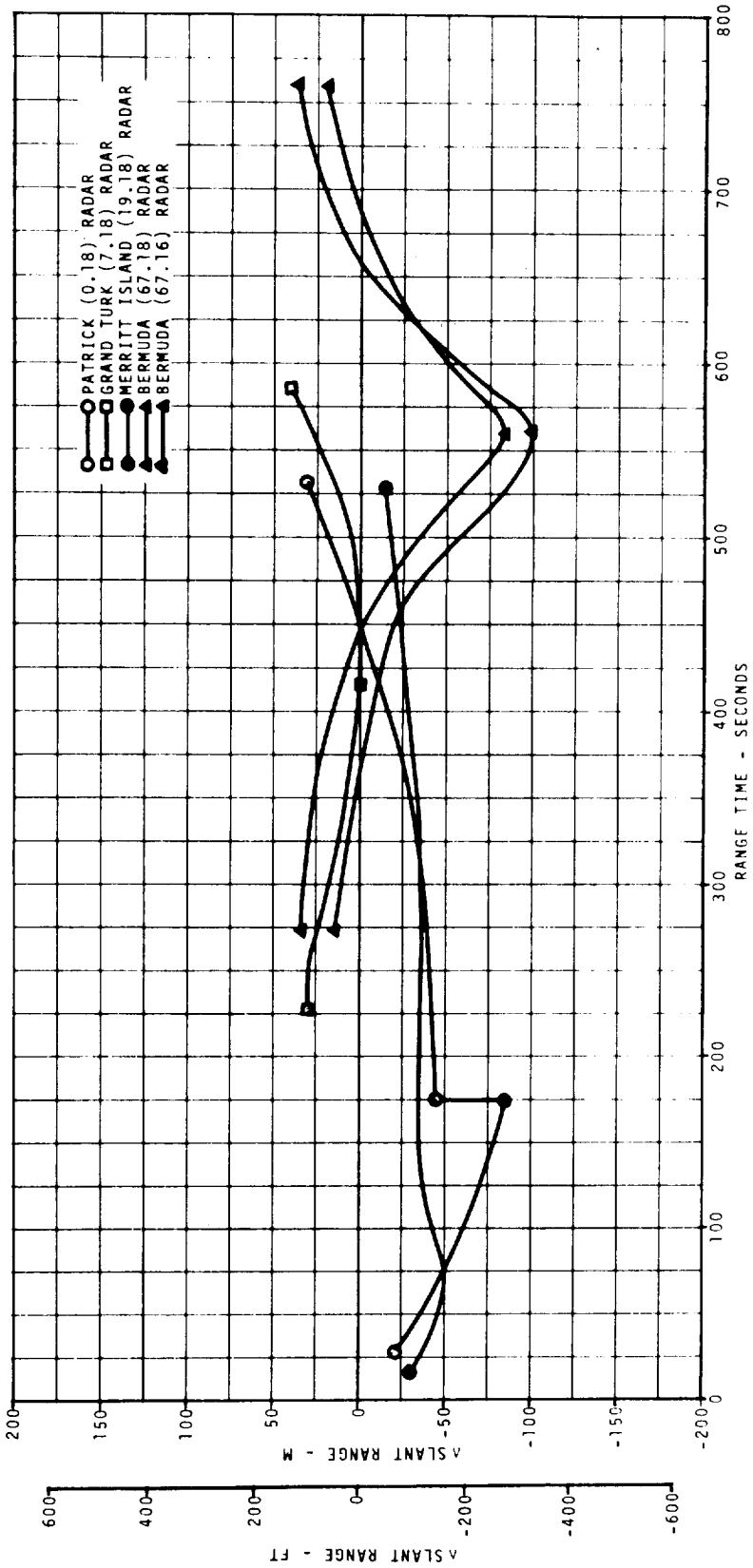

FIGURE 3-15. SLANT RANGE TRACKING DEVIATIONS - ASCENT PHASE

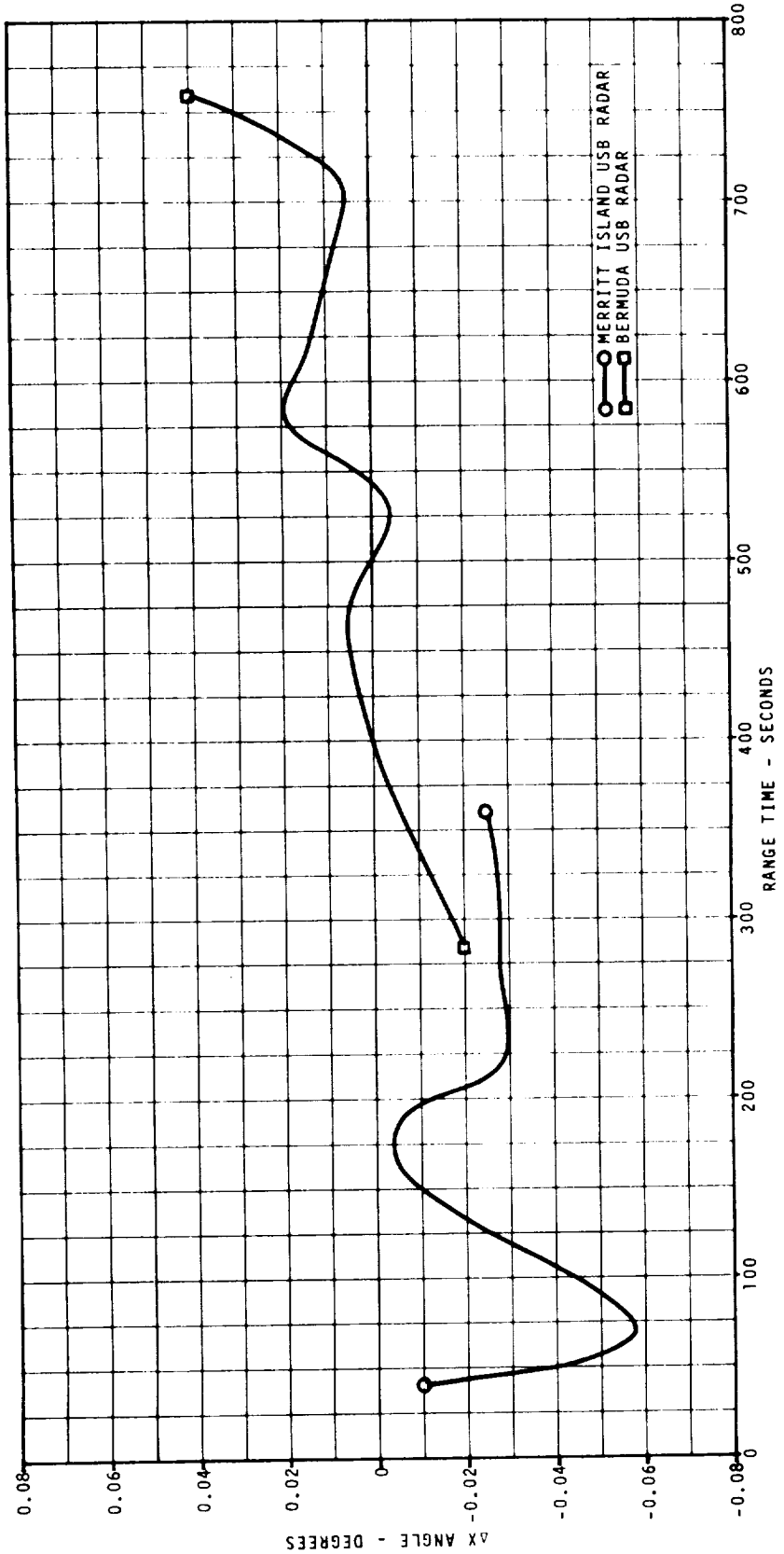

FIGURE 3-16. X ANGLE TRACKING DEVIATIONS - ASCENT PHASE

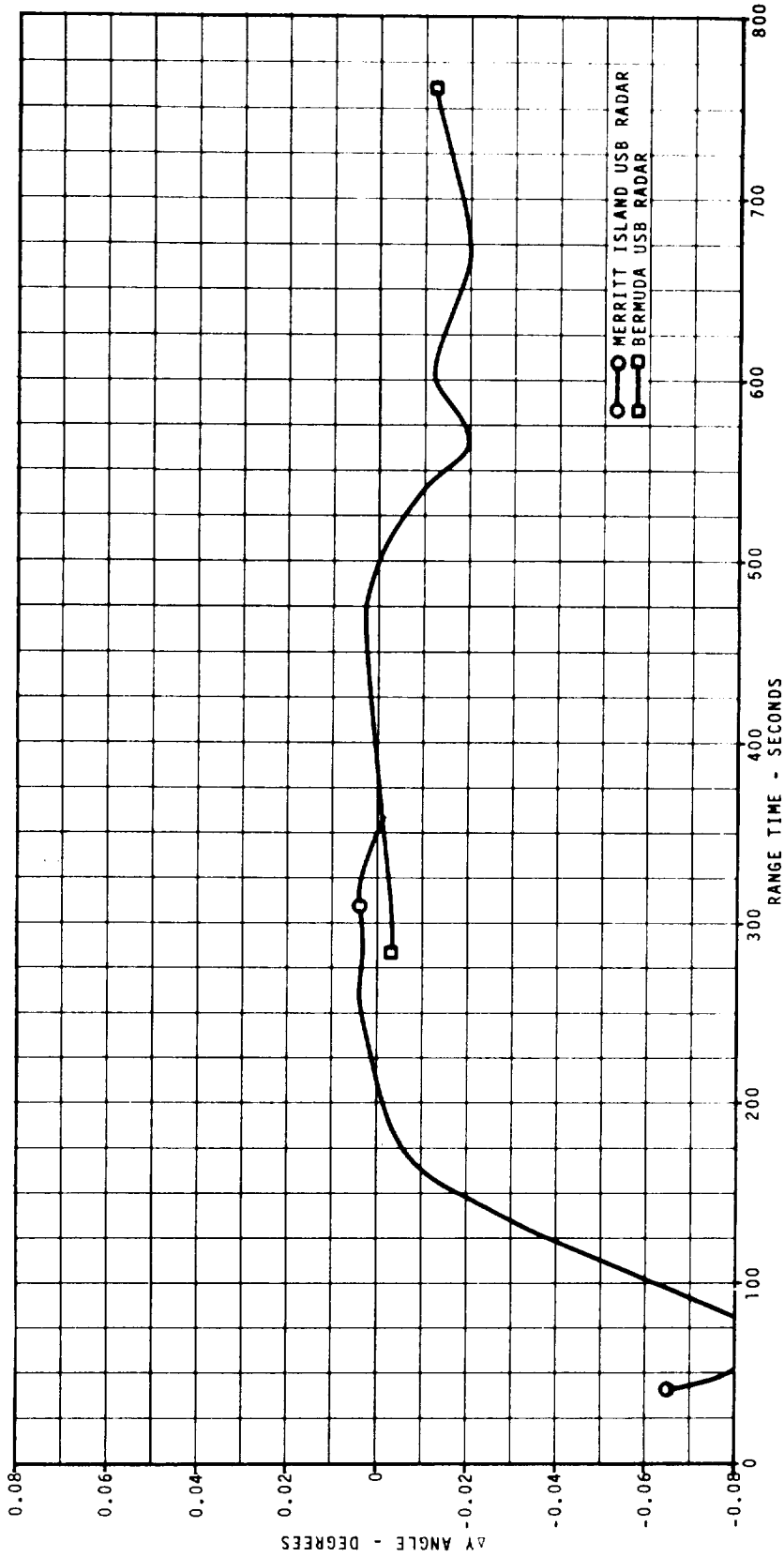

FIGURE 3-17. Y ANGLE TRACKING DEVIATIONS - ASCENT PHASE

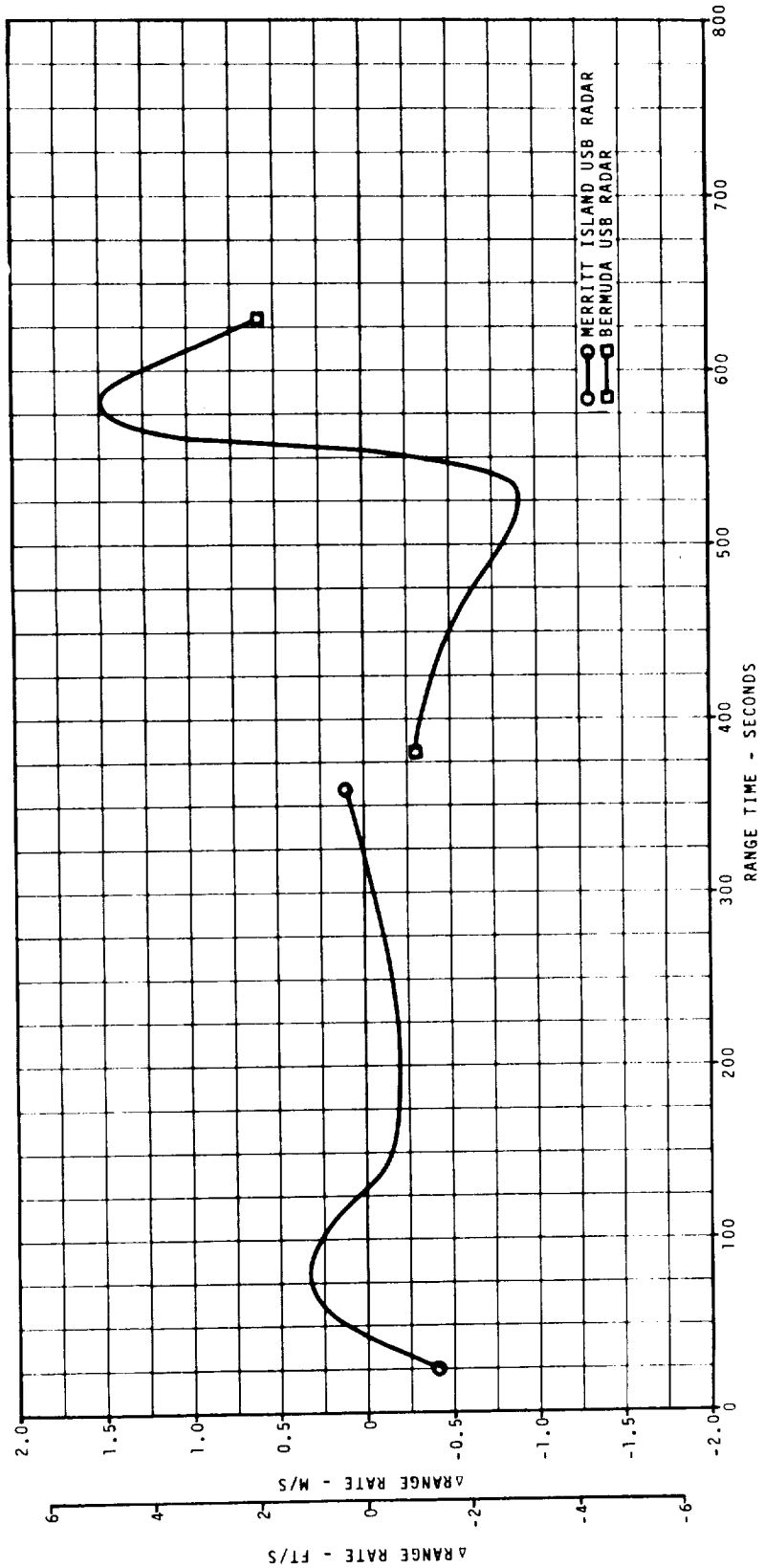

FIGURE 3-18. RANGE RATE TRACKING DEVIATIONS - ASCENT PHASE

TABLE 3-I. TIMES OF SIGNIFICANT EVENTS

EVENT	RANGE TIME, SECONDS		
	ACTUAL	NOMINAL	ACT-NOM
Guidance Reference Release	-16.961	-17.000	0.039
First Motion	0.3	0.3	0.0
Start of Time Base 1	0.6	0.7	-0.1
Mach 1	68.4	68.6	-0.2
Maximum Dynamic Pressure	81.3	85.3	-4.0
S-IC Center Engine Cutoff	135.18	135.25	-0.07
S-IC Outboard Engine Cutoff	163.60	164.00	-0.40
S-IC/S-II Separation Command	164.3	164.7	-0.4
S-II Center Engine Cutoff	330.64	463.01	-132.37
S-II Outboard Engine Cutoff	592.64	558.11	34.53
S-II/S-IVB Separation Command	593.5	559.0	34.5
S-IVB 1st Guidance Cutoff	749.83	705.76	44.07
Parking Orbit Insertion	759.83	715.76	44.07
Begin S-IVB Restart Preparations	8,768.1	8,749.9	18.2
S-IVB Engine Reignition (STDV Open)	9,346.3	9,327.9	18.4
S-IVB 2nd Guidance Cutoff	9,697.15	9,683.59	13.56
Translunar Injection	9,707.15	9,693.59	13.56
CSM Separation	11,198.9	11,160.0	38.9

TABLE 3-II. SIGNIFICANT TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
First Motion	Range Time, sec	0.3
	Total Inertial Acceleration, m/s^2 (ft/s^2) (g)	10.35 (33.96) (1.06)
Mach 1	Range Time, sec	68.4
	Altitude, km (n mi)	8.1 (4.4)
Maximum Dynamic Pressure	Range Time, sec	81.3
	Dynamic Pressure, N/cm^2 (lbf/ft^2)	3.12 (651.6)
	Altitude, km (n mi)	12.5 (6.7)
Maximum Total Inertial Acceleration: S-IC	Range Time, sec	163.70
	Acceleration, m/s^2 (ft/s^2) (g)	37.60 (123.36) (3.83)
S-II	Range Time, sec	537.00
	Acceleration, m/s^2 (ft/s^2) (g)	16.25 (53.31) (1.66)
S-IVB 1st Burn	Range Time, sec	750.00
	Acceleration, m/s^2 (ft/s^2) (g)	6.66 (21.85) (0.68)
S-IVB 2nd Burn	Range Time, sec	9,697.23
	Acceleration, m/s^2 (ft/s^2) (g)	14.03 (46.03) (1.43)
Maximum Earth-Fixed Velocity: S-IC	Range Time, sec	164.10
	Velocity, m/s (ft/s)	2,383.8 (7,820.9)
S-II	Range Time, sec	593.50
	Velocity, m/s (ft/s)	6,492.7 (21,301.5)
S-IVB 1st Burn	Range Time, sec	750.50
	Velocity, m/s (ft/s)	7,389.3 (24,243.1)
S-IVB 2nd Burn	Range Time, sec	9,697.80
	Velocity, m/s (ft/s)	10,433.6 (34,231.0)

TABLE 3-III. ENGINE CUTOFF CONDITIONS

PARAMETER	S-IC CECO	S-IC OECO	S-II CECO	S-II OECO	S-IVB 1ST GUIDANCE CUTOFF	S-IVB 2ND GUIDANCE CUTOFF
Range Time, sec	135.18	163.60	330.64	592.64	749.83	9,697.15
Altitude, km (n mi)	43.5 (23.5)	67.4 (36.4)	159.6 (86.2)	189.1 (102.1)	191.6 (103.5)	324.0 (174.9)
Surface Range, km (n mi)	44.9 (24.2)	94.4 (51.0)	552.0 (298.1)	1,786.4 (964.6)	2,840.2 (1,533.6)	
Space-Fixed Velocity, m/s (ft/s)	1,928.8 (6,328.1)	2,744.0 (9,002.6)	3,919.6 (12,859.6)	6,891.8 (22,610.9)	7,790.8 (25,560.4)	10,839.5 (35,562.7)
Flight Path Angle, deg	23.612	19.480	4.158	0.657	0.004	7.182
Heading Angle, deg	76.609	75.696	76.956	83.348	89.713	59.443
Cross Range, km (n mi)	0.5 (0.3)	1.0 (0.5)	6.4 (3.5)	32.0 (17.3)	69.3 (37.4)	
Cross Range Velocity, m/s (ft/s)	11.1 (36.4)	23.4 (76.8)	44.7 (146.7)	183.2 (601.0)	297.0 (974.4)	
Eccentricity						0.9758
C_3*, m^2/s^2 (ft^2/s^2)						-1,463,628 (-15,754,361)
Inclination, deg						31.818
Descending Node, deg						122.996

* Twice the specific energy of orbit

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

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

TABLE 3-IV. STAGE SEPARATION CONDITIONS

PARAMETER	S-IC/S-II SEPARATION COMMAND	S-II/S-IVB SEPARATION COMMAND
Range Time, sec	164.3	593.5
Altitude, km (n mi)	68.0 (36.7)	189.2 (102.2)
Surface Range, km (n mi)	96.0 (51.8)	1,791.8 (967.5)
Space-Fixed Velocity, m/s (ft/s)	2,754.3 (9,036.4)	6,895.9 (22,624.3)
Flight Path Angle, deg	19.383	0.650
Heading Angle, deg	75.693	83.380
Cross Range, km (n mi)	1.0 (0.5)	32.2 (17.4)
Cross Range Velocity, m/s (ft/s)	23.6 (77.4)	183.7 (602.7)
Geodetic Latitude, deg N	28.864	32.087
Longitude, deg E	-79.666	-62.380

TABLE 3-V. TARGETING PARAMETERS

PARAMETER	ACTUAL	NOMINAL*	ACT-NOM
S-IVB 1ST GUIDANCE CUTOFF			
Range Time, sec	749.83	705.76	44.07
Altitude, km (n mi)	191.6 (103.5)	191.4 (103.3)	0.2 (0.2)
Space-Fixed Velocity, m/s (ft/s)	7,790.8 (25,560.4)	7,791.4 (25,562.3)	-0.6 (-1.9)
Flight Path Angle, deg	0.004	-0.001	0.005
TRANSLUNAR INJECTION			
Range Time, sec	9,707.15	9,693.59	13.56
Eccentricity	0.9772	0.9772	0.0000
C_3, m^2/s^2 (ft^2/s^2)	-1,376,274 (-14,814,090)	-1,376,265 (-14,813,993)	-9 (-97)
Inclination, deg	31.817	31.833	-0.016
Descending Node, deg	122.997	123.031	-0.034

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

TABLE 3-VI. AVAILABLE TRACKING DATA - ASCENT PHASE

DATA SOURCE	TIME AVAILABLE (SEC)
C-BAND*	
Patrick (0.18) Radar (FPQ-6)	27 - 527
Merritt Island (19.18) Radar (TPQ-18)	16 - 527
Grand Turk (7.18) Radar (TPQ-18)	227 - 586
Bermuda (67.16) Radar (FPS-16M)	273 - 759
Bermuda (67.18) Radar (FPQ-6)	272 - 759
USB**	
Merritt Island Radar	26 - 359
Bermuda Radar	283 - 759

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

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

SECTION 4

ORBITAL TRAJECTORY RECONSTRUCTION

4.1 ORBITAL TRAJECTORIES

The S-IVB/LM/CSM was inserted into a near circular parking orbit at 759.83 seconds. While in parking orbit, vehicle subsystem checkout was carried out from the Mission Control Center at Houston. During the second revolution over Australia, the S-IVB stage was restarted and the vehicle was placed onto a translunar trajectory.

The parking orbit insertion conditions were close to nominal. The space-fixed velocity at insertion was 0.5 m/s (1.7 ft/s) less than nominal, and the flight path angle was 0.005 degree greater than nominal. The eccentricity was 0.0001 greater than nominal. The apogee was 0.5 km (0.3 n mi) greater than nominal, and the perigee was 1.2 km (0.6 n mi) less than nominal.

The translunar injection (TLI) conditions were also close to nominal. The eccentricity was equal to nominal, the inclination was 0.016 degree less than nominal, and the node was 0.034 degree lower than nominal. The space-fixed velocity was 3.7 m/s (12.2 ft/s) greater than nominal, the altitude was 4.5 km (2.4 n mi) less than nominal, and C_3 was 9 m^2/s^2 (97 ft^2/s^2) less than nominal.

The parking orbit trajectory spans the interval from insertion to 8,950 seconds. The post TLI trajectory covers the period from translunar injection (9,707.15 seconds) to CSM separation (11,198.9 seconds). These two orbital trajectories were established by the integration of the orbital model equations using the insertion/injection vector as the initial conditions.

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

4.2 ORBITAL DATA SOURCES

4.2.1 Orbital Tracking Data

Orbital tracking was conducted by the NASA Manned Space Flight Network (MSFN). A summary of the orbital tracking data is given in Table 4-I. The C-band and Unified S-band tracking data were mutually consistent and both agreed favorably with the reconstructed trajectory.

4.2.2 Orbital Venting Acceleration Data

During the orbit, no major thrusting occurred; however, the orbit was continuously perturbed by low-level LH_2 venting thrust. To accurately model the orbit of the vehicle, this perturbation was taken into account. The venting model was derived from telemetered guidance velocity data from the ST-124M guidance platform. The guidance velocity data were fitted in segments by polynomials in time. These polynomials were analytically differentiated to model the acceleration components measured by the guidance platform. Table 4-II lists the acceleration polynomials derived by this method. Figure 4-1 reflects the best estimate of the total venting acceleration (RSS of components) after atmospheric effects and biases have been removed.

4.3 TRAJECTORY RECONSTRUCTION

4.3.1 Parking Orbit Insertion Conditions

The Orbital Correction Program (OCP) was used to solve for the parking orbit insertion conditions utilizing the tracking data and the above-mentioned vent model. The insertion conditions are given in Table 4-III. The parking orbit solution was based on a composite fit of the two Bermuda stations at insertion, pass one of Canary Island S-band, pass one of Carnarvon, pass two of MILA, and pass two of Carnarvon. This combination of trackers is geometrically spaced to insure adequate coverage of the parking orbit. The Bermuda data at insertion were also used in the trajectory reconstruction of the ascent phase. The use of Bermuda data in the ascent phase solution and also in the orbital phase solution aids in assuring the continuity of the trajectory. The orbital solution, with the exception of the FPS-16M Bermuda radar, is based on the higher quality FPQ-6 or TPQ-18 radars. The ground track from parking orbit insertion to CSM separation is given in Figure 4-2. The parking orbit trajectory in PACSS1 is given in Tables B-IV and C-IV.

4.3.2 Translunar Injection Conditions

The translunar injection (TLI) conditions were determined by the Orbital Correction Program (OCP) utilizing the post injection tracking data. The post TLI trajectory is based on a composite fit of Hawaii, MILA, Bermuda C-band data and Hawaii, MILA, Corpus Christi Unified S-band data. The Goldstone Wing Site data were utilized to verify the integrity of this trajectory segment. The TLI conditions are given 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 CSM separation conditions are given in Table 4-V.

4.4 ORBITAL TRACKING ANALYSIS

The stations used to obtain the parking orbit insertion conditions and translunar injection conditions are given by Tables 4-VI and 4-VII, respectively. These two tables also include the number of data points and the Root-Mean-Square (RMS) errors of the residuals for each data type. These RMS errors represent the difference between the actual 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 residuals for the parking orbit was 21 m (69 ft) in slant range, 0.036 degree in elevation angle, and 0.018 degree in azimuth angle for the C-band trackers and 0.8 m/s (2.6 ft/s) in range rate, 0.035 degree in X-angle, and 0.014 degree in Y-angle for the Unified S-band tracker. The maximum RMS error of the residuals for the post TLI trajectory was 5 m (16 ft) in slant range, 0.039 degree in elevation angle, and 0.018 degree in azimuth angle for the C-band trackers and 0.3 m/s (1.0 ft/s) in range rate, 0.012 degree in X-angle and 0.008 degree in Y-angle for the Unified S-band trackers. The magnitudes of these RMS errors are reasonable and indicate the validity of the parking orbit and post TLI trajectory.

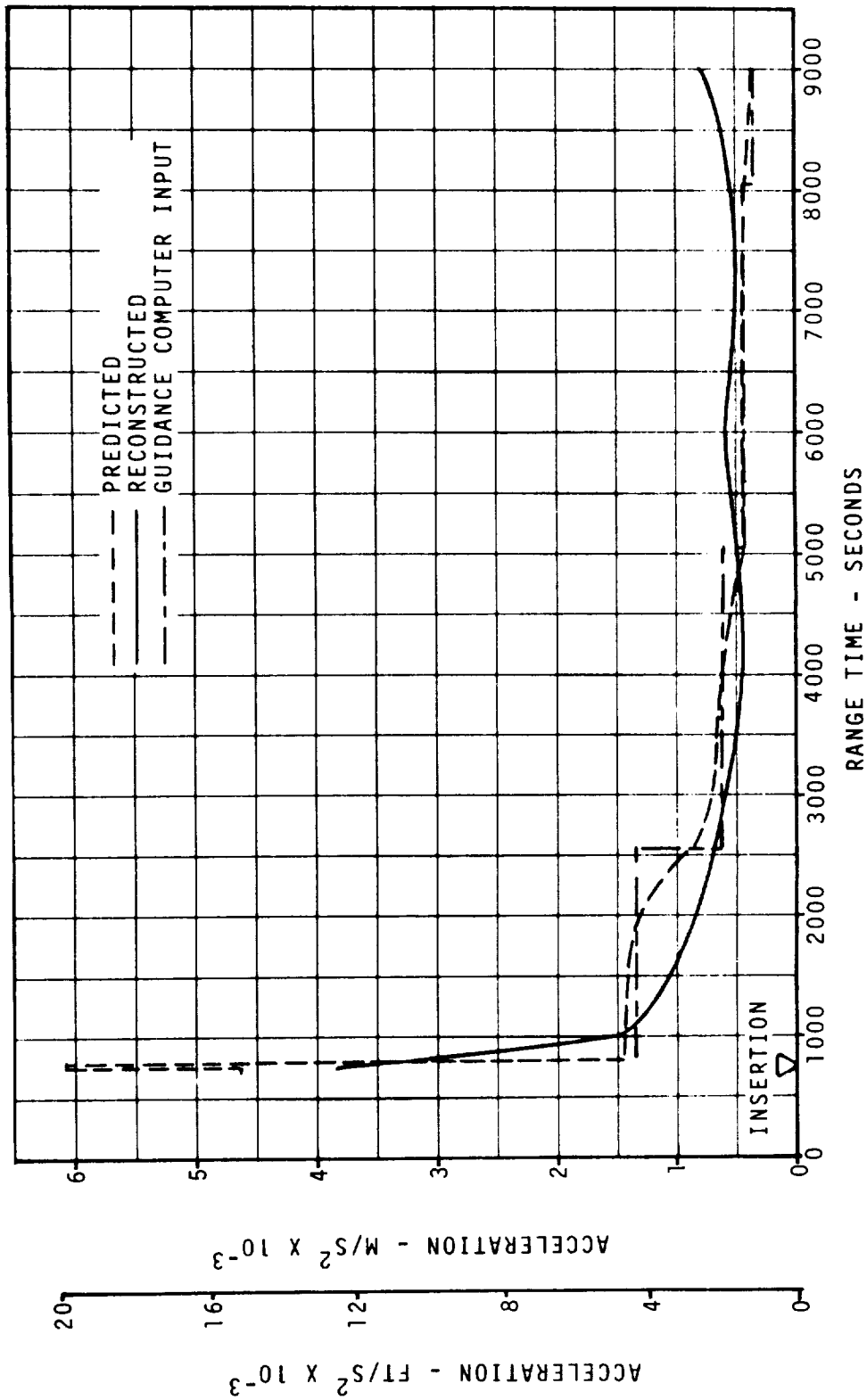

FIGURE 4-1. ORBITAL ACCELERATION DUE TO VENTING

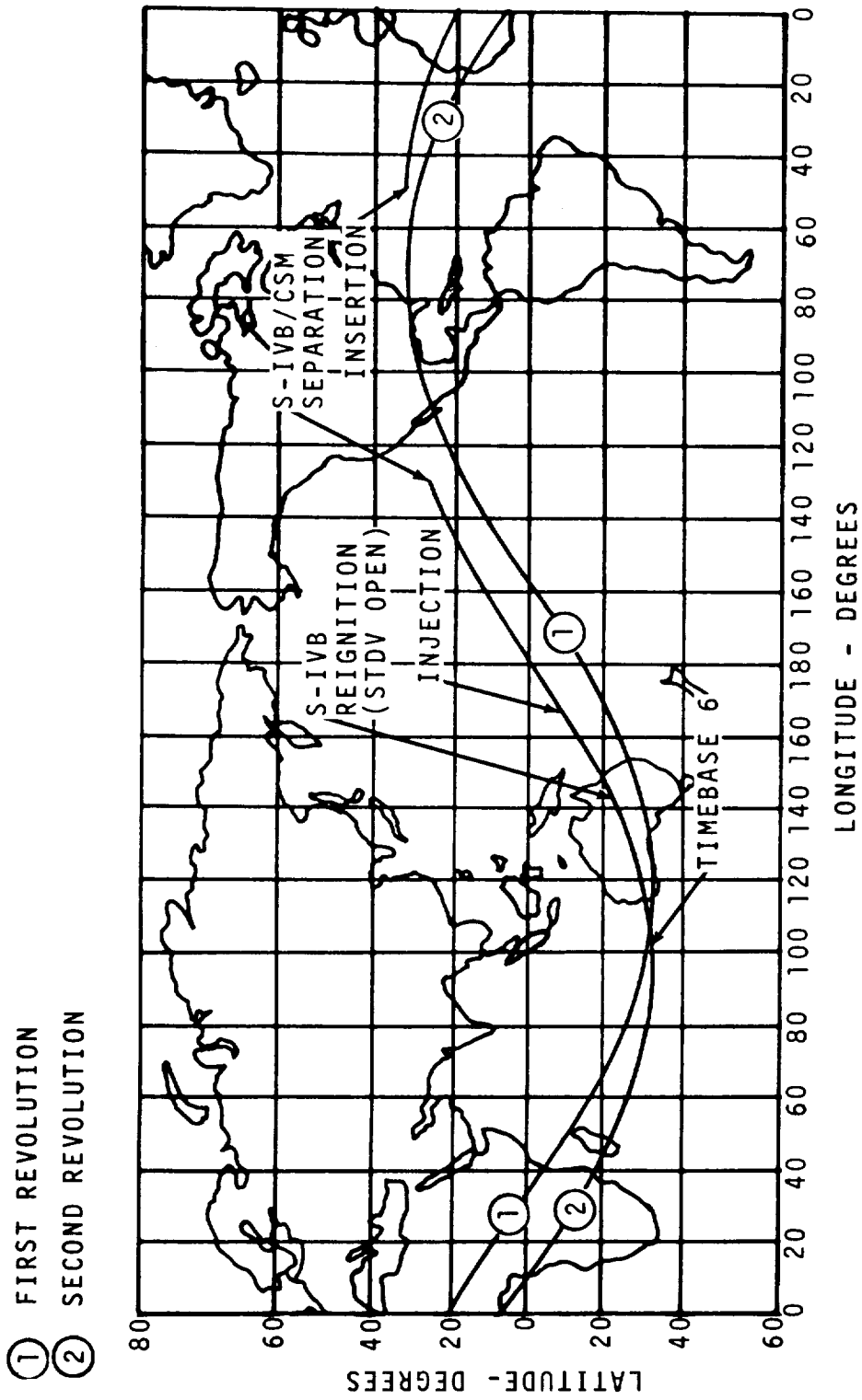

FIGURE 4-2. GROUND TRACK

TABLE 4-I. SUMMARY OF ORBITAL TRACKING DATA AVAILABLE

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

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

TABLE 4-II. ORBITAL VENTING ACCELERATION POLYNOMIALS*

	$\ddot{X}$**	
T_b	759	
T_e	9,281	
C_0	$-0.74495042 \times 10^{-6}$	
C_1	$-0.93528923 \times 10^{-9}$	
C_2	$0.12408145 \times 10^{-11}$	
C_3	$-0.37716176 \times 10^{-15}$	
C_4	$0.42706252 \times 10^{-19}$	
C_5	$-0.16021814 \times 10^{-23}$	
	$\ddot{Y}$	
T_b	759	
T_e	9,281	
C_0	$-0.58670000 \times 10^{-7}$	
C_1	0	
C_2	0	
C_3	0	
C_4	0	
C_5	0	
	$\ddot{Z}$	
T_b	759	952
T_e	952	9,281
C_0	$0.37549244 \times 10^{-5}$	$0.11845452 \times 10^{-5}$
C_1	$-0.11401015 \times 10^{-7}$	$-0.21655062 \times 10^{-8}$
C_2	0	$0.72556226 \times 10^{-12}$
C_3	0	$-0.93970400 \times 10^{-17}$
C_4	0	$-0.18107583 \times 10^{-19}$
C_5	0	$0.14722653 \times 10^{-23}$

* Polynomials are of the form $a=C_0+C_1t+C_2t^2+C_3t^3+C_4t^4+C_5t^5$ where a is the acceleration component (km/s^2) and $t = T-T_b$ where $T_b \leq T < T_e$. The begin time (T_b) and the end time (T_e) for the polynomial segments are expressed in seconds.

** The acceleration components are expressed in the launch vehicle platform-accelerometer system (PACSS12).

TABLE 4-III. PARKING ORBIT INSERTION CONDITIONS

PARAMETER	VALUE
Range Time, sec	759.83
Altitude, km (n mi)	191.6 (103.5)
Space-Fixed Velocity, m/s (ft/s)	7,792.5 (25,565.9)
Flight Path Angle, deg	0.005
Heading Angle, deg	90.148
Inclination, deg	32.525
Descending Node, deg	123.084
Eccentricity	0.0001
Apogee*, km (n mi)	185.7 (100.3)
Perigee*, km (n mi)	183.9 (99.3)
Period, min	88.19
Geodetic Latitude, deg N	32.694
Longitude, deg E	-50.490

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

TABLE 4-IV. TRANSLUNAR INJECTION CONDITIONS

PARAMETER	VALUE
Range Time, sec	9,707.15
Altitude, km (n mi)	337.9 (182.5)
Space-Fixed Velocity, m/s (ft/s)	10,832.1 (35,538.4)
Flight Path Angle, deg	7.635
Heading Angle, deg	59.318
Inclination, deg	31.817
Descending Node, deg	122.997
Eccentricity	0.9772
C_3*, m^2/s^2 (ft^2/s^2)	-1,376,274 (-14,814,090)
Geodetic Latitude, deg N	-8.919
Longitude, deg E	167.207

*Twice the specific energy of orbit

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

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

TABLE 4-V. CSM SEPARATION CONDITIONS

PARAMETER	VALUE
Range Time, sec	11,198.9
Altitude, km (n mi)	6,997.9 (3,778.6)
Space-Fixed Velocity, m/s (ft/s)	7,628.9 (25,029.2)
Flight Path Angle, deg	45.030
Heading Angle, deg	72.315
Geodetic Latitude, deg N	26.952
Longitude, deg E	-129.677

TABLE 4-VI. PARKING ORBIT TRACKING UTILIZATION SUMMARY

STATION	TIME OF TRACK (SECONDS) BEGIN	END	DATA TYPE	VALID OBSERVATIONS	RMS ERROR OF RESIDUALS
Bermuda (FPS-16M)	762	768	Azimuth Angle Elevation Angle Slant Range	2 2 2	0.018 deg 0.036 deg 21 m (69 ft)
Bermuda (FPQ-6)	762	768	Azimuth Angle Elevation Angle Slant Range	2 2 2	0.004 deg 0.020 deg 7 m (23 ft)
Canary Island (USB-30')	1,020	1,434	X-Angle Y-Angle Range Rate	35 46 44	0.035 deg 0.014 deg 0.8 m/s (2.6 ft/s)
Carnarvon (FPQ-6)	3,246	3,492	Azimuth Angle Elevation Angle Slant Range	41 37 39	0.005 deg 0.010 deg 7 m (23 ft)
Merritt Island (TPQ-18)	5,754	6,132	Azimuth Angle Elevation Angle Slant Range	55 54 56	0.005 deg 0.006 deg 5 m (16 ft)
Carnarvon (FPQ-6)	8,772	9,114	Azimuth Angle Elevation Angle Slant Range	56 50 52	0.005 deg 0.018 deg 6 m (20 ft)

TABLE 4-VII. POST TLI TRACKING UTILIZATION SUMMARY

STATION	TIME OF TRACK (SECONDS) BEGIN	END	DATA TYPE	VALID OBSERVATIONS	RMS ERROR OF RESIDUALS
Hawaii (FPS-16M)	9,936	11,304	Azimuth Angle Elevation Angle Slant Range	213 210 189	0.018 deg 0.013 deg 5 m (16 ft)
Merritt Island (TPQ-18)	10,764	11,304	Azimuth Angle Elevation Angle Slant Range	80 88 79	0.004 deg 0.039 deg 3 m (10 ft)
Hawaii (USB-30')	10,860	11,460	X-Angle Y-Angle Range Rate	43 48 45	0.006 deg 0.008 deg 0.3 m/s (1.0 ft/s)
Merritt Island (USB-30')	10,908	11,460	X-Angle Y-Angle Range Rate	42 36 47	0.005 deg 0.003 deg 0.3 m/s (1.0 ft/s)
Bermuda (FPQ-6)	11,070	11,304	Azimuth Angle Elevation Angle Slant Range	39 38 38	0.012 deg 0.013 deg 4 m (13 ft)
Corpus Christi (USB-30')	11,292	11,460	X-Angle Y-Angle Range Rate	27 28 21	0.012 deg 0.005 deg 0.04 m/s (0.13 ft/s)

SECTION 5

TRAJECTORY ERROR ANALYSIS

5.1 ERROR ANALYSIS

The confidence level or uncertainty that is assigned to a reconstructed trajectory depends on the degree of fulfillment of the following criteria:

a. Quantity of Tracking Data

b. Quality of Tracking Data

c. Consistency between Tracking and Guidance Velocity Data

d. Continuity between Trajectory Segments

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

5.1.1 Quantity of Tracking Data

The available tracking data for the ascent phase are given in Figure 3-11 and Table 3-VI. The tracking coverages for the parking orbit and post TLI phases are given in Table 4-I.

The tracking stations for the ascent and post TLI phases provided extensive redundant coverage. The available tracking data during parking orbit provided adequate coverage. No tracking data were available for the second burn phase.

5.1.2 Quality of Tracking Data

The C-band and S-band tracking data were of good quality. Comparisons of the C-band data in measured parameters (PACSS3a) with the ascent trajectory are shown in Figures 3-13 through 3-15. Comparisons of the S-band data in measured parameters (PACSS3c) with the ascent trajectory are shown in Figures 3-16 through 3-18. These plots indicate that the tracking data from the different stations were mutually consistent and the data deviations were of acceptable magnitude. The tracking data obtained during the parking orbit and post TLI phases were of good quality. The RMS errors of residuals for each data type are given in Tables 4-VI and 4-VII, respectively.

5.1.2 (Continued)

The tracking data were transformed into the earth-fixed launch site coordinate system (PACSS10) and differenced with the reconstructed trajectory to provide a more direct indication of the spread of the tracking data. The tracking data spreads for the ascent, parking orbit, and post TLI phases are given in Tables 5-I through 5-III, respectively.

5.1.3 Consistency Between Tracking and Guidance Velocity Data

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

The guidance velocity error plots for the ascent phase had reasonable shapes and magnitudes. The maximum error amounted to 1.6 m/s (5.2 ft/s) in the X-direction, 3.7 m/s (12.1 ft/s) in the Y-direction, and 0.5 m/s (1.6 ft/s) in the Z-direction, referenced to launch vehicle platform-accelerometer coordinate system (PACSS12).

The guidance velocity error plots for the second burn phase also had reasonable shapes and magnitudes. The maximum error amounted to 1.1 m/s (3.6 ft/s) in the X-direction, 1.2 m/s (3.9 ft/s) in the Y-direction, and 7.0 m/s (23.0 ft/s) in the Z-direction, referenced to PACSS12.

5.1.4 Continuity Between Trajectory Segments

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

Comparisons of the state vector differences at parking orbit insertion obtained independently by the powered flight and orbital analyses yielded good agreement. The position and velocity components of the solutions had a spread of 10 m (33 ft) and 0.2 m/s (0.7 ft/s) in the downrange direction, 340 m (1,115 ft) and 1.4 m/s (4.6 ft/s) in the vertical direction, and 120 m (394 ft) and 0.8 m/s (2.6 ft/s) in the crossrange direction, referenced to the earth-fixed launch site coordinate system (PACSS10).

Comparisons of the TLI vectors determined independently from the powered flight and orbital analyses also yielded good

2

5.1.4 (Continued)

agreement. The TLI vector from the powered flight analysis was obtained by propagating forward the state vector at 8,950 seconds (from parking orbit analysis) to 9,707.15 seconds, using the telemetered guidance velocity data as the generating parameter. The TLI vector from the orbital analysis was determined separately by fitting the post TLI tracking data. The position and velocity components of the two solutions had respectively a difference of 580 m (1,903 ft) and 4.7 m/s (15.4 (15.4 ft/s) in the X-direction, 140 m (459 ft) and 2.0 m/s (6.6 ft/s) in the Y-direction, and 480 m (1,575 ft) and 5.0 m/s (16.4 ft/s) in the Z-direction, referenced to the earth-fixed launch site coordinate system (PACSS10).

A dispersion analysis was performed for the TLI trajectory by selecting various tracking data combinations. The TLI vectors had a spread in position and velocity components in PACSS10:

a. 310 m (1,017 ft) - 0.2 m/s (0.7 ft/s)

b. 1,210 m (3,970 ft) - 2.8 m/s (9.2 ft/s)

c. 520 m (1,706 ft) - 0.9 m/s (3.0 ft/s)

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

5.2 TRAJECTORY UNCERTAINTIES

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

The uncertainties for the ascent phase are shown in Figure 5-1. At S-IC OECO, the uncertainties in position and velocity components in PACSS10 are ±70 m (±230 ft) and ±0.4 m/s (±1.3 ft/s), respectively. At S-II OECO, the uncertainties in position and velocity components in PACSS10 are ±360 m (±1,181 ft) and ±0.7 m/s (±2.3 ft/s), respectively. At insertion and throughout the parking orbit, the uncertainties in position and velocity components in PACSS10 are ±500 m (±1,640 ft) and ±1.0 m/s (±3.3 ft/s), respectively. The trajectory uncertainties increased to ±750 m (±2,461 ft) in position components and ±1.5 m/s (±4.9 ft/s) in velocity components at TLI and throughout the post TLI trajectory.

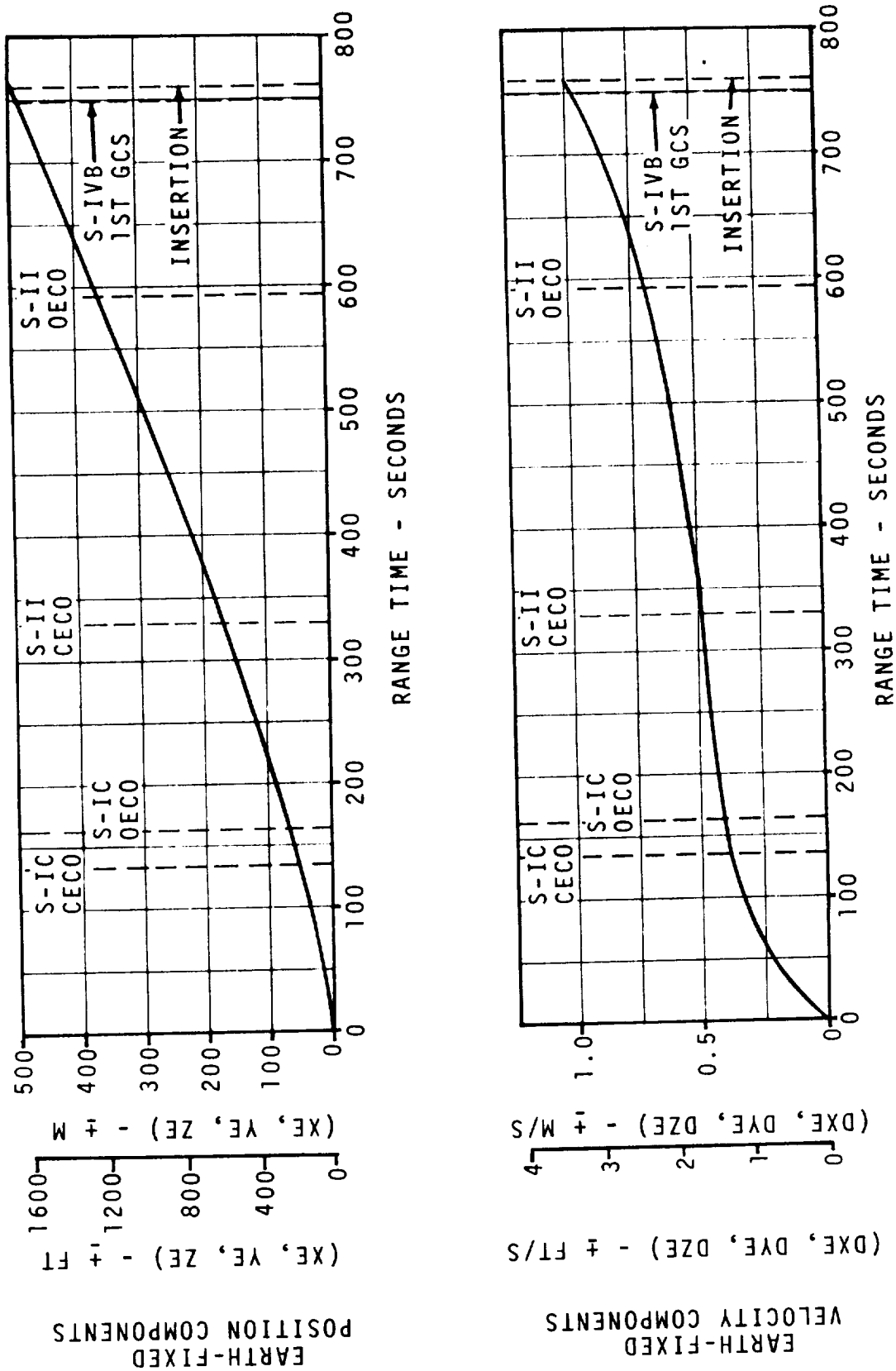

FIGURE 5-1. ESTIMATED TRAJECTORY UNCERTAINTY - ASCENT PHASE

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

STATION	ΔX	ΔY	ΔZ
C-BAND			
Patrick (0.18) Radar (FPQ-6)	100 m (328 ft)	70 m (230 ft)	90 m (295 ft)
Merritt Island (19.18) Radar (TPQ-18)	50 m (164 ft)	40 m (131 ft)	80 m (262 ft)
Grand Turk (7.18) Radar (TPQ-18)**	300 m (984 ft)	200 m (656 ft)	350 m (1,148 ft)
Bermuda (67.18) Radar (FPQ-6)	100 m (328 ft)	170 m (558 ft)	100 m (328 ft)
Bermuda (67.16) Radar (FPS-16M)	250 m (820 ft)	100 m (328 ft)	200 m (656 ft)
USB			
Merritt Island Radar (30')	200 m (656 ft)	50 m (164 ft)	100 m (328 ft)
Bermuda Radar (30')	200 m (656 ft)	200 m (656 ft)	300 m (984 ft)

* Expressed in PACSS10

** Elevation angle less than 5.0 degrees.

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

STATION	ΔX	ΔY	ΔZ
Bermuda (FPQ-6) Rev 1 **	600 m (1,969 ft)	150 m (492 ft)	200 m (656 ft)
Bermuda (FPS-16M) Rev 1 **	600 m (1,969 ft)	200 m (656 ft)	180 m (591 ft)
Carnarvon (FPQ-6) Rev 1	150 m (492 ft)	150 m (492 ft)	150 m (492 ft)
Merritt Island (TPQ-18) Rev 2	180 m (591 ft)	100 m (328 ft)	80 m (262 ft)
Carnarvon (FPQ-6) Rev 2	300 m (984 ft)	180 m (591 ft)	180 m (591 ft)

* Expressed in PACSS10

** Elevation angle less than 2.0 degrees

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

STATION	SLANT RANGE MIN	SLANT RANGE MAX	ΔX	ΔY	ΔZ
Hawaii (FPS-16M)	2,350 km (1,269 n mi)	8,960 km (4,838 n mi)	800 m (2,625 ft)	2,000 m (6,562 ft)	800 m (2,625 ft)
Merritt Island (TPQ-18)	8,900 km (4,806 n mi)	10,060 km (5,432 n mi)	5,500 m (18,045 ft)	1,800 m (5,906 ft)	2,500 m (8,202 ft)
Bermuda (FPQ-6)	10,830 km (5,848 n mi)	11,425 km (6,169 n mi)	2,500 m (8,202 ft)	2,500 m (8,202 ft)	1,000 m (3,280 ft)

* Expressed in PACSS10.

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SECTION 6

SPENT STAGE TRAJECTORIES

6.1 S-IC SPENT STAGE TRAJECTORY

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

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

a. Zero degree angle-of-attack entry

b. Ninety degree angle-of-attack entry

c. Tumbling entry

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

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

6.2 S-II SPENT STAGE TRAJECTORY

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

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

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

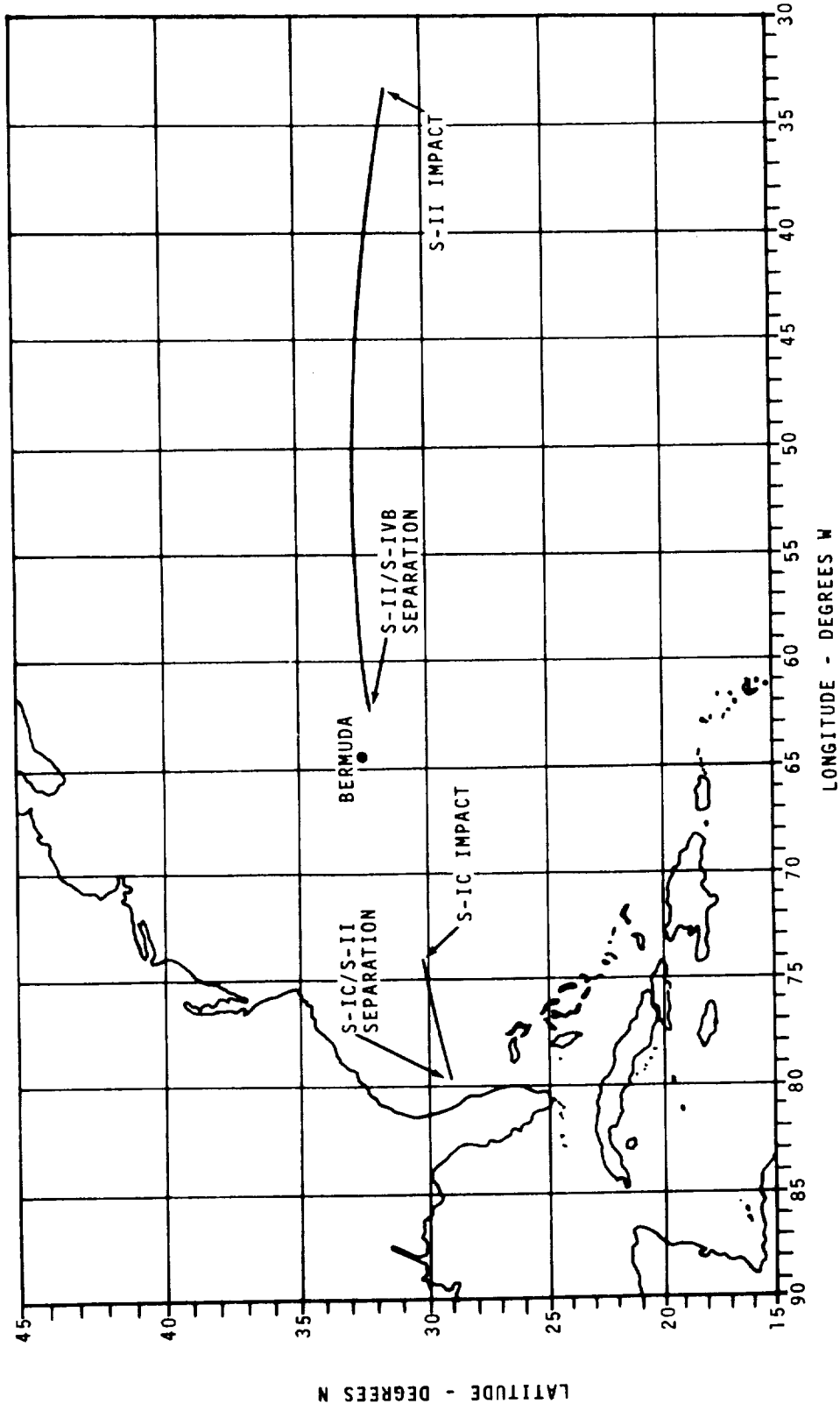

FIGURE 6-1. GROUND TRACKS FOR S-IC AND S-II SPENT STAGES

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

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	546.9
	Latitude, deg N	30.177
	Longitude, deg E	-74.065
	Surface Range, km (n mi)	658.0 (355.3)
Impact: 0° Angle-of-Attack	Range Time, sec	506.6
	Latitude, deg N	30.195
	Longitude, deg E	-73.973
	Surface Range, km (n mi)	667.1 (360.2)
Impact: 90° Angle-of-Attack	Range Time, sec	581.1
	Latitude, deg N	30.164
	Longitude, deg E	-74.127
	Surface Range, km (n mi)	651.9 (352.0)
Apex: Tumbling Case	Range Time, sec	271.7
	Altitude, km (n mi)	116.9 (63.1)
	Surface Range, km (n mi)	325.9 (176.0)

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

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	1,258.1
	Latitude, deg N	31.320
	Longitude, deg E	-33.289
	Surface Range, km (n mi)	4,542.3 (2,452.6)
Impact: 0° Angle-of-Attack	Range Time, sec	1,224.0
	Latitude, deg N	31.280
	Longitude, deg E	-33.034
	Surface Range, km (n mi)	4,567.0 (2,466.0)
Impact: 90° Angle-of-Attack	Range Time, sec	1,297.6
	Latitude, deg N	31.361
	Longitude, deg E	-33.550
	Surface Range, km (n mi)	4,517.1 (2,439.0)
Apex: Tumbling Case	Range Time, sec	632.2
	Altitude, km (n mi)	190.7 (103.0)
	Surface Range, km (n mi)	2,035.0 (1,098.8)

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

APPENDIX A (Continued)

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

APPENDIX A (Continued)

SYMBOL	DEFINITION
ALTITUDE	Perpendicular distance from vehicle center of gravity to Fischer Ellipsoid, positive above Fischer Ellipsoid.
RANGE	Surface range, measured along Fischer Ellipsoid from the launch site to the subvehicle point.
TIME	Range time, referenced to nearest integer second before IU umbilical disconnect.

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APPENDIX B

TIME HISTORY OF TRAJECTORY PARAMETERS - METRIC UNITS

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

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

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

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

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

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

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

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

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
GUIDANCE REFERENCE RELEASE									
-16.961	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	60	0	0	0.0	0.0	0.0	0.0	0.0	0.0
ALL HOLDDOWN ARMS RELEASED									
0.300	60	0	0	0.0	-0.0	0.0	0.55	-0.01	0.00
START OF TIME BASE 1									
0.600	60	0	0	0.3	-0.0	0.0	0.98	-0.03	0.01
1.0	60	0	0	0.8	-0.0	0.0	1.67	-0.07	0.00
2.0	62	0	0	2.9	-0.2	0.0	2.12	-0.26	-0.01
3.0	66	0	0	5.0	-0.4	-0.0	2.17	-0.17	-0.01
4.0	72	-1	0	7.2	-0.5	-0.0	2.29	0.02	-0.01
5.0	80	-1	0	9.5	-0.4	-0.0	2.34	0.08	-0.02
6.0	91	-2	0	11.9	-0.4	-0.0	2.39	0.11	-0.02
7.0	104	-2	0	14.3	-0.2	-0.1	2.44	0.15	-0.02
8.0	120	-2	0	16.8	-0.1	-0.1	2.49	0.15	-0.04
9.0	138	-2	0	19.3	0.1	-0.1	2.54	0.15	-0.04
10.0	158	-2	0	21.8	0.3	-0.2	2.57	0.25	-0.04
11.0	181	-2	-1	24.4	0.5	-0.2	2.62	0.21	-0.06
12.0	207	-1	-1	27.1	0.6	-0.3	2.66	0.06	-0.05
13.0	235	0	-1	29.8	0.7	-0.4	2.72	0.01	-0.15
14.0	267	0	-2	32.5	0.7	-0.5	2.81	0.02	-0.05

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
15.0	301	1	-2	35.4	0.7	-0.5	2.88	0.03	0.02
16.0	337	2	-3	38.3	0.8	-0.5	2.91	0.04	0.07
17.0	377	2	-3	41.2	0.8	-0.4	2.98	0.03	0.11
18.0	420	3	-3	44.2	0.8	-0.2	3.05	0.03	0.14
19.0	466	4	-4	47.3	0.9	-0.1	3.14	0.01	0.18
20.0	515	5	-4	50.5	0.8	0.1	3.21	-0.02	0.25
21.0	567	6	-3	53.8	0.8	0.4	3.30	-0.01	0.32
22.0	622	7	-3	57.1	0.8	0.8	3.39	-0.00	0.40
23.0	681	7	-2	60.5	0.8	1.2	3.47	-0.01	0.48
24.0	743	8	0	64.0	0.8	1.7	3.55	-0.02	0.55
25.0	809	9	2	67.6	0.8	2.3	3.61	-0.02	0.64
26.0	878	10	4	71.2	0.8	3.0	3.67	-0.02	0.74
27.0	952	11	8	75.0	0.7	3.8	3.73	-0.02	0.84
28.0	1028	11	12	78.7	0.7	4.7	3.79	-0.02	0.95
29.0	1109	12	17	82.5	0.7	5.7	3.86	-0.02	1.06
30.0	1193	13	24	86.4	0.7	6.8	3.94	-0.01	1.16
31.0	1282	13	31	90.4	0.7	8.0	4.01	-0.00	1.26
32.0	1374	14	40	94.5	0.7	9.3	4.10	0.00	1.35
33.0	1471	15	50	98.6	0.7	10.7	4.18	0.01	1.44
34.0	1572	15	61	102.8	0.7	12.2	4.27	0.02	1.52
35.0	1677	16	74	107.1	0.7	13.8	4.34	0.03	1.62
36.0	1786	17	89	111.5	0.7	15.4	4.42	0.02	1.72
37.0	1900	17	106	116.0	0.8	17.2	4.50	0.02	1.82
38.0	2018	18	123	120.5	0.8	19.1	4.57	0.01	1.94
39.0	2141	19	143	125.1	0.8	21.1	4.65	0.00	2.07
40.0	2268	20	165	129.8	0.8	23.2	4.73	-0.00	2.22
41.0	2400	21	190	134.6	0.8	25.5	4.81	-0.00	2.37
42.0	2537	21	216	139.4	0.8	28.0	4.89	0.01	2.54
43.0	2679	22	246	144.4	0.8	30.6	4.97	0.02	2.73
44.0	2826	23	278	149.4	0.8	33.4	5.04	0.04	2.93
45.0	2978	24	313	154.4	0.9	36.5	5.11	0.06	3.14
46.0	3135	25	351	159.6	0.9	39.7	5.18	0.08	3.34
47.0	3297	26	392	164.8	1.0	43.2	5.24	0.09	3.54
48.0	3464	27	437	170.1	1.1	46.8	5.31	0.10	3.73
49.0	3637	28	486	175.4	1.2	50.6	5.38	0.11	3.92
50.0	3815	29	538	180.8	1.4	54.6	5.45	0.12	4.09
51.0	3999	31	595	186.3	1.5	58.8	5.52	0.13	4.27
52.0	4188	32	656	191.8	1.6	63.1	5.59	0.13	4.44
53.0	4383	34	721	197.5	1.7	67.7	5.66	0.12	4.61
54.0	4583	36	791	203.2	1.9	72.4	5.73	0.12	4.78
55.0	4789	38	866	208.9	2.0	77.2	5.80	0.10	4.96
56.0	5001	40	946	214.8	2.1	82.3	5.87	0.09	5.13
57.0	5218	42	1031	220.7	2.1	87.5	5.94	0.07	5.30

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	5442	44	1121	226.6	2.2	92.9	6.01	0.05	5.47
59.0	5672	46	1217	232.7	2.2	98.4	6.08	0.03	5.66
60.0	5908	48	1318	238.8	2.3	104.2	6.16	0.01	5.86
61.0	6149	51	1425	245.0	2.3	110.2	6.24	0.00	6.07
62.0	6398	53	1538	251.3	2.3	116.4	6.31	0.01	6.28
63.0	6652	55	1658	257.6	2.3	122.7	6.37	0.02	6.50
64.0	6913	57	1784	264.0	2.3	129.3	6.41	0.04	6.72
65.0	7180	60	1917	270.4	2.4	136.2	6.43	0.06	6.94
66.0	7454	62	2056	276.9	2.4	143.2	6.44	0.08	7.17
67.0	7734	65	2203	283.3	2.5	150.5	6.44	0.10	7.40
68.0	8020	67	2357	289.8	2.6	158.1	6.45	0.12	7.65
	MACH 1								
68.400	8137	68	2421	292.3	2.7	161.1	6.45	0.12	7.75
69.0	8313	70	2519	296.2	2.8	165.8	6.46	0.13	7.90
70.0	8613	73	2679	302.7	2.9	173.9	6.48	0.13	8.17
71.0	8919	76	2847	309.2	3.0	182.2	6.50	0.14	8.43
72.0	9231	79	3053	315.7	3.2	190.7	6.53	0.15	8.70
73.0	9550	82	3249	322.2	3.3	199.5	6.57	0.14	8.96
74.0	9876	86	3453	328.8	3.5	208.6	6.61	0.13	9.22
75.0	10209	89	3666	335.5	3.6	218.0	6.66	0.12	9.47
76.0	10547	93	3889	342.2	3.7	227.6	6.72	0.10	9.71
77.0	10892	96	4121	348.9	3.8	237.4	6.80	0.10	9.94
78.0	11244	100	4364	355.8	3.9	247.4	6.89	0.10	10.18
79.0	11604	104	4618	362.7	4.0	257.7	6.97	0.12	10.42
80.0	11970	108	4879	369.7	4.1	268.3	7.06	0.13	10.67
81.0	12343	113	5153	376.8	4.3	279.1	7.13	0.14	10.93
	MAXIMUM DYNAMIC PRESSURE								
81.300	12457	114	5237	379.3	4.3	282.4	7.15	0.14	11.01
82.0	12723	117	5437	383.9	4.4	290.2	7.18	0.14	11.20
83.0	13111	121	5733	391.1	4.5	301.5	7.23	0.14	11.47
84.0	13506	125	6041	398.4	4.7	313.1	7.27	0.13	11.75
85.0	13908	131	6360	405.7	4.8	325.0	7.31	0.12	12.03
86.0	14317	136	6691	413.0	4.9	337.2	7.35	0.12	12.31
87.0	14734	140	7034	420.4	5.0	349.6	7.40	0.11	12.60
88.0	15159	146	7390	427.8	5.2	362.4	7.43	0.11	12.91
89.0	15590	151	7759	435.3	5.2	375.4	7.46	0.10	13.24
90.0	16029	156	8141	442.7	5.3	388.9	7.47	0.09	13.58
91.0	16475	161	8537	450.2	5.4	402.6	7.45	0.07	13.94
92.0	16929	167	8946	457.6	5.5	416.7	7.42	0.04	14.30

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	17390	172	9370	465.0	5.5	431.2	7.37	0.02	14.69
94.0	17859	178	9809	472.4	5.5	446.1	7.32	0.02	15.08
95.0	18335	183	10263	479.7	5.5	461.4	7.27	0.02	15.47
96.0	18818	189	10732	486.9	5.6	477.1	7.22	0.03	15.87
97.0	19309	195	11217	494.1	5.6	493.1	7.19	0.04	16.26
98.0	19807	200	11718	501.3	5.6	509.6	7.15	0.05	16.64
99.0	20311	206	12236	508.4	5.7	526.4	7.13	0.06	17.02
100.0	20823	212	12771	515.6	5.7	543.6	7.12	0.06	17.39
101.0	21342	217	13323	522.7	5.8	561.2	7.11	0.06	17.74
102.0	21869	223	13894	529.8	5.9	579.1	7.10	0.05	18.09
103.0	22402	229	14482	536.9	5.9	597.3	7.08	0.04	18.43
104.0	22942	235	15088	543.9	5.9	615.9	7.06	0.03	18.77
105.0	23490	241	15714	551.0	6.0	634.9	7.03	0.04	19.11
106.0	24044	247	16358	558.0	6.0	654.2	7.00	0.04	19.46
107.0	24606	253	17022	565.0	6.1	673.8	6.96	0.05	19.81
108.0	25174	259	17706	571.9	6.1	693.8	6.92	0.07	20.18
109.0	25750	265	18410	578.8	6.2	714.2	6.89	0.09	20.55
110.0	26332	271	19134	585.7	6.3	734.9	6.85	0.11	20.93
111.0	26921	278	19880	592.5	6.4	756.0	6.83	0.13	21.29
112.0	27517	284	20646	599.3	6.5	777.5	6.81	0.14	21.65
113.0	28120	291	21435	606.1	6.7	799.3	6.79	0.15	22.01
114.0	28729	298	22245	612.9	6.8	821.5	6.78	0.15	22.35
115.0	29345	305	23078	619.7	7.0	844.0	6.79	0.15	22.68
116.0	29969	312	23933	626.5	7.1	866.8	6.81	0.14	23.01
117.0	30598	319	24812	633.3	7.3	890.0	6.85	0.14	23.34
118.0	31235	326	25713	640.2	7.4	913.5	6.91	0.14	23.66
119.0	31879	334	26639	647.2	7.6	937.3	6.99	0.16	23.99
120.0	32530	341	27588	654.2	7.7	961.5	7.08	0.18	24.32
121.0	33187	349	28562	661.3	7.9	986.0	7.16	0.20	24.66
122.0	33852	357	29560	668.5	8.1	1010.8	7.24	0.21	25.01
123.0	34524	365	30584	675.8	8.3	1036.0	7.28	0.22	25.36
124.0	35204	374	31632	683.1	8.5	1061.6	7.31	0.22	25.73
125.0	35891	382	32707	690.4	8.8	1087.5	7.31	0.20	26.13
126.0	36585	391	33808	697.7	9.0	1113.8	7.30	0.19	26.54
127.0	37286	400	34935	705.0	9.1	1140.6	7.27	0.18	26.96
128.0	37995	410	36089	712.2	9.3	1167.7	7.25	0.18	27.40
129.0	38710	419	37270	719.1	9.5	1195.3	7.24	0.18	27.82
130.0	39434	429	38480	726.4	9.7	1223.4	7.24	0.18	28.26
131.0	40164	439	39717	733.6	9.9	1251.8	7.24	0.24	28.70
132.0	40901	449	40984	740.9	10.2	1280.7	7.26	0.28	29.14
133.0	41646	459	42279	748.1	10.5	1310.1	7.28	0.28	29.58
134.0	42399	469	43604	755.4	10.7	1339.9	7.31	0.28	30.01
135.0	43158	480	44959	762.7	11.0	1370.1	7.36	0.28	30.45

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)									
135.180	43296	432	45207	764.1	11.1	1375.6	7.37	0.29	30.53
136.0	43924	492	46343	768.6	11.3	1397.9	3.82	0.32	24.36
137.0	44695	503	47754	772.4	11.7	1422.4	3.84	0.34	24.64
138.0	45469	515	49187	776.2	12.0	1447.2	3.87	0.39	24.92
139.0	46247	527	50646	780.1	12.4	1472.2	3.90	0.42	25.20
140.0	47030	540	52132	784.0	12.9	1497.6	3.92	0.48	25.50
141.0	47816	553	53643	788.0	13.4	1523.2	3.95	0.51	25.81
142.0	48606	566	55179	791.9	13.9	1549.2	3.98	0.50	26.14
143.0	49400	581	56741	795.9	14.4	1575.5	4.01	0.48	26.48
144.0	50198	595	58330	800.1	14.9	1602.1	4.05	0.47	26.85
145.0	51000	610	59945	804.2	15.3	1629.2	4.09	0.45	27.22
146.0	51807	626	61588	808.3	15.7	1656.6	4.09	0.44	27.62
147.0	52617	642	63258	812.4	16.2	1684.4	4.11	0.43	28.00
148.0	53431	658	64957	816.5	16.6	1712.5	4.13	0.43	28.38
149.0	54250	675	66684	820.6	17.0	1741.0	4.15	0.42	28.76
150.0	55073	692	68439	824.8	17.5	1769.9	4.17	0.42	29.15
151.0	55899	710	70223	829.0	17.9	1799.1	4.21	0.43	29.53
152.0	56731	728	72037	833.2	18.3	1828.7	4.25	0.43	29.91
153.0	57566	746	73881	837.5	18.7	1858.8	4.29	0.43	30.29
154.0	58406	765	75755	841.8	19.2	1889.2	4.32	0.43	30.68
155.0	59249	785	77660	846.1	19.6	1920.1	4.34	0.44	31.06
156.0	60098	805	79595	850.4	20.1	1951.1	4.37	0.42	31.48
157.0	60951	825	81562	854.7	20.5	1982.8	4.40	0.44	31.90
158.0	61808	846	83561	859.1	20.9	2014.9	4.43	0.41	32.32
159.0	62669	867	85593	863.5	21.4	2047.5	4.46	0.48	32.74
160.0	63535	888	87657	868.0	21.8	2080.4	4.49	0.45	33.16
161.0	64406	910	89755	872.5	22.3	2113.8	4.52	0.45	33.58
162.0	65281	933	91887	877.0	22.7	2147.6	4.55	0.43	34.00
163.0	66161	956	94052	881.6	23.1	2181.8	4.58	0.43	34.43
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
163.600	66691	970	95368	884.4	23.4	2202.5	4.60	0.43	34.68
164.0	67045	979	96250	885.2	23.5	2212.7	-6.25	0.17	11.31
S-IC/S-II SEPARATION COMMAND									
164.300	67312	986	96920	882.7	23.6	2214.0	-9.09	0.16	0.14
166.0	68801	1026	100685	867.2	23.9	2214.2	-9.09	0.15	0.14
168.0	70517	1075	105121	850.4	24.2	2217.8	-7.32	0.15	4.99

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
170.0	72204	1123	109566	836.2	24.4	2229.0	-7.01	0.13	5.86
172.0	73861	1172	114038	822.6	24.7	2241.6	-6.51	0.14	6.75
174.0	75493	1222	118535	809.7	25.0	2255.3	-6.44	0.14	6.85
176.0	77099	1272	123060	796.9	25.3	2269.0	-6.43	0.14	6.92
178.0	78680	1323	127612	783.9	25.5	2283.1	-6.38	0.15	6.99
180.0	80235	1374	132193	771.2	25.8	2297.1	-6.36	0.15	7.02
182.0	81765	1426	136801	758.5	26.1	2311.2	-6.33	0.15	7.06
184.0	83269	1479	141438	745.8	26.4	2325.4	-6.31	0.14	7.09
186.0	84748	1532	146103	733.2	26.7	2339.6	-6.29	0.15	7.12
188.0	86202	1586	150796	720.7	27.0	2353.8	-6.27	0.16	7.15
190.0	87631	1640	155518	708.1	27.3	2368.2	-6.25	0.16	7.17
192.0	89034	1695	160269	695.7	27.6	2382.6	-6.23	0.16	7.21
194.0	90413	1750	165048	683.2	27.9	2397.0	-6.20	0.16	7.25
196.0	91767	1806	169857	670.9	28.3	2411.5	-6.17	0.16	7.29
198.0	93097	1863	174694	658.5	28.6	2426.2	-6.15	0.17	7.34
200.0	94402	1921	179562	646.3	28.9	2440.9	-6.10	0.17	7.38
202.0	95682	1979	184458	634.1	29.3	2455.7	-6.10	0.17	7.42
204.0	96938	2038	189384	621.9	29.6	2470.6	-6.13	0.17	7.46
206.0	98169	2098	194340	609.6	29.9	2485.5	-6.09	0.15	7.48
208.0	99377	2158	199326	597.6	30.2	2500.4	-5.95	0.11	7.45
210.0	100560	2218	204342	585.9	30.4	2515.3	-5.71	0.06	7.39
212.0	101721	2279	209387	574.8	30.5	2530.0	-5.41	0.03	7.28
214.0	102860	2340	214462	564.3	30.5	2544.4	-5.12	0.01	7.18
216.0	103978	2401	219565	554.3	30.5	2558.7	-4.90	-0.00	7.10
218.0	105077	2462	224696	544.6	30.5	2572.9	-4.82	0.01	7.10
220.0	106156	2523	229857	534.9	30.5	2587.1	-4.83	0.01	7.15
222.0	107217	2584	235045	525.2	30.5	2601.5	-4.84	0.02	7.20
224.0	108257	2645	240262	515.6	30.6	2615.9	-4.84	0.02	7.24
226.0	109279	2706	245509	505.9	30.6	2630.4	-4.85	0.02	7.29
228.0	110281	2768	250784	496.2	30.7	2645.1	-4.87	0.02	7.33
230.0	111264	2829	256089	486.4	30.7	2659.8	-4.88	0.03	7.37
232.0	112227	2890	261423	476.7	30.8	2674.5	-4.88	0.03	7.42
234.0	113170	2952	266787	466.9	30.8	2689.4	-4.88	0.04	7.46
236.0	114094	3014	272181	457.1	30.9	2704.4	-4.88	0.04	7.50
238.0	114999	3076	277605	447.4	31.0	2719.4	-4.89	0.05	7.54
240.0	115884	3138	283059	437.6	31.1	2734.5	-4.89	0.06	7.58
242.0	116749	3200	288543	427.8	31.2	2749.7	-4.89	0.06	7.62
244.0	117595	3263	294058	418.0	31.3	2765.0	-4.89	0.07	7.66
246.0	118421	3325	299603	408.2	31.5	2780.4	-4.89	0.07	7.71
248.0	119228	3388	305179	398.4	31.6	2795.8	-4.90	0.08	7.75
250.0	120015	3452	310787	388.6	31.8	2811.4	-4.90	0.09	7.80
252.0	120782	3516	316425	378.8	32.0	2827.1	-4.90	0.09	7.85
254.0	121530	3580	322095	369.0	32.1	2842.8	-4.91	0.09	7.88

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
256.0	122259	3644	327796	359.2	32.3	2858.6	-4.92	0.09	7.92
258.0	122967	3709	333529	349.3	32.5	2874.5	-4.94	0.10	7.97
260.0	123656	3774	339294	339.5	32.7	2890.5	-4.94	0.10	8.01
262.0	124325	3840	345091	329.6	32.9	2906.5	-4.94	0.10	8.06
264.0	124974	3906	350920	319.7	33.1	2922.7	-4.93	0.10	8.10
266.0	125604	3972	356782	309.8	33.3	2938.9	-4.93	0.11	8.14
268.0	126214	4039	362676	300.0	33.5	2955.3	-4.94	0.12	8.20
270.0	126804	4107	368603	290.1	33.8	2971.7	-4.94	0.12	8.25
272.0	127374	4174	374563	280.2	34.0	2988.2	-4.95	0.12	8.29
274.0	127925	4243	380556	270.3	34.3	3004.9	-4.96	0.12	8.33
276.0	128455	4311	386583	260.4	34.5	3021.6	-4.96	0.12	8.39
278.0	128966	4381	392643	250.4	34.8	3038.4	-4.96	0.13	8.44
280.0	129457	4450	398736	240.5	35.0	3055.3	-4.97	0.14	8.49
282.0	129928	4521	404864	230.6	35.3	3072.3	-4.98	0.15	8.53
284.0	130379	4592	411026	220.6	35.6	3089.4	-4.99	0.15	8.56
286.0	130810	4663	417222	210.6	35.9	3106.6	-5.00	0.15	8.62
288.0	131222	4735	423452	200.6	36.2	3123.9	-5.01	0.15	8.69
290.0	131613	4808	429717	190.6	36.5	3141.4	-5.02	0.15	8.76
292.0	131984	4882	436018	180.5	36.8	3158.9	-5.02	0.16	8.81
294.0	132335	4956	442353	170.5	37.2	3176.6	-5.03	0.17	8.84
296.0	132666	5030	448724	160.4	37.5	3194.3	-5.03	0.18	8.88
298.0	132976	5106	455131	150.3	37.9	3212.1	-5.05	0.19	8.94
300.0	133267	5182	461573	140.2	38.2	3230.1	-5.06	0.19	9.00
302.0	133537	5258	468051	130.1	38.6	3248.1	-5.07	0.19	9.05
304.0	133787	5336	474565	120.0	39.0	3266.3	-5.07	0.19	9.10
306.0	134017	5414	481116	109.8	39.4	3284.5	-5.08	0.19	9.16
308.0	134227	5494	487703	99.6	39.7	3302.9	-5.09	0.19	9.21
310.0	134416	5573	494328	89.4	40.1	3321.4	-5.11	0.20	9.27
312.0	134584	5654	500989	79.2	40.5	3340.0	-5.12	0.20	9.33
314.0	134732	5736	507688	68.9	40.9	3358.7	-5.13	0.20	9.39
316.0	134860	5818	514424	58.7	41.4	3377.5	-5.14	0.21	9.44
318.0	134967	5901	521198	48.4	41.8	3396.5	-5.15	0.22	9.50
320.0	135054	5985	528010	38.1	42.2	3415.5	-5.16	0.22	9.56
322.0	135119	6070	534860	27.7	42.7	3434.7	-5.18	0.23	9.63
324.0	135165	6156	541749	17.4	43.1	3454.0	-5.20	0.23	9.69
326.0	135189	6242	548676	7.0	43.6	3473.5	-5.21	0.23	9.76
328.0	135192	6330	555643	-3.5	44.1	3493.1	-5.23	0.24	9.82
330.0	135175	6419	562648	-14.0	44.5	3512.7	-5.25	0.24	9.87
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
330.640	135165	6447	564898	-17.3	44.7	3519.1	-5.26	0.24	9.88
332.0	135136	6508	569690	-25.3	45.0	3530.0	-5.98	0.20	7.74

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
334.0	135073	6599	576764	-37.3	45.4	3545.4	-5.97	0.22	7.74
336.0	134986	6690	583870	-49.2	45.9	3560.9	-5.88	0.22	7.74
338.0	134877	6782	591007	-60.7	46.3	3576.4	-5.65	0.20	7.73
340.0	134744	6875	598175	-71.6	46.7	3591.8	-5.38	0.21	7.69
342.0	134590	6969	605373	-82.1	47.1	3606.9	-5.13	0.20	7.63
344.0	134416	7064	612602	-92.2	47.5	3622.1	-4.94	0.20	7.59
346.0	134222	7159	619862	-102.0	47.9	3637.3	-4.83	0.20	7.58
348.0	134008	7255	627152	-111.5	48.3	3652.5	-4.76	0.20	7.59
350.0	133776	7352	634472	-121.0	48.7	3667.7	-4.73	0.22	7.61
352.0	133524	7450	641822	-130.5	49.2	3682.9	-4.74	0.23	7.64
354.0	133254	7549	649204	-140.0	49.6	3698.3	-4.76	0.23	7.70
356.0	132964	7649	656615	-149.6	50.1	3713.7	-4.80	0.23	7.77
358.0	132655	7750	664058	-159.2	50.6	3729.3	-4.84	0.23	7.82
360.0	132327	7851	671533	-168.9	51.0	3745.0	-4.88	0.23	7.87
362.0	131979	7954	679039	-178.7	51.5	3760.8	-4.92	0.23	7.93
364.0	131612	8057	686576	-188.6	51.9	3776.8	-4.96	0.23	8.00
366.0	131225	8162	694146	-198.6	52.4	3792.8	-5.00	0.25	8.06
368.0	130818	8267	701747	-208.6	52.9	3809.0	-5.02	0.26	8.11
370.0	130391	8373	709382	-218.6	53.4	3825.2	-5.03	0.26	8.15
372.0	129943	8481	717048	-228.7	54.0	3841.6	-5.06	0.27	8.20
374.0	129476	8589	724748	-238.9	54.5	3858.0	-5.09	0.27	8.26
376.0	128988	8699	732481	-249.1	55.1	3874.6	-5.11	0.28	8.31
378.0	128480	8809	740247	-259.3	55.6	3891.3	-5.12	0.29	8.36
380.0	127951	8921	748046	-269.5	56.2	3908.1	-5.14	0.29	8.42
382.0	127401	9034	755879	-279.9	56.8	3925.0	-5.16	0.29	8.47
384.0	126831	9149	763746	-290.2	57.4	3941.9	-5.17	0.30	8.52
386.0	126241	9264	771647	-300.5	58.0	3959.0	-5.18	0.31	8.57
388.0	125629	9380	779582	-310.9	58.6	3976.2	-5.20	0.32	8.62
390.0	124997	9498	787552	-321.4	59.3	3993.5	-5.22	0.32	8.67
392.0	124344	9618	795556	-331.8	59.9	4010.9	-5.23	0.32	8.72
394.0	123670	9738	803595	-342.3	60.5	4028.4	-5.25	0.32	8.77
396.0	122975	9860	811670	-352.8	61.2	4046.0	-5.27	0.33	8.83
398.0	122258	9983	819779	-363.4	61.9	4063.7	-5.29	0.34	8.88
400.0	121521	10107	827925	-374.0	62.6	4081.5	-5.30	0.35	8.93
402.0	120763	10233	836106	-384.6	63.3	4099.5	-5.32	0.35	8.99
404.0	119983	10360	844323	-395.2	64.0	4117.5	-5.34	0.35	9.05
406.0	119182	10489	852576	-405.9	64.7	4135.6	-5.36	0.35	9.10
408.0	118359	10619	860865	-416.7	65.4	4153.9	-5.38	0.34	9.16
410.0	117515	10750	869191	-427.5	66.1	4172.3	-5.40	0.35	9.22
412.0	116649	10883	877554	-438.3	66.8	4190.8	-5.43	0.37	9.28
414.0	115762	11017	885955	-449.2	67.5	4209.4	-5.45	0.38	9.34
416.0	114852	11153	894392	-460.1	68.3	4228.1	-5.47	0.38	9.39
418.0	113921	11291	902867	-471.0	69.1	4247.0	-5.49	0.38	9.45

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
420.0	112968	11430	911380	-482.0	69.9	4265.9	-5.52	0.39	9.51
422.0	111993	11570	919931	-493.1	70.7	4285.0	-5.54	0.40	9.57
424.0	110996	11713	928520	-504.2	71.5	4304.2	-5.56	0.40	9.63
426.0	109976	11856	937148	-515.3	72.3	4323.5	-5.58	0.41	9.69
428.0	108935	12002	945814	-526.5	73.1	4343.0	-5.60	0.42	9.75
430.0	107870	12149	954520	-537.8	73.9	4362.5	-5.63	0.42	9.81
432.0	106783	12297	963264	-549.0	74.8	4382.2	-5.66	0.43	9.87
434.0	105674	12448	972049	-560.4	75.7	4402.0	-5.68	0.43	9.94
436.0	104542	12600	980873	-571.7	76.5	4422.0	-5.69	0.44	10.01
438.0	103387	12754	989737	-583.1	77.4	4442.1	-5.70	0.44	10.07
440.0	102209	12910	998641	-594.6	78.3	4462.3	-5.74	0.45	10.14
442.0	101009	13067	1007586	-606.1	79.2	4482.6	-5.78	0.45	10.20
444.0	99785	13226	1016571	-617.7	80.1	4503.1	-5.81	0.46	10.27
446.0	98538	13388	1025598	-629.3	81.0	4523.7	-5.83	0.46	10.34
448.0	97268	13551	1034666	-641.0	81.9	4544.4	-5.86	0.47	10.40
450.0	95974	13715	1043776	-652.8	82.9	4565.3	-5.89	0.48	10.47
452.0	94657	13882	1052928	-664.6	83.9	4586.3	-5.92	0.49	10.54
454.0	93316	14051	1062121	-676.4	84.9	4607.5	-5.95	0.50	10.61
456.0	91951	14222	1071358	-688.4	85.9	4628.8	-5.98	0.51	10.68
458.0	90562	14394	1080637	-700.4	86.9	4650.2	-6.00	0.51	10.76
460.0	89149	14569	1089959	-712.4	87.9	4671.8	-6.06	0.51	10.82
462.0	87712	14746	1099324	-724.6	88.9	4693.5	-6.13	0.51	10.88
464.0	86251	14925	1108733	-736.9	90.0	4715.3	-6.14	0.52	10.95
466.0	84765	15106	1118185	-749.1	91.0	4737.3	-6.12	0.53	11.02
468.0	83254	15289	1127682	-761.4	92.1	4759.4	-6.12	0.54	11.09
470.0	81719	15474	1137223	-773.7	93.2	4781.6	-6.18	0.55	11.16
472.0	80160	15662	1146809	-786.1	94.3	4804.0	-6.26	0.56	11.24
474.0	78575	15851	1156439	-798.6	95.4	4826.6	-6.27	0.56	11.32
476.0	76965	16043	1166115	-811.2	96.5	4849.3	-6.30	0.57	11.40
478.0	75330	16238	1175837	-823.8	97.7	4872.2	-6.33	0.57	11.47
480.0	73670	16434	1185604	-836.5	98.8	4895.2	-6.37	0.58	11.55
482.0	71984	16633	1195418	-849.3	100.0	4918.4	-6.41	0.58	11.63
484.0	70273	16834	1205278	-862.1	101.2	4941.7	-6.45	0.59	11.71
486.0	68536	17038	1215185	-875.1	102.4	4965.3	-6.49	0.60	11.80
488.0	66772	17244	1225139	-888.1	103.6	4989.0	-6.53	0.60	11.88
490.0	64983	17452	1235141	-901.2	104.8	5012.8	-6.56	0.61	11.96
492.0	63168	17663	1245190	-914.3	106.0	5036.8	-6.60	0.62	12.05
494.0	61326	17876	1255288	-927.6	107.2	5061.0	-6.64	0.62	12.14
496.0	59457	18092	1265434	-940.9	108.5	5085.4	-6.68	0.63	12.23
498.0	57562	18310	1275630	-954.3	109.8	5109.9	-6.72	0.64	12.32
500.0	55640	18531	1285874	-967.8	111.0	5134.6	-6.77	0.65	12.41
502.0	53691	18754	1296168	-981.4	112.4	5159.5	-6.81	0.66	12.49
504.0	51715	18980	1306513	-995.0	113.7	5184.6	-6.85	0.66	12.58

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
506.0	49711	19209	1316907	-1008.8	115.0	5209.9	-6.89	0.67	12.68
508.0	47680	19440	1327352	-1022.6	116.4	5235.3	-6.94	0.67	12.78
510.0	45620	19674	1337849	-1036.5	117.7	5261.0	-6.98	0.68	12.88
512.0	43533	19911	1348396	-1050.5	119.1	5286.9	-7.03	0.69	12.97
514.0	41418	20151	1358996	-1064.7	120.5	5312.9	-7.08	0.70	13.07
516.0	39275	20393	1369648	-1078.9	121.9	5339.1	-7.13	0.71	13.17
518.0	37103	20638	1380353	-1093.2	123.3	5365.6	-7.19	0.72	13.27
520.0	34902	20886	1391111	-1107.6	124.8	5392.2	-7.24	0.73	13.38
522.0	32672	21137	1401922	-1122.2	126.3	5419.1	-7.29	0.74	13.49
524.0	30413	21391	1412787	-1136.8	127.8	5446.2	-7.35	0.75	13.58
526.0	28125	21648	1423707	-1151.5	129.3	5473.4	-7.40	0.76	13.68
528.0	25807	21908	1434681	-1166.4	130.8	5500.9	-7.46	0.77	13.80
530.0	23459	22172	1445710	-1181.4	132.3	5528.6	-7.51	0.78	13.90
532.0	21082	22438	1456795	-1196.5	133.9	5556.5	-7.55	0.77	14.02
534.0	18673	22707	1467937	-1211.6	135.5	5584.6	-7.60	0.80	14.13
536.0	16235	22980	1479134	-1226.9	137.1	5613.0	-7.64	0.80	14.24
538.0	13766	23255	1490388	-1242.3	138.7	5641.1	-7.79	0.79	12.68
540.0	11266	23534	1501692	-1258.1	140.1	5663.2	-7.91	0.73	10.61
542.0	8734	23816	1513038	-1274.0	141.6	5684.5	-8.01	0.74	10.62
544.0	6170	24101	1524428	-1290.1	143.1	5705.7	-8.13	0.71	10.63
546.0	3573	24388	1535861	-1306.4	144.5	5727.0	-8.18	0.73	10.66
548.0	944	24679	1547336	-1322.8	146.0	5748.4	-8.22	0.74	10.70
550.0	-1718	24972	1558854	-1339.3	147.5	5769.8	-8.26	0.76	10.74
552.0	-4414	25269	1570414	-1355.8	149.0	5791.2	-8.28	0.76	10.80
554.0	-7142	25568	1582018	-1372.5	150.5	5812.9	-8.34	0.78	10.85
556.0	-9904	25871	1593667	-1389.2	152.1	5834.6	-8.36	0.78	10.91
558.0	-12699	26176	1605360	-1405.9	153.7	5856.5	-8.36	0.78	10.96
560.0	-15527	26485	1617097	-1422.6	155.2	5878.4	-8.37	0.78	11.02
562.0	-18389	26797	1628878	-1439.4	156.8	5900.5	-8.44	0.79	11.09
564.0	-21285	27112	1640701	-1456.4	158.4	5922.8	-8.55	0.81	11.15
566.0	-24215	27431	1652569	-1473.6	160.0	5945.1	-8.62	0.82	11.21
568.0	-27180	27753	1664482	-1490.9	161.7	5967.6	-8.69	0.83	11.28
570.0	-30179	28078	1676440	-1508.4	163.3	5990.3	-8.76	0.84	11.35
572.0	-33213	28406	1688443	-1526.0	165.0	6013.1	-8.82	0.85	11.42
574.0	-36283	28738	1700492	-1543.7	166.7	6036.0	-8.88	0.85	11.48
576.0	-39388	29073	1712587	-1561.5	168.4	6059.0	-8.93	0.86	11.54
578.0	-42529	29411	1724729	-1579.4	170.1	6082.2	-8.99	0.87	11.61
580.0	-45706	29753	1736916	-1597.4	171.9	6105.5	-9.05	0.88	11.68
582.0	-48918	30099	1749151	-1615.6	173.7	6128.9	-9.10	0.88	11.75
584.0	-52168	30448	1761432	-1633.8	175.4	6152.5	-9.16	0.89	11.81
586.0	-55454	30801	1773760	-1652.2	177.2	6176.1	-9.21	0.89	11.87
588.0	-58777	31157	1786136	-1670.7	179.0	6199.9	-9.27	0.92	11.91
590.0	-62137	31517	1798560	-1689.3	180.9	6223.8	-9.32	0.90	11.96

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
592.0	-65534	31880	1811032	-1708.0	182.6	6247.7	-9.38	0.88	12.01
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
592.640	-66629	31997	1815033	-1714.0	183.2	6255.4	-9.40	0.88	12.03
S-II/S-IVB SEPARATION COMMAND									
593.500	-68106	32155	1820413	-1721.3	183.7	6257.7	-8.13	0.48	-2.68
594.0	-68968	32247	1823542	-1725.3	184.0	6256.4	-8.12	0.48	-2.68
596.0	-72435	32616	1836051	-1741.5	184.9	6251.0	-8.13	0.47	-2.68
598.0	-75934	32987	1848546	-1757.8	185.9	6246.5	-8.26	0.51	0.88
600.0	-79467	33360	1861045	-1774.8	187.1	6250.9	-8.57	0.62	2.68
602.0	-83034	33735	1873553	-1791.9	188.3	6256.3	-8.57	0.63	2.77
604.0	-86635	34113	1886070	-1809.1	189.5	6261.9	-8.62	0.59	2.82
606.0	-90270	34493	1898600	-1826.6	190.7	6267.6	-8.79	0.57	2.84
608.0	-93941	34876	1911141	-1844.3	191.8	6273.3	-8.90	0.56	2.85
610.0	-97648	35260	1923693	-1862.1	192.9	6279.0	-8.93	0.57	2.88
612.0	-101390	35647	1936257	-1880.0	194.1	6284.8	-8.91	0.59	2.88
614.0	-105168	36037	1948833	-1897.8	195.3	6290.5	-8.92	0.60	2.89
616.0	-108981	36429	1961419	-1915.7	196.5	6296.3	-8.95	0.62	2.89
618.0	-112830	36823	1974018	-1933.6	197.8	6302.1	-8.97	0.64	2.89
620.0	-116716	37220	1986628	-1951.6	199.1	6307.9	-8.98	0.65	2.88
622.0	-120637	37619	1999249	-1969.5	200.4	6313.6	-9.00	0.65	2.87
624.0	-124594	38021	2011882	-1987.6	201.7	6319.3	-9.04	0.66	2.85
626.0	-128587	38426	2024527	-2005.7	203.0	6325.0	-9.07	0.67	2.84
628.0	-132617	38833	2037182	-2023.9	204.4	6330.7	-9.09	0.69	2.84
630.0	-136682	39243	2049850	-2042.0	205.8	6336.4	-9.09	0.70	2.85
632.0	-140785	39656	2062528	-2060.2	207.2	6342.1	-9.10	0.70	2.85
634.0	-144923	40072	2075218	-2078.4	208.6	6347.8	-9.11	0.70	2.85
636.0	-149098	40490	2087919	-2096.7	210.0	6353.5	-9.12	0.71	2.85
638.0	-153310	40912	2100632	-2114.9	211.4	6359.2	-9.15	0.72	2.84
640.0	-157558	41336	2113356	-2133.2	212.8	6364.9	-9.17	0.72	2.82
642.0	-161843	41763	2126092	-2151.6	214.3	6370.5	-9.19	0.73	2.81
644.0	-166165	42193	2138838	-2170.0	215.7	6376.1	-9.20	0.72	2.80
646.0	-170523	42626	2151596	-2188.4	217.2	6381.7	-9.21	0.72	2.79
648.0	-174918	43062	2164365	-2206.8	218.6	6387.3	-9.23	0.72	2.79
650.0	-179350	43501	2177145	-2225.3	220.1	6392.9	-9.24	0.73	2.79
652.0	-183820	43942	2189937	-2243.8	221.5	6398.5	-9.25	0.74	2.79
654.0	-188326	44387	2202739	-2262.3	223.0	6404.0	-9.26	0.73	2.79
656.0	-192869	44834	2215553	-2280.8	224.5	6409.6	-9.27	0.73	2.79
658.0	-197449	45285	2228378	-2299.4	226.0	6415.2	-9.28	0.74	2.79
660.0	-202066	45738	2241214	-2318.0	227.4	6420.8	-9.29	0.75	2.78

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
662.0	-206721	46194	2254061	-2336.6	228.9	6426.3	-9.32	0.75	2.77
664.0	-211413	46654	2266919	-2355.2	230.4	6431.9	-9.34	0.75	2.76
666.0	-216142	47116	2279788	-2373.9	231.9	6437.4	-9.35	0.75	2.75
668.0	-220908	47581	2292668	-2392.6	233.4	6442.9	-9.35	0.75	2.75
670.0	-225712	48050	2305560	-2411.3	234.9	6448.4	-9.36	0.75	2.75
672.0	-230554	48521	2318462	-2430.1	236.4	6453.9	-9.37	0.75	2.74
674.0	-235432	48996	2331375	-2448.8	237.9	6459.3	-9.38	0.76	2.73
676.0	-240349	49473	2344299	-2467.6	239.5	6464.8	-9.40	0.76	2.72
678.0	-245303	49953	2357234	-2486.4	241.0	6470.3	-9.42	0.76	2.72
680.0	-250294	50437	2370180	-2505.2	242.5	6475.7	-9.43	0.76	2.72
682.0	-255324	50923	2383137	-2524.1	244.0	6481.1	-9.45	0.76	2.71
684.0	-260391	51413	2396105	-2543.0	245.5	6486.6	-9.46	0.76	2.71
686.0	-265496	51905	2409083	-2562.0	247.0	6492.0	-9.47	0.76	2.71
688.0	-270639	52401	2422073	-2580.9	248.6	6497.4	-9.48	0.77	2.70
690.0	-275820	52900	2435073	-2599.9	250.1	6502.8	-9.49	0.77	2.70
692.0	-281038	53401	2448084	-2618.9	251.6	6508.2	-9.51	0.77	2.69
694.0	-286295	53906	2461106	-2637.9	253.2	6513.6	-9.52	0.76	2.69
696.0	-291590	54414	2474138	-2656.9	254.7	6518.9	-9.53	0.76	2.69
698.0	-296923	54925	2487181	-2676.0	256.2	6524.3	-9.54	0.77	2.69
700.0	-302294	55439	2500235	-2695.1	257.8	6529.7	-9.55	0.77	2.68
702.0	-307703	55956	2513300	-2714.2	259.3	6535.1	-9.57	0.77	2.67
704.0	-313151	56476	2526376	-2733.4	260.8	6540.4	-9.59	0.77	2.67
706.0	-318637	56999	2539462	-2752.6	262.4	6545.7	-9.60	0.77	2.67
708.0	-324161	57526	2552558	-2771.8	263.9	6551.1	-9.60	0.77	2.66
710.0	-329724	58055	2565666	-2791.0	265.5	6556.4	-9.61	0.77	2.66
712.0	-335325	58588	2578784	-2810.2	267.0	6561.7	-9.61	0.77	2.66
714.0	-340965	59123	2591913	-2829.4	268.6	6567.0	-9.63	0.78	2.67
716.0	-346643	59662	2605052	-2848.7	270.1	6572.4	-9.65	0.78	2.67
718.0	-352360	60204	2618202	-2868.0	271.7	6577.7	-9.67	0.78	2.67
720.0	-358115	60749	2631363	-2887.4	273.3	6583.1	-9.71	0.79	2.66
722.0	-363909	61297	2644535	-2906.9	274.8	6588.4	-9.77	0.79	2.64
724.0	-369743	61848	2657717	-2926.5	276.4	6593.6	-9.80	0.79	2.62
726.0	-375615	62402	2670909	-2946.1	278.0	6598.9	-9.80	0.79	2.63
728.0	-381527	62960	2684112	-2965.7	279.6	6604.1	-9.78	0.79	2.63
730.0	-387478	63521	2697325	-2985.2	281.2	6609.4	-9.78	0.80	2.63
732.0	-393468	64085	2710549	-3004.8	282.8	6614.6	-9.77	0.80	2.63
734.0	-399497	64652	2723784	-3024.3	284.4	6619.9	-9.76	0.80	2.64
736.0	-405565	65222	2737029	-3043.8	286.0	6625.2	-9.75	0.80	2.65
738.0	-411672	65796	2750285	-3063.3	287.6	6630.5	-9.73	0.79	2.66
740.0	-417818	66372	2763551	-3082.8	289.1	6635.8	-9.72	0.79	2.66
742.0	-424003	66952	2776828	-3102.2	290.7	6641.1	-9.73	0.80	2.66
744.0	-430227	67535	2790115	-3121.7	292.3	6646.4	-9.73	0.79	2.66
746.0	-436490	68122	2803413	-3141.1	294.0	6651.7	-9.74	0.81	2.66

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
748.0	-442792	68711	2816722	-3160.6	295.6	6657.0	-9.74	0.80	2.67
S-IVB 1ST GUIDANCE CUTOFF									
749.830	-448592	69253	2828909	-3178.4	297.0	6661.9	-9.74	0.80	2.67
750.0	-449132	69304	2830041	-3180.1	297.1	6662.3	-9.74	0.80	2.67
752.0	-455507	69899	2843358	-3195.6	298.2	6655.8	-7.47	0.50	-3.69
754.0	-461913	70497	2856664	-3210.5	299.2	6648.4	-7.47	0.50	-3.69
756.0	-468348	71096	2869952	-3225.4	300.2	6641.1	-7.47	0.50	-3.69
758.0	-474814	71698	2883227	-3240.2	301.2	6633.8	-7.47	0.50	-3.69
PARKING ORBIT INSERTION									
759.830	-480758	72249	2895360	-3253.8	302.1	6627.1	-7.47	0.49	-3.69

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									
-16.961	6373.330	17.085	-5.537	-0.0	126.0	388.7	-0.02	-0.01	0.00
-16.0	6373.330	17.206	-5.164	-0.0	126.0	388.7	-0.02	-0.01	0.00
-15.0	6373.330	17.332	-4.775	-0.1	126.0	388.7	-0.02	-0.01	0.00
-14.0	6373.330	17.458	-4.386	-0.1	125.9	388.7	-0.02	-0.01	0.00
-13.0	6373.329	17.584	-3.997	-0.1	125.9	388.7	-0.02	-0.01	0.00
-12.0	6373.329	17.710	-3.609	-0.1	125.9	388.8	-0.02	-0.01	0.00
-11.0	6373.329	17.836	-3.220	-0.2	125.9	388.8	-0.02	-0.01	0.00
-10.0	6373.329	17.962	-2.831	-0.2	125.9	388.8	-0.02	-0.01	0.00
-9.0	6373.329	18.088	-2.442	-0.2	125.9	388.8	-0.02	-0.01	0.00
-8.0	6373.329	18.214	-2.054	-0.2	125.9	388.8	-0.02	-0.01	0.00
-7.0	6373.328	18.339	-1.665	-0.3	125.8	388.8	-0.02	-0.01	0.00
-6.0	6373.328	18.465	-1.276	-0.3	125.8	388.8	-0.02	-0.01	0.00
-5.0	6373.328	18.591	-0.887	-0.3	125.8	388.8	-0.02	-0.01	0.00
-4.0	6373.328	18.717	-0.498	-0.3	125.8	388.8	-0.02	-0.01	0.00
-3.0	6373.327	18.843	-0.110	-0.4	125.8	388.8	-0.02	-0.01	0.00
-2.0	6373.327	18.969	0.279	-0.4	125.8	388.8	-0.02	-0.01	0.00
-1.0	6373.326	19.094	0.668	-0.4	125.8	388.8	-0.02	-0.01	0.00
0.0	6373.326	19.220	1.057	-0.4	125.8	388.8	-0.02	-0.01	0.00
ALL HOLDDOWN ARMS RELEASED									
0.300	6373.326	19.258	1.173	-0.4	125.7	388.8	0.53	-0.03	0.01
START OF TIME BASE 1									
0.600	6373.326	19.296	1.290	-0.2	125.7	388.8	0.96	-0.04	0.01
1.0	6373.326	19.346	1.446	0.3	125.7	388.8	1.65	-0.08	0.01
2.0	6373.327	19.471	1.834	2.4	125.5	388.8	2.10	-0.27	-0.00
3.0	6373.330	19.597	2.223	4.5	125.3	388.8	2.15	-0.18	-0.01
4.0	6373.336	19.722	2.612	6.7	125.2	388.8	2.27	0.01	-0.01
5.0	6373.344	19.847	3.001	9.0	125.2	388.8	2.32	0.07	-0.01
6.0	6373.354	19.973	3.390	11.3	125.3	388.8	2.36	0.10	-0.01
7.0	6373.367	20.098	3.778	13.7	125.4	388.8	2.42	0.14	-0.02
8.0	6373.381	20.223	4.167	16.1	125.6	388.8	2.47	0.14	-0.03
9.0	6373.399	20.349	4.556	18.6	125.7	388.7	2.52	0.14	-0.03
10.0	6373.419	20.475	4.945	21.1	125.9	388.7	2.55	0.24	-0.03
11.0	6373.441	20.601	5.333	23.7	126.1	388.7	2.60	0.21	-0.05
12.0	6373.466	20.727	5.722	26.3	126.3	388.6	2.64	0.05	-0.04
13.0	6373.494	20.853	6.111	29.0	126.3	388.5	2.70	0.00	-0.14
14.0	6373.524	20.980	6.499	31.7	126.3	388.5	2.79	0.21	-0.04

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	6373.557	21.106	6.888	34.5	126.3	388.4	2.85	0.03	0.03
16.0	6373.593	21.232	7.276	37.4	126.3	388.5	2.89	0.04	0.09
17.0	6373.632	21.359	7.665	40.3	126.4	388.6	2.96	0.03	0.13
18.0	6373.674	21.485	8.053	43.3	126.4	388.8	3.03	0.02	0.16
19.0	6373.719	21.611	8.442	46.4	126.4	388.9	3.11	0.00	0.19
20.0	6373.767	21.738	8.831	49.5	126.4	389.2	3.19	-0.03	0.27
21.0	6373.818	21.864	9.221	52.8	126.3	389.5	3.28	-0.02	0.34
22.0	6373.872	21.990	9.610	56.1	126.3	389.9	3.37	-0.01	0.42
23.0	6373.930	22.117	10.000	59.5	126.3	390.3	3.45	-0.02	0.49
24.0	6373.991	22.243	10.391	62.9	126.3	390.8	3.52	-0.02	0.57
25.0	6374.056	22.369	10.782	66.5	126.3	391.5	3.59	-0.03	0.66
26.0	6374.124	22.496	11.174	70.1	126.2	392.2	3.65	-0.03	0.76
27.0	6374.196	22.622	11.566	73.8	126.2	393.0	3.70	-0.03	0.86
28.0	6374.272	22.748	11.960	77.5	126.2	393.9	3.76	-0.03	0.97
29.0	6374.351	22.874	12.354	81.3	126.1	394.9	3.84	-0.03	1.08
30.0	6374.435	23.000	12.750	85.2	126.1	396.1	3.91	-0.02	1.18
31.0	6374.522	23.126	13.146	89.1	126.1	397.3	3.99	-0.01	1.28
32.0	6374.613	23.252	13.544	93.2	126.1	398.6	4.07	-0.00	1.37
33.0	6374.708	23.378	13.944	97.3	126.1	400.0	4.15	0.01	1.46
34.0	6374.807	23.505	14.344	101.5	126.1	401.5	4.24	0.02	1.55
35.0	6374.911	23.631	14.747	105.7	126.1	403.2	4.31	0.02	1.65
36.0	6375.019	23.757	15.151	110.1	126.1	404.8	4.39	0.02	1.75
37.0	6375.131	23.883	15.557	114.5	126.1	406.6	4.47	0.01	1.86
38.0	6375.248	24.009	15.964	119.0	126.1	408.6	4.54	0.00	1.97
39.0	6375.369	24.135	16.374	123.6	126.1	410.6	4.62	-0.01	2.10
40.0	6375.495	24.261	16.785	128.2	126.1	412.8	4.69	-0.01	2.25
41.0	6375.626	24.387	17.199	133.0	126.1	415.1	4.78	-0.01	2.41
42.0	6375.761	24.513	17.616	137.8	126.1	417.6	4.86	0.00	2.58
43.0	6375.901	24.640	18.035	142.7	126.1	420.3	4.93	0.02	2.77
44.0	6376.046	24.766	18.456	147.6	126.1	423.2	5.01	0.03	2.97
45.0	6376.197	24.892	18.881	152.7	126.2	426.2	5.07	0.05	3.18
46.0	6376.352	25.018	19.309	157.8	126.2	429.5	5.14	0.07	3.38
47.0	6376.512	25.144	19.740	162.9	126.3	433.0	5.20	0.08	3.58
48.0	6376.678	25.271	20.175	168.1	126.4	436.7	5.26	0.09	3.78
49.0	6376.848	25.397	20.614	173.4	126.5	440.5	5.33	0.10	3.96
50.0	6377.024	25.524	21.056	178.8	126.6	444.6	5.40	0.11	4.14
51.0	6377.206	25.650	21.503	184.2	126.7	448.8	5.47	0.12	4.32
52.0	6377.393	25.777	21.954	189.7	126.8	453.2	5.54	0.12	4.49
53.0	6377.585	25.904	22.409	195.3	126.9	457.8	5.61	0.11	4.66
54.0	6377.784	26.031	22.870	200.9	127.0	462.6	5.68	0.10	4.84
55.0	6377.987	26.158	23.335	206.7	127.1	467.5	5.75	0.09	5.01
56.0	6378.197	26.285	23.805	212.4	127.2	472.6	5.81	0.08	5.19
57.0	6378.412	26.412	24.280	218.3	127.3	477.9	5.88	0.06	5.35

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	6378.633	26.540	24.760	224.2	127.3	483.3	5.95	0.04	5.53
59.0	6378.861	26.667	25.246	230.2	127.3	488.9	6.02	0.01	5.72
60.0	6379.094	26.794	25.738	236.2	127.3	494.8	6.10	-0.01	5.92
61.0	6379.333	26.922	26.236	242.4	127.3	500.8	6.17	-0.02	6.13
62.0	6379.579	27.049	26.740	248.6	127.3	507.0	6.24	-0.01	6.35
63.0	6379.830	27.176	27.250	254.8	127.3	513.5	6.30	-0.00	6.57
64.0	6380.088	27.304	27.767	261.1	127.3	520.2	6.34	0.02	6.79
65.0	6380.353	27.431	28.291	267.5	127.4	527.1	6.36	0.04	7.01
66.0	6380.623	27.559	28.821	273.8	127.4	534.2	6.37	0.06	7.24
67.0	6380.900	27.686	29.359	280.2	127.5	541.5	6.37	0.08	7.47
68.0	6381.184	27.813	29.904	286.6	127.6	549.1	6.37	0.09	7.72
MACH 1									
68.400	6381.299	27.864	30.125	289.1	127.6	552.3	6.37	0.10	7.82
69.0	6381.473	27.941	30.457	292.9	127.7	557.0	6.38	0.10	7.98
70.0	6381.769	28.069	31.018	299.3	127.8	565.1	6.39	0.11	8.24
71.0	6382.072	28.197	31.588	305.7	127.9	573.5	6.41	0.11	8.51
72.0	6382.381	28.325	32.165	312.1	128.0	582.1	6.43	0.12	8.77
73.0	6382.696	28.453	32.752	318.6	128.1	591.0	6.47	0.11	9.04
74.0	6383.018	28.581	33.348	325.1	128.2	600.2	6.51	0.10	9.30
75.0	6383.346	28.709	33.952	331.6	128.3	609.6	6.56	0.09	9.55
76.0	6383.681	28.837	34.567	338.2	128.4	619.3	6.62	0.07	9.79
77.0	6384.023	28.966	35.191	344.9	128.4	629.2	6.69	0.06	10.03
78.0	6384.371	29.094	35.825	351.6	128.5	639.3	6.78	0.07	10.27
79.0	6384.726	29.223	36.470	358.4	128.6	649.7	6.86	0.08	10.51
80.0	6385.088	29.351	37.125	365.3	128.7	660.4	6.94	0.09	10.76
81.0	6385.456	29.480	37.791	372.2	128.7	671.3	7.01	0.10	11.02
MAXIMUM DYNAMIC PRESSURE									
81.300	6385.569	29.519	37.993	374.3	128.8	674.6	7.02	0.10	11.10
82.0	6385.832	29.609	38.467	379.3	128.8	682.4	7.06	0.10	11.29
83.0	6386.215	29.738	39.156	386.3	128.9	693.8	7.10	0.09	11.57
84.0	6386.605	29.867	39.855	393.4	129.0	705.6	7.14	0.09	11.84
85.0	6387.002	29.996	40.567	400.6	129.1	717.5	7.18	0.08	12.13
86.0	6387.406	30.125	41.290	407.8	129.2	729.8	7.21	0.07	12.41
87.0	6387.818	30.254	42.026	415.0	129.2	742.4	7.25	0.06	12.71
88.0	6388.236	30.383	42.775	422.3	129.3	755.2	7.28	0.06	13.01
89.0	6388.662	30.513	43.537	429.6	129.3	768.4	7.31	0.05	13.34
90.0	6389.095	30.642	44.312	436.9	129.4	781.9	7.31	0.03	13.68
91.0	6389.536	30.771	45.101	444.2	129.4	795.8	7.28	0.01	14.04
92.0	6389.984	30.901	45.904	451.4	129.4	810.0	7.25	-0.02	14.41

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	6390.439	31.030	46.721	458.6	129.3	824.6	7.20	-0.04	14.80
94.0	6390.901	31.159	47.553	465.8	129.3	839.6	7.14	-0.05	15.19
95.0	6391.370	31.289	48.400	472.9	129.2	855.0	7.08	-0.05	15.58
96.0	6391.847	31.418	49.263	480.0	129.2	870.8	7.03	-0.05	15.98
97.0	6392.330	31.547	50.142	487.0	129.2	887.0	6.99	-0.04	16.37
98.0	6392.821	31.676	51.037	494.0	129.1	903.5	6.95	-0.03	16.76
99.0	6393.318	31.805	51.949	500.9	129.1	920.5	6.92	-0.03	17.13
100.0	6393.823	31.934	52.878	507.8	129.0	937.8	6.90	-0.02	17.50
101.0	6394.334	32.063	53.825	514.7	129.0	955.5	6.89	-0.03	17.85
102.0	6394.852	32.192	54.789	521.6	129.0	973.5	6.87	-0.04	18.20
103.0	6395.377	32.321	55.772	528.4	128.9	991.9	6.85	-0.05	18.55
104.0	6395.909	32.450	56.773	535.3	128.9	1010.6	6.82	-0.06	18.89
105.0	6396.447	32.579	57.793	542.1	128.8	1029.7	6.79	-0.06	19.23
106.0	6396.993	32.708	58.833	548.8	128.7	1049.1	6.75	-0.06	19.58
107.0	6397.545	32.837	59.892	555.6	128.7	1068.8	6.71	-0.06	19.93
108.0	6398.104	32.965	60.970	562.2	128.6	1088.9	6.66	-0.04	20.30
109.0	6398.670	33.094	62.070	568.9	128.6	1109.4	6.62	-0.03	20.68
110.0	6399.242	33.222	63.189	575.5	128.6	1130.3	6.58	-0.01	21.05
111.0	6399.820	33.351	64.330	582.0	128.6	1151.5	6.54	0.01	21.42
112.0	6400.406	33.480	65.493	588.5	128.6	1173.1	6.52	0.02	21.78
113.0	6400.998	33.608	66.677	595.0	128.6	1195.1	6.49	0.02	22.14
114.0	6401.596	33.737	67.883	601.5	128.6	1217.4	6.48	0.02	22.48
115.0	6402.201	33.865	69.112	608.0	128.6	1240.0	6.48	0.01	22.81
116.0	6402.812	33.994	70.363	614.5	128.6	1263.0	6.50	0.00	23.14
117.0	6403.430	34.123	71.638	621.0	128.6	1286.3	6.53	-0.00	23.47
118.0	6404.054	34.251	72.936	627.6	128.6	1310.0	6.59	-0.00	23.80
119.0	6404.685	34.380	74.258	634.2	128.6	1333.9	6.65	0.01	24.13
120.0	6405.322	34.509	75.604	640.9	128.7	1358.2	6.73	0.03	24.46
121.0	6405.966	34.637	76.975	647.6	128.7	1382.9	6.81	0.04	24.80
122.0	6406.618	34.766	78.370	654.5	128.7	1407.8	6.88	0.05	25.15
123.0	6407.275	34.895	79.790	661.4	128.8	1433.2	6.92	0.06	25.51
124.0	6407.940	35.024	81.236	668.3	128.8	1458.9	6.93	0.05	25.88
125.0	6408.612	35.153	82.708	675.2	128.9	1485.0	6.93	0.03	26.28
126.0	6409.291	35.281	84.206	682.1	128.9	1511.4	6.91	0.02	26.69
127.0	6409.976	35.410	85.731	689.0	128.9	1538.3	6.88	0.00	27.11
128.0	6410.669	35.539	87.283	695.9	128.9	1565.7	6.85	0.00	27.55
129.0	6411.368	35.668	88.863	702.8	128.9	1593.4	6.83	-0.00	27.98
130.0	6412.074	35.797	90.470	709.1	128.9	1621.6	6.81	-0.01	28.42
131.0	6412.787	35.926	92.106	715.9	128.9	1650.2	6.81	0.05	28.86
132.0	6413.507	36.055	93.771	722.8	129.0	1679.3	6.82	0.09	29.30
133.0	6414.233	36.184	95.465	729.6	129.1	1708.8	6.83	0.07	29.74
134.0	6414.967	36.313	97.189	736.4	129.1	1738.8	6.85	0.06	30.18
135.0	6415.707	36.442	98.943	743.3	129.2	1769.2	6.88	0.06	30.62

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)									
135.180	6415.841	36.465	99.263	744.5	129.2	1774.7	6.89	0.07	30.69
136.0	6416.453	36.571	100.726	748.6	129.3	1797.1	3.39	0.12	24.49
137.0	6417.204	36.701	102.536	752.0	129.4	1821.7	3.41	0.14	24.77
138.0	6417.958	36.830	104.369	755.4	129.6	1846.6	3.43	0.19	25.05
139.0	6418.714	36.960	106.227	758.9	129.7	1871.8	3.45	0.21	25.34
140.0	6419.476	37.090	108.113	762.3	130.0	1897.3	3.47	0.27	25.64
141.0	6420.240	37.220	110.023	765.8	130.3	1923.1	3.49	0.29	25.95
142.0	6421.008	37.350	111.959	769.3	130.6	1949.2	3.51	0.28	26.27
143.0	6421.779	37.481	113.921	772.8	130.8	1975.6	3.53	0.25	26.62
144.0	6422.554	37.612	115.910	776.5	131.0	2002.4	3.57	0.24	26.99
145.0	6423.332	37.743	117.926	780.1	131.2	2029.6	3.60	0.22	27.36
146.0	6424.114	37.874	119.969	783.7	131.5	2057.1	3.59	0.20	27.76
147.0	6424.899	38.006	122.041	787.3	131.7	2085.1	3.60	0.19	28.14
148.0	6425.688	38.138	124.140	790.9	131.8	2113.3	3.61	0.18	28.52
149.0	6426.481	38.270	126.267	794.5	132.0	2142.0	3.62	0.17	28.91
150.0	6427.277	38.402	128.424	798.1	132.2	2171.0	3.64	0.16	29.29
151.0	6428.077	38.534	130.609	801.8	132.3	2200.4	3.66	0.16	29.67
152.0	6428.881	38.666	132.825	805.5	132.5	2230.2	3.69	0.16	30.06
153.0	6429.688	38.799	135.070	809.2	132.6	2260.4	3.72	0.15	30.44
154.0	6430.499	38.932	137.346	812.9	132.8	2290.9	3.74	0.15	30.82
155.0	6431.314	39.064	139.652	816.6	132.9	2321.9	3.76	0.15	31.21
156.0	6432.133	39.197	141.990	820.3	133.1	2353.2	3.78	0.13	31.63
157.0	6432.955	39.331	144.359	824.0	133.2	2385.0	3.80	0.15	32.05
158.0	6433.781	39.464	146.760	827.8	133.4	2417.3	3.82	0.11	32.47
159.0	6434.611	39.597	149.194	831.6	133.5	2450.0	3.84	0.17	32.90
160.0	6435.445	39.731	151.661	835.5	133.6	2483.1	3.85	0.14	33.32
161.0	6436.283	39.865	154.161	839.3	133.8	2516.6	3.87	0.13	33.74
162.0	6437.124	39.998	156.696	843.2	133.9	2550.5	3.89	0.10	34.16
163.0	6437.970	40.132	159.265	847.1	134.0	2584.9	3.91	0.10	34.58
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
163.600	6438.480	40.213	160.822	849.4	134.1	2605.7	3.92	0.09	34.84
164.0	6438.819	40.266	161.865	850.0	134.1	2616.0	-6.67	-0.06	11.35
S-IC/S-II SEPARATION COMMAND									
164.300	6439.075	40.307	162.656	847.4	134.1	2617.2	-9.39	-0.00	0.14
166.0	6440.504	40.535	167.107	831.5	134.1	2617.5	-9.38	-0.01	0.15
168.0	6442.148	40.803	172.350	814.0	134.0	2621.1	-7.67	-0.05	5.01

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
170.0	6443.761	41.071	177.602	799.1	133.9	2632.4	-7.37	-0.07	5.88
172.0	6445.344	41.338	182.880	784.8	133.8	2645.0	-6.89	-0.07	6.78
174.0	6446.899	41.606	188.184	771.1	133.6	2658.7	-6.82	-0.07	6.87
176.0	6448.427	41.873	193.516	757.4	133.4	2672.5	-6.81	-0.08	6.94
178.0	6449.928	42.139	198.875	743.7	133.3	2686.7	-6.77	-0.06	7.01
180.0	6451.402	42.406	204.263	730.2	133.1	2700.7	-6.75	-0.07	7.04
182.0	6452.849	42.672	209.678	716.7	133.0	2714.8	-6.72	-0.07	7.07
184.0	6454.269	42.937	215.122	703.3	132.8	2729.0	-6.71	-0.08	7.10
186.0	6455.662	43.203	220.595	689.9	132.7	2743.3	-6.69	-0.08	7.13
188.0	6457.029	43.468	226.095	676.5	132.5	2757.6	-6.67	-0.07	7.16
190.0	6458.368	43.733	231.625	663.2	132.4	2771.9	-6.65	-0.07	7.18
192.0	6459.681	43.998	237.183	649.9	132.2	2786.3	-6.63	-0.07	7.21
194.0	6460.968	44.262	242.770	636.6	132.1	2800.8	-6.61	-0.07	7.25
196.0	6462.228	44.526	248.386	623.4	131.9	2815.3	-6.58	-0.07	7.29
198.0	6463.462	44.790	254.031	610.3	131.8	2829.9	-6.56	-0.07	7.34
200.0	6464.669	45.053	259.706	597.2	131.6	2844.6	-6.52	-0.07	7.37
202.0	6465.850	45.316	265.410	584.1	131.5	2859.4	-6.52	-0.07	7.41
204.0	6467.006	45.579	271.144	571.0	131.3	2874.3	-6.55	-0.07	7.45
206.0	6468.135	45.841	276.907	559.0	131.2	2889.2	-6.52	-0.10	7.47
208.0	6469.238	46.104	282.700	545.1	130.9	2904.1	-6.38	-0.14	7.44
210.0	6470.315	46.365	288.524	532.5	130.6	2919.0	-6.14	-0.19	7.38
212.0	6471.368	46.626	294.376	520.5	130.2	2933.6	-5.84	-0.22	7.28
214.0	6472.399	46.886	300.258	509.1	129.7	2948.1	-5.55	-0.25	7.17
216.0	6473.405	47.145	306.168	498.2	129.2	2962.4	-5.33	-0.25	7.10
218.0	6474.391	47.402	312.107	487.6	128.7	2976.5	-5.26	-0.25	7.09
220.0	6475.356	47.659	318.075	477.1	128.2	2990.8	-5.27	-0.24	7.14
222.0	6476.299	47.915	324.070	466.6	127.7	3005.1	-5.29	-0.24	7.19
224.0	6477.222	48.170	330.095	456.0	127.2	3019.5	-5.29	-0.24	7.23
226.0	6478.123	48.424	336.149	445.4	126.7	3034.0	-5.30	-0.24	7.27
228.0	6479.003	48.677	342.231	434.8	126.2	3048.6	-5.32	-0.24	7.31
230.0	6479.862	48.929	348.343	424.1	125.7	3063.3	-5.34	-0.24	7.35
232.0	6480.700	49.180	354.484	413.4	125.3	3078.0	-5.34	-0.24	7.40
234.0	6481.516	49.430	360.655	402.7	124.8	3092.9	-5.34	-0.24	7.43
236.0	6482.310	49.679	366.856	392.0	124.3	3107.8	-5.35	-0.23	7.47
238.0	6483.084	49.927	373.086	381.3	123.8	3122.8	-5.36	-0.23	7.51
240.0	6483.836	50.174	379.347	370.6	123.4	3137.8	-5.37	-0.22	7.56
242.0	6484.566	50.421	385.638	359.8	122.9	3153.0	-5.37	-0.22	7.59
244.0	6485.275	50.666	391.959	349.1	122.5	3168.2	-5.37	-0.22	7.63
246.0	6485.962	50.910	398.311	338.3	122.0	3183.5	-5.38	-0.22	7.67
248.0	6486.628	51.154	404.693	327.5	121.6	3198.9	-5.38	-0.21	7.72
250.0	6487.272	51.397	411.106	316.7	121.2	3214.4	-5.39	-0.21	7.77
252.0	6487.895	51.639	417.551	305.9	120.8	3230.0	-5.39	-0.21	7.81
254.0	6488.496	51.880	424.026	295.1	120.3	3245.6	-5.41	-0.21	7.84

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
256.0	6489.075	52.120	430.533	284.3	119.9	3261.4	-5.42	-0.21	7.88
258.0	6489.633	52.359	437.072	273.4	119.5	3277.2	-5.44	-0.21	7.92
260.0	6490.169	52.598	443.642	262.5	119.1	3293.1	-5.45	-0.21	7.96
262.0	6490.683	52.836	450.244	251.6	118.6	3309.0	-5.45	-0.21	8.01
264.0	6491.175	53.073	456.878	240.7	118.2	3325.1	-5.45	-0.21	8.04
266.0	6491.646	53.309	463.545	229.8	117.8	3341.2	-5.45	-0.20	8.09
268.0	6492.094	53.544	470.243	218.8	117.4	3357.5	-5.46	-0.20	8.14
270.0	6492.521	53.778	476.974	207.9	117.0	3373.8	-5.47	-0.20	8.19
272.0	6492.926	54.012	483.738	196.9	116.6	3390.2	-5.48	-0.20	8.23
274.0	6493.309	54.244	490.535	185.9	116.1	3406.7	-5.49	-0.21	8.27
276.0	6493.670	54.476	497.365	174.9	115.7	3423.3	-5.50	-0.21	8.32
278.0	6494.009	54.707	504.229	163.9	115.3	3440.0	-5.51	-0.20	8.37
280.0	6494.325	54.937	511.125	152.9	114.9	3456.8	-5.52	-0.20	8.42
282.0	6494.620	55.167	518.056	141.8	114.5	3473.7	-5.53	-0.19	8.46
284.0	6494.893	55.395	525.020	130.7	114.1	3490.6	-5.55	-0.19	8.49
286.0	6495.143	55.623	532.019	119.6	113.7	3507.7	-5.56	-0.19	8.54
288.0	6495.371	55.850	539.051	108.5	113.4	3524.8	-5.57	-0.20	8.61
290.0	6495.577	56.077	546.118	97.3	112.9	3542.1	-5.58	-0.20	8.68
292.0	6495.760	56.302	553.220	86.1	112.5	3559.5	-5.59	-0.20	8.73
294.0	6495.921	56.527	560.356	74.9	112.2	3577.0	-5.60	-0.19	8.76
296.0	6496.060	56.751	567.528	63.7	111.8	3594.6	-5.61	-0.18	8.80
298.0	6496.176	56.974	574.735	52.4	111.4	3612.3	-5.63	-0.18	8.85
300.0	6496.270	57.197	581.977	41.2	111.0	3630.0	-5.65	-0.18	8.91
302.0	6496.341	57.418	589.255	29.8	110.7	3647.9	-5.66	-0.18	8.96
304.0	6496.389	57.639	596.569	18.5	110.3	3665.9	-5.67	-0.19	9.01
306.0	6496.415	57.860	603.918	7.1	109.9	3683.9	-5.68	-0.19	9.06
308.0	6496.418	58.079	611.304	-4.3	109.6	3702.1	-5.70	-0.18	9.12
310.0	6496.398	58.298	618.727	-15.7	109.2	3720.4	-5.72	-0.18	9.17
312.0	6496.355	58.516	626.186	-27.1	108.8	3738.8	-5.74	-0.19	9.23
314.0	6496.289	58.733	633.682	-38.7	108.4	3757.3	-5.75	-0.19	9.28
316.0	6496.200	58.949	641.215	-50.2	108.1	3776.0	-5.76	-0.18	9.34
318.0	6496.088	59.165	648.786	-61.7	107.7	3794.7	-5.77	-0.18	9.39
320.0	6495.953	59.380	656.394	-73.3	107.3	3813.5	-5.79	-0.18	9.45
322.0	6495.795	59.595	664.040	-84.9	107.0	3832.5	-5.81	-0.18	9.51
324.0	6495.613	59.808	671.724	-96.6	106.6	3851.6	-5.84	-0.18	9.58
326.0	6495.409	60.021	679.447	-108.3	106.3	3870.8	-5.86	-0.18	9.64
328.0	6495.180	60.233	687.207	-120.1	105.9	3890.1	-5.88	-0.19	9.69
330.0	6494.928	60.445	695.007	-131.9	105.6	3909.6	-5.91	-0.17	9.74
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
330.640	6494.843	60.512	697.511	-135.6	105.5	3915.8	-5.91	-0.18	9.76
332.0	6494.652	60.656	702.842	-144.5	105.2	3926.6	-6.60	-0.20	7.60

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
334.0	6494.350	60.866	710.710	-157.7	104.8	3941.8	-6.59	-0.17	7.59
336.0	6494.021	61.075	718.608	-170.8	104.5	3956.9	-6.50	-0.18	7.59
338.0	6493.667	61.284	726.536	-183.6	104.1	3972.1	-6.28	-0.20	7.59
340.0	6493.287	61.491	734.495	-195.8	103.7	3987.3	-6.00	-0.19	7.55
342.0	6492.884	61.698	742.484	-207.6	103.3	4002.1	-5.75	-0.20	7.49
344.0	6492.457	61.905	750.504	-218.9	102.9	4017.1	-5.57	-0.20	7.46
346.0	6492.008	62.110	758.553	-229.9	102.5	4032.0	-5.46	-0.21	7.45
348.0	6491.538	62.314	766.632	-240.8	102.1	4046.9	-5.40	-0.20	7.46
350.0	6491.045	62.518	774.740	-251.6	101.7	4061.8	-5.37	-0.19	7.47
352.0	6490.531	62.721	782.879	-262.3	101.3	4076.8	-5.38	-0.18	7.51
354.0	6489.996	62.923	791.048	-273.1	100.9	4091.9	-5.41	-0.18	7.57
356.0	6489.439	63.125	799.247	-284.0	100.5	4107.1	-5.45	-0.19	7.63
358.0	6488.860	63.326	807.476	-294.9	100.2	4122.4	-5.49	-0.19	7.68
360.0	6488.259	63.525	815.737	-306.0	99.8	4137.8	-5.53	-0.19	7.73
362.0	6487.636	63.725	824.028	-317.1	99.4	4153.3	-5.58	-0.20	7.79
364.0	6486.991	63.923	832.350	-328.3	99.0	4169.0	-5.62	-0.20	7.85
366.0	6486.323	64.120	840.704	-339.6	98.6	4184.7	-5.66	-0.19	7.91
368.0	6485.632	64.317	849.089	-351.0	98.2	4200.6	-5.69	-0.18	7.95
370.0	6484.919	64.513	857.506	-362.4	97.8	4216.6	-5.71	-0.18	7.99
372.0	6484.182	64.709	865.955	-373.9	97.5	4232.6	-5.74	-0.18	8.04
374.0	6483.423	64.903	874.437	-385.4	97.1	4248.7	-5.77	-0.17	8.10
376.0	6482.641	65.097	882.950	-397.0	96.8	4265.0	-5.80	-0.17	8.14
378.0	6481.835	65.290	891.497	-408.6	96.4	4281.3	-5.81	-0.16	8.19
380.0	6481.006	65.483	900.076	-420.3	96.1	4297.8	-5.84	-0.17	8.25
382.0	6480.154	65.675	908.688	-432.0	95.8	4314.3	-5.87	-0.17	8.30
384.0	6479.278	65.866	917.333	-443.7	95.4	4331.0	-5.88	-0.16	8.34
386.0	6478.379	66.056	926.012	-455.5	95.1	4347.7	-5.90	-0.15	8.39
388.0	6477.456	66.246	934.724	-467.4	94.8	4364.5	-5.92	-0.15	8.44
390.0	6476.510	66.435	943.470	-479.2	94.5	4381.5	-5.94	-0.15	8.49
392.0	6475.539	66.624	952.250	-491.1	94.2	4398.5	-5.96	-0.15	8.54
394.0	6474.545	66.812	961.064	-503.1	93.8	4415.6	-5.98	-0.15	8.58
396.0	6473.527	66.999	969.913	-515.1	93.5	4432.9	-6.00	-0.15	8.64
398.0	6472.485	67.186	978.796	-527.1	93.2	4450.2	-6.03	-0.15	8.69
400.0	6471.418	67.372	987.714	-539.2	92.9	4467.6	-6.04	-0.14	8.74
402.0	6470.328	67.558	996.666	-551.3	92.7	4485.2	-6.07	-0.14	8.79
404.0	6469.213	67.743	1005.654	-563.5	92.4	4502.8	-6.09	-0.14	8.85
406.0	6468.074	67.927	1014.678	-575.7	92.1	4520.6	-6.12	-0.15	8.90
408.0	6466.910	68.111	1023.737	-588.0	91.7	4538.4	-6.14	-0.16	8.95
410.0	6465.722	68.294	1032.831	-600.3	91.4	4556.4	-6.16	-0.15	9.01
412.0	6464.509	68.477	1041.962	-612.7	91.1	4574.5	-6.20	-0.14	9.07
414.0	6463.271	68.659	1051.129	-625.1	90.9	4592.7	-6.22	-0.12	9.12
416.0	6462.008	68.841	1060.333	-637.6	90.6	4611.0	-6.25	-0.13	9.18
418.0	6460.720	69.022	1069.573	-650.1	90.4	4629.4	-6.27	-0.13	9.23

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
420.0	6459.407	69.202	1078.851	-662.7	90.1	4647.9	-6.31	-0.13	9.29
422.0	6458.069	69.382	1088.165	-675.4	89.8	4666.5	-6.34	-0.13	9.35
424.0	6456.706	69.561	1097.517	-688.1	89.5	4685.3	-6.36	-0.13	9.40
426.0	6455.317	69.740	1106.906	-700.9	89.3	4704.2	-6.39	-0.13	9.46
428.0	6453.902	69.918	1116.334	-713.7	89.0	4723.2	-6.41	-0.12	9.52
430.0	6452.462	70.096	1125.799	-726.6	88.8	4742.3	-6.44	-0.12	9.58
432.0	6450.996	70.273	1135.303	-739.5	88.5	4761.5	-6.48	-0.12	9.63
434.0	6449.504	70.450	1144.845	-752.5	88.3	4780.8	-6.50	-0.12	9.70
436.0	6447.986	70.626	1154.426	-765.5	88.0	4800.3	-6.52	-0.12	9.76
438.0	6446.442	70.802	1164.046	-778.6	87.8	4819.9	-6.54	-0.12	9.83
440.0	6444.871	70.977	1173.706	-791.8	87.5	4839.6	-6.58	-0.12	9.89
442.0	6443.275	71.152	1183.405	-805.0	87.3	4859.4	-6.62	-0.11	9.95
444.0	6441.651	71.327	1193.143	-818.3	87.1	4879.4	-6.67	-0.11	10.01
446.0	6440.001	71.500	1202.922	-831.7	86.8	4899.5	-6.69	-0.12	10.08
448.0	6438.325	71.674	1212.742	-845.1	86.6	4919.7	-6.72	-0.11	10.14
450.0	6436.621	71.847	1222.601	-858.6	86.4	4940.1	-6.76	-0.10	10.21
452.0	6434.890	72.019	1232.502	-872.2	86.1	4960.6	-6.79	-0.10	10.27
454.0	6433.132	72.191	1242.444	-885.8	85.9	4981.2	-6.83	-0.09	10.34
456.0	6431.347	72.363	1252.427	-899.5	85.8	5002.0	-6.87	-0.09	10.41
458.0	6429.534	72.534	1262.452	-913.3	85.6	5022.8	-6.90	-0.09	10.48
460.0	6427.694	72.705	1272.518	-927.2	85.4	5043.9	-6.96	-0.10	10.54
462.0	6425.825	72.876	1282.627	-941.2	85.2	5065.0	-7.03	-0.10	10.60
464.0	6423.929	73.046	1292.778	-955.3	85.0	5086.3	-7.05	-0.09	10.66
466.0	6422.004	73.216	1302.972	-969.4	84.8	5107.7	-7.03	-0.09	10.72
468.0	6420.051	73.385	1313.209	-983.5	84.6	5129.2	-7.04	-0.09	10.79
470.0	6418.070	73.554	1323.489	-997.7	84.4	5150.8	-7.11	-0.08	10.86
472.0	6416.061	73.723	1333.813	-1011.9	84.3	5172.7	-7.19	-0.07	10.94
474.0	6414.022	73.891	1344.180	-1026.4	84.1	5194.6	-7.21	-0.08	11.02
476.0	6411.955	74.059	1354.591	-1040.8	83.9	5216.7	-7.25	-0.08	11.09
478.0	6409.859	74.227	1365.047	-1055.4	83.8	5239.0	-7.28	-0.08	11.16
480.0	6407.734	74.394	1375.547	-1070.0	83.6	5261.4	-7.33	-0.07	11.23
482.0	6405.579	74.561	1386.093	-1084.7	83.5	5283.9	-7.37	-0.07	11.31
484.0	6403.395	74.728	1396.683	-1099.5	83.3	5306.7	-7.42	-0.07	11.39
486.0	6401.181	74.894	1407.319	-1114.4	83.2	5329.5	-7.47	-0.07	11.47
488.0	6398.937	75.061	1418.001	-1129.4	83.0	5352.6	-7.51	-0.07	11.55
490.0	6396.663	75.227	1428.730	-1144.5	82.9	5375.7	-7.56	-0.07	11.63
492.0	6394.359	75.392	1439.504	-1159.7	82.7	5399.1	-7.60	-0.07	11.71
494.0	6392.024	75.557	1450.326	-1175.0	82.6	5422.6	-7.65	-0.07	11.80
496.0	6389.659	75.722	1461.195	-1190.4	82.4	5446.3	-7.70	-0.06	11.89
498.0	6387.262	75.887	1472.112	-1205.8	82.3	5470.2	-7.75	-0.06	11.97
500.0	6384.835	76.052	1483.076	-1221.4	82.2	5494.2	-7.80	-0.05	12.05
502.0	6382.377	76.216	1494.088	-1237.0	82.1	5518.4	-7.85	-0.05	12.14
504.0	6379.887	76.380	1505.150	-1252.8	82.0	5542.8	-7.90	-0.05	12.22

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
506.0	6377.366	76.544	1516.260	-1268.7	81.8	5567.3	-7.94	-0.05	12.32
508.0	6374.812	76.707	1527.419	-1284.6	81.7	5592.0	-8.00	-0.05	12.41
510.0	6372.227	76.871	1538.628	-1300.7	81.6	5617.0	-8.05	-0.05	12.50
512.0	6369.609	77.034	1549.887	-1316.9	81.5	5642.1	-8.11	-0.04	12.59
514.0	6366.959	77.197	1561.196	-1333.2	81.4	5667.3	-8.16	-0.04	12.68
516.0	6364.277	77.359	1572.556	-1349.6	81.3	5692.8	-8.23	-0.04	12.78
518.0	6361.561	77.522	1583.967	-1366.1	81.2	5718.5	-8.29	-0.03	12.88
520.0	6358.812	77.684	1595.430	-1382.8	81.2	5744.4	-8.35	-0.03	12.99
522.0	6356.030	77.846	1606.945	-1399.5	81.1	5770.4	-8.41	-0.03	13.09
524.0	6353.214	78.009	1618.512	-1416.4	81.0	5796.7	-8.47	-0.03	13.18
526.0	6350.364	78.171	1630.132	-1433.5	81.0	5823.1	-8.53	-0.02	13.27
528.0	6347.480	78.332	1641.805	-1450.6	80.9	5849.8	-8.60	-0.02	13.38
530.0	6344.561	78.494	1653.531	-1467.9	80.9	5876.7	-8.66	-0.02	13.49
532.0	6341.608	78.656	1665.312	-1485.3	80.8	5903.8	-8.71	-0.03	13.59
534.0	6338.620	78.817	1677.147	-1502.8	80.8	5931.0	-8.77	-0.01	13.70
536.0	6335.597	78.979	1689.036	-1520.4	80.7	5958.6	-8.82	-0.01	13.81
538.0	6332.538	79.140	1700.980	-1538.3	80.7	5985.8	-8.92	-0.00	12.24
540.0	6329.444	79.302	1712.973	-1556.2	80.6	6007.1	-8.97	-0.03	10.16
542.0	6326.314	79.463	1725.006	-1574.2	80.6	6027.4	-9.08	-0.02	10.17
544.0	6323.147	79.624	1737.081	-1592.5	80.5	6047.7	-9.20	-0.05	10.17
546.0	6319.943	79.785	1749.196	-1611.0	80.4	6068.1	-9.25	-0.04	10.20
548.0	6316.703	79.946	1761.353	-1629.6	80.4	6088.5	-9.30	-0.03	10.23
550.0	6313.425	80.107	1773.550	-1648.2	80.3	6109.0	-9.34	-0.02	10.27
552.0	6310.110	80.267	1785.788	-1667.0	80.2	6129.5	-9.37	-0.02	10.32
554.0	6306.757	80.428	1798.068	-1685.8	80.2	6150.2	-9.44	-0.01	10.37
556.0	6303.367	80.588	1810.390	-1704.7	80.2	6171.0	-9.46	-0.01	10.42
558.0	6299.938	80.748	1822.755	-1723.7	80.2	6191.9	-9.46	-0.02	10.47
560.0	6296.472	80.909	1835.162	-1742.6	80.1	6212.9	-9.49	-0.02	10.53
562.0	6292.967	81.069	1847.610	-1761.7	80.1	6234.0	-9.56	-0.01	10.59
564.0	6289.425	81.229	1860.100	-1781.0	80.0	6255.2	-9.68	0.00	10.64
566.0	6285.843	81.389	1872.631	-1800.4	80.0	6276.6	-9.76	-0.00	10.70
568.0	6282.223	81.549	1885.206	-1820.1	80.0	6298.0	-9.83	0.00	10.77
570.0	6278.563	81.709	1897.824	-1839.8	80.0	6319.6	-9.90	0.01	10.83
572.0	6274.863	81.869	1910.485	-1859.7	80.1	6341.4	-9.97	0.02	10.89
574.0	6271.124	82.029	1923.189	-1879.7	80.1	6363.3	-10.03	0.02	10.94
576.0	6267.344	82.189	1935.938	-1899.9	80.1	6385.2	-10.09	0.02	11.00
578.0	6263.524	82.350	1948.730	-1920.2	80.1	6407.3	-10.16	0.02	11.07
580.0	6259.664	82.510	1961.567	-1940.6	80.2	6429.5	-10.23	0.02	11.13
582.0	6255.762	82.670	1974.448	-1961.1	80.2	6451.8	-10.29	0.02	11.19
584.0	6251.819	82.831	1987.374	-1981.8	80.2	6474.3	-10.35	0.02	11.25
586.0	6247.835	82.991	2000.346	-2002.6	80.3	6496.8	-10.41	0.02	11.30
588.0	6243.809	83.152	2013.362	-2023.5	80.3	6519.5	-10.47	0.04	11.33
590.0	6239.741	83.313	2026.424	-2044.5	80.4	6542.2	-10.53	0.02	11.38

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
592.0	6235.631	83.473	2039.531	-2065.6	80.4	6565.0	-10.59	-0.00	11.43
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
592.640	6234.306	83.525	2043.735	-2072.4	80.4	6572.3	-10.61	-0.01	11.44
	S-II/S-IVB SEPARATION COMMAND								
593.500	6232.521	83.594	2049.387	-2080.5	80.3	6574.1	-8.80	-0.08	-3.22
594.0	6231.480	83.634	2052.674	-2084.9	80.3	6572.5	-8.79	-0.08	-3.22
596.0	6227.292	83.795	2065.815	-2102.4	80.1	6566.1	-8.79	-0.09	-3.22
598.0	6223.070	83.955	2078.939	-2120.1	80.0	6560.5	-9.06	-0.13	0.33
600.0	6218.811	84.114	2092.065	-2138.8	79.8	6563.8	-9.44	-0.06	2.11
602.0	6214.514	84.274	2105.197	-2157.7	79.7	6568.1	-9.44	-0.06	2.20
604.0	6210.180	84.433	2118.337	-2176.6	79.5	6572.6	-9.50	-0.09	2.24
606.0	6205.807	84.592	2131.487	-2195.9	79.2	6577.1	-9.66	-0.13	2.26
608.0	6201.396	84.750	2144.646	-2215.4	79.0	6581.6	-9.78	-0.13	2.26
610.0	6196.945	84.908	2157.813	-2235.0	78.7	6586.1	-9.81	-0.12	2.28
612.0	6192.456	85.065	2170.990	-2254.6	78.5	6590.7	-9.79	-0.11	2.28
614.0	6187.927	85.221	2184.176	-2274.3	78.2	6595.3	-9.80	-0.10	2.28
616.0	6183.359	85.378	2197.371	-2293.9	78.0	6599.9	-9.84	-0.08	2.28
618.0	6178.751	85.534	2210.576	-2313.6	77.9	6604.4	-9.85	-0.07	2.28
620.0	6174.104	85.689	2223.789	-2333.4	77.8	6609.0	-9.86	-0.05	2.27
622.0	6169.418	85.845	2237.012	-2353.1	77.6	6613.5	-9.89	-0.05	2.25
624.0	6164.692	86.000	2250.243	-2373.0	77.5	6618.0	-9.93	-0.05	2.23
626.0	6159.926	86.155	2263.484	-2392.9	77.4	6622.5	-9.96	-0.04	2.22
628.0	6155.120	86.309	2276.733	-2412.8	77.3	6626.9	-9.97	-0.02	2.21
630.0	6150.274	86.464	2289.991	-2432.8	77.3	6631.3	-9.98	-0.02	2.21
632.0	6145.389	86.619	2303.258	-2452.8	77.2	6635.8	-9.98	-0.02	2.21
634.0	6140.463	86.773	2316.534	-2472.8	77.2	6640.2	-10.00	-0.02	2.21
636.0	6135.497	86.927	2329.819	-2492.9	77.2	6644.6	-10.01	-0.01	2.20
638.0	6130.492	87.082	2343.113	-2512.9	77.1	6649.0	-10.04	-0.01	2.19
640.0	6125.446	87.236	2356.415	-2533.1	77.1	6653.4	-10.06	-0.00	2.17
642.0	6120.359	87.390	2369.726	-2553.2	77.1	6657.7	-10.08	0.00	2.16
644.0	6115.233	87.544	2383.046	-2573.4	77.1	6662.0	-10.09	-0.00	2.14
646.0	6110.066	87.698	2396.374	-2593.6	77.1	6666.3	-10.11	-0.01	2.13
648.0	6104.858	87.853	2409.711	-2613.9	77.0	6670.5	-10.12	-0.01	2.12
650.0	6099.610	88.007	2423.057	-2634.2	77.0	6674.8	-10.13	0.00	2.11
652.0	6094.322	88.161	2436.410	-2654.5	77.0	6679.0	-10.14	0.00	2.11
654.0	6088.992	88.315	2449.773	-2674.8	77.0	6683.2	-10.16	-0.00	2.11
656.0	6083.622	88.469	2463.143	-2695.1	77.0	6687.5	-10.17	-0.00	2.11
658.0	6078.212	88.623	2476.522	-2715.5	77.0	6691.7	-10.18	0.00	2.10
660.0	6072.760	88.777	2489.910	-2735.9	77.0	6695.9	-10.19	0.01	2.09

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
662.0	6067.268	88.931	2503.306	-2756.3	77.0	6700.0	-10.22	0.01	2.07
664.0	6061.735	89.084	2516.710	-2776.8	77.0	6704.2	-10.23	0.00	2.06
666.0	6056.161	89.238	2530.123	-2797.3	77.0	6708.3	-10.25	0.00	2.04
668.0	6050.546	89.392	2543.543	-2817.9	77.0	6712.4	-10.25	0.00	2.04
670.0	6044.889	89.546	2556.972	-2838.4	77.0	6716.5	-10.26	0.00	2.03
672.0	6039.192	89.700	2570.409	-2859.0	77.0	6720.5	-10.27	0.00	2.02
674.0	6033.454	89.854	2583.854	-2879.5	77.0	6724.6	-10.28	0.00	2.01
676.0	6027.674	90.008	2597.308	-2900.1	76.9	6728.6	-10.30	0.00	2.00
678.0	6021.853	90.162	2610.769	-2920.8	76.9	6732.6	-10.32	0.00	1.99
680.0	6015.991	90.316	2624.238	-2941.5	76.9	6736.6	-10.34	0.00	1.98
682.0	6010.087	90.470	2637.715	-2962.2	76.9	6740.6	-10.35	0.00	1.97
684.0	6004.142	90.623	2651.200	-2982.9	76.9	6744.5	-10.37	0.00	1.97
686.0	5998.155	90.777	2664.693	-3003.7	76.9	6748.4	-10.37	0.00	1.96
688.0	5992.127	90.931	2678.194	-3024.5	76.9	6752.4	-10.38	0.00	1.95
690.0	5986.057	91.085	2691.703	-3045.3	76.9	6756.3	-10.39	0.00	1.94
692.0	5979.946	91.239	2705.219	-3066.1	76.9	6760.1	-10.42	-0.00	1.93
694.0	5973.793	91.392	2718.743	-3087.0	76.9	6764.0	-10.43	-0.01	1.93
696.0	5967.598	91.546	2732.275	-3107.9	76.8	6767.9	-10.44	-0.01	1.92
698.0	5961.361	91.700	2745.815	-3128.8	76.8	6771.7	-10.45	-0.00	1.92
700.0	5955.083	91.853	2759.362	-3149.7	76.8	6775.6	-10.46	0.00	1.91
702.0	5948.762	92.007	2772.917	-3170.7	76.8	6779.4	-10.48	-0.00	1.89
704.0	5942.400	92.160	2786.480	-3191.7	76.8	6783.2	-10.50	-0.01	1.89
706.0	5935.996	92.314	2800.050	-3212.7	76.7	6786.9	-10.51	-0.01	1.88
708.0	5929.549	92.467	2813.627	-3233.8	76.7	6790.7	-10.51	-0.01	1.87
710.0	5923.061	92.621	2827.213	-3254.8	76.7	6794.4	-10.52	-0.01	1.87
712.0	5916.530	92.774	2840.805	-3275.9	76.6	6798.2	-10.53	-0.01	1.86
714.0	5909.957	92.927	2854.405	-3297.0	76.6	6801.9	-10.55	-0.01	1.86
716.0	5903.342	93.080	2868.013	-3318.2	76.6	6805.6	-10.56	-0.01	1.86
718.0	5896.684	93.234	2881.628	-3339.3	76.6	6809.4	-10.58	-0.01	1.86
720.0	5889.984	93.387	2895.250	-3360.6	76.5	6813.1	-10.63	-0.00	1.84
722.0	5883.242	93.540	2908.880	-3381.9	76.5	6816.7	-10.69	-0.00	1.81
724.0	5876.457	93.693	2922.517	-3403.3	76.5	6820.4	-10.72	-0.00	1.79
726.0	5869.628	93.846	2936.162	-3424.8	76.5	6824.0	-10.72	-0.01	1.79
728.0	5862.757	93.999	2949.813	-3446.3	76.4	6827.5	-10.70	-0.00	1.79
730.0	5855.843	94.151	2963.472	-3467.7	76.4	6831.1	-10.69	-0.00	1.79
732.0	5848.887	94.304	2977.138	-3489.1	76.4	6834.7	-10.69	0.00	1.78
734.0	5841.887	94.457	2990.811	-3510.5	76.4	6838.3	-10.68	-0.00	1.79
736.0	5834.845	94.610	3004.491	-3531.9	76.4	6841.9	-10.67	-0.01	1.80
738.0	5827.760	94.763	3018.178	-3553.3	76.3	6845.5	-10.66	-0.01	1.80
740.0	5820.632	94.915	3031.873	-3574.6	76.3	6849.1	-10.65	-0.01	1.80
742.0	5813.461	95.068	3045.574	-3595.9	76.3	6852.7	-10.65	-0.01	1.80
744.0	5806.248	95.220	3059.283	-3617.2	76.2	6856.3	-10.66	-0.02	1.80
746.0	5798.992	95.373	3072.999	-3638.6	76.2	6859.9	-10.66	-0.01	1.80

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
748.0	5791.694	95.525	3086.723	-3660.0	76.2	6863.5	-10.67	-0.01	1.79
S-IVB 1ST GUIDANCE CUTOFF									
749.830	5784.978	95.664	3099.286	-3679.5	76.1	6866.7	-10.67	-0.01	1.79
750.0	5784.352	95.677	3100.453	-3681.3	76.1	6867.0	-10.67	-0.01	1.79
752.0	5776.974	95.829	3114.178	-3698.2	75.9	6858.9	-8.09	-0.11	-4.46
754.0	5769.561	95.981	3127.888	-3714.4	75.7	6850.1	-8.09	-0.11	-4.46
756.0	5762.117	96.132	3141.578	-3730.5	75.4	6841.2	-8.09	-0.11	-4.47
758.0	5754.640	96.283	3155.252	-3746.6	75.2	6832.3	-8.09	-0.11	-4.47
PARKING ORBIT INSERTION									
759.830	5747.768	96.420	3167.747	-3761.4	75.0	6824.2	-8.09	-0.12	-4.47

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											
-16.961	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-16.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-15.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-14.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-13.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-12.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-11.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-10.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-9.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-8.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-7.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-6.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-5.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-4.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-3.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-2.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
-1.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
0.0	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	60
ALL HOLDDOWN ARMS RELEASED											
0.300	6373.355	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.01	408.6	0	60
START OF TIME BASE 1											
0.600	6373.355	-80.6041	28.4470	20.04	88.03	0.3	90.00	0.04	408.6	0	60
1.0	6373.355	-80.6041	28.4470	357.30	87.55	0.8	90.00	0.11	408.6	0	60
2.0	6373.357	-80.6041	28.4470	344.78	85.73	2.9	89.97	0.40	408.6	0	62
3.0	6373.361	-80.6041	28.4470	342.40	85.05	5.0	89.94	0.70	408.5	0	66
4.0	6373.367	-80.6041	28.4470	341.05	85.94	7.3	89.93	1.01	408.5	1	72
5.0	6373.376	-80.6041	28.4470	338.84	87.18	9.6	89.94	1.34	408.6	1	80
6.0	6373.386	-80.6041	28.4470	336.62	88.09	11.9	89.95	1.67	408.7	2	91
7.0	6373.399	-80.6041	28.4470	330.35	88.88	14.3	89.97	2.01	408.8	2	104
8.0	6373.415	-80.6041	28.4470	309.98	89.47	16.8	89.99	2.35	408.9	2	120
9.0	6373.433	-80.6041	28.4470	240.66	89.65	19.3	90.01	2.70	409.0	2	138
10.0	6373.454	-80.6041	28.4470	197.82	89.30	21.9	90.04	3.06	409.1	2	158
11.0	6373.477	-80.6041	28.4470	186.33	88.86	24.4	90.07	3.42	409.3	2	181
12.0	6373.502	-80.6041	28.4470	185.40	88.63	27.1	90.09	3.79	409.5	2	207
13.0	6373.531	-80.6041	28.4470	193.25	88.66	29.8	90.10	4.17	409.6	1	235
14.0	6373.562	-80.6041	28.4470	199.51	88.66	32.6	90.10	4.56	409.7	1	267

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	6373.596	-80.6042	28.4470	199.55	88.73	35.4	90.10	4.95	409.9	2	301
16.0	6373.633	-80.6042	28.4469	195.28	88.83	38.3	90.11	5.35	410.2	2	337
17.0	6373.673	-80.6042	28.4469	187.97	88.94	41.2	90.11	5.76	410.6	3	377
18.0	6373.715	-80.6042	28.4469	178.06	89.04	44.2	90.10	6.18	411.1	4	420
19.0	6373.761	-80.6042	28.4469	165.28	89.12	47.3	90.10	6.61	411.6	4	466
20.0	6373.810	-80.6042	28.4469	148.00	89.17	50.5	90.09	7.04	412.2	5	515
21.0	6373.862	-80.6041	28.4469	127.23	89.12	53.8	90.07	7.48	412.8	5	567
22.0	6373.918	-80.6041	28.4469	110.26	88.94	57.1	90.05	7.93	413.6	5	622
23.0	6373.976	-80.6041	28.4469	98.83	88.66	60.5	90.03	8.40	414.5	6	681
24.0	6374.039	-80.6041	28.4469	91.24	88.31	64.1	90.01	8.86	415.5	6	743
25.0	6374.104	-80.6041	28.4469	86.11	87.92	67.6	89.98	9.34	416.7	7	809
26.0	6374.174	-80.6041	28.4469	82.43	87.48	71.3	89.94	9.82	417.9	9	878
27.0	6374.247	-80.6040	28.4469	79.82	87.01	75.1	89.90	10.30	419.3	12	952
28.0	6374.324	-80.6040	28.4469	77.98	86.51	78.9	89.86	10.78	420.8	15	1028
29.0	6374.404	-80.6039	28.4469	76.67	85.98	82.7	89.82	11.27	422.5	20	1109
30.0	6374.489	-80.6039	28.4469	75.74	85.44	86.7	89.77	11.75	424.3	26	1193
31.0	6374.577	-80.6038	28.4470	75.06	84.88	90.8	89.71	12.25	426.2	33	1282
32.0	6374.670	-80.6037	28.4470	74.58	84.32	94.9	89.66	12.74	428.3	42	1374
33.0	6374.766	-80.6036	28.4470	74.24	83.75	99.2	89.60	13.24	430.6	52	1471
34.0	6374.867	-80.6035	28.4470	73.99	83.19	103.6	89.54	13.74	432.9	63	1572
35.0	6374.972	-80.6034	28.4471	73.82	82.63	108.0	89.48	14.24	435.4	76	1677
36.0	6375.081	-80.6032	28.4471	73.67	82.08	112.6	89.41	14.74	438.1	91	1786
37.0	6375.195	-80.6031	28.4472	73.52	81.52	117.2	89.34	15.25	440.9	107	1900
38.0	6375.313	-80.6029	28.4472	73.37	80.96	122.0	89.26	15.75	443.8	125	2018
39.0	6375.436	-80.6027	28.4472	73.22	80.39	126.9	89.18	16.25	447.0	145	2141
40.0	6375.563	-80.6025	28.4473	73.08	79.81	131.9	89.10	16.75	450.3	168	2268
41.0	6375.696	-80.6022	28.4474	72.96	79.21	137.0	89.01	17.25	453.8	192	2400
42.0	6375.833	-80.6020	28.4474	72.87	78.61	142.2	88.91	17.74	457.5	219	2537
43.0	6375.974	-80.6017	28.4475	72.81	77.98	147.6	88.81	18.23	461.4	248	2679
44.0	6376.121	-80.6014	28.4476	72.78	77.33	153.1	88.71	18.71	465.6	280	2826
45.0	6376.273	-80.6010	28.4477	72.77	76.66	158.7	88.60	19.18	470.0	315	2978
46.0	6376.430	-80.6006	28.4478	72.79	75.98	164.4	88.49	19.64	474.7	353	3135
47.0	6376.592	-80.6002	28.4479	72.82	75.28	170.3	88.37	20.09	479.6	395	3297
48.0	6376.760	-80.5998	28.4480	72.86	74.57	176.4	88.25	20.54	484.7	440	3464
49.0	6376.932	-80.5993	28.4482	72.91	73.86	182.6	88.13	20.97	490.1	489	3637
50.0	6377.110	-80.5988	28.4483	72.96	73.15	188.9	88.01	21.39	495.6	541	3815
51.0	6377.294	-80.5983	28.4484	73.00	72.44	195.4	87.88	21.80	501.4	598	3999
52.0	6377.483	-80.5977	28.4486	73.04	71.74	202.0	87.75	22.21	507.5	659	4188
53.0	6377.677	-80.5970	28.4488	73.06	71.04	208.8	87.61	22.60	513.7	725	4383
54.0	6377.878	-80.5963	28.4490	73.08	70.35	215.7	87.47	22.99	520.1	795	4583
55.0	6378.084	-80.5956	28.4492	73.09	69.67	222.8	87.33	23.37	526.7	870	4789
56.0	6378.296	-80.5948	28.4494	73.08	68.99	230.0	87.18	23.73	533.5	950	5001
57.0	6378.513	-80.5940	28.4496	73.06	68.33	237.4	87.03	24.09	540.5	1035	5219

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	6378.737	-80.5931	28.4498	73.08	67.67	244.9	86.88	24.43	547.8	1125	5442
59.0	6378.966	-80.5922	28.4501	72.99	67.03	252.7	86.72	24.77	555.2	1221	5672
60.0	6379.202	-80.5912	28.4503	72.94	66.39	260.6	86.55	25.10	562.9	1322	5908
61.0	6379.444	-80.5901	28.4506	72.89	65.75	268.7	86.39	25.42	570.7	1429	6150
62.0	6379.692	-80.5890	28.4509	72.84	65.12	276.9	86.22	25.72	578.9	1543	6398
63.0	6379.946	-80.5879	28.4512	72.80	64.49	285.4	86.05	26.02	587.2	1662	6652
64.0	6380.207	-80.5866	28.4516	72.77	63.86	294.0	85.88	26.30	595.8	1788	6913
65.0	6380.474	-80.5853	28.4519	72.74	63.24	302.8	85.71	26.56	604.6	1921	7180
66.0	6380.749	-80.5840	28.4523	72.73	62.61	311.7	85.54	26.81	613.6	2061	7454
67.0	6381.028	-80.5825	28.4527	72.73	61.99	320.8	85.37	27.05	622.9	2207	7734
68.0	6381.314	-80.5810	28.4531	72.73	61.36	330.1	85.21	27.26	632.4	2362	8021
	MACH 1										
68.400	6381.431	-80.5804	28.4533	72.73	61.11	333.8	85.14	27.34	636.3	2426	8137
69.0	6381.607	-80.5794	28.4535	72.73	60.73	339.5	85.04	27.46	642.1	2523	8314
70.0	6381.907	-80.5778	28.4540	72.74	60.10	349.1	84.87	27.65	652.1	2693	8613
71.0	6382.212	-80.5762	28.4545	72.75	59.47	358.9	84.70	27.82	662.3	2871	8919
72.0	6382.525	-80.5742	28.4550	72.75	58.84	368.8	84.54	27.98	672.8	3057	9232
73.0	6382.844	-80.5723	28.4555	72.76	58.21	379.0	84.37	28.12	683.5	3252	9551
74.0	6383.169	-80.5703	28.4560	72.76	57.59	389.4	84.20	28.25	694.5	3456	9877
75.0	6383.501	-80.5683	28.4566	72.76	56.97	400.1	84.03	28.38	705.7	3669	10209
76.0	6383.840	-80.5661	28.4572	72.76	56.36	410.9	83.85	28.49	717.2	3892	10548
77.0	6384.185	-80.5638	28.4578	72.75	55.76	422.0	83.68	28.60	728.9	4124	10893
78.0	6384.538	-80.5614	28.4585	72.74	55.17	433.4	83.51	28.70	740.8	4366	11246
79.0	6384.897	-80.5590	28.4591	72.74	54.59	445.0	83.34	28.79	753.1	4618	11605
80.0	6385.263	-80.5564	28.4598	72.74	54.02	456.8	83.18	28.88	765.5	4881	11972
81.0	6385.636	-80.5538	28.4606	72.74	53.47	468.9	83.01	28.96	778.3	5154	12345
	MAXIMUM DYNAMIC PRESSURE										
81.300	6385.750	-80.5529	28.4608	72.73	53.30	472.6	82.96	28.98	782.2	5238	12459
82.0	6386.017	-80.5513	28.4613	72.73	52.92	481.3	82.85	29.03	791.3	5438	12726
83.0	6386.404	-80.5491	28.4621	72.73	52.38	493.9	82.69	29.09	804.5	5733	13114
84.0	6386.799	-80.5451	28.4629	72.73	51.84	506.7	82.52	29.15	818.1	6040	13509
85.0	6387.201	-80.5429	28.4638	72.73	51.31	519.8	82.36	29.19	831.9	6358	13911
86.0	6387.611	-80.5388	28.4647	72.72	50.79	533.2	82.21	29.23	845.9	6689	14321
87.0	6388.027	-80.5354	28.4656	72.72	50.27	546.8	82.05	29.26	860.3	7031	14738
88.0	6388.452	-80.5320	28.4665	72.71	49.75	560.7	81.89	29.29	874.9	7386	15162
89.0	6388.883	-80.5284	28.4675	72.70	49.24	574.9	81.73	29.30	889.8	7754	15594
90.0	6389.322	-80.5246	28.4685	72.69	48.73	589.3	81.57	29.30	905.0	8135	16034
91.0	6389.769	-80.5208	28.4696	72.68	48.22	604.0	81.42	29.29	920.5	8530	16481
92.0	6390.223	-80.5168	28.4707	72.67	47.71	619.0	81.26	29.28	936.3	8938	16935

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	6390.685	-80.5127	28.4718	72.65	47.19	634.2	81.10	29.24	952.4	9360	17397
94.0	6391.154	-80.5094	28.4730	72.63	46.67	649.8	80.95	29.20	968.8	9798	17867
95.0	6391.630	-80.5040	28.4742	72.62	46.15	665.6	80.79	29.15	985.6	10250	18343
96.0	6392.114	-80.4994	28.4754	72.60	45.63	681.7	80.64	29.08	1002.7	10717	18827
97.0	6392.605	-80.4947	28.4767	72.59	45.11	698.1	80.49	29.00	1020.1	11200	19319
98.0	6393.103	-80.4898	28.4781	72.58	44.58	714.8	80.34	28.92	1037.8	11700	19817
99.0	6393.608	-80.4848	28.4795	72.57	44.06	731.9	80.20	28.82	1055.9	12216	20323
100.0	6394.121	-80.4796	28.4809	72.56	43.55	749.2	80.05	28.72	1074.2	12748	20836
101.0	6394.641	-80.4742	28.4824	72.55	43.04	766.9	79.91	28.61	1092.9	13298	21356
102.0	6395.168	-80.4687	28.4839	72.55	42.53	784.9	79.77	28.50	1111.9	13866	21884
103.0	6395.702	-80.4630	28.4855	72.54	42.03	803.2	79.64	28.38	1131.2	14451	22418
104.0	6396.243	-80.4571	28.4871	72.53	41.53	821.7	79.50	28.26	1150.8	15055	22960
105.0	6396.792	-80.4510	28.4888	72.52	41.04	840.6	79.37	28.13	1170.7	15677	23509
106.0	6397.347	-80.4448	28.4905	72.51	40.56	859.8	79.24	28.00	1190.9	16318	24065
107.0	6397.910	-80.4383	28.4923	72.51	40.08	879.3	79.12	27.86	1211.4	16979	24629
108.0	6398.479	-80.4317	28.4942	72.50	39.61	899.1	78.99	27.72	1232.3	17659	25199
109.0	6399.056	-80.4249	28.4961	72.50	39.14	919.3	78.87	27.58	1253.4	18359	25776
110.0	6399.640	-80.4178	28.4980	72.50	38.69	939.8	78.76	27.43	1274.9	19079	26361
111.0	6400.231	-80.4106	28.5000	72.50	38.22	960.6	78.64	27.28	1296.7	19820	26952
112.0	6400.828	-80.4032	28.5021	72.50	37.76	981.7	78.53	27.12	1318.8	20582	27550
113.0	6401.433	-80.3955	28.5042	72.50	37.32	1003.2	78.43	26.96	1341.2	21366	28156
114.0	6402.045	-80.3877	28.5064	72.51	36.88	1025.0	78.32	26.80	1364.0	22171	28768
115.0	6402.663	-80.3796	28.5086	72.51	36.44	1047.1	78.22	26.64	1387.1	22998	29387
116.0	6403.289	-80.3713	28.5109	72.51	36.02	1069.6	78.12	26.48	1410.5	23848	30013
117.0	6403.921	-80.3628	28.5132	72.52	35.61	1092.4	78.02	26.33	1434.2	24720	30647
118.0	6404.561	-80.3541	28.5157	72.52	35.20	1115.6	77.92	26.17	1458.2	25616	31287
119.0	6405.207	-80.3451	28.5181	72.52	34.81	1139.1	77.83	26.02	1482.6	26535	31934
120.0	6405.861	-80.3359	28.5207	72.53	34.43	1163.0	77.74	25.86	1507.3	27477	32589
121.0	6406.523	-80.3265	28.5233	72.53	34.06	1187.3	77.65	25.71	1532.4	28444	33251
122.0	6407.191	-80.3168	28.5260	72.54	33.69	1211.9	77.57	25.57	1557.9	29434	33921
123.0	6407.867	-80.3069	28.5287	72.54	33.34	1237.0	77.48	25.42	1583.7	30450	34598
124.0	6408.551	-80.2967	28.5315	72.55	32.99	1262.4	77.40	25.28	1609.8	31490	35282
125.0	6409.242	-80.2863	28.5344	72.56	32.65	1288.1	77.32	25.13	1636.3	32556	35974
126.0	6409.941	-80.2757	28.5373	72.56	32.32	1314.3	77.25	24.99	1663.2	33647	36674
127.0	6410.647	-80.2648	28.5403	72.57	31.98	1340.9	77.17	24.84	1690.5	34765	37381
128.0	6411.361	-80.2536	28.5434	72.57	31.65	1367.8	77.09	24.69	1718.2	35909	38096
129.0	6412.083	-80.2422	28.5466	72.58	31.32	1395.0	77.02	24.53	1746.1	37080	38819
130.0	6412.812	-80.2305	28.5498	72.58	30.99	1422.8	76.95	24.39	1774.6	38278	39549
131.0	6413.549	-80.2185	28.5531	72.59	30.68	1451.0	76.88	24.24	1803.4	39504	40287
132.0	6414.293	-80.2062	28.5565	72.60	30.36	1479.6	76.81	24.08	1832.8	40758	41032
133.0	6415.046	-80.1937	28.5599	72.61	30.06	1508.7	76.75	23.94	1862.5	42041	41786
134.0	6415.806	-80.1809	28.5634	72.62	29.75	1538.2	76.68	23.79	1892.7	43353	42547
135.0	6416.573	-80.1678	28.5670	72.63	29.46	1568.2	76.62	23.64	1923.3	44695	43316

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
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)											
135.180	6416.712	-80.1654	28.5677	72.63	29.40	1573.6	76.61	23.61	1928.8	44940	43455
136.0	6417.348	-80.1544	28.5707	72.64	29.17	1595.3	76.57	23.48	1951.0	46065	44091
137.0	6418.128	-80.1408	28.5745	72.65	28.88	1618.6	76.52	23.32	1975.1	47461	44873
138.0	6418.912	-80.1269	28.5783	72.66	28.60	1642.2	76.48	23.15	1999.4	48879	45658
139.0	6419.700	-80.1128	28.5821	72.68	28.32	1666.2	76.45	22.99	2023.9	50322	46447
140.0	6420.493	-80.0984	28.5861	72.70	28.05	1690.4	76.41	22.83	2048.8	51791	47241
141.0	6421.291	-80.0838	28.5901	72.71	27.78	1715.0	76.37	22.67	2074.0	53285	48040
142.0	6422.092	-80.0690	28.5941	72.73	27.52	1739.9	76.34	22.51	2099.6	54803	48843
143.0	6422.899	-80.0539	28.5982	72.75	27.26	1765.2	76.31	22.36	2125.4	56347	49651
144.0	6423.710	-80.0385	28.6024	72.77	27.01	1790.9	76.27	22.21	2151.7	57917	50463
145.0	6424.525	-80.0229	28.6067	72.78	26.76	1816.9	76.24	22.06	2178.3	59513	51280
146.0	6425.346	-80.0071	28.6110	72.80	26.51	1843.3	76.21	21.91	2205.3	61136	52102
147.0	6426.171	-79.9909	28.6154	72.81	26.26	1870.1	76.17	21.76	2232.6	62786	52928
148.0	6427.001	-79.9745	28.6198	72.83	26.02	1897.2	76.14	21.61	2260.3	64463	53759
149.0	6427.835	-79.9578	28.6243	72.84	25.78	1924.8	76.11	21.46	2288.4	66167	54596
150.0	6428.675	-79.9409	28.6289	72.85	25.55	1952.7	76.08	21.31	2316.8	67900	55437
151.0	6429.520	-79.9236	28.6336	72.87	25.32	1981.0	76.04	21.17	2345.7	69661	56283
152.0	6430.369	-79.9061	28.6383	72.88	25.09	2009.7	76.01	21.03	2374.9	71450	57134
153.0	6431.224	-79.8883	28.6431	72.89	24.86	2038.8	75.98	20.89	2404.5	73268	57990
154.0	6432.084	-79.8702	28.6480	72.91	24.64	2068.3	75.95	20.75	2434.5	75116	58851
155.0	6432.949	-79.8518	28.6530	72.92	24.42	2098.3	75.92	20.61	2464.9	76994	59718
156.0	6433.819	-79.8332	28.6580	72.93	24.21	2128.5	75.90	20.47	2495.6	78902	60590
157.0	6434.695	-79.8142	28.6631	72.95	24.00	2159.3	75.87	20.33	2526.9	80841	61467
158.0	6435.576	-79.7949	28.6683	72.96	23.79	2190.5	75.84	20.20	2558.6	82810	62350
159.0	6436.462	-79.7753	28.6736	72.97	23.58	2222.2	75.81	20.07	2590.7	84812	63238
160.0	6437.354	-79.7554	28.6789	72.99	23.38	2254.3	75.79	19.94	2623.3	86844	64132
161.0	6438.252	-79.7351	28.6844	73.00	23.18	2286.9	75.76	19.81	2656.2	88910	65032
162.0	6439.156	-79.7145	28.6899	73.01	22.98	2319.9	75.74	19.68	2689.6	91008	65936
163.0	6440.065	-79.6937	28.6955	73.02	22.79	2353.3	75.71	19.55	2723.5	93140	66848
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)											
163.600	6440.613	-79.6810	28.6989	73.03	22.69	2373.6	75.70	19.48	2744.0	94435	67397
164.0	6440.979	-79.6725	28.7012	73.04	22.61	2383.3	75.69	19.43	2753.9	95302	67763
S-IC/S-II SEPARATION COMMAND											
164.300	6441.255	-79.6660	28.7029	73.04	22.55	2383.5	75.69	19.38	2754.3	95961	68040
166.0	6442.799	-79.6297	28.7126	73.07	22.24	2378.1	75.71	19.10	2749.7	99664	69587
168.0	6444.582	-79.5869	28.7240	73.10	21.86	2375.3	75.74	19.78	2747.8	104027	71373

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
170.0	6446.339	-79.5441	28.7354	73.12	21.49	2380.8	75.75	18.46	2754.2	108395	73134
172.0	6448.070	-79.5009	28.7469	73.15	21.12	2388.0	75.76	18.15	2762.3	112788	74869
174.0	6449.779	-79.4576	28.7584	73.17	20.75	2396.3	75.76	17.84	2771.5	117204	76582
176.0	6451.466	-79.4140	28.7699	73.20	20.40	2405.0	75.77	17.54	2781.0	121646	78272
178.0	6453.131	-79.3701	28.7815	73.22	20.03	2414.1	75.78	17.24	2790.9	126113	79941
180.0	6454.774	-79.3260	28.7932	73.25	19.68	2423.3	75.79	16.94	2800.9	130606	81588
182.0	6456.396	-79.2816	28.8049	73.27	19.33	2432.6	75.80	16.65	2811.0	135124	83213
184.0	6457.996	-79.2370	28.8166	73.30	18.99	2442.2	75.81	16.36	2821.3	139669	84817
186.0	6459.574	-79.1920	28.8284	73.33	18.65	2451.9	75.82	16.07	2831.8	144240	86399
188.0	6461.132	-79.1469	28.8403	73.35	18.31	2461.8	75.83	15.79	2842.4	148838	87960
190.0	6462.668	-79.1013	28.8522	73.38	17.98	2471.9	75.84	15.51	2853.2	153462	89501
192.0	6464.184	-79.0556	28.8641	73.41	17.65	2482.2	75.85	15.23	2864.1	158112	91020
194.0	6465.679	-79.0096	28.8761	73.43	17.32	2492.6	75.86	14.96	2875.2	162790	92518
196.0	6467.153	-78.9633	28.8882	73.46	17.00	2503.3	75.87	14.69	2886.5	167495	93996
198.0	6468.607	-78.9167	28.9003	73.49	16.69	2514.1	75.88	14.42	2898.0	172226	95454
200.0	6470.040	-78.8698	28.9124	73.51	16.37	2525.2	75.90	14.16	2909.6	176985	96892
202.0	6471.454	-78.8227	28.9246	73.54	16.06	2536.4	75.91	13.90	2921.4	181772	98309
204.0	6472.848	-78.7753	28.9369	73.57	15.76	2547.8	75.92	13.64	2933.4	186587	99707
206.0	6474.222	-78.7275	28.9492	73.60	15.45	2559.4	75.93	13.39	2945.5	191429	101084
208.0	6475.576	-78.6795	28.9615	73.62	15.16	2571.0	75.94	13.14	2957.8	196300	102443
210.0	6476.911	-78.6312	28.9740	73.65	14.87	2582.8	75.95	12.90	2970.0	201199	103782
212.0	6478.228	-78.5826	28.9864	73.67	14.60	2594.6	75.96	12.67	2982.3	206125	105103
214.0	6479.528	-78.5338	28.9989	73.69	14.35	2606.4	75.97	12.46	2994.5	211079	106407
216.0	6480.813	-78.4846	29.0115	73.71	14.12	2618.2	75.97	12.26	3006.7	216059	107695
218.0	6482.083	-78.4352	29.0241	73.73	13.89	2630.1	75.98	12.07	3019.0	221067	108969
220.0	6483.338	-78.3855	29.0368	73.75	13.67	2642.0	75.99	11.88	3031.3	226100	110229
222.0	6484.579	-78.3356	29.0495	73.78	13.44	2654.1	76.00	11.70	3043.8	231161	111474
224.0	6485.806	-78.2853	29.0623	73.80	13.22	2666.4	76.01	11.51	3056.4	236249	112705
226.0	6487.019	-78.2348	29.0751	73.82	13.01	2678.8	76.01	11.33	3069.1	241363	113922
228.0	6488.218	-78.1840	29.0880	73.84	12.79	2691.4	76.02	11.15	3082.0	246506	115125
230.0	6489.403	-78.1329	29.1009	73.87	12.58	2704.0	76.03	10.97	3095.0	251675	116314
232.0	6490.574	-78.0815	29.1139	73.89	12.37	2716.9	76.04	10.79	3108.2	256873	117489
234.0	6491.730	-78.0299	29.1269	73.91	12.16	2729.8	76.05	10.61	3121.5	262099	118650
236.0	6492.873	-77.9779	29.1400	73.94	11.95	2742.9	76.06	10.44	3134.9	267352	119796
238.0	6494.002	-77.9256	29.1531	73.96	11.74	2756.1	76.08	10.26	3148.4	272635	120930
240.0	6495.117	-77.8731	29.1663	73.99	11.54	2769.5	76.09	10.09	3162.0	277945	122049
242.0	6496.218	-77.8202	29.1795	74.01	11.34	2783.0	76.10	9.92	3175.8	283285	123154
244.0	6497.306	-77.7671	29.1928	74.04	11.14	2796.6	76.11	9.76	3189.7	288653	124246
246.0	6498.380	-77.7137	29.2061	74.06	10.95	2810.4	76.12	9.59	3203.8	294050	125325
248.0	6499.441	-77.6599	29.2195	74.09	10.75	2824.3	76.14	9.43	3217.9	299477	126390
250.0	6500.488	-77.6058	29.2330	74.12	10.56	2838.3	76.15	9.26	3232.2	304933	127442
252.0	6501.522	-77.5515	29.2464	74.14	10.37	2852.5	76.16	9.10	3246.7	310419	128480
254.0	6502.543	-77.4968	29.2600	74.17	10.19	2866.8	76.18	8.95	3261.2	315935	129505

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
256.0	6503.551	-77.4418	29.2736	74.20	10.00	2881.3	76.19	8.79	3275.9	321481	130517
258.0	6504.545	-77.3865	29.2872	74.23	9.82	2895.8	76.21	8.63	3290.7	327057	131516
260.0	6505.527	-77.3309	29.3009	74.25	9.64	2910.5	76.22	8.48	3305.6	332664	132502
262.0	6506.495	-77.2749	29.3146	74.28	9.46	2925.3	76.24	8.33	3320.7	338301	133474
264.0	6507.450	-77.2187	29.3284	74.31	9.29	2940.3	76.25	8.18	3335.9	343969	134434
266.0	6508.393	-77.1621	29.3423	74.34	9.11	2955.4	76.27	8.03	3351.2	349668	135381
268.0	6509.323	-77.1052	29.3562	74.37	8.94	2970.6	76.29	7.88	3366.6	355399	136315
270.0	6510.240	-77.0479	29.3701	74.40	8.77	2986.0	76.30	7.74	3382.2	361161	137237
272.0	6511.145	-76.9903	29.3841	74.43	8.61	3001.5	76.32	7.60	3397.9	366954	138146
274.0	6512.037	-76.9324	29.3981	74.46	8.44	3017.2	76.34	7.46	3413.8	372780	139043
276.0	6512.917	-76.8742	29.4122	74.49	8.28	3033.0	76.35	7.32	3429.7	378638	139927
278.0	6513.784	-76.8156	29.4264	74.52	8.12	3048.9	76.37	7.18	3445.8	384528	140799
280.0	6514.640	-76.7567	29.4406	74.55	7.96	3065.0	76.39	7.04	3462.1	390450	141659
282.0	6515.483	-76.6974	29.4548	74.58	7.81	3081.2	76.41	6.91	3478.5	396405	142507
284.0	6516.314	-76.6378	29.4691	74.61	7.65	3097.5	76.43	6.78	3495.0	402394	143342
286.0	6517.133	-76.5778	29.4835	74.65	7.50	3114.0	76.45	6.65	3511.6	408415	144166
288.0	6517.940	-76.5175	29.4979	74.68	7.35	3130.6	76.47	6.52	3528.3	414470	144978
290.0	6518.735	-76.4569	29.5123	74.71	7.20	3147.4	76.48	6.39	3545.3	420558	145778
292.0	6519.519	-76.3958	29.5268	74.74	7.06	3164.3	76.50	6.27	3562.4	426680	146566
294.0	6520.291	-76.3345	29.5414	74.78	6.91	3181.4	76.52	6.14	3579.6	432837	147342
296.0	6521.051	-76.2727	29.5560	74.81	6.77	3198.5	76.55	6.02	3596.9	439028	148107
298.0	6521.800	-76.2106	29.5706	74.84	6.63	3215.9	76.57	5.90	3614.3	445253	148861
300.0	6522.537	-76.1482	29.5853	74.88	6.50	3233.3	76.59	5.78	3631.9	451514	149603
302.0	6523.263	-76.0853	29.6001	74.91	6.36	3250.9	76.61	5.66	3649.7	457809	150334
304.0	6523.978	-76.0221	29.6149	74.95	6.23	3268.7	76.63	5.55	3667.6	464140	151053
306.0	6524.681	-75.9585	29.6297	74.98	6.10	3286.6	76.65	5.43	3685.6	470506	151762
308.0	6525.374	-75.8946	29.6446	75.02	5.97	3304.6	76.68	5.32	3703.7	476908	152459
310.0	6526.056	-75.8302	29.6596	75.05	5.84	3322.8	76.70	5.21	3722.0	483346	153146
312.0	6526.726	-75.7655	29.6746	75.09	5.71	3341.2	76.72	5.10	3740.5	489820	153821
314.0	6527.386	-75.7004	29.6896	75.12	5.59	3359.7	76.75	4.99	3759.1	496331	154486
316.0	6528.036	-75.6349	29.7047	75.16	5.47	3378.3	76.77	4.89	3777.8	502878	155140
318.0	6528.674	-75.5690	29.7199	75.19	5.35	3397.1	76.80	4.78	3796.7	509463	155783
320.0	6529.302	-75.5027	29.7351	75.23	5.23	3416.0	76.82	4.68	3815.7	516085	156416
322.0	6529.920	-75.4360	29.7503	75.27	5.11	3435.1	76.84	4.58	3834.9	522744	157039
324.0	6530.527	-75.3689	29.7656	75.31	5.00	3454.4	76.87	4.48	3854.3	529441	157651
326.0	6531.124	-75.3014	29.7809	75.34	4.89	3473.8	76.90	4.38	3873.8	536177	158253
328.0	6531.711	-75.2335	29.7963	75.38	4.78	3493.3	76.92	4.28	3893.4	542950	158845
330.0	6532.288	-75.1652	29.8118	75.42	4.67	3513.1	76.95	4.19	3913.2	549762	159427
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
330.640	6532.470	-75.1433	29.8167	75.43	4.63	3519.4	76.96	4.16	3919.6	551950	159610
332.0	6532.853	-75.0966	29.8272	75.46	4.55	3530.4	76.98	4.08	3930.6	556611	159997

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
334.0	6533.406	-75.0275	29.8427	75.50	4.42	3545.9	77.00	3.97	3946.3	563491	160555
336.0	6533.945	-74.9582	29.8583	75.54	4.29	3561.6	77.03	3.86	3962.0	570403	161099
338.0	6534.471	-74.8884	29.8739	75.57	4.17	3577.2	77.06	3.75	3977.7	577346	161630
340.0	6534.986	-74.8184	29.8895	75.61	4.06	3592.8	77.09	3.65	3993.4	584320	162150
342.0	6535.490	-74.7480	29.9051	75.65	3.96	3608.2	77.12	3.57	4008.9	591325	162659
344.0	6535.984	-74.6773	29.9207	75.69	3.87	3623.6	77.15	3.49	4024.4	598360	163158
346.0	6536.469	-74.6063	29.9364	75.73	3.79	3639.1	77.18	3.41	4039.9	605425	163649
348.0	6536.946	-74.5350	29.9521	75.77	3.71	3654.5	77.21	3.34	4055.4	612521	164131
350.0	6537.415	-74.4633	29.9678	75.81	3.63	3670.0	77.24	3.27	4070.9	619646	164605
352.0	6537.877	-74.3913	29.9836	75.85	3.56	3685.6	77.27	3.21	4086.5	626802	165071
354.0	6538.330	-74.3189	29.9994	75.89	3.48	3701.2	77.30	3.14	4102.3	633989	165530
356.0	6538.776	-74.2462	30.0152	75.93	3.41	3717.1	77.33	3.08	4118.1	641206	165981
358.0	6539.215	-74.1732	30.0310	75.97	3.34	3733.1	77.36	3.01	4134.2	648454	166425
360.0	6539.646	-74.0999	30.0468	76.01	3.27	3749.2	77.39	2.95	4150.3	655733	166861
362.0	6540.069	-74.0262	30.0627	76.05	3.19	3765.4	77.42	2.89	4166.6	663044	167289
364.0	6540.485	-73.9521	30.0786	76.09	3.12	3781.8	77.45	2.82	4183.1	670387	167710
366.0	6540.893	-73.8777	30.0945	76.14	3.05	3798.4	77.49	2.76	4199.7	677762	168123
368.0	6541.293	-73.8030	30.1104	76.18	2.98	3815.0	77.52	2.69	4216.4	685169	168528
370.0	6541.686	-73.7279	30.1264	76.22	2.91	3831.8	77.55	2.63	4233.2	692609	168926
372.0	6542.071	-73.6525	30.1424	76.26	2.84	3848.8	77.58	2.57	4250.2	700082	169317
374.0	6542.448	-73.5766	30.1584	76.31	2.77	3865.8	77.62	2.51	4267.3	707587	169699
376.0	6542.818	-73.5005	30.1744	76.35	2.70	3883.0	77.65	2.45	4284.5	715126	170075
378.0	6543.181	-73.4239	30.1904	76.39	2.64	3900.3	77.69	2.39	4301.9	722699	170443
380.0	6543.536	-73.3470	30.2065	76.44	2.57	3917.8	77.72	2.33	4319.3	730305	170803
382.0	6543.885	-73.2697	30.2226	76.48	2.51	3935.3	77.75	2.28	4337.0	737946	171157
384.0	6544.225	-73.1921	30.2387	76.52	2.45	3953.0	77.79	2.22	4354.7	745620	171503
386.0	6544.559	-73.1140	30.2548	76.57	2.38	3970.8	77.83	2.17	4372.5	753329	171842
388.0	6544.886	-73.0356	30.2710	76.61	2.32	3988.8	77.86	2.11	4390.5	761073	172174
390.0	6545.206	-72.9568	30.2871	76.66	2.26	4006.9	77.90	2.06	4408.6	768852	172499
392.0	6545.520	-72.8777	30.3033	76.71	2.21	4025.1	77.93	2.01	4426.8	776666	172818
394.0	6545.826	-72.7981	30.3195	76.75	2.15	4043.4	77.97	1.96	4445.2	784516	173130
396.0	6546.126	-72.7181	30.3357	76.80	2.09	4061.8	78.01	1.91	4463.7	792401	173435
398.0	6546.420	-72.6378	30.3520	76.84	2.04	4080.4	78.04	1.86	4482.3	800322	173734
400.0	6546.707	-72.5570	30.3682	76.89	1.99	4099.1	78.08	1.81	4501.0	808279	174026
402.0	6546.988	-72.4759	30.3845	76.94	1.93	4117.9	78.12	1.76	4519.9	816273	174313
404.0	6547.262	-72.3944	30.4008	76.99	1.88	4136.9	78.16	1.71	4538.9	824303	174593
406.0	6547.531	-72.3124	30.4171	77.03	1.83	4156.0	78.20	1.67	4558.0	832371	174866
408.0	6547.794	-72.2300	30.4334	77.08	1.78	4175.3	78.23	1.62	4577.3	840475	175134
410.0	6548.050	-72.1473	30.4497	77.13	1.73	4194.6	78.27	1.58	4596.7	848617	175396
412.0	6548.301	-72.0641	30.4661	77.18	1.69	4214.2	78.31	1.54	4616.2	856797	175652
414.0	6548.546	-71.9805	30.4825	77.23	1.64	4233.8	78.35	1.50	4635.9	865015	175903
416.0	6548.786	-71.8965	30.4988	77.28	1.59	4253.6	78.39	1.46	4655.7	873271	176148
418.0	6549.020	-71.8120	30.5152	77.33	1.55	4273.6	78.43	1.42	4675.7	881565	176387

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
420.0	6549.248	-71.7272	30.5316	77.37	1.51	4293.6	78.47	1.38	4695.8	889898	176621
422.0	6549.471	-71.6419	30.5481	77.42	1.47	4313.8	78.51	1.34	4716.0	898271	176850
424.0	6549.689	-71.5562	30.5645	77.47	1.42	4334.2	78.55	1.30	4736.4	906682	177073
426.0	6549.902	-71.4702	30.5809	77.53	1.38	4354.7	78.60	1.27	4756.9	915134	177291
428.0	6550.110	-71.3834	30.5974	77.58	1.34	4375.4	78.64	1.23	4777.6	923625	177505
430.0	6550.313	-71.2963	30.6139	77.63	1.31	4396.2	78.68	1.20	4798.4	932156	177713
432.0	6550.511	-71.2089	30.6304	77.68	1.27	4417.1	78.72	1.16	4819.4	940728	177917
434.0	6550.705	-71.1209	30.6468	77.73	1.23	4438.2	78.76	1.13	4840.5	949341	178115
436.0	6550.894	-71.0325	30.6633	77.78	1.20	4459.4	78.81	1.10	4861.7	957994	178310
438.0	6551.078	-70.9437	30.6798	77.83	1.17	4480.8	78.85	1.07	4883.1	966689	178500
440.0	6551.259	-70.8544	30.6964	77.89	1.13	4502.4	78.89	1.04	4904.7	975426	178686
442.0	6551.435	-70.7646	30.7129	77.94	1.10	4524.1	78.94	1.01	4926.4	984204	178867
444.0	6551.607	-70.6744	30.7294	77.99	1.07	4546.0	78.98	0.98	4948.3	993025	179045
446.0	6551.775	-70.5837	30.7460	78.05	1.04	4568.0	79.03	0.96	4970.3	1001888	179218
448.0	6551.939	-70.4925	30.7625	78.10	1.01	4590.1	79.07	0.93	4992.5	1010794	179388
450.0	6552.099	-70.4009	30.7791	78.16	0.99	4612.5	79.12	0.91	5014.9	1019743	179553
452.0	6552.256	-70.3088	30.7956	78.21	0.96	4635.0	79.16	0.88	5037.4	1028736	179716
454.0	6552.410	-70.2162	30.8122	78.26	0.93	4657.6	79.21	0.86	5060.1	1037772	179874
456.0	6552.559	-70.1231	30.8288	78.32	0.91	4680.5	79.26	0.84	5082.9	1046852	180030
458.0	6552.706	-70.0295	30.8453	78.38	0.88	4703.5	79.30	0.81	5105.9	1055977	180182
460.0	6552.849	-69.9354	30.8619	78.43	0.86	4726.6	79.35	0.79	5129.1	1065147	180331
462.0	6552.990	-69.8409	30.8785	78.49	0.84	4749.9	79.40	0.77	5152.4	1074361	180477
464.0	6553.127	-69.7458	30.8950	78.54	0.82	4773.4	79.45	0.75	5175.9	1083621	180619
466.0	6553.262	-69.6502	30.9116	78.60	0.79	4797.0	79.49	0.73	5199.5	1092927	180759
468.0	6553.393	-69.5541	30.9282	78.66	0.78	4820.8	79.54	0.72	5223.3	1102278	180897
470.0	6553.523	-69.4575	30.9448	78.72	0.76	4844.7	79.59	0.70	5247.3	1111676	181031
472.0	6553.650	-69.3604	30.9613	78.77	0.74	4868.8	79.64	0.68	5271.4	1121120	181164
474.0	6553.775	-69.2628	30.9779	78.83	0.72	4893.2	79.69	0.67	5295.7	1130611	181294
476.0	6553.898	-69.1646	30.9945	78.89	0.71	4917.6	79.74	0.66	5320.2	1140150	181423
478.0	6554.018	-69.0659	31.0110	78.95	0.69	4942.3	79.79	0.64	5344.9	1149736	181549
480.0	6554.137	-68.9667	31.0276	79.01	0.68	4967.2	79.84	0.63	5369.7	1159370	181673
482.0	6554.255	-68.8670	31.0442	79.07	0.67	4992.2	79.89	0.62	5394.8	1169052	181796
484.0	6554.370	-68.7667	31.0607	79.13	0.66	5017.4	79.95	0.61	5420.0	1178783	181917
486.0	6554.485	-68.6659	31.0772	79.19	0.65	5042.8	80.00	0.60	5445.4	1188564	182037
488.0	6554.598	-68.5645	31.0938	79.25	0.64	5068.4	80.05	0.59	5471.1	1198393	182156
490.0	6554.710	-68.4626	31.1103	79.31	0.63	5094.2	80.10	0.58	5496.9	1208273	182273
492.0	6554.821	-68.3601	31.1268	79.37	0.62	5120.2	80.15	0.57	5522.9	1218202	182390
494.0	6554.931	-68.2570	31.1433	79.43	0.61	5146.4	80.21	0.57	5549.1	1228182	182506
496.0	6555.041	-68.1534	31.1598	79.49	0.61	5172.8	80.26	0.56	5575.5	1238213	182621
498.0	6555.150	-68.0492	31.1763	79.56	0.60	5199.4	80.32	0.56	5602.1	1248296	182735
500.0	6555.259	-67.9445	31.1928	79.62	0.60	5226.2	80.37	0.55	5628.9	1258432	182850
502.0	6555.368	-67.8391	31.2092	79.68	0.59	5253.2	80.42	0.55	5655.9	1268616	182964
504.0	6555.476	-67.7332	31.2256	79.75	0.59	5280.5	80.48	0.55	5683.2	1278855	183078

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
506.0	6555.585	-67.6267	31.2421	79.81	0.59	5307.9	80.54	0.55	5710.6	1289147	183192
508.0	6555.694	-67.5196	31.2585	79.87	0.59	5335.6	80.59	0.55	5738.3	1299492	183306
510.0	6555.804	-67.4119	31.2749	79.94	0.59	5363.4	80.65	0.55	5766.2	1309891	183422
512.0	6555.914	-67.3036	31.2912	80.00	0.59	5391.5	80.70	0.55	5794.3	1320345	183537
514.0	6556.025	-67.1947	31.3076	80.07	0.59	5419.9	80.76	0.55	5822.6	1330853	183654
516.0	6556.137	-67.0852	31.3239	80.13	0.59	5448.4	80.82	0.55	5851.2	1341415	183771
518.0	6556.251	-66.9751	31.3402	80.20	0.60	5477.2	80.88	0.56	5880.0	1352034	183890
520.0	6556.365	-66.8643	31.3565	80.27	0.60	5506.2	80.94	0.56	5909.0	1362708	184010
522.0	6556.481	-66.7529	31.3727	80.33	0.61	5535.5	80.99	0.56	5938.3	1373439	184132
524.0	6556.599	-66.6409	31.3890	80.40	0.61	5565.0	81.05	0.57	5967.8	1384227	184255
526.0	6556.719	-66.5283	31.4052	80.47	0.62	5594.7	81.11	0.58	5997.5	1395072	184380
528.0	6556.841	-66.4150	31.4214	80.54	0.63	5624.7	81.17	0.58	6027.5	1405975	184507
530.0	6556.965	-66.3010	31.4375	80.61	0.63	5654.9	81.23	0.59	6057.8	1416936	184637
532.0	6557.091	-66.1864	31.4536	80.67	0.64	5685.4	81.30	0.60	6088.3	1427956	184769
534.0	6557.220	-66.0712	31.4697	80.74	0.65	5716.2	81.36	0.61	6119.0	1439036	184903
536.0	6557.352	-65.9552	31.4858	80.81	0.67	5747.1	81.42	0.62	6150.0	1450175	185040
538.0	6557.487	-65.8387	31.5018	80.88	0.68	5777.9	81.48	0.63	6180.8	1461373	185181
540.0	6557.623	-65.7215	31.5177	80.95	0.67	5803.0	81.55	0.63	6205.9	1472625	185322
542.0	6557.759	-65.6038	31.5337	81.02	0.67	5827.2	81.61	0.62	6230.1	1483924	185463
544.0	6557.894	-65.4855	31.5495	81.10	0.66	5851.5	81.67	0.62	6254.4	1495272	185604
546.0	6558.029	-65.3667	31.5653	81.17	0.65	5875.9	81.74	0.61	6278.8	1506666	185743
548.0	6558.163	-65.2474	31.5810	81.24	0.65	5900.4	81.80	0.61	6303.3	1518107	185882
550.0	6558.295	-65.1275	31.5967	81.31	0.64	5925.0	81.87	0.60	6328.0	1529596	186020
552.0	6558.427	-65.0071	31.6123	81.38	0.64	5949.7	81.93	0.60	6352.6	1541133	186158
554.0	6558.559	-64.8861	31.6279	81.46	0.63	5974.6	82.00	0.59	6377.6	1552717	186295
556.0	6558.692	-64.7645	31.6433	81.53	0.63	5999.6	82.07	0.59	6402.6	1564351	186432
558.0	6558.824	-64.6425	31.6588	81.60	0.63	6024.8	82.13	0.59	6427.8	1576035	186570
560.0	6558.957	-64.5199	31.6741	81.68	0.63	6050.1	82.20	0.59	6453.1	1587767	186708
562.0	6559.091	-64.3967	31.6894	81.75	0.63	6075.6	82.27	0.59	6478.6	1599548	186847
564.0	6559.225	-64.2730	31.7046	81.82	0.63	6101.3	82.33	0.59	6504.3	1611377	186986
566.0	6559.359	-64.1487	31.7197	81.90	0.63	6127.1	82.40	0.59	6530.2	1623255	187126
568.0	6559.495	-64.0239	31.7347	81.97	0.63	6153.2	82.47	0.59	6556.2	1635184	187266
570.0	6559.631	-63.8984	31.7497	82.05	0.63	6179.4	82.54	0.60	6582.5	1647164	187407
572.0	6559.769	-63.7724	31.7646	82.13	0.64	6205.9	82.61	0.60	6609.0	1659194	187550
574.0	6559.907	-63.6458	31.7794	82.20	0.64	6232.5	82.68	0.60	6635.6	1671276	187693
576.0	6560.047	-63.5187	31.7941	82.28	0.64	6259.3	82.75	0.60	6662.4	1683409	187838
578.0	6560.188	-63.3909	31.8088	82.36	0.65	6286.2	82.82	0.61	6689.3	1695594	187984
580.0	6560.331	-63.2625	31.8233	82.43	0.65	6313.3	82.89	0.61	6716.5	1707831	188132
582.0	6560.475	-63.1336	31.8378	82.51	0.65	6340.6	82.96	0.62	6743.8	1720121	188281
584.0	6560.622	-63.0040	31.8522	82.59	0.66	6368.1	83.03	0.62	6771.3	1732463	188432
586.0	6560.770	-62.8739	31.8665	82.67	0.67	6395.8	83.11	0.63	6798.9	1744859	188586
588.0	6560.921	-62.7431	31.8807	82.75	0.68	6423.5	83.18	0.64	6826.7	1757308	188741
590.0	6561.074	-62.6118	31.8948	82.83	0.69	6451.5	83.25	0.65	6854.7	1769812	188899

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
592.0	6561.237	-62.4738	31.9288	82.91	0.69	6479.6	83.32	0.65	6882.8	1782369	189060
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
592.640	6561.281	-62.4374	31.9133	82.93	0.70	6488.6	83.35	0.66	6891.8	1786399	189112
	S-II/S-IVB SEPARATION COMMAND										
593.500	6561.349	-62.3805	31.9193	82.97	0.69	6492.7	83.38	0.65	6895.9	1791819	189181
594.0	6561.387	-62.3473	31.9227	82.99	0.68	6493.5	83.40	0.64	6895.7	1794971	189222
596.0	6561.538	-62.2147	31.9365	83.07	0.64	6491.7	83.47	0.61	6894.9	1807582	189377
598.0	6561.679	-62.0821	31.9501	83.15	0.61	6491.8	83.55	0.57	6895.1	1820187	189522
600.0	6561.815	-61.9493	31.9636	83.23	0.59	6500.7	83.62	0.55	6903.9	1832804	189663
602.0	6561.946	-61.8163	31.9769	83.31	0.57	6510.6	83.70	0.54	6913.9	1845439	189799
604.0	6562.074	-61.6831	31.9901	83.39	0.55	6520.8	83.77	0.52	6924.1	1858091	189931
606.0	6562.197	-61.5496	32.0031	83.46	0.53	6531.1	83.85	0.50	6934.4	1870764	190059
608.0	6562.316	-61.4159	32.0160	83.54	0.51	6541.6	83.92	0.48	6944.9	1883457	190182
610.0	6562.431	-61.2819	32.0288	83.62	0.49	6552.2	83.99	0.46	6955.5	1896171	190301
612.0	6562.541	-61.1476	32.0415	83.70	0.47	6562.8	84.07	0.44	6966.1	1908904	190415
614.0	6562.646	-61.0131	32.0540	83.78	0.45	6573.5	84.14	0.42	6976.8	1921658	190525
616.0	6562.749	-60.8784	32.0663	83.86	0.43	6584.2	84.22	0.41	6987.6	1934433	190630
618.0	6562.845	-60.7434	32.0785	83.94	0.41	6595.0	84.29	0.39	6998.4	1947229	190731
620.0	6562.937	-60.6081	32.0906	84.03	0.39	6605.9	84.37	0.37	7009.2	1960045	190828
622.0	6563.026	-60.4726	32.1026	84.11	0.37	6616.7	84.45	0.35	7020.1	1972882	190920
624.0	6563.110	-60.3368	32.1143	84.19	0.36	6627.6	84.52	0.34	7031.0	1985740	191009
626.0	6563.190	-60.2007	32.1260	84.27	0.34	6638.5	84.60	0.32	7041.9	1998620	191093
628.0	6563.266	-60.0644	32.1375	84.35	0.32	6649.5	84.68	0.30	7052.9	2011520	191173
630.0	6563.338	-59.9279	32.1488	84.44	0.30	6660.5	84.75	0.28	7063.9	2024442	191249
632.0	6563.407	-59.7910	32.1600	84.52	0.28	6671.6	84.83	0.27	7075.0	2037384	191321
634.0	6563.471	-59.6539	32.1711	84.60	0.27	6682.7	84.91	0.25	7086.1	2050349	191389
636.0	6563.531	-59.5166	32.1820	84.69	0.25	6693.8	84.99	0.24	7097.3	2063334	191453
638.0	6563.588	-59.3790	32.1927	84.77	0.24	6705.0	85.07	0.22	7108.5	2076342	191513
640.0	6563.641	-59.2411	32.2033	84.85	0.22	6716.2	85.15	0.21	7119.7	2089371	191570
642.0	6563.691	-59.1029	32.2138	84.94	0.20	6727.5	85.22	0.19	7130.9	2102421	191623
644.0	6563.737	-58.9645	32.2241	85.02	0.19	6738.7	85.30	0.18	7142.2	2115493	191673
646.0	6563.780	-58.8259	32.2342	85.11	0.17	6750.0	85.38	0.16	7153.5	2128588	191719
648.0	6563.819	-58.6869	32.2442	85.19	0.16	6761.3	85.46	0.15	7164.8	2141704	191761
650.0	6563.855	-58.5477	32.2540	85.27	0.15	6772.7	85.54	0.14	7176.2	2154841	191801
652.0	6563.888	-58.4083	32.2636	85.36	0.13	6784.1	85.62	0.12	7187.6	2168001	191837
654.0	6563.918	-58.2685	32.2732	85.44	0.12	6795.5	85.70	0.11	7199.0	2181183	191870
656.0	6563.944	-58.1285	32.2825	85.53	0.11	6807.0	85.78	0.10	7210.5	2194388	191900
658.0	6563.967	-57.9883	32.2917	85.62	0.09	6818.6	85.86	0.09	7222.1	2207614	191926
660.0	6563.986	-57.8477	32.3007	85.70	0.08	6830.2	85.94	0.08	7233.7	2220863	191951

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
662.0	6564.207	-57.7069	32.3096	85.79	0.07	6841.8	86.02	0.07	7245.3	2234135	191972
664.0	6564.023	-57.5658	32.3132	85.87	0.06	6853.4	86.10	0.06	7256.9	2247429	191990
666.0	6564.036	-57.4245	32.3268	85.96	0.05	6865.1	86.18	0.05	7268.6	2260745	192006
668.0	6564.047	-57.2829	32.3351	86.04	0.04	6876.8	86.26	0.04	7280.3	2274084	192020
670.0	6564.055	-57.1410	32.3433	86.13	0.03	6888.5	86.35	0.03	7292.0	2287446	192031
672.0	6564.061	-56.9989	32.3514	86.22	0.02	6900.3	86.43	0.02	7303.8	2300831	192039
674.0	6564.064	-56.8564	32.3592	86.30	0.01	6912.0	86.51	0.01	7315.6	2314238	192046
676.0	6564.066	-56.7138	32.3669	86.39	0.00	6923.9	86.59	0.00	7327.4	2327668	192050
678.0	6564.065	-56.5708	32.3744	86.48	-0.01	6935.7	86.67	-0.01	7339.3	2341122	192052
680.0	6564.063	-56.4276	32.3818	86.57	-0.01	6947.6	86.75	-0.01	7351.2	2354598	192052
682.0	6564.059	-56.2841	32.3890	86.65	-0.02	6959.6	86.84	-0.02	7363.1	2368098	192051
684.0	6564.053	-56.1403	32.3960	86.74	-0.03	6971.6	86.92	-0.03	7375.1	2381620	192047
686.0	6564.046	-55.9963	32.4028	86.83	-0.03	6983.6	87.00	-0.03	7387.1	2395166	192042
688.0	6564.037	-55.8519	32.4095	86.92	-0.04	6995.6	87.08	-0.04	7399.2	2408736	192035
690.0	6564.027	-55.7074	32.4160	87.00	-0.05	7007.7	87.17	-0.04	7411.3	2422329	192027
692.0	6564.015	-55.5625	32.4223	87.09	-0.05	7019.8	87.25	-0.05	7423.4	2435945	192017
694.0	6564.002	-55.4174	32.4284	87.18	-0.06	7032.0	87.33	-0.05	7435.6	2449585	192007
696.0	6563.988	-55.2720	32.4344	87.27	-0.06	7044.2	87.42	-0.06	7447.8	2463249	191994
698.0	6563.973	-55.1263	32.4401	87.36	-0.06	7056.5	87.50	-0.06	7460.0	2476936	191981
700.0	6563.957	-54.9804	32.4457	87.44	-0.07	7068.7	87.58	-0.06	7472.3	2490647	191967
702.0	6563.940	-54.8341	32.4511	87.53	-0.07	7081.0	87.67	-0.07	7484.6	2504382	191952
704.0	6563.923	-54.6876	32.4564	87.62	-0.07	7093.4	87.75	-0.07	7496.9	2518141	191937
706.0	6563.905	-54.5409	32.4614	87.71	-0.07	7105.8	87.83	-0.07	7509.3	2531924	191921
708.0	6563.886	-54.3938	32.4663	87.80	-0.08	7118.2	87.92	-0.07	7521.8	2545731	191904
710.0	6563.867	-54.2465	32.4709	87.89	-0.08	7130.7	88.00	-0.07	7534.2	2559563	191886
712.0	6563.848	-54.0989	32.4754	87.98	-0.08	7143.1	88.09	-0.07	7546.7	2573418	191869
714.0	6563.828	-53.9510	32.4797	88.07	-0.08	7155.7	88.17	-0.07	7559.2	2587298	191851
716.0	6563.810	-53.8029	32.4838	88.16	-0.08	7168.3	88.26	-0.07	7571.8	2601203	191834
718.0	6563.791	-53.6545	32.4878	88.25	-0.07	7180.9	88.34	-0.07	7584.5	2615132	191816
720.0	6563.773	-53.5058	32.4915	88.34	-0.07	7193.6	88.43	-0.07	7597.2	2629085	191799
722.0	6563.754	-53.3568	32.4951	88.43	-0.07	7206.4	88.51	-0.07	7609.9	2643063	191781
724.0	6563.736	-53.2076	32.4984	88.52	-0.07	7219.2	88.60	-0.07	7622.7	2657067	191764
726.0	6563.718	-53.0581	32.5016	88.61	-0.07	7232.0	88.69	-0.07	7635.5	2671094	191747
728.0	6563.700	-52.9083	32.5046	88.70	-0.07	7244.8	88.77	-0.07	7648.4	2685147	191730
730.0	6563.683	-52.7582	32.5073	88.79	-0.07	7257.7	88.85	-0.06	7661.3	2699225	191714
732.0	6563.666	-52.6078	32.5099	88.88	-0.06	7270.6	88.94	-0.06	7674.2	2713328	191699
734.0	6563.651	-52.4572	32.5123	88.97	-0.06	7283.6	89.03	-0.06	7687.1	2727456	191684
736.0	6563.637	-52.3063	32.5145	89.06	-0.05	7296.5	89.11	-0.05	7700.1	2741610	191671
738.0	6563.624	-52.1551	32.5165	89.15	-0.05	7309.6	89.20	-0.04	7713.1	2755788	191659
740.0	6563.613	-52.0036	32.5182	89.25	-0.04	7322.6	89.29	-0.04	7726.1	2769992	191648
742.0	6563.604	-51.8519	32.5198	89.34	-0.03	7335.7	89.37	-0.03	7739.2	2784221	191639
744.0	6563.596	-51.6999	32.5212	89.43	-0.02	7348.8	89.46	-0.02	7752.3	2798476	191633
746.0	6563.591	-51.5476	32.5224	89.52	-0.01	7361.9	89.55	-0.01	7765.5	2812756	191628

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	SE VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
748.0	6563.589	-51.2952	32.5233	89.61	-0.01	7375.1	89.63	-0.01	7778.7	2827062	191626
	S-IVB 1ST GUIDANCE CUTOFF										
749.830	6563.588	-51.2552	32.5241	89.70	0.00	7387.2	89.71	0.00	7790.8	2840174	191625
750.0	6563.589	-51.2422	32.5241	89.70	0.00	7388.4	89.72	0.00	7791.9	2841393	191626
752.0	6563.590	-51.1992	32.5247	89.80	0.00	7389.2	89.81	0.00	7792.8	2855736	191627
754.0	6563.592	-51.0362	32.5250	89.89	0.00	7389.1	89.89	0.00	7792.7	2870083	191629
756.0	6563.593	-50.7832	32.5252	89.98	0.00	7389.0	89.98	0.00	7792.6	2884427	191630
758.0	6563.594	-50.4302	32.5251	90.07	0.01	7389.0	90.07	0.00	7792.5	2898773	191632
	PARKING ORBIT INSERTION										
759.837	6563.593	-50.4332	32.5249	90.16	0.01	7389.0	90.15	0.01	7792.5	2911899	191631

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								
759.830	6563.593	-50.4902	32.5249	32.6945	90.15	0.01	7792.5	191.631
800.0	6563.621	-47.4185	32.4762	32.6456	91.89	0.00	7792.6	191.641
850.0	6563.651	-43.6049	32.2997	32.4687	94.05	0.00	7792.8	191.612
900.0	6563.677	-39.9123	31.9960	32.1641	96.19	0.00	7792.9	191.536
950.0	6563.700	-36.3516	31.5674	31.7343	98.28	0.00	7793.1	191.415
1000.0	6563.718	-32.9323	31.0171	31.1824	100.33	0.00	7793.2	191.251
1050.0	6563.732	-29.6628	30.3491	30.5123	102.31	0.00	7793.4	191.045
1100.0	6563.741	-26.5503	29.5680	29.7286	104.23	0.00	7793.6	190.801
1150.0	6563.745	-23.6003	28.6790	28.8366	106.06	0.00	7793.8	190.522
1200.0	6563.744	-18.8172	27.6878	27.8418	107.81	-0.00	7794.1	190.213
1250.0	6563.739	-14.6037	26.6002	26.7501	109.47	-0.00	7794.3	189.877
1300.0	6563.728	-11.2611	25.4224	25.5676	111.03	-0.00	7794.6	189.519
1350.0	6563.712	-7.9895	24.1608	24.3007	112.49	-0.00	7794.9	189.143
1400.0	6563.690	-4.7881	22.8215	22.9554	113.86	-0.00	7795.2	188.755
1450.0	6563.663	-1.6548	21.4109	21.5382	115.12	-0.00	7795.4	188.359
1500.0	6563.630	1.4133	19.9351	20.0552	116.28	-0.01	7795.7	187.960
1550.0	6563.592	4.4195	18.4001	18.5124	117.34	-0.01	7796.0	187.564
1600.0	6563.545	7.3681	16.8119	16.9156	118.29	-0.01	7796.3	187.176
1650.0	6563.493	10.2634	15.1760	15.2708	119.15	-0.01	7796.6	186.799
1700.0	6563.434	13.1106	13.4982	13.5933	119.91	-0.01	7796.9	186.439
1750.0	6563.369	15.9147	11.7837	11.8586	120.57	-0.01	7797.2	186.100
1800.0	6563.299	18.6812	10.0377	10.1021	121.14	-0.01	7797.5	185.785
1850.0	6563.221	21.4155	8.2654	8.3187	121.61	-0.01	7797.7	185.499
1900.0	6563.137	24.1235	6.4716	6.5136	121.98	-0.01	7798.0	185.244
1950.0	6563.048	26.8109	4.6612	4.6915	122.27	-0.01	7798.2	185.024
2000.0	6562.953	29.4834	2.8388	2.8574	122.45	-0.01	7798.4	184.839
2050.0	6562.853	32.1469	1.0092	1.0158	122.55	-0.02	7798.6	184.693
2100.0	6562.748	34.8073	-0.8230	-0.8283	122.56	-0.02	7798.7	184.587
2150.0	6562.640	37.4704	-2.6532	-2.6705	122.47	-0.02	7798.9	184.520
2200.0	6562.528	40.1421	-4.4767	-4.5059	122.29	-0.02	7799.0	184.493
2250.0	6562.414	42.8283	-6.2890	-6.3298	122.02	-0.02	7799.1	184.506
2300.0	6562.298	45.5348	-8.0852	-8.1374	121.65	-0.02	7799.2	184.557
2350.0	6562.182	48.2673	-9.8606	-9.9239	121.19	-0.02	7799.3	184.646
2400.0	6562.066	51.0316	-11.6102	-11.6841	120.63	-0.02	7799.3	184.770
2450.0	6561.951	53.8331	-13.3289	-13.4131	119.98	-0.02	7799.3	184.927
2500.0	6561.838	56.6775	-15.0117	-15.1055	119.23	-0.02	7799.3	185.114
2550.0	6561.730	59.5699	-16.6529	-16.7559	118.38	-0.02	7799.3	185.328
2600.0	6561.626	62.5150	-18.2472	-18.3587	117.44	-0.01	7799.3	185.566
2650.0	6561.527	65.5178	-19.7888	-19.9082	116.39	-0.01	7799.2	185.823
2700.0	6561.436	68.5824	-21.2718	-21.3985	115.23	-0.01	7799.2	186.097

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
2750.0	6561.352	71.7120	-22.4902	-22.8236	113.98	-0.01	7799.1	186.382
2800.0	6561.278	74.8399	-24.0377	-24.1771	112.63	-0.01	7799.0	186.675
2850.0	6561.214	78.1779	-25.3082	-25.4529	111.17	-0.01	7798.9	186.972
2900.0	6561.162	81.5172	-26.4952	-26.6447	109.62	-0.01	7798.8	187.268
2950.0	6561.121	84.9278	-27.5925	-27.7462	107.97	-0.01	7798.7	187.560
3000.0	6561.094	88.4084	-28.5938	-28.7512	106.22	-0.00	7798.6	187.844
3050.0	6561.080	91.9563	-29.4932	-29.6537	104.40	-0.00	7798.5	188.116
3100.0	6561.081	95.5674	-30.2851	-30.4481	102.49	0.00	7798.4	188.373
3150.0	6561.097	99.2361	-30.9640	-31.1292	100.51	0.00	7798.3	188.612
3200.0	6561.129	102.9556	-31.5254	-31.6922	98.46	0.01	7798.1	188.831
3250.0	6561.177	106.7172	-31.9651	-32.1332	96.37	0.01	7798.0	189.026
3300.0	6561.242	110.5116	-32.2799	-32.4488	94.24	0.01	7797.9	189.196
3350.0	6561.322	114.3281	-32.4674	-32.6368	92.07	0.01	7797.8	189.340
3400.0	6561.419	118.1555	-32.5261	-32.6957	89.90	0.02	7797.7	189.457
3450.0	6561.532	121.9822	-32.4556	-32.5250	87.73	0.02	7797.6	189.546
3500.0	6561.661	125.7968	-32.2565	-32.4254	85.57	0.02	7797.5	189.608
3550.0	6561.806	129.5880	-31.9303	-32.0982	83.44	0.02	7797.4	189.643
3600.0	6561.966	133.3455	-31.4795	-31.6461	81.35	0.02	7797.4	189.652
3650.0	6562.139	137.0596	-30.9074	-31.0724	79.31	0.03	7797.3	189.636
3700.0	6562.327	140.7222	-30.2183	-30.3811	77.34	0.03	7797.2	189.597
3750.0	6562.527	144.3265	-29.4169	-29.5770	75.44	0.03	7797.1	189.538
3800.0	6562.738	147.8669	-28.5085	-28.6655	73.62	0.03	7797.1	189.462
3850.0	6562.960	151.3395	-27.4988	-27.6521	71.88	0.03	7797.0	189.370
3900.0	6563.191	154.7420	-26.3939	-26.5430	70.24	0.03	7796.9	189.267
3950.0	6563.430	158.0730	-25.2000	-25.3443	68.70	0.04	7796.9	189.156
4000.0	6563.676	161.3327	-23.9234	-24.0622	67.25	0.04	7796.8	189.041
4050.0	6563.927	164.5222	-22.5704	-22.7031	65.91	0.04	7796.7	188.925
4100.0	6564.183	167.6438	-21.1472	-21.2733	64.66	0.04	7796.7	188.812
4150.0	6564.441	170.7004	-19.6601	-19.7788	63.52	0.04	7796.6	188.706
4200.0	6564.700	173.6955	-18.1151	-18.2258	62.48	0.04	7796.5	188.610
4250.0	6564.959	176.6335	-16.5180	-16.6201	61.54	0.04	7796.4	188.529
4300.0	6565.217	179.5189	-14.8745	-14.9675	60.70	0.04	7796.3	188.466
4350.0	6565.471	-177.6432	-13.1902	-13.2735	59.96	0.04	7796.2	188.424
4400.0	6565.722	-174.8478	-11.4704	-11.5435	59.32	0.04	7796.0	188.406
4450.0	6565.967	-172.0892	-9.7203	-9.7927	58.77	0.04	7795.9	188.414
4500.0	6566.206	-169.3620	-7.9449	-7.9962	58.32	0.03	7795.8	188.451
4550.0	6566.438	-166.6603	-6.1491	-6.1890	57.96	0.03	7795.6	188.518
4600.0	6566.661	-163.9786	-4.3378	-4.3660	57.69	0.03	7795.4	188.618
4650.0	6566.875	-161.3109	-2.5155	-2.5320	57.52	0.03	7795.2	188.750
4700.0	6567.079	-158.6514	-0.6871	-0.6916	57.44	0.03	7795.0	188.916
4750.0	6567.272	-155.9942	1.1430	1.1505	57.45	0.03	7794.8	189.114
4800.0	6567.454	-153.3336	2.9701	2.9895	57.56	0.03	7794.6	189.345
4850.0	6567.624	-150.6636	4.7896	4.8208	57.75	0.02	7794.4	189.608

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
4900.0	6567.782	-147.9785	6.5969	6.6396	58.04	0.02	7794.1	189.900
4950.0	6567.929	-145.2724	8.3872	8.4413	58.42	0.02	7793.9	190.220
5000.0	6568.063	-142.5395	10.1558	10.2208	58.90	0.02	7793.6	190.565
5050.0	6568.185	-139.7744	11.8977	11.9733	59.47	0.02	7793.4	190.932
5100.0	6568.295	-136.9713	13.6079	13.6935	60.13	0.02	7793.1	191.318
5150.0	6568.393	-134.1250	15.2811	15.3764	60.90	0.01	7792.9	191.719
5200.0	6568.480	-131.2302	16.9121	17.0164	61.76	0.01	7792.6	192.132
5250.0	6568.556	-128.2921	18.4953	18.6080	62.72	0.01	7792.3	192.551
5300.0	6568.621	-125.2762	20.0251	20.1455	63.79	0.01	7792.1	192.973
5350.0	6568.676	-122.2085	21.4954	21.6230	64.95	0.01	7791.8	193.394
5400.0	6568.722	-119.0753	22.9003	23.0345	66.22	0.01	7791.6	193.808
5450.0	6568.759	-115.8741	24.2338	24.3738	67.59	0.00	7791.4	194.211
5500.0	6568.788	-112.6029	25.4894	25.6347	69.05	0.00	7791.2	194.598
5550.0	6568.810	-109.2606	26.6610	26.8110	70.62	0.00	7791.0	194.966
5600.0	6568.825	-105.8477	27.7423	27.8964	72.28	0.00	7790.8	195.310
5650.0	6568.833	-102.3654	28.7273	28.8849	74.03	0.00	7790.7	195.626
5700.0	6568.836	-98.8166	29.6099	29.7706	75.87	0.00	7790.5	195.910
5750.0	6568.835	-95.2056	30.3847	30.5478	77.78	-0.00	7790.4	196.160
5800.0	6568.829	-91.5380	31.0463	31.2115	79.77	-0.00	7790.3	196.371
5850.0	6568.820	-87.8210	31.5903	31.7571	81.81	-0.00	7790.3	196.543
5900.0	6568.808	-84.0630	32.0128	32.1808	83.91	-0.00	7790.2	196.672
5950.0	6568.793	-80.2738	32.3105	32.4793	86.04	-0.00	7790.2	196.758
6000.0	6568.776	-76.4638	32.4811	32.6505	88.20	-0.00	7790.2	196.798
6050.0	6568.757	-72.6443	32.5235	32.6929	90.37	-0.00	7790.3	196.794
6100.0	6568.736	-68.8267	32.4372	32.6064	92.54	-0.00	7790.4	196.744
6150.0	6568.715	-65.0225	32.2229	32.3915	94.69	-0.00	7790.5	196.650
6200.0	6568.692	-61.2424	31.8823	32.0500	96.81	-0.00	7790.6	196.512
6250.0	6568.668	-57.4974	31.4179	31.5842	98.89	-0.00	7790.7	196.333
6300.0	6568.643	-53.7969	30.8331	30.9977	100.92	-0.00	7790.9	196.114
6350.0	6568.616	-50.1466	30.1322	30.2945	102.88	-0.00	7791.1	195.859
6400.0	6568.589	-46.5556	29.3198	29.4795	104.77	-0.00	7791.3	195.570
6450.0	6568.560	-43.0296	28.4014	28.5579	106.58	-0.00	7791.5	195.250
6500.0	6568.529	-39.5666	27.3827	27.5354	108.30	-0.00	7791.7	194.904
6550.0	6568.497	-36.1802	26.2695	26.4180	109.93	-0.00	7792.0	194.536
6600.0	6568.462	-32.8617	25.0682	25.2118	111.46	-0.01	7792.2	194.150
6650.0	6568.425	-29.6140	23.7850	23.9231	112.89	-0.01	7792.5	193.751
6700.0	6568.385	-26.4358	22.4261	22.5581	114.23	-0.01	7792.8	193.344
6750.0	6568.342	-23.3244	20.9977	21.1230	115.46	-0.01	7793.1	192.934
6800.0	6568.296	-20.2780	19.5061	19.6239	116.59	-0.01	7793.3	192.524
6850.0	6568.245	-17.2919	17.9570	18.0668	117.62	-0.01	7793.6	192.121
6900.0	6568.191	-14.3625	16.3564	16.4576	118.55	-0.01	7793.9	191.729
6950.0	6568.133	-11.4833	14.7099	14.8022	119.38	-0.01	7794.2	191.352
7000.0	6568.072	-8.6524	13.0230	13.1053	120.11	-0.01	7794.4	190.995

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

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	GC LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
7050.0	6568.003	-5.8625	11.3610	11.3731	120.74	-0.01	7794.7	190.662
7100.0	6567.931	-3.1086	9.5491	9.6104	121.28	-0.01	7794.9	190.356
7150.0	6567.854	-0.3952	7.7722	7.8224	121.72	-0.01	7795.1	190.081
7200.0	6567.773	2.3135	5.9752	6.0140	122.07	-0.01	7795.4	189.840
7250.0	6567.687	4.9931	4.1629	4.1901	122.33	-0.01	7795.5	189.634
7300.0	6567.597	7.4596	2.3401	2.3554	122.49	-0.01	7795.7	189.467
7350.0	6567.503	10.3186	0.5113	0.5146	122.56	-0.01	7795.9	189.339
7400.0	6567.406	12.9761	-1.3189	-1.3275	122.54	-0.01	7796.0	189.251
7450.0	6567.305	15.6378	-3.1458	-3.1663	122.43	-0.02	7796.1	189.204
7500.0	6567.202	18.3098	-4.9648	-4.9972	122.23	-0.02	7796.2	189.197
7550.0	6567.096	20.9977	-6.7713	-6.8152	121.93	-0.02	7796.3	189.229
7600.0	6566.990	23.7074	-8.5605	-8.6157	121.54	-0.02	7796.3	189.300
7650.0	6566.883	26.4446	-10.3276	-10.3937	121.05	-0.02	7796.4	189.408
7700.0	6566.777	29.2149	-12.0676	-12.1442	120.47	-0.02	7796.4	189.550
7750.0	6566.672	32.0239	-13.7755	-13.8622	119.80	-0.02	7796.4	189.724
7800.0	6566.569	34.8770	-15.4460	-15.5422	119.02	-0.01	7796.3	189.927
7850.0	6566.470	37.7792	-17.0738	-17.1789	118.15	-0.01	7796.3	190.155
7900.0	6566.375	40.7355	-18.6531	-18.7667	117.17	-0.01	7796.2	190.406
7950.0	6566.285	43.7503	-20.1784	-20.2997	116.10	-0.01	7796.2	190.674
8000.0	6566.201	46.8276	-21.6437	-21.7721	114.92	-0.01	7796.1	190.957
8050.0	6566.125	49.9708	-23.0429	-23.1777	113.64	-0.01	7796.0	191.249
8100.0	6566.058	53.1826	-24.3698	-24.5105	112.26	-0.01	7795.9	191.548
8150.0	6566.000	56.4648	-25.6182	-25.7641	110.78	-0.01	7795.8	191.848
8200.0	6565.952	59.8183	-26.7817	-26.9323	109.21	-0.01	7795.7	192.145
8250.0	6565.916	63.2426	-27.8541	-28.0087	107.54	-0.00	7795.6	192.436
8300.0	6565.891	66.7362	-28.8293	-28.9874	105.77	-0.00	7795.5	192.716
8350.0	6565.880	70.2961	-29.7014	-29.8624	103.93	-0.00	7795.4	192.983
8400.0	6565.882	73.9178	-30.4647	-30.6282	102.00	0.00	7795.3	193.233
8450.0	6565.899	77.5955	-31.1142	-31.2796	100.01	0.00	7795.1	193.463
8500.0	6565.929	81.3218	-31.6452	-31.8123	97.95	0.01	7795.0	193.670
8550.0	6565.974	85.0879	-32.0541	-32.2223	95.85	0.01	7794.9	193.853
8600.0	6566.035	88.8842	-32.3376	-32.5066	93.71	0.01	7794.8	194.009
8650.0	6566.111	92.6999	-32.4936	-32.6631	91.55	0.01	7794.8	194.137
8700.0	6566.202	96.5238	-32.5210	-32.6905	89.37	0.01	7794.7	194.238
8750.0	6566.307	100.3442	-32.4195	-32.5887	87.21	0.02	7794.6	194.309
BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6								
8769.100	6566.349	101.7241	-32.3511	-32.5202	86.42	0.02	7794.6	194.327

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								
8768.100	-12921594	323271	-341655	229.1	-2599.8	-6914.8	8.25	-1.00	0.65
8770.0	-12921145	318330	-354791	244.8	-2601.7	-6913.5	8.25	-0.99	0.67
8780.0	-12918286	292264	-423802	327.3	-2611.4	-6906.4	8.25	-0.96	0.75
8790.0	-12914600	266103	-492917	409.7	-2620.8	-6898.5	8.24	-0.92	0.84
8800.0	-12910091	239849	-561859	492.1	-2629.9	-6889.6	8.24	-0.89	0.93
8810.0	-12904758	213507	-630707	574.4	-2638.6	-6879.9	8.23	-0.85	1.01
8820.0	-12898603	187079	-699454	656.6	-2647.0	-6869.3	8.22	-0.82	1.10
8830.0	-12891626	160568	-768091	738.8	-2655.0	-6857.9	8.21	-0.79	1.19
8840.0	-12883827	133980	-836609	820.9	-2662.7	-6845.6	8.20	-0.75	1.27
8850.0	-12875208	107316	-905000	902.9	-2670.0	-6832.4	8.19	-0.72	1.36
8860.0	-12865770	80581	-973254	984.7	-2677.0	-6818.4	8.18	-0.68	1.45
8870.0	-12855514	53778	-1041364	1066.5	-2683.6	-6803.5	8.17	-0.64	1.53
8880.0	-12844442	26910	-1109320	1148.1	-2689.9	-6787.7	8.15	-0.61	1.62
8890.0	-12832554	-18	-1177115	1229.5	-2695.8	-6771.1	8.14	-0.57	1.70
8900.0	-12819852	-27004	-1244739	1310.8	-2701.3	-6753.6	8.12	-0.54	1.79
8910.0	-12806338	-54043	-1312184	1391.9	-2706.5	-6735.3	8.11	-0.50	1.87
8920.0	-12792014	-81133	-1379442	1472.9	-2711.3	-6716.1	8.09	-0.46	1.96
8930.0	-12776881	-108269	-1446504	1553.7	-2715.8	-6696.1	8.07	-0.43	2.04
8940.0	-12760941	-135448	-1513362	1634.3	-2719.9	-6675.2	8.05	-0.39	2.13
8950.0	-12744196	-162666	-1580006	1714.6	-2723.7	-6653.6	8.03	-0.36	2.21
8960.0	-12726649	-189920	-1646430	1794.8	-2727.0	-6631.0	8.01	-0.32	2.30
8970.0	-12708300	-217205	-1712624	1874.8	-2730.0	-6607.7	7.98	-0.28	2.38
8980.0	-12689154	-244519	-1778580	1954.5	-2732.7	-6583.5	7.96	-0.24	2.46
8990.0	-12669211	-271857	-1844292	2033.9	-2734.9	-6558.4	7.93	-0.21	2.54
9000.0	-12648476	-299216	-1909745	2113.1	-2736.8	-6532.6	7.91	-0.17	2.63
9010.0	-12626953	-326593	-1974933	2192.1	-2738.3	-6505.9	7.88	-0.13	2.71
9020.0	-12604646	-353982	-2039846	2270.7	-2739.5	-6478.4	7.85	-0.10	2.79
9030.0	-12581556	-381381	-2104474	2349.1	-2740.3	-6450.2	7.82	-0.06	2.87
9040.0	-12557686	-408786	-2168811	2427.2	-2740.7	-6421.0	7.79	-0.02	2.95
9050.0	-12533044	-436194	-2232842	2505.0	-2740.7	-6391.1	7.76	0.02	3.03
9060.0	-12507636	-463599	-2296560	2582.4	-2740.4	-6360.4	7.73	0.05	3.11
9070.0	-12481465	-490999	-2359957	2659.5	-2739.6	-6328.9	7.70	0.09	3.19
9080.0	-12454537	-518391	-2423025	2736.3	-2738.5	-6296.6	7.67	0.13	3.27
9090.0	-12426857	-545769	-2485756	2812.8	-2737.0	-6263.5	7.63	0.17	3.35
9100.0	-12398431	-573130	-2548122	2888.9	-2735.2	-6229.6	7.59	0.21	3.43
9110.0	-12369262	-600471	-2610066	2964.7	-2732.9	-6195.0	7.56	0.24	3.50
9120.0	-12339358	-627788	-2672419	3040.0	-2730.3	-6159.5	7.52	0.28	3.58
9130.0	-12308723	-655077	-2733834	3115.0	-2727.3	-6123.3	7.48	0.32	3.66
9140.0	-12277365	-682333	-2794883	3189.7	-2724.0	-6086.4	7.44	0.36	3.73
9150.0	-12244291	-709554	-2855553	3263.9	-2720.2	-6048.7	7.40	0.40	3.81

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
9160.0	-12211243	-736734	-2915854	3337.6	-2716.1	-6010.2	7.35	0.43	3.88
9170.0	-12177500	-763874	-2975760	3411.0	-2711.5	-5971.0	7.31	0.47	3.96
9180.0	-12143026	-790965	-3035271	3483.9	-2706.6	-5931.0	7.27	0.51	4.03
9190.0	-12107823	-818006	-3094378	3556.4	-2701.4	-5890.3	7.24	0.54	4.10
9200.0	-12071892	-844991	-3153074	3628.5	-2695.7	-5848.9	7.18	0.59	4.18
9210.0	-12035255	-871918	-3211353	3700.1	-2689.7	-5806.7	7.14	0.62	4.25
9220.0	-11997898	-898783	-3269206	3771.2	-2683.2	-5763.8	7.09	0.66	4.33
9230.0	-11959832	-925582	-3326626	3841.9	-2676.4	-5720.2	7.04	0.70	4.40
9240.0	-11921062	-952310	-3383607	3912.0	-2669.2	-5675.9	7.00	0.74	4.47
9250.0	-11881593	-978965	-3440141	3981.8	-2661.7	-5630.9	6.94	0.78	4.54
9260.0	-11841429	-1005543	-3496222	4050.9	-2653.7	-5585.1	6.89	0.81	4.61
9270.0	-11800576	-1032039	-3551841	4119.6	-2645.4	-5538.7	6.85	0.85	4.67
9280.0	-11759039	-1058450	-3606994	4187.8	-2636.7	-5491.7	6.80	0.89	4.74
9290.0	-11716822	-1084772	-3661672	4255.4	-2627.7	-5443.9	6.74	0.93	4.81
9300.0	-11673931	-1111002	-3715870	4322.6	-2618.2	-5395.5	6.68	0.96	4.88
9310.0	-11630373	-1137135	-3769580	4389.1	-2608.4	-5346.4	6.63	1.00	4.95
9320.0	-11586151	-1163168	-3822795	4455.2	-2598.2	-5296.6	6.57	1.04	5.01
9330.0	-11541271	-1189098	-3875510	4520.6	-2587.6	-5246.2	6.51	1.08	5.08
9340.0	-11495740	-1214920	-3927717	4585.5	-2576.7	-5195.2	6.46	1.11	5.12
	S-IVB RE-IGNITION (STDV OPEN)								
9346.300	-11466723	-1231131	-3960345	4626.1	-2569.7	-5162.9	6.43	1.13	5.13
9348.0	-11458849	-1235498	-3969115	4638.9	-2568.7	-5156.1	9.28	-0.46	1.93
9350.0	-11449552	-1240637	-3979424	4658.1	-2569.9	-5153.1	9.77	-0.66	1.31
9352.0	-11440215	-1245778	-3989728	4677.8	-2571.3	-5150.5	9.86	-0.69	1.25
9354.0	-11430840	-1250922	-4000027	4697.5	-2572.7	-5148.0	9.90	-0.69	1.27
9356.0	-11421425	-1256068	-4010320	4717.3	-2574.0	-5145.4	9.94	-0.68	1.29
9358.0	-11411970	-1261218	-4020608	4737.4	-2575.3	-5142.8	10.05	-0.67	1.34
9360.0	-11402475	-1266370	-4030891	4757.7	-2576.6	-5140.0	10.19	-0.64	1.44
9362.0	-11392939	-1271524	-4041168	4778.1	-2577.9	-5137.0	10.28	-0.63	1.51
9364.0	-11383363	-1276681	-4051439	4798.7	-2579.2	-5134.0	10.31	-0.62	1.51
9366.0	-11373744	-1281841	-4061704	4819.3	-2580.4	-5131.0	10.28	-0.62	1.49
9368.0	-11364085	-1287003	-4071963	4839.9	-2581.6	-5128.0	10.27	-0.62	1.49
9370.0	-11354385	-1292167	-4082216	4860.4	-2582.9	-5125.1	10.27	-0.61	1.50
9372.0	-11344644	-1297334	-4092463	4881.0	-2584.1	-5122.0	10.28	-0.59	1.51
9374.0	-11334861	-1302504	-4102704	4901.5	-2585.2	-5119.0	10.30	-0.58	1.52
9376.0	-11325038	-1307676	-4112939	4922.1	-2586.4	-5116.0	10.30	-0.56	1.52
9378.0	-11315173	-1312849	-4123169	4942.8	-2587.5	-5112.9	10.32	-0.54	1.52
9380.0	-11305267	-1318025	-4133391	4963.4	-2588.5	-5109.9	10.34	-0.53	1.53
9382.0	-11295319	-1323203	-4143608	4984.1	-2589.6	-5106.8	10.35	-0.52	1.54
9384.0	-11285330	-1328383	-4153818	5004.8	-2590.6	-5103.7	10.35	-0.51	1.54
9386.0	-11275300	-1333566	-4164023	5025.5	-2591.6	-5100.7	10.35	-0.51	1.55

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
9388.0	-11265228	-1338750	-4174221	5046.2	-2592.6	-5097.6	10.35	-0.49	1.56
9390.0	-11255115	-1343936	-4184413	5066.9	-2593.6	-5094.4	10.36	-0.49	1.56
9392.0	-11244961	-1349124	-4194599	5087.6	-2594.6	-5091.3	10.36	-0.48	1.56
9394.0	-11234765	-1354314	-4204778	5108.4	-2595.5	-5088.2	10.36	-0.47	1.55
9396.0	-11224527	-1359506	-4214951	5129.1	-2596.5	-5085.1	10.37	-0.46	1.55
9398.0	-11214248	-1364700	-4225118	5149.8	-2597.4	-5082.0	10.38	-0.45	1.57
9400.0	-11203928	-1369896	-4235279	5170.6	-2598.3	-5078.8	10.38	-0.44	1.58
9402.0	-11193566	-1375093	-4245434	5191.4	-2599.1	-5075.6	10.39	-0.43	1.60
9404.0	-11183162	-1380292	-4255582	5212.2	-2600.0	-5072.4	10.40	-0.43	1.60
9406.0	-11172717	-1385493	-4265724	5233.0	-2600.9	-5069.2	10.41	-0.43	1.60
9408.0	-11162230	-1390696	-4275859	5253.8	-2601.7	-5066.0	10.40	-0.42	1.61
9410.0	-11151702	-1395900	-4285988	5274.6	-2602.5	-5062.8	10.41	-0.41	1.61
9412.0	-11141132	-1401106	-4296110	5295.4	-2603.3	-5059.6	10.42	-0.40	1.61
9414.0	-11130520	-1406313	-4306226	5316.3	-2604.1	-5056.4	10.43	-0.39	1.61
9416.0	-11119867	-1411522	-4316336	5337.1	-2604.9	-5053.1	10.43	-0.38	1.62
9418.0	-11109172	-1416733	-4326439	5358.0	-2605.7	-5049.9	10.43	-0.38	1.63
9420.0	-11098435	-1421945	-4336535	5378.9	-2606.4	-5046.6	10.44	-0.38	1.64
9422.0	-11087656	-1427159	-4346625	5399.8	-2607.2	-5043.4	10.45	-0.37	1.63
9424.0	-11076836	-1432374	-4356708	5420.7	-2607.9	-5040.1	10.45	-0.35	1.63
9426.0	-11065974	-1437590	-4366785	5441.6	-2608.6	-5036.8	10.45	-0.34	1.64
9428.0	-11055070	-1442808	-4376856	5462.5	-2609.3	-5033.5	10.46	-0.34	1.65
9430.0	-11044124	-1448028	-4386919	5483.4	-2610.0	-5030.2	10.46	-0.34	1.65
9432.0	-11033136	-1453248	-4396977	5504.3	-2610.7	-5026.9	10.47	-0.34	1.65
9434.0	-11022106	-1458470	-4407027	5525.2	-2611.3	-5023.6	10.47	-0.33	1.65
9436.0	-11011035	-1463693	-4417071	5546.2	-2612.0	-5020.3	10.47	-0.31	1.66
9438.0	-10999922	-1468918	-4427108	5567.1	-2612.6	-5017.0	10.47	-0.31	1.67
9440.0	-10988767	-1474144	-4437139	5588.1	-2613.2	-5013.6	10.48	-0.31	1.67
9442.0	-10977570	-1479371	-4447163	5609.0	-2613.8	-5010.3	10.49	-0.31	1.68
9444.0	-10966331	-1484599	-4457180	5630.0	-2614.4	-5007.0	10.50	-0.31	1.68
9446.0	-10955049	-1489828	-4467191	5651.0	-2615.0	-5003.6	10.50	-0.30	1.68
9448.0	-10943726	-1495059	-4477195	5672.1	-2615.6	-5000.2	10.51	-0.30	1.69
9450.0	-10932361	-1500291	-4487192	5693.9	-2616.4	-4997.5	11.35	-0.59	0.96
9452.0	-10920951	-1505525	-4497185	5716.5	-2617.6	-4995.5	11.39	-0.59	0.94
9454.0	-10909495	-1510761	-4507174	5739.3	-2618.8	-4993.6	11.40	-0.59	0.93
9456.0	-10897993	-1516000	-4517160	5762.1	-2620.0	-4991.7	11.42	-0.58	0.93
9458.0	-10886446	-1521242	-4527141	5784.9	-2621.2	-4989.9	11.43	-0.57	0.93
9460.0	-10874854	-1526485	-4537119	5807.8	-2622.4	-4988.0	11.44	-0.57	0.93
9462.0	-10863215	-1531731	-4547093	5830.6	-2623.5	-4986.2	11.44	-0.56	0.93
9464.0	-10851531	-1536978	-4557064	5853.5	-2624.6	-4984.3	11.45	-0.56	0.94
9466.0	-10839801	-1542230	-4567031	5876.4	-2625.7	-4982.5	11.47	-0.55	0.92
9468.0	-10828025	-1547482	-4576994	5899.4	-2626.9	-4980.6	11.49	-0.55	0.92
9470.0	-10816204	-1552737	-4586953	5922.4	-2628.0	-4978.8	11.51	-0.55	0.92
9472.0	-10804336	-1557994	-4596909	5945.4	-2629.1	-4976.9	11.52	-0.55	0.92

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
9474.0	-10792422	-1563253	-4636861	5968.5	-2630.2	-4975.1	11.53	-0.56	0.92
9476.0	-10782462	-1568515	-4616809	5991.5	-2631.3	-4973.3	11.54	-0.55	0.91
9478.0	-10768456	-1573773	-4626754	6014.6	-2632.4	-4971.5	11.54	-0.55	0.92
9480.0	-10756403	-1579044	-4636695	6037.7	-2633.5	-4969.6	11.55	-0.54	0.92
9482.0	-10744305	-1584312	-4646633	6060.8	-2634.5	-4967.8	11.56	-0.54	0.92
9484.0	-10732160	-1589582	-4656566	6084.0	-2635.6	-4966.0	11.57	-0.55	0.90
9486.0	-10719969	-1594855	-4666496	6107.1	-2636.8	-4964.2	11.58	-0.56	0.90
9488.0	-10707732	-1600129	-4676423	6130.3	-2637.9	-4962.4	11.60	-0.55	0.90
9490.0	-10695448	-1605406	-4686346	6153.5	-2639.0	-4960.6	11.61	-0.54	0.89
9492.0	-10683118	-1610685	-4696265	6176.7	-2640.0	-4958.8	11.62	-0.52	0.89
9494.0	-10670741	-1615966	-4706181	6200.0	-2641.1	-4957.0	11.64	-0.52	0.88
9496.0	-10658318	-1621249	-4716093	6223.3	-2642.1	-4955.3	11.65	-0.52	0.87
9498.0	-10645848	-1626534	-4726002	6246.6	-2643.1	-4953.5	11.67	-0.52	0.87
9500.0	-10633331	-1631822	-4735908	6269.9	-2644.2	-4951.8	11.68	-0.52	0.87
9502.0	-10620768	-1637111	-4745810	6293.3	-2645.2	-4950.1	11.68	-0.51	0.87
9504.0	-10608158	-1642403	-4755708	6316.7	-2646.2	-4948.4	11.70	-0.51	0.86
9506.0	-10595501	-1647696	-4765603	6340.1	-2647.2	-4946.7	11.72	-0.50	0.85
9508.0	-10582797	-1652992	-4775495	6363.6	-2648.2	-4945.0	11.74	-0.50	0.85
9510.0	-10570047	-1658289	-4785383	6387.1	-2649.2	-4943.3	11.75	-0.50	0.84
9512.0	-10557249	-1663588	-4795268	6410.6	-2650.2	-4941.6	11.76	-0.49	0.83
9514.0	-10544404	-1668890	-4805149	6434.1	-2651.2	-4940.0	11.78	-0.49	0.82
9516.0	-10531513	-1674193	-4815028	6457.7	-2652.2	-4938.3	11.79	-0.49	0.82
9518.0	-10518574	-1679499	-4824903	6481.3	-2653.2	-4936.7	11.81	-0.48	0.81
9520.0	-10505587	-1684806	-4834774	6504.9	-2654.1	-4935.1	11.83	-0.48	0.81
9522.0	-10492554	-1690115	-4844643	6528.6	-2655.1	-4933.5	11.84	-0.48	0.80
9524.0	-10479473	-1695426	-4854508	6552.3	-2656.0	-4931.9	11.85	-0.47	0.79
9526.0	-10466344	-1700739	-4864370	6576.0	-2657.0	-4930.3	11.86	-0.47	0.78
9528.0	-10453169	-1706054	-4874229	6599.8	-2657.9	-4928.7	11.88	-0.47	0.77
9530.0	-10439945	-1711371	-4884085	6623.6	-2658.8	-4927.2	11.91	-0.46	0.77
9532.0	-10426675	-1716689	-4893938	6647.4	-2659.8	-4925.7	11.94	-0.46	0.76
9534.0	-10413356	-1722010	-4903788	6671.3	-2660.7	-4924.2	11.95	-0.46	0.75
9536.0	-10399989	-1727332	-4913635	6695.2	-2661.6	-4922.7	11.95	-0.46	0.75
9538.0	-10386575	-1732656	-4923479	6719.1	-2662.5	-4921.2	11.96	-0.46	0.74
9540.0	-10373113	-1737982	-4933320	6743.1	-2663.5	-4919.7	12.00	-0.46	0.72
9542.0	-10359603	-1743310	-4943158	6767.1	-2664.4	-4918.3	12.02	-0.45	0.70
9544.0	-10346044	-1748640	-4952993	6791.1	-2665.3	-4916.9	12.03	-0.45	0.70
9546.0	-10332438	-1753971	-4962825	6815.2	-2666.2	-4915.5	12.03	-0.44	0.70
9548.0	-10318784	-1759304	-4972655	6839.3	-2667.0	-4914.1	12.05	-0.44	0.70
9550.0	-10305081	-1764639	-4982482	6863.4	-2667.9	-4912.7	12.08	-0.44	0.68
9552.0	-10291330	-1769976	-4992306	6887.6	-2668.8	-4911.4	12.10	-0.44	0.67
9554.0	-10277530	-1775314	-5002127	6911.9	-2669.7	-4910.0	12.12	-0.44	0.66
9556.0	-10263682	-1780655	-5011946	6936.1	-2670.5	-4908.7	12.14	-0.43	0.65
9558.0	-10249786	-1785997	-5021762	6960.4	-2671.4	-4907.4	12.17	-0.43	0.64

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
[illegible]	-10335941	-1731340	-5031575	6364.3	-2672.2	-4896.2	12.19	-0.42	0.63
[illegible]	-10321947	-1726084	-5041337	7209.2	-2673.1	-4894.9	12.20	-0.43	0.61
[illegible]	-10307954	-1720828	-5051100	7033.5	-2674.0	-4893.7	12.23	-0.43	0.60
[illegible]	-10293960	-1715572	-5060863	7058.1	-2674.8	-4892.5	12.25	-0.43	0.59
9649.0	-10279966	-1710316	-5070625	7082.6	-2675.7	-4891.3	12.27	-0.42	0.59
9648.0	-10265973	-1705060	-5080388	7107.2	-2676.5	-4890.2	12.30	-0.42	0.58
9647.0	-10251979	-1699804	-5090151	7131.8	-2677.3	-4889.0	12.32	-0.41	0.57
9646.0	-10237985	-1694548	-5099913	7156.4	-2678.1	-4887.9	12.34	-0.40	0.55
9645.0	-10223992	-1689292	-5109676	7181.2	-2679.0	-4886.8	12.37	-0.40	0.54
9644.0	-10209998	-1684036	-5119438	7205.9	-2679.8	-4885.7	12.39	-0.41	0.54
9643.0	-10196004	-1678779	-5129201	7230.7	-2680.6	-4884.7	12.41	-0.41	0.52
9642.0	-10182011	-1673523	-5138963	7255.6	-2681.4	-4883.6	12.44	-0.41	0.51
9641.0	-10168017	-1668267	-5148726	7280.5	-2682.2	-4882.6	12.46	-0.40	0.49
9640.0	-10154023	-1663011	-5158488	7305.4	-2683.0	-4881.7	12.49	-0.40	0.49
9639.0	-10140030	-1657755	-5168250	7330.4	-2683.8	-4880.7	12.52	-0.41	0.47
9638.0	-10126036	-1652499	-5178013	7355.5	-2684.6	-4879.8	12.54	-0.40	0.46
9637.0	-10112042	-1647243	-5187775	7380.6	-2685.4	-4878.9	12.56	-0.40	0.44
9636.0	-10098049	-1641987	-5197538	7405.7	-2686.2	-4878.0	12.59	-0.39	0.43
9635.0	-10084055	-1636731	-5207300	7430.9	-2687.0	-4877.2	12.62	-0.39	0.42
9634.0	-10070061	-1631475	-5217062	7456.2	-2687.8	-4876.3	12.65	-0.39	0.41
9633.0	-10056068	-1626219	-5226824	7481.5	-2688.6	-4875.5	12.68	-0.39	0.40
9632.0	-10042074	-1620963	-5236587	7506.9	-2689.3	-4874.7	12.71	-0.39	0.38
9631.0	-10028080	-1615707	-5246349	7532.4	-2690.1	-4874.0	12.74	-0.40	0.37
9630.0	-10014087	-1610450	-5256111	7557.9	-2690.9	-4873.3	12.77	-0.39	0.36
9629.0	-9986321	-1600982	-5266450	7583.5	-2691.7	-4872.6	12.81	-0.39	0.35
9613.0	-9971129	-1595466	-5276215	7609.1	-2692.4	-4871.9	12.83	-0.38	0.33
9612.0	-9955984	-1590252	-5285978	7634.8	-2693.2	-4871.2	12.86	-0.39	0.32
9614.0	-9940839	-1585039	-5295740	7660.5	-2693.9	-4870.6	12.90	-0.38	0.30
9615.0	-9925693	-1579826	-5305500	7686.4	-2694.7	-4869.9	12.93	-0.38	0.29
9618.0	-9909843	-1574018	-5315260	7712.3	-2695.5	-4879.4	12.97	-0.38	0.29
9622.0	-9894393	-1568410	-5325018	7738.2	-2696.2	-4878.9	12.99	-0.37	0.28
9622.0	-9878830	-1562803	-5334775	7764.2	-2696.9	-4878.3	13.02	-0.37	0.26
9624.0	-9863336	-1557197	-5344531	7790.3	-2697.7	-4877.8	13.06	-0.36	0.25
9626.0	-9847739	-1551593	-5354287	7816.5	-2698.4	-4877.3	13.10	-0.37	0.25
9628.0	-9832179	-1545991	-5364041	7842.7	-2699.1	-4876.8	13.14	-0.37	0.24
9630.0	-9816580	-1540390	-5373794	7869.0	-2699.9	-4876.4	13.18	-0.37	0.22
9632.0	-9800994	-1534790	-5383546	7895.4	-2700.6	-4875.9	13.22	-0.36	0.21
9634.0	-9785377	-1529192	-5393296	7921.9	-2701.3	-4875.5	13.27	-0.36	0.20
9636.0	-9769756	-1523595	-5403045	7948.5	-2702.0	-4875.1	13.31	-0.35	0.19
9638.0	-9754133	-1517999	-5412793	7975.1	-2702.7	-4874.8	13.35	-0.35	0.17
9640.0	-9738506	-1512404	-5422540	8001.9	-2703.4	-4874.5	13.39	-0.35	0.15
9642.0	-9722875	-1506811	-5432284	8028.7	-2704.1	-4874.2	13.43	-0.36	0.14
9644.0	-9707241	-1501219	-5442026	8055.6	-2704.8	-4873.9	13.47	-0.36	0.12

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
9646.0	-9588752	-2022634	-5451792	8082.6	-2705.6	-4873.7	13.52	-0.36	0.11
9648.0	-9572560	-2028646	-5461539	8109.7	-2706.3	-4873.5	13.57	-0.35	0.10
9650.0	-9556314	-2033459	-5471286	8136.9	-2707.0	-4873.3	13.63	-0.35	0.10
9652.0	-9540013	-2038873	-5481032	8164.2	-2707.7	-4873.1	13.69	-0.35	0.10
9654.0	-9523657	-2044295	-5490778	8191.6	-2708.4	-4872.9	13.73	-0.35	0.10
9656.0	-9507246	-2049707	-5500523	8219.1	-2709.1	-4872.7	13.78	-0.35	0.08
9658.0	-9490780	-2055126	-5510269	8246.8	-2709.8	-4872.5	13.83	-0.34	0.07
9660.0	-9474259	-2060546	-5520014	8274.5	-2710.5	-4872.4	13.89	-0.34	0.06
9662.0	-9457682	-2065968	-5529758	8302.3	-2711.1	-4872.3	13.95	-0.34	0.06
9664.0	-9441050	-2071391	-5539503	8330.3	-2711.8	-4872.2	14.01	-0.34	0.06
9666.0	-9424361	-2076815	-5549247	8358.3	-2712.5	-4872.1	14.06	-0.33	0.04
9668.0	-9407616	-2082241	-5558991	8386.5	-2713.1	-4872.0	14.11	-0.32	0.03
9670.0	-9390815	-2087667	-5568735	8414.8	-2713.8	-4871.9	14.22	-0.29	0.10
9672.0	-9373957	-2093096	-5578478	8443.4	-2714.3	-4871.5	14.37	-0.24	0.23
9674.0	-9357041	-2098525	-5588221	8472.3	-2714.7	-4871.0	14.51	-0.19	0.33
9676.0	-9340067	-2103954	-5597962	8501.4	-2715.1	-4870.4	14.58	-0.19	0.33
9678.0	-9323035	-2109385	-5607702	8530.6	-2715.5	-4869.7	14.61	-0.21	0.27
9680.0	-9305945	-2114816	-5617441	8559.9	-2715.9	-4869.2	14.65	-0.24	0.24
9682.0	-9288796	-2120249	-5627179	8589.2	-2716.4	-4868.8	14.69	-0.25	0.20
9684.0	-9271588	-2125682	-5636916	8618.6	-2717.0	-4868.4	14.73	-0.27	0.14
9686.0	-9254321	-2131117	-5646653	8648.2	-2717.5	-4868.2	14.78	-0.29	0.10
9688.0	-9236995	-2136552	-5656389	8677.7	-2718.1	-4868.1	14.81	-0.31	0.05
9690.0	-9219610	-2141989	-5666125	8707.4	-2718.8	-4868.0	14.86	-0.34	-0.00
9692.0	-9202166	-2147427	-5675861	8737.1	-2719.4	-4868.0	14.89	-0.36	-0.04
9694.0	-9184662	-2152867	-5685598	8766.9	-2720.2	-4868.1	14.93	-0.39	-0.08
9696.0	-9167098	-2158308	-5695334	8796.8	-2721.0	-4868.3	14.97	-0.41	-0.12
	S-IVB 2ND GUIDANCE CUTOFF								
9697.150	-9156971	-2161437	-5700933	8814.0	-2721.5	-4868.5	14.99	-0.43	-0.14
9698.0	-9149477	-2163750	-5705069	8819.9	-2720.3	-4864.8	2.98	2.13	6.65
9700.0	-9131831	-2169187	-5714786	8825.8	-2716.0	-4851.5	2.95	2.14	6.65
9702.0	-9114174	-2174614	-5724475	8831.7	-2711.7	-4838.2	2.92	2.14	6.66
9704.0	-9096504	-2180033	-5734138	8837.5	-2707.4	-4824.8	2.89	2.15	6.67
9706.0	-9078823	-2185444	-5743774	8843.4	-2703.1	-4811.5	2.87	2.16	6.67
	TRANSLUNAR INJECTION (TLI)								
9707.150	-9068651	-2188551	-5749302	8846.6	-2700.7	-4803.8	2.85	2.16	6.66
9750.0	-8687123	-2302270	-5949020	8957.0	-2606.5	-4517.9	2.30	2.23	6.67
9800.0	-8236664	-2429781	-6166602	9056.3	-2493.5	-4196.0	1.66	2.29	6.59
9850.0	-7782034	-2551587	-6367723	9124.2	-2378.6	-3860.1	1.07	2.30	6.43
9900.0	-7324726	-2667645	-6552778	9163.6	-2263.8	-3544.0	0.52	2.29	6.21

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
9950.0	-6866109	-2777994	-6722329	9176.9	-2150.5	-3240.4	0.02	2.24	5.93
10000.0	-6407419	-2882737	-6877063	9167.1	-2039.8	-2951.6	-0.41	2.18	5.62
10050.0	-5949739	-2982035	-7017762	9137.0	-1932.8	-2679.1	-0.78	2.10	5.28
10100.0	-5494003	-3076088	-7145265	9089.8	-1830.1	-2423.9	-1.10	2.01	4.93
10150.0	-5041001	-3165124	-7260442	9028.1	-1732.2	-2186.1	-1.36	1.91	4.58
10200.0	-4591385	-3249392	-7364170	8954.8	-1639.4	-1965.9	-1.57	1.80	4.23
10250.0	-4145682	-3329152	-7457316	8872.0	-1551.9	-1762.7	-1.74	1.70	3.90
10300.0	-3704310	-3404666	-7540720	8781.8	-1469.6	-1576.1	-1.86	1.59	3.57
10350.0	-3267590	-3476194	-7615187	8686.2	-1392.4	-1405.1	-1.96	1.49	3.27
10400.0	-2835758	-3543991	-7681482	8586.5	-1320.3	-1249.0	-2.02	1.39	2.98
10450.0	-2408981	-3608303	-7740323	8484.2	-1253.0	-1106.8	-2.07	1.30	2.71
10500.0	-1987367	-3669365	-7792381	8380.2	-1190.2	-977.6	-2.09	1.21	2.46
10550.0	-1570972	-3727399	-7838281	8275.5	-1131.8	-860.4	-2.10	1.13	2.23
10600.0	-1159815	-3782617	-7878601	8170.8	-1077.5	-754.2	-2.09	1.05	2.02
10650.0	-753891	-3835216	-7913875	8066.7	-1027.0	-658.4	-2.07	0.97	1.82
10700.0	-353129	-3885381	-7944594	7963.6	-980.1	-571.9	-2.05	0.90	1.64
10750.0	42504	-3933284	-7971209	7862.0	-936.5	-494.1	-2.02	0.84	1.47
10800.0	433096	-3979087	-7994136	7762.0	-896.1	-424.2	-1.98	0.78	1.32
10850.0	818736	-4022939	-8013755	7664.0	-858.5	-361.7	-1.94	0.72	1.18
10900.0	1199525	-4064979	-8030414	7568.0	-823.6	-305.8	-1.90	0.67	1.06
10950.0	1575569	-4105336	-8044433	7474.2	-791.1	-256.0	-1.85	0.62	0.94
11000.0	1946979	-4144130	-8056105	7382.6	-761.0	-211.8	-1.81	0.58	0.83
11050.0	2313867	-4181472	-8065697	7293.3	-733.0	-172.7	-1.76	0.54	0.73
11100.0	2676349	-4217466	-8073457	7206.4	-707.1	-138.4	-1.72	0.50	0.64
11150.0	3034541	-4252208	-8079609	7121.7	-682.9	-108.4	-1.67	0.47	0.56
CSM SEPARATION									
11198.900	3380811	-4285060	-8084270	7041.1	-661.0	-82.9	-1.63	0.43	0.49

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									
8768.100	-5465.307	-105.283	-3638.169	4318.3	-117.0	-6488.0	7.70	0.14	5.12
8770.0	-5457.089	-105.505	-3650.487	4333.0	-116.7	-6478.2	7.68	0.14	5.14
8780.0	-5413.376	-106.665	-3715.011	4409.5	-115.3	-6426.4	7.62	0.14	5.23
8790.0	-5368.901	-107.812	-3779.012	4485.4	-113.9	-6373.6	7.56	0.14	5.32
8800.0	-5323.669	-108.944	-3842.480	4560.7	-112.5	-6320.0	7.50	0.14	5.41
8810.0	-5277.688	-110.063	-3905.408	4635.4	-111.1	-6265.4	7.43	0.14	5.50
8820.0	-5230.964	-111.167	-3967.786	4709.4	-109.7	-6210.0	7.37	0.14	5.59
8830.0	-5183.503	-112.256	-4029.605	4782.7	-108.3	-6153.7	7.30	0.14	5.67
8840.0	-5135.312	-113.332	-4090.857	4855.4	-106.8	-6096.5	7.23	0.15	5.76
8850.0	-5086.397	-114.392	-4151.533	4927.4	-105.3	-6038.5	7.16	0.15	5.84
8860.0	-5036.767	-115.438	-4211.625	4998.7	-103.8	-5979.7	7.09	0.15	5.93
8870.0	-4986.427	-116.469	-4271.124	5069.2	-102.3	-5920.0	7.02	0.15	6.01
8880.0	-4935.384	-117.484	-4330.021	5139.1	-100.8	-5859.4	6.95	0.15	6.10
8890.0	-4883.647	-118.484	-4388.309	5208.3	-99.3	-5798.1	6.88	0.15	6.18
8900.0	-4831.221	-119.469	-4445.980	5276.7	-97.7	-5735.9	6.80	0.15	6.26
8910.0	-4778.116	-120.438	-4503.024	5344.4	-96.1	-5672.9	6.73	0.16	6.34
8920.0	-4724.337	-121.392	-4559.435	5411.3	-94.6	-5609.1	6.65	0.16	6.42
8930.0	-4669.893	-122.329	-4615.203	5477.4	-93.0	-5544.5	6.58	0.16	6.50
8940.0	-4614.791	-123.251	-4670.323	5542.8	-91.4	-5479.2	6.50	0.16	6.57
8950.0	-4559.039	-124.157	-4724.784	5607.4	-89.7	-5413.0	6.42	0.16	6.65
8960.0	-4502.645	-125.046	-4778.581	5671.3	-88.1	-5346.2	6.34	0.16	6.73
8970.0	-4445.616	-125.919	-4831.705	5734.3	-86.5	-5278.5	6.26	0.16	6.80
8980.0	-4387.962	-126.775	-4884.148	5796.5	-84.8	-5210.1	6.18	0.17	6.88
8990.0	-4329.689	-127.615	-4935.905	5857.9	-83.1	-5141.0	6.10	0.17	6.95
9000.0	-4270.806	-128.438	-4986.966	5918.5	-81.5	-5071.2	6.01	0.17	7.02
9010.0	-4211.322	-129.244	-5037.326	5978.2	-79.8	-5000.6	5.93	0.17	7.09
9020.0	-4151.244	-130.033	-5086.976	6037.1	-78.1	-4929.4	5.84	0.17	7.16
9030.0	-4090.582	-130.805	-5135.911	6095.2	-76.3	-4857.4	5.76	0.17	7.23
9040.0	-4029.343	-131.560	-5184.123	6152.4	-74.6	-4784.8	5.67	0.17	7.30
9050.0	-3967.537	-132.297	-5231.605	6208.7	-72.9	-4711.5	5.59	0.17	7.37
9060.0	-3905.172	-133.017	-5278.351	6264.2	-71.1	-4637.5	5.50	0.17	7.43
9070.0	-3842.257	-133.719	-5324.354	6318.7	-69.4	-4562.9	5.41	0.18	7.50
9080.0	-3778.800	-134.404	-5369.607	6372.4	-67.6	-4487.6	5.32	0.18	7.56
9090.0	-3714.811	-135.071	-5414.104	6425.2	-65.8	-4411.7	5.23	0.18	7.62
9100.0	-3650.299	-135.720	-5457.840	6477.1	-64.0	-4335.2	5.14	0.18	7.68
9110.0	-3585.272	-136.351	-5500.807	6528.1	-62.2	-4258.1	5.05	0.18	7.74
9120.0	-3519.740	-136.964	-5543.000	6578.1	-60.4	-4180.4	4.96	0.18	7.80
9130.0	-3453.712	-137.558	-5584.412	6627.3	-58.6	-4102.1	4.87	0.18	7.86
9140.0	-3387.198	-138.135	-5625.039	6675.5	-56.7	-4023.2	4.77	0.18	7.92
9150.0	-3320.206	-138.693	-5664.874	6722.7	-54.9	-3943.7	4.67	0.18	7.97

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
9160.0	-3252.746	-139.233	-5703.911	6769.0	-53.1	-3863.7	4.58	0.18	8.02
9170.0	-3184.329	-139.754	-5742.147	6914.4	-51.2	-3783.2	4.48	0.18	8.08
9180.0	-3116.462	-140.257	-5779.573	6858.8	-49.3	-3702.1	4.39	0.19	8.14
9190.0	-3047.656	-140.741	-5816.187	6902.2	-47.5	-3620.5	4.30	0.19	8.19
9200.0	-2978.421	-141.206	-5851.981	6944.7	-45.6	-3538.4	4.19	0.19	8.24
9210.0	-2908.765	-141.653	-5886.952	6986.2	-43.7	-3455.8	4.10	0.19	8.29
9220.0	-2838.700	-142.080	-5921.095	7026.7	-41.8	-3372.6	4.00	0.19	8.34
9230.0	-2768.235	-142.489	-5954.404	7066.2	-39.9	-3289.1	3.90	0.19	8.38
9240.0	-2697.380	-142.878	-5986.875	7104.7	-38.0	-3205.0	3.80	0.19	8.43
9250.0	-2626.145	-143.249	-6018.503	7142.2	-36.1	-3120.5	3.70	0.19	8.47
9260.0	-2554.539	-143.600	-6049.284	7178.7	-34.2	-3035.6	3.60	0.19	8.52
9270.0	-2482.573	-143.932	-6079.213	7214.3	-32.2	-2950.2	3.51	0.19	8.56
9280.0	-2410.257	-144.245	-6108.288	7248.8	-30.3	-2864.5	3.40	0.19	8.60
9290.0	-2337.600	-144.538	-6136.502	7282.3	-28.4	-2778.3	3.29	0.19	8.64
9300.0	-2264.614	-144.812	-6163.853	7314.8	-26.4	-2691.8	3.19	0.19	8.68
9310.0	-2191.309	-145.067	-6190.337	7346.2	-24.5	-2604.9	3.08	0.19	8.72
9320.0	-2117.693	-145.302	-6215.949	7376.6	-22.5	-2517.6	2.98	0.19	8.75
9330.0	-2043.779	-145.518	-6240.687	7406.0	-20.6	-2429.9	2.88	0.19	8.79
9340.0	-1969.577	-145.714	-6264.546	7434.4	-18.6	-2341.9	2.79	0.20	8.80
	S-IVB RE-IGNITION (STDV OPEN)								
9346.300	-1922.685	-145.827	-6279.124	7451.8	-17.4	-2286.5	2.74	0.20	8.80
9348.0	-1910.012	-145.857	-6282.999	7459.2	-17.1	-2272.2	7.11	0.08	7.45
9350.0	-1895.078	-145.891	-6287.529	7474.5	-16.9	-2257.7	7.87	0.15	7.18
9352.0	-1880.113	-145.924	-6292.030	7490.4	-16.6	-2243.4	7.98	0.16	7.19
9354.0	-1865.116	-145.957	-6296.503	7506.3	-16.2	-2228.9	8.00	0.15	7.22
9356.0	-1850.088	-145.989	-6300.946	7522.3	-15.9	-2214.5	8.02	0.15	7.26
9358.0	-1835.027	-146.020	-6305.360	7538.5	-15.6	-2199.7	8.08	0.16	7.37
9360.0	-1819.934	-146.051	-6309.744	7554.7	-15.3	-2184.8	8.13	0.16	7.54
9362.0	-1804.808	-146.081	-6314.099	7571.0	-14.9	-2169.6	8.17	0.16	7.65
9364.0	-1789.650	-146.111	-6318.423	7587.4	-14.6	-2154.3	8.18	0.16	7.67
9366.0	-1774.458	-146.140	-6322.716	7603.7	-14.3	-2139.0	8.17	0.16	7.64
9368.0	-1759.235	-146.168	-6326.979	7620.1	-14.0	-2123.7	8.15	0.17	7.64
9370.0	-1743.978	-146.196	-6331.211	7636.4	-13.6	-2108.4	8.15	0.17	7.66
9372.0	-1728.689	-146.223	-6335.413	7652.7	-13.3	-2093.1	8.15	0.18	7.68
9374.0	-1713.368	-146.249	-6339.583	7669.0	-12.9	-2077.7	8.15	0.20	7.70
9376.0	-1698.013	-146.274	-6343.723	7685.3	-12.5	-2062.3	8.15	0.21	7.71
9378.0	-1682.626	-146.299	-6347.832	7701.6	-12.0	-2046.9	8.15	0.23	7.73
9380.0	-1667.207	-146.322	-6351.911	7717.9	-11.6	-2031.4	8.15	0.24	7.75
9382.0	-1651.755	-146.345	-6355.958	7734.2	-11.1	-2015.9	8.15	0.24	7.77
9384.0	-1636.270	-146.367	-6359.974	7750.5	-10.6	-2000.3	8.15	0.25	7.78
9386.0	-1620.753	-146.387	-6363.959	7766.8	-10.1	-1984.7	8.14	0.25	7.79

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
9388.0	-1605.203	-146.407	-6367.913	7783.1	-9.6	-1969.2	8.14	0.26	7.81
9390.0	-1589.620	-146.425	-6371.836	7799.4	-9.0	-1953.5	8.13	0.26	7.82
9392.0	-1574.005	-146.443	-6375.727	7815.7	-8.5	-1937.9	8.13	0.27	7.82
9394.0	-1558.358	-146.460	-6379.587	7831.9	-8.0	-1922.3	8.13	0.28	7.82
9396.0	-1542.678	-146.475	-6383.416	7848.2	-7.4	-1906.6	8.13	0.29	7.83
9398.0	-1526.965	-146.489	-6387.214	7864.5	-6.8	-1890.9	8.13	0.30	7.85
9400.0	-1511.220	-146.502	-6390.980	7880.7	-6.2	-1875.2	8.12	0.30	7.88
9402.0	-1495.442	-146.514	-6394.715	7896.9	-5.6	-1859.5	8.11	0.30	7.89
9404.0	-1479.632	-146.524	-6398.418	7913.2	-5.0	-1843.7	8.11	0.30	7.90
9406.0	-1463.789	-146.534	-6402.089	7929.4	-4.4	-1827.8	8.11	0.30	7.91
9408.0	-1447.914	-146.542	-6405.729	7945.6	-3.8	-1812.0	8.11	0.31	7.92
9410.0	-1432.007	-146.549	-6409.337	7961.9	-3.1	-1796.2	8.10	0.31	7.93
9412.0	-1416.067	-146.555	-6412.914	7978.1	-2.5	-1780.3	8.10	0.32	7.94
9414.0	-1400.095	-146.559	-6416.459	7994.3	-1.8	-1764.4	8.10	0.34	7.95
9416.0	-1384.090	-146.562	-6419.971	8010.5	-1.2	-1748.5	8.10	0.34	7.97
9418.0	-1368.053	-146.564	-6423.453	8026.7	-0.5	-1732.5	8.09	0.33	7.98
9420.0	-1351.983	-146.564	-6426.902	8042.9	0.2	-1716.6	8.09	0.34	7.99
9422.0	-1335.881	-146.563	-6430.319	8059.1	0.9	-1700.6	8.10	0.35	8.00
9424.0	-1319.747	-146.560	-6433.704	8075.3	1.6	-1684.6	8.09	0.36	8.01
9426.0	-1303.580	-146.557	-6437.057	8091.5	2.3	-1668.6	8.08	0.36	8.02
9428.0	-1287.381	-146.551	-6440.378	8107.6	3.0	-1652.5	8.08	0.37	8.03
9430.0	-1271.150	-146.544	-6443.667	8123.8	3.8	-1636.5	8.08	0.36	8.04
9432.0	-1254.886	-146.536	-6446.924	8140.0	4.5	-1620.4	8.08	0.37	8.04
9434.0	-1238.590	-146.527	-6450.149	8156.1	5.2	-1604.3	8.07	0.37	8.05
9436.0	-1222.261	-146.515	-6453.341	8172.3	6.0	-1588.2	8.06	0.38	8.06
9438.0	-1205.901	-146.503	-6456.502	8188.4	6.8	-1572.0	8.06	0.39	8.08
9440.0	-1189.508	-146.488	-6459.629	8204.5	7.5	-1555.9	8.06	0.38	8.09
9442.0	-1173.083	-146.472	-6462.725	8220.7	8.3	-1539.7	8.06	0.38	8.10
9444.0	-1156.625	-146.455	-6465.788	8236.8	9.1	-1523.5	8.06	0.38	8.11
9446.0	-1140.135	-146.436	-6468.819	8252.9	9.9	-1507.3	8.07	0.38	8.12
9448.0	-1123.613	-146.415	-6471.817	8269.1	10.7	-1491.0	8.07	0.39	8.13
9450.0	-1107.058	-146.393	-6474.783	8286.2	11.5	-1474.8	9.20	0.44	7.96
9452.0	-1090.468	-146.369	-6477.717	8304.6	12.4	-1458.9	9.24	0.45	7.97
9454.0	-1073.840	-146.343	-6480.618	8323.1	13.3	-1443.0	9.25	0.46	7.98
9456.0	-1057.175	-146.316	-6483.489	8341.5	14.1	-1427.0	9.26	0.47	7.99
9458.0	-1040.474	-146.287	-6486.327	8360.0	15.1	-1411.1	9.26	0.48	8.00
9460.0	-1023.735	-146.256	-6489.133	8378.6	16.0	-1395.1	9.26	0.48	8.01
9462.0	-1006.960	-146.223	-6491.907	8397.1	17.0	-1379.1	9.26	0.48	8.02
9464.0	-990.147	-146.188	-6494.649	8415.7	18.0	-1363.0	9.26	0.48	8.03
9466.0	-973.297	-146.151	-6497.359	8434.2	18.9	-1347.0	9.28	0.50	8.03
9468.0	-956.410	-146.112	-6500.037	8452.8	19.9	-1330.9	9.30	0.50	8.04
9470.0	-939.486	-146.071	-6502.683	8471.4	21.0	-1314.8	9.31	0.50	8.06
9472.0	-922.524	-146.028	-6505.296	8490.0	22.0	-1298.7	9.32	0.50	8.07

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
9474.0	-905.526	-145.983	-6507.877	8508.7	23.0	-1282.5	9.33	0.50	8.08
9476.0	-888.490	-145.936	-6510.426	8527.3	24.0	-1266.4	9.33	0.50	8.08
9478.0	-871.416	-145.887	-6512.943	8546.0	25.0	-1250.2	9.33	0.51	8.09
9480.0	-854.306	-145.836	-6515.427	8564.7	26.0	-1234.0	9.33	0.51	8.11
9482.0	-837.158	-145.783	-6517.879	8583.3	27.0	-1217.8	9.34	0.51	8.11
9484.0	-819.972	-145.728	-6520.298	8602.0	28.1	-1201.6	9.35	0.51	8.11
9486.0	-802.749	-145.671	-6522.685	8620.7	29.1	-1185.3	9.36	0.50	8.11
9488.0	-785.489	-145.612	-6525.039	8639.5	30.1	-1169.1	9.37	0.51	8.12
9490.0	-768.192	-145.551	-6527.361	8658.2	31.1	-1152.9	9.37	0.53	8.14
9492.0	-750.856	-145.487	-6529.651	8677.0	32.2	-1136.6	9.38	0.54	8.14
9494.0	-733.484	-145.422	-6531.908	8695.8	33.3	-1120.3	9.39	0.55	8.15
9496.0	-716.073	-145.354	-6534.132	8714.6	34.4	-1104.0	9.41	0.55	8.16
9498.0	-698.625	-145.284	-6536.324	8733.4	35.5	-1087.7	9.42	0.56	8.16
9500.0	-681.140	-145.212	-6538.483	8752.3	36.7	-1071.3	9.42	0.56	8.17
9502.0	-663.616	-145.138	-6540.609	8771.1	37.8	-1055.0	9.43	0.56	8.18
9504.0	-646.055	-145.061	-6542.702	8790.0	38.9	-1038.6	9.44	0.57	8.19
9506.0	-628.456	-144.982	-6544.763	8808.9	40.1	-1022.2	9.46	0.58	8.20
9508.0	-610.820	-144.901	-6546.791	8827.8	41.2	-1005.8	9.47	0.59	8.21
9510.0	-593.145	-144.817	-6548.787	8846.8	42.4	-989.4	9.48	0.59	8.22
9512.0	-575.433	-144.731	-6550.749	8865.7	43.6	-972.9	9.49	0.60	8.22
9514.0	-557.682	-144.642	-6552.678	8884.7	44.8	-956.5	9.50	0.61	8.23
9516.0	-539.894	-144.552	-6554.575	8903.8	46.0	-940.0	9.51	0.61	8.24
9518.0	-522.067	-144.458	-6556.438	8922.8	47.3	-923.5	9.53	0.62	8.25
9520.0	-504.202	-144.362	-6558.269	8941.9	48.5	-907.0	9.54	0.62	8.26
9522.0	-486.299	-144.264	-6560.067	8961.0	49.8	-890.5	9.55	0.62	8.26
9524.0	-468.358	-144.163	-6561.831	8980.1	51.0	-874.0	9.56	0.63	8.26
9526.0	-450.379	-144.060	-6563.562	8999.2	52.3	-857.5	9.57	0.64	8.27
9528.0	-432.362	-143.954	-6565.261	9018.4	53.6	-840.9	9.59	0.65	8.28
9530.0	-414.306	-143.846	-6566.926	9037.6	54.9	-824.3	9.61	0.65	8.30
9532.0	-396.211	-143.735	-6568.558	9056.8	56.2	-807.7	9.63	0.66	8.31
9534.0	-378.078	-143.621	-6570.157	9076.1	57.6	-791.1	9.64	0.67	8.31
9536.0	-359.907	-143.504	-6571.723	9095.4	58.9	-774.5	9.64	0.67	8.31
9538.0	-341.697	-143.385	-6573.255	9114.7	60.2	-757.9	9.65	0.67	8.32
9540.0	-323.448	-143.263	-6574.754	9134.1	61.6	-741.2	9.69	0.68	8.33
9542.0	-305.160	-143.139	-6576.220	9153.5	63.0	-724.6	9.71	0.70	8.33
9544.0	-286.834	-143.011	-6577.652	9172.9	64.4	-707.9	9.71	0.70	8.34
9546.0	-268.469	-142.881	-6579.051	9192.3	65.8	-691.2	9.71	0.70	8.35
9548.0	-250.065	-142.748	-6580.417	9211.8	67.2	-674.5	9.73	0.71	8.36
9550.0	-231.622	-142.612	-6581.749	9231.2	68.6	-657.8	9.75	0.72	8.37
9552.0	-213.140	-142.474	-6583.048	9250.8	70.1	-641.0	9.78	0.73	8.37
9554.0	-194.619	-142.332	-6584.313	9270.4	71.5	-624.3	9.79	0.73	8.38
9556.0	-176.058	-142.188	-6585.545	9290.0	73.0	-607.5	9.81	0.74	8.39
9558.0	-157.459	-142.040	-6586.743	9309.6	74.5	-590.7	9.83	0.75	8.40

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
9560.0	-136.823	-141.880	-6587.938	9329.3	74.0	-573.9	9.85	0.76	8.41
9562.0	-129.141	-141.736	-6589.039	9349.2	77.5	-557.1	9.87	0.76	8.41
9564.0	-121.424	-141.579	-6590.137	9368.8	79.1	-540.3	9.89	0.76	8.42
9566.0	-82.666	-141.420	-6591.233	9388.6	80.6	-523.4	9.92	0.77	8.43
9568.0	-63.869	-141.257	-6592.330	9408.5	82.2	-506.6	9.93	0.78	8.44
9570.0	-45.032	-141.091	-6593.227	9428.4	83.7	-489.7	9.95	0.79	8.45
9572.0	-26.156	-140.922	-6594.169	9448.3	85.3	-472.8	9.97	0.80	8.46
9574.0	-7.239	-140.750	-6595.118	9468.3	86.9	-455.8	9.99	0.81	8.47
9576.0	11.718	-140.574	-6596.012	9488.3	88.6	-438.9	10.01	0.82	8.48
9578.0	30.714	-140.396	-6596.873	9508.3	90.2	-421.9	10.03	0.82	8.49
9580.0	49.751	-140.213	-6597.733	9528.4	91.9	-404.9	10.06	0.82	8.50
9582.0	68.828	-140.028	-6598.493	9548.6	93.5	-388.0	10.08	0.83	8.50
9584.0	87.945	-139.839	-6599.252	9568.7	95.2	-370.9	10.10	0.84	8.51
9586.0	107.103	-139.647	-6599.977	9589.0	96.9	-353.9	10.13	0.85	8.52
9588.0	126.301	-139.452	-6600.667	9609.3	98.6	-336.9	10.16	0.85	8.53
9590.0	145.540	-139.253	-6601.324	9629.6	100.3	-319.8	10.17	0.86	8.53
9592.0	164.820	-139.051	-6601.947	9650.0	102.0	-302.7	10.20	0.87	8.54
9594.0	184.140	-138.845	-6602.535	9670.4	103.8	-285.6	10.22	0.88	8.55
9596.0	203.501	-138.636	-6603.089	9690.9	105.6	-268.5	10.25	0.89	8.57
9598.0	222.904	-138.423	-6603.609	9711.4	107.4	-251.4	10.28	0.90	8.58
9600.0	242.347	-138.206	-6604.095	9732.0	109.2	-234.2	10.30	0.91	8.59
9602.0	261.832	-137.986	-6604.546	9752.6	111.0	-217.0	10.33	0.91	8.60
9604.0	281.358	-137.762	-6604.963	9773.3	112.8	-199.8	10.36	0.91	8.61
9606.0	300.925	-137.535	-6605.345	9794.1	114.7	-182.6	10.39	0.93	8.63
9608.0	320.534	-137.303	-6605.693	9814.9	116.5	-165.3	10.42	0.94	8.64
9610.0	340.185	-137.069	-6606.006	9835.8	118.4	-148.0	10.44	0.95	8.65
9612.0	359.877	-136.830	-6606.285	9856.7	120.3	-130.7	10.47	0.95	8.66
9614.0	379.611	-136.587	-6606.529	9877.7	122.2	-113.4	10.51	0.96	8.67
9616.0	399.388	-136.341	-6606.739	9898.7	124.2	-96.0	10.53	0.97	8.69
9618.0	419.206	-136.091	-6606.913	9919.8	126.1	-78.6	10.56	0.97	8.71
9620.0	439.067	-135.836	-6607.053	9941.0	128.1	-61.2	10.58	0.98	8.72
9622.0	458.970	-135.578	-6607.158	9962.2	130.1	-43.8	10.61	0.99	8.73
9624.0	478.916	-135.316	-6607.228	9983.4	132.1	-26.3	10.64	1.00	8.75
9626.0	498.904	-135.050	-6607.263	10004.7	134.1	-8.8	10.68	1.01	8.77
9628.0	518.935	-134.780	-6607.263	10026.1	136.1	8.8	10.71	1.01	8.79
9630.0	539.008	-134.506	-6607.228	10047.6	138.1	26.4	10.75	1.02	8.81
9632.0	559.125	-134.227	-6607.157	10069.1	140.2	44.0	10.79	1.03	8.83
9634.0	579.285	-133.945	-6607.052	10090.8	142.3	61.7	10.82	1.05	8.85
9636.0	599.488	-133.658	-6606.911	10112.4	144.4	79.4	10.86	1.06	8.87
9638.0	619.735	-133.367	-6606.734	10134.2	146.5	97.2	10.89	1.07	8.89
9640.0	640.025	-133.072	-6606.522	10156.0	148.6	115.0	10.94	1.07	8.90
9642.0	660.359	-132.773	-6606.274	10178.0	150.8	132.8	10.97	1.08	8.91
9644.0	680.737	-132.469	-6605.991	10200.0	153.0	150.6	11.01	1.09	8.93

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
9646.0	701.159	-132.161	-6605.672	10222.0	155.2	168.5	11.05	1.10	8.95
9648.0	721.625	-131.848	-6605.317	10244.2	157.4	186.4	11.10	1.10	8.98
9650.0	742.136	-131.531	-6604.926	10266.4	159.6	204.4	11.14	1.11	9.02
9652.0	762.691	-131.210	-6604.499	10288.8	161.8	222.4	11.18	1.12	9.05
9654.0	783.291	-130.884	-6604.036	10311.2	164.1	240.6	11.22	1.12	9.08
9656.0	803.936	-130.554	-6603.537	10333.7	166.3	258.7	11.27	1.13	9.10
9658.0	824.626	-130.219	-6603.001	10356.3	168.6	277.0	11.31	1.15	9.12
9660.0	845.361	-129.879	-6602.429	10378.9	170.9	295.3	11.35	1.15	9.16
9662.0	866.142	-129.535	-6601.820	10401.7	173.2	313.6	11.40	1.16	9.19
9664.0	886.968	-129.187	-6601.175	10424.5	175.5	332.0	11.45	1.17	9.23
9666.0	907.840	-128.833	-6600.492	10447.5	177.9	350.5	11.49	1.18	9.25
9668.0	928.758	-128.475	-6599.773	10470.5	180.3	369.0	11.54	1.20	9.28
9670.0	949.722	-128.112	-6599.016	10493.6	182.7	387.7	11.58	1.21	9.41
9672.0	970.732	-127.744	-6598.222	10516.8	185.1	406.8	11.62	1.22	9.62
9674.0	991.789	-127.372	-6597.389	10540.1	187.6	426.1	11.66	1.24	9.79
9676.0	1012.893	-126.994	-6596.517	10563.5	190.1	445.8	11.72	1.25	9.84
9678.0	1034.044	-126.611	-6595.606	10587.0	192.6	465.4	11.77	1.25	9.81
9680.0	1055.241	-126.223	-6594.655	10610.6	195.1	485.0	11.83	1.24	9.80
9682.0	1076.486	-125.831	-6593.666	10634.3	197.6	504.6	11.88	1.24	9.80
9684.0	1097.779	-125.433	-6592.637	10658.2	200.1	524.2	11.94	1.25	9.78
9686.0	1119.119	-125.030	-6591.569	10682.1	202.6	543.7	12.00	1.26	9.77
9688.0	1140.507	-124.623	-6590.462	10706.2	205.1	563.2	12.06	1.25	9.75
9690.0	1161.944	-124.210	-6589.316	10730.4	207.6	582.7	12.13	1.25	9.73
9692.0	1183.429	-123.792	-6588.131	10754.7	210.1	602.2	12.18	1.25	9.72
9694.0	1204.963	-123.370	-6586.907	10779.1	212.6	621.6	12.23	1.24	9.71
9696.0	1226.545	-122.942	-6585.644	10803.6	215.1	641.0	12.28	1.23	9.70
S-IVB 2ND GUIDANCE CUTOFF									
9697.150	1238.978	-122.694	-6584.901	10817.7	216.5	652.1	12.32	1.23	9.69
9698.0	1248.173	-122.510	-6584.343	10820.2	217.0	659.8	-1.64	0.16	8.73
9700.0	1269.812	-122.075	-6583.006	10816.9	217.3	677.2	-1.67	0.16	8.72
9702.0	1291.441	-121.640	-6581.634	10813.5	217.7	694.6	-1.70	0.15	8.71
9704.0	1313.065	-121.205	-6580.227	10810.1	218.0	712.0	-1.74	0.15	8.69
9706.0	1334.682	-120.768	-6578.786	10806.6	218.3	729.5	-1.76	0.15	8.68
TRANSLUNAR INJECTION (TLI)									
9707.150	1347.108	-120.517	-6577.940	10804.6	218.4	739.5	-1.77	0.15	8.67
9750.0	1808.294	-111.020	-6538.386	10717.1	224.8	1104.5	-2.31	0.14	8.36
9800.0	2341.029	-99.616	-6472.889	10587.6	231.2	1511.7	-2.87	0.12	7.92
9850.0	2866.628	-87.911	-6387.603	10432.4	236.8	1895.6	-3.34	0.10	7.43
9900.0	3383.914	-75.952	-6283.757	10255.9	241.4	2253.8	-3.72	0.08	6.90

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
9850.0	3891.931	-63.784	-6162.670	10062.4	245.1	2585.1	-4.01	0.07	6.35
10000.0	4389.937	-51.451	-5925.706	9856.1	248.1	2888.9	-4.23	0.05	5.80
10050.0	4877.387	-38.990	-5874.233	9640.8	250.2	3165.5	-4.38	0.04	5.27
10100.0	5353.918	-26.439	-5709.592	9419.8	251.7	3415.8	-4.46	0.02	4.75
10150.0	5819.320	-13.829	-5537.069	9196.1	252.6	3641.0	-4.49	0.01	4.26
10200.0	6273.519	-1.197	-5345.983	8972.0	253.0	3842.6	-4.47	0.00	3.81
10250.0	6716.549	11.461	-5149.169	8749.6	252.9	4022.4	-4.42	-0.01	3.39
10300.0	7148.534	24.096	-4943.979	8530.4	252.4	4182.0	-4.35	-0.01	3.00
10350.0	7569.664	36.699	-4731.275	8315.6	251.6	4322.2	-4.25	-0.02	2.65
10400.0	7980.184	49.255	-4511.934	8106.2	250.6	4447.8	-4.13	-0.02	2.34
10450.0	8380.378	61.752	-4286.750	7902.6	249.3	4557.2	-4.01	-0.03	2.05
10500.0	8770.555	74.180	-4056.437	7705.5	247.8	4653.1	-3.88	-0.03	1.79
10550.0	9151.042	86.529	-3821.639	7515.1	246.2	4736.9	-3.74	-0.03	1.56
10600.0	9522.175	98.794	-3582.932	7331.4	244.4	4809.7	-3.61	-0.04	1.36
10650.0	9884.295	110.970	-3340.830	7154.5	242.5	4872.8	-3.47	-0.04	1.17
10700.0	10237.740	123.051	-3095.794	6984.4	240.7	4927.2	-3.34	-0.04	1.01
10750.0	10582.844	135.035	-2848.234	6820.9	238.7	4973.9	-3.21	-0.04	0.86
10800.0	10919.935	146.920	-2598.516	6663.8	236.7	5013.7	-3.08	-0.04	0.73
10850.0	11249.330	158.705	-2346.965	6513.0	234.7	5047.4	-2.95	-0.04	0.62
10900.0	11571.338	170.387	-2093.871	6368.3	232.6	5075.5	-2.84	-0.04	0.51
10950.0	11886.253	181.968	-1839.493	6229.3	230.6	5098.8	-2.72	-0.04	0.42
11000.0	12194.361	193.447	-1584.060	6095.9	228.6	5117.8	-2.61	-0.04	0.34
11050.0	12495.933	204.824	-1327.777	5967.9	226.5	5132.9	-2.51	-0.04	0.27
11100.0	12791.231	216.100	-1070.827	5844.9	224.5	5144.6	-2.41	-0.04	0.20
11150.0	13080.502	227.276	-813.372	5726.8	222.5	5153.2	-2.31	-0.04	0.14
CSM SEPARATION									
11198.900	13357.807	238.111	-561.230	5615.7	220.6	5158.9	-2.22	-0.04	0.09

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-FL 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										
8768.100	6566.349	101.7241	-32.3511	86.23	0.02	7390.9	86.42	0.02	7794.6	194327
8770.0	6566.354	101.8688	-32.3430	86.14	0.02	7390.9	86.34	0.02	7794.6	194330
8780.0	6566.378	102.6300	-32.2970	85.69	0.02	7390.9	85.91	0.02	7794.6	194338
8790.0	6566.403	103.3903	-32.2460	85.24	0.02	7390.9	85.48	0.02	7794.5	194346
8800.0	6566.428	104.1497	-32.1899	84.78	0.02	7390.9	85.06	0.02	7794.5	194352
8810.0	6566.454	104.9081	-32.1288	84.33	0.02	7390.9	84.63	0.02	7794.5	194358
8820.0	6566.481	105.6653	-32.0626	83.89	0.02	7390.9	84.20	0.02	7794.5	194362
8830.0	6566.508	106.4213	-31.9914	83.44	0.02	7390.9	83.78	0.02	7794.5	194365
8840.0	6566.535	107.1760	-31.9152	82.99	0.02	7390.9	83.36	0.02	7794.5	194367
8850.0	6566.563	107.9294	-31.8341	82.55	0.02	7390.9	82.94	0.02	7794.5	194368
8860.0	6566.592	108.6813	-31.7480	82.11	0.02	7390.9	82.52	0.02	7794.5	194368
8870.0	6566.621	109.4317	-31.6569	81.67	0.02	7390.9	82.10	0.02	7794.5	194366
8880.0	6566.651	110.1805	-31.5610	81.23	0.02	7391.0	81.68	0.02	7794.4	194364
8890.0	6566.681	110.9276	-31.4602	80.79	0.02	7391.0	81.27	0.02	7794.4	194361
8900.0	6566.712	111.6730	-31.3546	80.36	0.02	7391.0	80.86	0.02	7794.4	194357
8910.0	6566.744	112.4166	-31.2442	79.92	0.02	7391.0	80.45	0.02	7794.4	194351
8920.0	6566.775	113.1583	-31.1290	79.50	0.02	7391.0	80.04	0.02	7794.4	194345
8930.0	6566.808	113.8980	-31.0090	79.07	0.03	7391.0	79.64	0.02	7794.4	194338
8940.0	6566.841	114.6357	-30.8844	78.64	0.03	7391.1	79.24	0.02	7794.4	194330
8950.0	6566.874	115.3714	-30.7551	78.22	0.03	7391.1	78.84	0.02	7794.4	194320
8960.0	6566.908	116.1049	-30.6212	77.80	0.03	7391.1	78.44	0.03	7794.4	194310
8970.0	6566.942	116.8363	-30.4826	77.39	0.03	7391.1	78.05	0.03	7794.4	194299
8980.0	6566.977	117.5654	-30.3395	76.97	0.03	7391.2	77.66	0.03	7794.4	194287
8990.0	6567.012	118.2922	-30.1919	76.56	0.03	7391.2	77.27	0.03	7794.4	194274
9000.0	6567.047	119.0167	-30.0398	76.15	0.03	7391.2	76.88	0.03	7794.3	194260
9010.0	6567.083	119.7387	-29.8833	75.75	0.03	7391.2	76.50	0.03	7794.3	194245
9020.0	6567.120	120.4584	-29.7224	75.35	0.03	7391.3	76.12	0.03	7794.3	194230
9030.0	6567.157	121.1755	-29.5571	74.95	0.03	7391.3	75.75	0.03	7794.4	194214
9040.0	6567.195	121.8902	-29.3875	74.56	0.03	7391.4	75.37	0.03	7794.4	194197
9050.0	6567.233	122.6023	-29.2137	74.16	0.03	7391.4	75.00	0.03	7794.3	194180
9060.0	6567.271	123.3118	-29.0356	73.78	0.03	7391.4	74.64	0.03	7794.3	194161
9070.0	6567.310	124.0186	-28.8534	73.39	0.03	7391.4	74.27	0.03	7794.3	194142
9080.0	6567.349	124.7229	-28.6670	73.01	0.03	7391.5	73.91	0.03	7794.3	194123
9090.0	6567.389	125.4244	-28.4765	72.63	0.03	7391.5	73.56	0.03	7794.3	194102
9100.0	6567.429	126.1232	-28.2821	72.26	0.03	7391.6	73.20	0.03	7794.3	194081
9110.0	6567.468	126.8192	-28.0836	71.89	0.03	7391.6	72.86	0.03	7794.3	194060
9120.0	6567.509	127.5126	-27.8812	71.52	0.03	7391.6	72.51	0.03	7794.3	194037
9130.0	6567.550	128.2031	-27.6749	71.16	0.03	7391.7	72.17	0.03	7794.3	194015
9140.0	6567.591	128.8909	-27.4647	70.80	0.03	7391.7	71.83	0.03	7794.3	193991
9150.0	6567.633	129.5758	-27.2508	70.45	0.03	7391.8	71.49	0.03	7794.3	193968

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
9160.0	6567.675	130.2580	-27.0331	70.10	0.03	7391.8	71.16	0.03	7794.3	193943
9170.0	6567.717	130.9372	-26.8117	69.75	0.03	7391.9	70.84	0.03	7794.3	193919
9180.0	6567.760	131.6137	-26.5867	69.40	0.03	7391.9	70.51	0.03	7794.3	193894
9190.0	6567.804	132.2873	-26.3581	69.07	0.03	7392.0	70.19	0.03	7794.3	193870
9200.0	6567.847	132.9580	-26.1259	68.73	0.03	7392.0	69.88	0.03	7794.3	193844
9210.0	6567.891	133.6259	-25.8902	68.40	0.03	7392.1	69.56	0.03	7794.3	193818
9220.0	6567.935	134.2909	-25.6511	68.07	0.03	7392.1	69.26	0.03	7794.3	193792
9230.0	6567.980	134.9531	-25.4086	67.75	0.03	7392.1	68.95	0.03	7794.3	193766
9240.0	6568.024	135.6124	-25.1628	67.43	0.03	7392.2	68.65	0.03	7794.2	193740
9250.0	6568.069	136.2689	-24.9136	67.11	0.03	7392.3	68.36	0.03	7794.3	193713
9260.0	6568.114	136.9225	-24.6612	66.80	0.04	7392.3	68.06	0.03	7794.3	193686
9270.0	6568.160	137.5733	-24.4056	66.50	0.04	7392.4	67.78	0.03	7794.3	193659
9280.0	6568.205	138.2213	-24.1469	66.19	0.04	7392.4	67.49	0.03	7794.3	193632
9290.0	6568.251	138.8665	-23.8851	65.90	0.04	7392.5	67.21	0.03	7794.3	193606
9300.0	6568.298	139.5088	-23.6202	65.60	0.04	7392.6	66.93	0.03	7794.4	193579
9310.0	6568.344	140.1484	-23.3523	65.31	0.04	7392.7	66.66	0.03	7794.4	193552
9320.0	6568.391	140.7853	-23.0815	65.03	0.04	7392.8	66.39	0.03	7794.4	193525
9330.0	6568.438	141.4193	-22.8078	64.75	0.04	7392.9	66.13	0.03	7794.5	193499
9340.0	6568.485	142.0507	-22.5313	64.47	0.04	7393.0	65.87	0.04	7794.5	193472
	S-IVB RE-IGNITION (STDV OPEN)									
9346.300	6568.515	142.4470	-22.3556	64.30	0.04	7393.2	65.71	0.04	7794.7	193456
9348.0	6568.523	142.5538	-22.3080	64.25	0.04	7396.2	65.66	0.04	7797.7	193451
9350.0	6568.533	142.6795	-22.2519	64.20	0.04	7406.5	65.61	0.04	7808.0	193447
9352.0	6568.544	142.8052	-22.1955	64.14	0.04	7417.6	65.56	0.04	7819.1	193442
9354.0	6568.554	142.9310	-22.1390	64.09	0.04	7428.8	65.51	0.04	7830.3	193438
9356.0	6568.565	143.0569	-22.0823	64.04	0.05	7440.0	65.46	0.04	7841.5	193434
9358.0	6568.577	143.1829	-22.0254	63.99	0.05	7451.4	65.41	0.04	7852.9	193431
9360.0	6568.589	143.3089	-21.9683	63.94	0.05	7462.8	65.36	0.04	7864.3	193429
9362.0	6568.601	143.4351	-21.9110	63.88	0.04	7474.3	65.31	0.04	7875.8	193425
9364.0	6568.612	143.5613	-21.8535	63.83	0.04	7485.9	65.26	0.04	7887.3	193421
9366.0	6568.622	143.6877	-21.7958	63.78	0.04	7497.4	65.21	0.04	7898.9	193417
9368.0	6568.633	143.8141	-21.7379	63.73	0.04	7509.1	65.15	0.04	7910.5	193412
9370.0	6568.643	143.9406	-21.6798	63.68	0.04	7520.7	65.10	0.04	7922.1	193407
9372.0	6568.653	144.0672	-21.6215	63.63	0.04	7532.4	65.05	0.04	7933.8	193403
9374.0	6568.663	144.1939	-21.5631	63.57	0.04	7544.0	65.00	0.04	7945.4	193398
9376.0	6568.673	144.3206	-21.5044	63.52	0.04	7555.8	64.95	0.04	7957.2	193393
9378.0	6568.684	144.4475	-21.4455	63.47	0.04	7567.6	64.91	0.04	7968.9	193389
9380.0	6568.695	144.5744	-21.3865	63.42	0.04	7579.4	64.86	0.04	7980.8	193385
9382.0	6568.707	144.7015	-21.3272	63.37	0.05	7591.2	64.81	0.04	7992.6	193382
9384.0	6568.719	144.8286	-21.2678	63.32	0.05	7603.1	64.76	0.05	8004.5	193379
9386.0	6568.732	144.9558	-21.2081	63.28	0.05	7615.0	64.71	0.05	8016.4	193377

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
9388.0	6568.746	145.0832	-21.1483	63.23	0.05	7627.0	64.66	0.05	8028.3	193376
9390.0	6568.761	145.2106	-21.0883	63.18	0.06	7639.0	64.61	0.06	8040.3	193376
9392.0	6568.777	145.3381	-21.0280	63.13	0.06	7651.0	64.57	0.06	8052.3	193376
9394.0	6568.795	145.4657	-20.9676	63.08	0.07	7663.0	64.52	0.06	8064.4	193379
9396.0	6568.814	145.5934	-20.9070	63.03	0.07	7675.1	64.47	0.07	8076.5	193382
9398.0	6568.834	145.7212	-20.8462	62.98	0.08	7687.2	64.42	0.08	8088.6	193388
9400.0	6568.856	145.8490	-20.7852	62.94	0.09	7699.4	64.38	0.08	8100.7	193395
9402.0	6568.880	145.9770	-20.7239	62.89	0.09	7711.6	64.33	0.09	8112.9	193404
9404.0	6568.906	146.1051	-20.6625	62.84	0.10	7723.8	64.28	0.10	8125.1	193414
9406.0	6568.934	146.2333	-20.6009	62.79	0.11	7736.0	64.24	0.10	8137.4	193427
9408.0	6568.965	146.3615	-20.5391	62.75	0.12	7748.3	64.19	0.11	8149.6	193442
9410.0	6568.997	146.4899	-20.4771	62.70	0.13	7760.6	64.14	0.12	8161.9	193460
9412.0	6569.033	146.6184	-20.4150	62.65	0.13	7772.9	64.10	0.13	8174.3	193480
9414.0	6569.070	146.7469	-20.3526	62.60	0.14	7785.3	64.05	0.14	8186.7	193502
9416.0	6569.111	146.8756	-20.2900	62.56	0.15	7797.7	64.00	0.15	8199.1	193528
9418.0	6569.155	147.0043	-20.2272	62.51	0.17	7810.2	63.96	0.16	8211.5	193556
9420.0	6569.201	147.1332	-20.1642	62.47	0.18	7822.7	63.91	0.17	8224.0	193587
9422.0	6569.251	147.2621	-20.1010	62.42	0.19	7835.2	63.87	0.18	8236.6	193622
9424.0	6569.304	147.3912	-20.0376	62.37	0.20	7847.7	63.82	0.19	8249.1	193660
9426.0	6569.361	147.5203	-19.9741	62.33	0.21	7860.3	63.78	0.20	8261.7	193701
9428.0	6569.422	147.6496	-19.9103	62.28	0.23	7872.9	63.73	0.22	8274.3	193746
9430.0	6569.486	147.7789	-19.8463	62.24	0.24	7885.6	63.69	0.23	8287.0	193795
9432.0	6569.554	147.9084	-19.7822	62.19	0.26	7898.3	63.64	0.24	8299.7	193848
9434.0	6569.627	148.0379	-19.7178	62.15	0.27	7911.0	63.60	0.26	8312.4	193905
9436.0	6569.703	148.1676	-19.6532	62.10	0.29	7923.8	63.56	0.27	8325.2	193967
9438.0	6569.785	148.2973	-19.5884	62.06	0.30	7936.5	63.51	0.29	8337.9	194033
9440.0	6569.871	148.4272	-19.5235	62.01	0.32	7949.3	63.47	0.30	8350.7	194103
9442.0	6569.961	148.5571	-19.4583	61.97	0.34	7962.2	63.42	0.32	8363.6	194179
9444.0	6570.057	148.6872	-19.3930	61.92	0.35	7975.1	63.38	0.34	8376.5	194259
9446.0	6570.158	148.8173	-19.3274	61.88	0.37	7988.0	63.34	0.35	8389.5	194344
9448.0	6570.263	148.9476	-19.2616	61.84	0.39	8001.0	63.29	0.37	8402.4	194435
9450.0	6570.375	149.0780	-19.1957	61.79	0.41	8015.0	63.25	0.39	8416.5	194531
9452.0	6570.491	149.2085	-19.1295	61.75	0.43	8030.3	63.21	0.41	8431.8	194632
9454.0	6570.614	149.3391	-19.0631	61.71	0.45	8045.8	63.16	0.43	8447.2	194739
9456.0	6570.742	149.4699	-18.9965	61.67	0.47	8061.2	63.12	0.44	8462.7	194852
9458.0	6570.877	149.6009	-18.9297	61.62	0.49	8076.8	63.08	0.46	8478.3	194971
9460.0	6571.017	149.7320	-18.8626	61.58	0.51	8092.4	63.04	0.49	8493.9	195096
9462.0	6571.165	149.8632	-18.7953	61.54	0.53	8108.1	63.00	0.51	8509.6	195228
9464.0	6571.319	149.9946	-18.7279	61.50	0.55	8123.8	62.96	0.53	8525.3	195367
9466.0	6571.479	150.1261	-18.6602	61.46	0.58	8139.5	62.91	0.55	8541.1	195512
9468.0	6571.647	150.2578	-18.5922	61.42	0.60	8155.3	62.87	0.57	8556.9	195665
9470.0	6571.823	150.3896	-18.5241	61.38	0.63	8171.2	62.83	0.60	8572.8	195825
9472.0	6572.005	150.5215	-18.4557	61.34	0.65	8187.2	62.79	0.62	8588.8	195992

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
9474.0	6572.196	150.6537	-18.3872	61.30	0.69	8203.2	62.75	0.65	8604.8	196167
9476.0	6572.394	150.7959	-18.3184	61.26	0.72	8219.2	62.71	0.67	8620.9	196350
9478.0	6572.600	150.9183	-18.2493	61.22	0.73	8235.3	62.67	0.70	8637.0	196540
9480.0	6572.815	151.0509	-18.1801	61.18	0.76	8251.4	62.63	0.72	8653.2	196740
9482.0	6573.038	151.1836	-18.1106	61.14	0.79	8267.6	62.59	0.75	8669.3	196947
9484.0	6573.270	151.3165	-18.0410	61.10	0.82	8283.8	62.55	0.78	8685.6	197164
9486.0	6573.511	151.4495	-17.9710	61.06	0.85	8300.1	62.51	0.81	8701.9	197390
9488.0	6573.761	151.5827	-17.9009	61.02	0.88	8316.5	62.47	0.84	8718.3	197624
9490.0	6574.021	151.7160	-17.8304	60.98	0.91	8332.9	62.43	0.87	8734.7	197869
9492.0	6574.290	151.8495	-17.7600	60.94	0.94	8349.3	62.39	0.90	8751.2	198123
9494.0	6574.569	151.9831	-17.6892	60.90	0.97	8365.8	62.35	0.93	8767.7	198387
9496.0	6574.859	152.1169	-17.6182	60.86	1.01	8382.4	62.31	0.96	8784.3	198661
9498.0	6575.159	152.2509	-17.5469	60.82	1.04	8399.0	62.27	0.99	8800.9	198945
9500.0	6575.469	152.3850	-17.4755	60.78	1.07	8415.7	62.23	1.03	8817.7	199240
9502.0	6575.790	152.5192	-17.4039	60.74	1.11	8432.5	62.20	1.06	8834.4	199546
9504.0	6576.122	152.6536	-17.3319	60.71	1.15	8449.2	62.16	1.09	8851.2	199863
9506.0	6576.466	152.7882	-17.2597	60.67	1.18	8466.1	62.12	1.13	8868.1	200191
9508.0	6576.821	152.9229	-17.1874	60.63	1.22	8483.0	62.08	1.16	8885.0	200531
9510.0	6577.188	153.0578	-17.1148	60.59	1.26	8499.9	62.04	1.20	8902.0	200882
9512.0	6577.566	153.1928	-17.0420	60.56	1.29	8517.0	62.01	1.24	8919.1	201245
9514.0	6577.957	153.3280	-16.9690	60.52	1.33	8534.0	61.97	1.27	8936.2	201621
9516.0	6578.361	153.4634	-16.8957	60.48	1.37	8551.2	61.93	1.31	8953.4	202009
9518.0	6578.777	153.5989	-16.8222	60.45	1.41	8568.4	61.89	1.35	8970.6	202410
9520.0	6579.206	153.7345	-16.7485	60.41	1.45	8585.7	61.86	1.39	8987.9	202824
9522.0	6579.648	153.8704	-16.6746	60.37	1.50	8603.0	61.82	1.43	9005.2	203251
9524.0	6580.104	154.0064	-16.6004	60.34	1.54	8620.3	61.78	1.47	9022.7	203691
9526.0	6580.573	154.1425	-16.5261	60.30	1.58	8637.8	61.75	1.51	9040.1	204146
9528.0	6581.057	154.2788	-16.4515	60.27	1.62	8655.3	61.71	1.55	9057.7	204614
9530.0	6581.555	154.4153	-16.3766	60.23	1.67	8672.8	61.68	1.59	9075.3	205096
9532.0	6582.067	154.5520	-16.3016	60.20	1.71	8690.5	61.64	1.64	9092.9	205593
9534.0	6582.593	154.6888	-16.2263	60.16	1.76	8708.2	61.60	1.68	9110.7	206105
9536.0	6583.135	154.8257	-16.1508	60.13	1.80	8726.0	61.57	1.72	9128.5	206631
9538.0	6583.692	154.9629	-16.0751	60.09	1.85	8743.8	61.53	1.77	9146.4	207173
9540.0	6584.264	155.1002	-15.9991	60.06	1.90	8761.7	61.50	1.81	9164.3	207730
9542.0	6584.852	155.2377	-15.9229	60.02	1.95	8779.6	61.46	1.86	9182.3	208303
9544.0	6585.456	155.3753	-15.8465	59.99	1.99	8797.7	61.43	1.91	9200.4	208892
9546.0	6586.077	155.5131	-15.7699	59.96	2.04	8815.7	61.40	1.95	9218.5	209498
9548.0	6586.714	155.6510	-15.6930	59.92	2.09	8833.9	61.36	2.00	9236.7	210119
9550.0	6587.368	155.7892	-15.6160	59.89	2.14	8852.1	61.33	2.05	9254.9	210758
9552.0	6588.038	155.9275	-15.5386	59.86	2.19	8870.3	61.29	2.10	9273.2	211414
9554.0	6588.727	156.0660	-15.4611	59.82	2.25	8888.7	61.26	2.15	9291.6	212087
9556.0	6589.432	156.2046	-15.3833	59.79	2.30	8907.1	61.23	2.20	9310.1	212778
9558.0	6590.156	156.3434	-15.3054	59.76	2.35	8925.6	61.19	2.25	9328.7	213487

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

TIME SEC	GC DIST KM	LONG DEG E	GC LAT DEG N	VEL-AZ DEG	VEL-FL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
9560.0	6590.898	156.4824	-15.2271	59.73	2.41	8944.2	61.16	2.30	9347.3	214214
9562.0	6591.658	156.6215	-15.1487	59.69	2.46	8962.8	61.13	2.35	9366.0	214959
9564.0	6592.437	156.7608	-15.0700	59.66	2.52	8981.5	61.10	2.41	9384.7	215724
9566.0	6593.235	156.9003	-14.9912	59.63	2.57	9000.3	61.06	2.46	9403.6	216507
9568.0	6594.053	157.0400	-14.9120	59.60	2.63	9019.2	61.03	2.52	9422.5	217309
9570.0	6594.890	157.1798	-14.8327	59.57	2.68	9038.1	61.00	2.57	9441.4	218132
9572.0	6595.746	157.3198	-14.7531	59.54	2.74	9057.1	60.97	2.63	9460.5	218974
9574.0	6596.623	157.4600	-14.6733	59.51	2.80	9076.2	60.94	2.68	9479.6	219836
9576.0	6597.520	157.6004	-14.5933	59.48	2.86	9095.3	60.91	2.74	9498.8	220718
9578.0	6598.438	157.7409	-14.5131	59.45	2.92	9114.5	60.87	2.80	9518.1	221622
9580.0	6599.377	157.8816	-14.4326	59.42	2.98	9133.8	60.84	2.85	9537.5	222546
9582.0	6600.337	158.0225	-14.3519	59.39	3.04	9153.2	60.81	2.91	9556.9	223491
9584.0	6601.319	158.1636	-14.2710	59.36	3.10	9172.6	60.78	2.97	9576.4	224459
9586.0	6602.323	158.3048	-14.1898	59.33	3.16	9192.2	60.75	3.03	9596.0	225448
9588.0	6603.348	158.4462	-14.1085	59.30	3.23	9211.8	60.72	3.09	9615.7	226459
9590.0	6604.397	158.5878	-14.0269	59.27	3.29	9231.5	60.69	3.15	9635.4	227493
9592.0	6605.467	158.7296	-13.9450	59.24	3.35	9251.2	60.66	3.21	9655.3	228549
9594.0	6606.561	158.8715	-13.8630	59.21	3.42	9271.1	60.63	3.28	9675.2	229629
9596.0	6607.679	159.0137	-13.7807	59.19	3.48	9291.0	60.60	3.34	9695.2	230732
9598.0	6608.820	159.1560	-13.6982	59.16	3.55	9311.0	60.58	3.40	9715.3	231859
9600.0	6609.985	159.2985	-13.6155	59.13	3.62	9331.1	60.55	3.47	9735.4	233009
9602.0	6611.174	159.4411	-13.5325	59.10	3.68	9351.3	60.52	3.53	9755.7	234184
9604.0	6612.388	159.5840	-13.4494	59.08	3.75	9371.6	60.49	3.60	9776.0	235384
9606.0	6613.626	159.7270	-13.3660	59.05	3.82	9392.0	60.46	3.66	9796.5	236609
9608.0	6614.890	159.8702	-13.2824	59.02	3.89	9412.4	60.44	3.73	9817.0	237858
9610.0	6616.180	160.0136	-13.1985	59.00	3.96	9432.9	60.41	3.79	9837.6	239134
9612.0	6617.495	160.1572	-13.1144	58.97	4.03	9453.5	60.38	3.86	9858.3	240435
9614.0	6618.836	160.3010	-13.0302	58.94	4.10	9474.3	60.35	3.93	9879.1	241762
9616.0	6620.203	160.4449	-12.9456	58.92	4.17	9495.1	60.33	4.00	9900.0	243116
9618.0	6621.598	160.5891	-12.8609	58.89	4.24	9516.0	60.30	4.07	9920.9	244496
9620.0	6623.019	160.7334	-12.7760	58.87	4.31	9536.9	60.27	4.14	9942.0	245904
9622.0	6624.468	160.8779	-12.6908	58.84	4.39	9558.0	60.25	4.21	9963.1	247339
9624.0	6625.944	161.0226	-12.6054	58.82	4.46	9579.1	60.22	4.28	9984.3	248801
9626.0	6627.448	161.1675	-12.5197	58.79	4.54	9600.3	60.20	4.35	10005.6	250292
9628.0	6628.981	161.3126	-12.4339	58.77	4.61	9621.7	60.17	4.42	10027.1	251811
9630.0	6630.542	161.4578	-12.3478	58.75	4.69	9643.1	60.15	4.50	10048.6	253358
9632.0	6632.131	161.6033	-12.2615	58.72	4.76	9664.7	60.12	4.57	10070.2	254934
9634.0	6633.750	161.7489	-12.1750	58.70	4.84	9686.3	60.10	4.64	10092.0	256540
9636.0	6635.399	161.8948	-12.0883	58.67	4.91	9708.1	60.07	4.72	10113.8	258175
9638.0	6637.077	162.0409	-12.0013	58.65	4.99	9729.9	60.05	4.79	10135.7	259840
9640.0	6638.785	162.1870	-11.9142	58.63	5.07	9751.9	60.03	4.87	10157.8	261535
9642.0	6640.524	162.3334	-11.8268	58.61	5.15	9773.9	60.00	4.94	10179.9	263261
9644.0	6642.294	162.4800	-11.7391	58.58	5.23	9796.1	59.98	5.02	10202.2	265017

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	SE VEL M/S	HEAD DEG	FLT-PATH DEG	SE VEL M/S	ALTITUDE M
9646.0	6644.094	162.6268	-11.6513	58.56	5.31	9818.4	59.96	5.10	10224.6	266805
9648.0	6645.927	162.7738	-11.5633	58.54	5.38	9840.8	59.93	5.17	10247.1	268624
9650.0	6647.790	162.9210	-11.4750	58.52	5.47	9863.3	59.91	5.25	10269.7	270475
9652.0	6649.686	163.0682	-11.3865	58.50	5.55	9886.0	59.89	5.33	10292.4	272358
9654.0	6651.614	163.2159	-11.2978	58.48	5.63	9908.7	59.86	5.41	10315.3	274273
9656.0	6653.575	163.3637	-11.2089	58.46	5.71	9931.6	59.84	5.49	10338.3	276221
9658.0	6655.568	163.5117	-11.1197	58.44	5.79	9954.6	59.82	5.57	10361.3	278202
9660.0	6657.595	163.6599	-11.0303	58.42	5.88	9977.7	59.80	5.65	10384.5	280216
9662.0	6659.656	163.8082	-10.9408	58.40	5.96	10000.9	59.78	5.73	10407.9	282264
9664.0	6661.750	163.9568	-10.8510	58.38	6.04	10024.2	59.76	5.81	10431.3	284345
9666.0	6663.878	164.1055	-10.7609	58.36	6.13	10047.7	59.74	5.89	10454.9	286461
9668.0	6666.041	164.2545	-10.6707	58.34	6.21	10071.3	59.72	5.97	10478.6	288611
9670.0	6668.238	164.4037	-10.5802	58.32	6.30	10095.0	59.70	6.05	10502.4	290796
9672.0	6670.470	164.5530	-10.4896	58.30	6.38	10118.8	59.68	6.13	10526.3	293016
9674.0	6672.736	164.7026	-10.3987	58.28	6.46	10142.8	59.66	6.21	10550.4	295270
9676.0	6675.037	164.8524	-10.3076	58.26	6.54	10166.9	59.64	6.29	10574.6	297559
9678.0	6677.372	165.0024	-10.2163	58.25	6.63	10191.1	59.62	6.37	10599.0	299882
9680.0	6679.741	165.1526	-10.1247	58.23	6.71	10215.5	59.60	6.45	10623.5	302239
9682.0	6682.147	165.3030	-10.0330	58.21	6.79	10240.1	59.58	6.53	10648.1	304633
9684.0	6684.588	165.4536	-9.9410	58.19	6.88	10264.7	59.56	6.62	10672.9	307062
9686.0	6687.065	165.6045	-9.8488	58.18	6.97	10289.5	59.54	6.70	10697.9	309528
9688.0	6689.580	165.7555	-9.7564	58.16	7.05	10314.5	59.52	6.78	10723.0	312031
9690.0	6692.132	165.9068	-9.6638	58.14	7.14	10339.6	59.51	6.87	10748.2	314571
9692.0	6694.722	166.0582	-9.5710	58.13	7.23	10364.9	59.49	6.96	10773.5	317150
9694.0	6697.350	166.2099	-9.4780	58.11	7.32	10390.3	59.47	7.04	10799.1	319767
9696.0	6700.018	166.3618	-9.3847	58.09	7.41	10415.8	59.45	7.13	10824.7	322423
	S-IVB 2ND GUIDANCE CUTOFF									
9697.150	6701.570	166.4493	-9.3310	58.08	7.47	10430.5	59.44	7.18	10839.5	323969
9698.0	6702.725	166.5139	-9.2912	58.07	7.51	10433.4	59.43	7.22	10842.5	325119
9700.0	6705.467	166.6659	-9.1977	58.05	7.60	10431.1	59.41	7.31	10840.2	327850
9702.0	6708.243	166.8176	-9.1042	58.02	7.69	10428.8	59.38	7.40	10838.0	330615
9704.0	6711.052	166.9692	-9.0107	57.99	7.79	10426.4	59.36	7.49	10835.7	333413
9706.0	6713.895	167.1205	-8.9172	57.96	7.88	10424.1	59.33	7.58	10833.4	336245
	TRANSLUNAR INJECTION (TLI)									
9707.150	6715.543	167.2074	-8.8635	57.95	7.94	10422.7	59.32	7.63	10832.1	337888
9750.0	6784.743	170.3943	-6.8663	57.43	9.94	10365.0	58.86	9.55	10776.3	406884
9800.0	6883.940	173.9833	-4.5646	56.99	12.21	10283.6	58.48	11.74	10697.5	505910
9850.0	7001.911	177.4310	-2.3153	56.70	14.43	10188.7	58.26	13.85	10605.9	623780
9900.0	7137.383	-179.2624	-0.1370	56.55	16.57	10082.5	58.18	15.89	10503.4	759217

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
9950.0	7289.011	-176.0951	1.9561	56.54	18.64	9967.0	58.24	17.85	10392.0	910871
10000.0	7455.422	-173.0642	3.9535	56.64	20.62	9844.2	58.40	19.72	10273.7	1077358
10050.0	7635.250	-170.1659	5.8485	56.83	22.52	9715.9	58.67	21.51	10150.2	1257307
10100.0	7827.169	-167.3958	7.6375	57.11	24.35	9583.7	59.02	23.21	10023.2	1449382
10150.0	8029.915	-164.7493	9.3195	57.46	26.09	9449.2	59.44	24.83	9893.9	1652313
10200.0	8243.300	-162.2212	10.8955	57.87	27.75	9313.4	59.92	26.37	9763.6	1864902
10250.0	8463.221	-159.8067	12.3682	58.32	29.34	9177.5	60.45	27.83	9633.2	2086041
10300.0	8691.665	-157.5008	13.7412	58.82	30.86	9042.4	61.02	29.21	9503.7	2314711
10350.0	8926.708	-155.2984	15.0191	59.35	32.31	8908.6	61.62	30.52	9375.7	2549985
10400.0	9167.514	-153.1946	16.2070	59.90	33.69	8776.8	62.24	31.76	9249.6	2791022
10450.0	9413.330	-151.1849	17.3100	60.47	35.02	8647.3	62.88	32.94	9125.9	3037065
10500.0	9663.479	-149.2646	18.3336	61.05	36.28	8520.6	63.54	34.05	9004.9	3287438
10550.0	9917.359	-147.4294	19.2831	61.64	37.50	8396.7	64.20	35.11	8886.8	3541534
10600.0	10174.428	-145.6751	20.1636	62.23	38.66	8276.0	64.86	36.11	8771.7	3798814
10650.0	10434.210	-143.9977	20.9800	62.83	39.78	8158.4	65.52	37.07	8659.7	4058797
10700.0	10696.280	-142.3933	21.7372	63.43	40.85	8044.1	66.18	37.98	8550.9	4321059
10750.0	10960.258	-140.8584	22.4394	64.02	41.89	7932.9	66.84	38.84	8445.2	4585221
10800.0	11225.812	-139.3894	23.0909	64.61	42.88	7825.1	67.49	39.66	8342.7	4850949
10850.0	11492.644	-137.9832	23.6956	65.19	43.84	7720.4	68.13	40.45	8243.2	5117946
10900.0	11760.492	-136.6366	24.2570	65.76	44.77	7618.8	68.76	41.19	8146.8	5385950
10950.0	12029.125	-135.3466	24.7784	66.33	45.67	7520.3	69.39	41.91	8053.3	5654731
11000.0	12298.337	-134.1106	25.2630	66.88	46.53	7424.7	70.00	42.59	7962.7	5924082
11050.0	12567.947	-132.9259	25.7135	67.43	47.38	7332.1	70.60	43.24	7874.9	6193823
11100.0	12837.794	-131.7898	26.1326	67.97	48.19	7242.3	71.19	43.87	7789.7	6463793
11150.0	13107.737	-130.7003	26.5225	68.50	48.99	7155.2	71.76	44.47	7707.2	6733852
	CSM SEPARATION									
11198.900	**13371.712**	**-129.6774**	**26.7968**	**69.00**	**49.74**	**7072.5**	**72.31**	**45.03**	**7628.9**	**6997934**

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APPENDIX C

TIME HISTORY OF TRAJECTORY PARAMETERS - ENGLISH UNITS

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

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

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

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

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

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

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

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

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

TIME SEC	XE FT	YE FT	ZE FT	VX FT/S	VY FT/S	VZ FT/S	AX FT/S SQ	AY FT/S SQ	AZ FT/S SQ
	GUIDANCE REFERENCE RELEASE								
-16.961	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	196	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	ALL HOLDDOWN ARMS RELEASED								
0.300	196	0	0	0.1	-0.0	0.0	1.81	-0.05	0.02
	START OF TIME BASE 1								
0.600	196	0	0	0.9	-0.0	0.0	3.22	-0.11	0.03
1.0	196	0	0	2.7	-0.1	0.0	5.49	-0.23	0.02
2.0	202	0	0	9.4	-0.7	0.0	6.95	-0.85	-0.02
3.0	215	-1	0	16.4	-1.4	-0.0	7.13	-0.55	-0.04
4.0	235	-3	0	23.7	-1.6	-0.0	7.51	0.06	-0.05
5.0	263	-5	0	31.3	-1.5	-0.1	7.67	0.27	-0.05
6.0	298	-6	0	39.1	-1.2	-0.2	7.83	0.35	-0.06
7.0	341	-7	0	47.0	-0.8	-0.2	8.01	0.49	-0.08
8.0	392	-7	-1	55.1	-0.3	-0.3	8.17	0.50	-0.12
9.0	451	-7	-1	63.3	0.2	-0.4	8.33	0.51	-0.13
10.0	519	-7	-2	71.7	0.9	-0.6	8.43	0.81	-0.14
11.0	595	-6	-2	80.2	1.7	-0.7	8.59	0.70	-0.19
12.0	679	-4	-3	88.8	2.1	-0.9	8.73	0.21	-0.17
13.0	772	-1	-4	97.7	2.2	-1.3	8.92	0.03	-0.50
14.0	875	1	-5	106.8	2.3	-1.6	9.22	0.06	-0.18

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
15.0	986	3	-7	116.1	2.4	-1.7	9.44	0.11	0.07
16.0	1107	6	-9	125.6	2.5	-1.5	9.55	0.14	0.24
17.0	1237	8	-10	135.3	2.6	-1.2	9.78	0.11	0.37
18.0	1377	11	-11	145.1	2.7	-0.8	10.01	0.09	0.47
19.0	1528	13	-12	155.3	2.8	-0.3	10.29	0.04	0.59
20.0	1688	16	-12	165.7	2.8	0.4	10.53	-0.07	0.83
21.0	1859	19	-11	176.4	2.7	1.4	10.82	-0.03	1.06
22.0	2041	22	-9	187.3	2.6	2.6	11.12	-0.02	1.30
23.0	2234	24	-5	198.6	2.6	4.0	11.40	-0.03	1.56
24.0	2438	27	-1	210.1	2.6	5.7	11.64	-0.05	1.82
25.0	2654	30	6	221.8	2.6	7.6	11.86	-0.07	2.10
26.0	2882	32	15	233.8	2.5	9.9	12.04	-0.08	2.42
27.0	3122	34	26	245.9	2.4	12.5	12.22	-0.07	2.75
28.0	3374	37	40	258.2	2.3	15.4	12.43	-0.07	3.11
29.0	3638	39	57	270.8	2.3	18.7	12.67	-0.06	3.46
30.0	3915	41	77	283.6	2.2	22.3	12.92	-0.04	3.80
31.0	4206	44	102	296.6	2.2	26.3	13.17	-0.02	4.12
32.0	4509	46	130	310.0	2.2	30.5	13.44	0.01	4.42
33.0	4826	48	163	323.5	2.2	35.1	13.71	0.04	4.71
34.0	5156	50	200	337.4	2.3	40.0	13.99	0.07	5.00
35.0	5500	53	243	351.5	2.3	45.1	14.25	0.08	5.31
36.0	5859	55	291	365.9	2.4	50.6	14.50	0.08	5.63
37.0	6232	57	344	380.5	2.5	56.4	14.75	0.05	5.98
38.0	6620	60	404	395.4	2.5	62.6	15.00	0.02	6.37
39.0	7023	62	469	410.5	2.5	69.1	15.25	0.00	6.79
40.0	7441	65	542	425.9	2.5	76.2	15.51	-0.01	7.27
41.0	7875	67	622	441.5	2.5	83.7	15.78	-0.00	7.79
42.0	8324	70	710	457.4	2.6	91.8	16.04	0.03	8.35
43.0	8790	73	806	473.6	2.6	100.4	16.30	0.08	8.95
44.0	9272	75	911	490.0	2.7	109.7	16.54	0.14	9.61
45.0	9770	78	1025	506.7	2.9	119.7	16.77	0.20	10.29
46.0	10285	81	1150	523.5	3.1	130.3	16.98	0.26	10.96
47.0	10817	84	1286	540.6	3.4	141.6	17.19	0.30	11.61
48.0	11366	88	1434	557.9	3.7	153.5	17.41	0.34	12.24
49.0	11933	92	1593	575.5	4.1	166.0	17.64	0.37	12.85
50.0	12517	96	1766	593.2	4.5	179.1	17.87	0.40	13.43
51.0	13120	101	1952	611.2	4.9	192.9	18.10	0.42	14.00
52.0	13740	106	2152	629.4	5.3	207.2	18.33	0.42	14.56
53.0	14378	111	2366	647.9	5.7	222.0	18.57	0.41	15.13
54.0	15036	117	2596	666.6	6.1	237.4	18.81	0.39	15.70
55.0	15712	123	2841	685.5	6.4	253.4	19.04	0.34	16.27
56.0	16407	130	[illegible]	[illegible]		[illegible]	19.25	0.30	16.84
57.0	17121	137	[illegible]	[illegible]		[illegible]	19.43	0.24	17.38

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	17855	144	3677	743.6	7.2	304.7	19.70	0.17	17.94
59.0	18608	151	3991	763.4	7.4	323.0	19.96	0.09	18.57
60.0	19382	159	4324	783.5	7.4	341.9	20.21	0.03	19.23
61.0	20175	166	4675	803.9	7.4	361.5	20.46	0.01	19.91
62.0	20990	174	5047	824.5	7.5	381.7	20.70	0.02	20.61
63.0	21824	181	5439	845.2	7.5	402.7	20.89	0.06	21.34
64.0	22680	189	5852	866.2	7.6	424.4	21.03	0.13	22.05
65.0	23557	196	6288	887.2	7.8	446.8	21.11	0.21	22.78
66.0	24454	204	6746	908.3	8.0	469.9	21.14	0.27	23.52
67.0	25373	212	7228	929.5	8.3	493.8	21.14	0.33	24.28
68.0	26314	221	7734	950.7	8.7	518.5	21.15	0.38	25.09
MACH 1									
68.400	26696	224	7944	959.1	8.8	528.7	21.17	0.39	25.42
69.0	27275	230	8265	971.8	9.1	544.1	21.20	0.41	25.93
70.0	28257	239	8822	993.1	9.5	570.4	21.26	0.44	26.79
71.0	29261	249	9406	1014.4	10.0	597.6	21.32	0.46	27.67
72.0	30286	259	10018	1035.7	10.4	625.7	21.42	0.48	28.53
73.0	31332	269	10658	1057.2	10.9	654.7	21.54	0.47	29.39
74.0	32400	281	11328	1078.8	11.3	684.5	21.69	0.44	30.24
75.0	33490	292	12027	1100.6	11.7	715.1	21.85	0.39	31.06
76.0	34602	304	12758	1122.5	12.1	746.6	22.05	0.34	31.85
77.0	35735	316	13521	1144.7	12.4	778.8	22.32	0.32	32.62
78.0	36891	329	14316	1167.2	12.8	811.8	22.60	0.34	33.40
79.0	38070	342	15145	1190.0	13.2	845.6	22.87	0.39	34.20
80.0	39271	355	16008	1213.0	13.6	880.2	23.15	0.42	35.02
81.0	40496	369	16906	1236.2	14.0	915.7	23.39	0.45	35.87
MAXIMUM DYNAMIC PRESSURE									
81.300	40868	373	17183	1243.2	14.1	926.5	23.44	0.46	36.13
82.0	41744	383	17839	1259.7	14.4	952.0	23.57	0.46	36.74
83.0	43015	398	18810	1283.3	14.9	989.2	23.72	0.44	37.64
84.0	44310	413	19818	1307.1	15.3	1027.3	23.86	0.43	38.54
85.0	45629	429	20865	1331.3	15.7	1066.2	23.99	0.41	39.46
86.0	46972	445	21951	1355.1	16.2	1106.1	24.13	0.39	40.38
87.0	48340	461	23077	1379.3	16.6	1147.0	24.26	0.37	41.35
88.0	49731	478	24245	1403.7	16.9	1188.9	24.39	0.35	42.36
89.0	51147	495	25455	1428.1	17.2	1231.8	24.48	0.34	43.42
90.0	52587	512	26709	1452.5	17.5	1275.8	24.49	0.29	44.54
91.0	54052	530	28007	1477.0	17.8	1320.9	24.44	0.21	45.72
92.0	55541	548	29351	1501.4	18.0	1367.2	24.33	0.13	46.93

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	57055	566	30742	1525.6	18.1	1414.8	24.19	0.07	48.19
94.0	58593	584	32181	1549.7	18.1	1463.6	24.01	0.05	49.49
95.0	60154	602	33670	1573.7	18.2	1513.8	23.85	0.05	50.76
96.0	61740	620	35209	1597.5	18.3	1565.2	23.70	0.08	52.06
97.0	63349	638	36801	1621.1	18.4	1617.9	23.57	0.12	53.35
98.0	64982	657	38445	1644.6	18.5	1671.9	23.47	0.15	54.61
99.0	66638	675	40145	1668.1	18.7	1727.1	23.40	0.18	55.84
100.0	68318	694	41900	1691.5	18.8	1783.5	23.35	0.20	57.04
101.0	70021	713	43712	1714.8	19.0	1841.1	23.32	0.19	58.19
102.0	71748	732	45583	1738.1	19.2	1899.9	23.28	0.16	59.33
103.0	73497	752	47512	1761.3	19.4	1959.8	23.23	0.13	60.46
104.0	75270	771	49502	1784.5	19.5	2020.8	23.16	0.11	61.57
105.0	77066	790	51554	1807.6	19.6	2082.9	23.07	0.12	62.69
106.0	78886	810	53669	1830.6	19.7	2146.2	22.97	0.14	63.84
107.0	80728	830	55847	1853.6	19.9	2210.6	22.85	0.17	65.00
108.0	82593	850	58090	1876.3	20.1	2276.2	22.71	0.22	66.20
109.0	84480	870	60400	1899.0	20.3	2343.0	22.59	0.28	67.42
110.0	86391	891	62777	1921.5	20.7	2411.1	22.48	0.35	68.65
111.0	88323	911	65222	1944.0	21.0	2480.3	22.39	0.42	69.86
112.0	90278	933	67738	1966.3	21.5	2550.8	22.33	0.47	71.05
113.0	92256	954	70324	1988.6	21.9	2622.4	22.28	0.49	72.21
114.0	94256	977	72983	2010.9	22.4	2695.1	22.25	0.49	73.32
115.0	96278	999	75715	2033.1	22.9	2769.0	22.26	0.48	74.42
116.0	98322	1022	78521	2055.4	23.4	2844.0	22.34	0.46	75.49
117.0	100389	1046	81403	2077.9	23.8	2920.0	22.49	0.45	76.57
118.0	102478	1070	84362	2100.5	24.3	2997.1	22.68	0.47	77.64
119.0	104590	1095	87398	2123.3	24.8	3075.3	22.93	0.51	78.71
120.0	106724	1120	90513	2146.4	25.4	3154.5	23.21	0.58	79.79
121.0	108882	1145	93707	2169.7	26.0	3234.9	23.50	0.65	80.90
122.0	111064	1172	96983	2193.3	26.6	3316.3	23.74	0.69	82.04
123.0	113269	1199	100340	2217.1	27.3	3399.0	23.89	0.72	83.21
124.0	115498	1226	103781	2241.0	28.0	3482.8	23.97	0.71	84.43
125.0	117751	1255	107306	2265.0	28.7	3567.9	23.98	0.67	85.72
126.0	120028	1284	110917	2289.0	29.4	3654.3	23.94	0.63	87.06
127.0	122329	1314	114615	2312.9	30.0	3742.0	23.87	0.61	88.44
128.0	124654	1344	118402	2336.7	30.6	3831.2	23.80	0.61	89.88
129.0	127003	1375	122279	2360.3	31.2	3921.6	23.76	0.61	91.28
130.0	129375	1407	126246	2383.1	31.9	4013.6	23.74	0.60	92.72
131.0	131771	1439	130306	2406.3	32.5	4107.1	23.77	0.80	94.16
132.0	134191	1472	134460	2430.6	33.4	4201.9	23.82	0.93	95.60
133.0	136635	1506	138711	2454.4	34.3	4298.2	23.89	0.92	97.04
134.0	139103	1540	143058	2478.4	35.3	4396.0	23.99	0.90	98.47
135.0	141595	1576	147504	2502.4	36.3	4495.2	24.14	0.93	99.91

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)									
135.180	142046	1583	148317	2506.8	36.3	4513.2	24.17	0.95	100.17
136.0	144108	1613	152045	2521.5	37.2	4586.2	12.52	1.06	79.92
137.0	146638	1650	156673	2534.1	38.2	4666.6	12.61	1.12	80.84
138.0	149177	1689	161376	2546.7	39.4	4747.9	12.69	1.29	81.76
139.0	151729	1729	166162	2559.4	40.8	4830.1	12.78	1.39	82.69
140.0	154297	1771	171037	2572.3	42.3	4913.3	12.87	1.58	83.67
141.0	156877	1814	175994	2585.2	43.9	4997.4	12.95	1.66	84.69
142.0	159469	1859	181033	2598.2	45.6	5082.6	13.04	1.63	85.75
143.0	162074	1905	186158	2611.2	47.1	5169.0	13.15	1.57	86.88
144.0	164692	1953	191370	2625.1	48.6	5256.4	13.29	1.54	88.09
145.0	167324	2002	196670	2638.3	50.1	5345.0	13.43	1.49	89.31
146.0	169969	2053	202060	2651.8	51.6	5435.0	13.42	1.45	90.60
147.0	172628	2105	207541	2665.3	53.1	5526.1	13.47	1.42	91.86
148.0	175300	2159	213113	2678.8	54.5	5618.3	13.56	1.40	93.11
149.0	177985	2214	218778	2692.3	55.9	5711.9	13.61	1.39	94.37
150.0	180684	2271	224537	2706.0	57.3	5806.6	13.69	1.39	95.62
151.0	183397	2329	230392	2719.8	58.6	5902.6	13.81	1.39	96.88
152.0	186124	2388	236343	2733.7	60.0	5999.8	13.94	1.40	98.13
153.0	188865	2449	242392	2747.6	61.4	6098.4	14.06	1.41	99.39
154.0	191619	2511	248540	2761.7	62.9	6198.2	14.16	1.42	100.64
155.0	194388	2575	254789	2776.0	64.3	6299.4	14.25	1.43	101.90
156.0	197171	2640	261140	2789.9	65.8	6401.4	14.35	1.38	103.28
157.0	199969	2706	267593	2804.0	67.2	6505.4	14.44	1.45	104.66
158.0	202781	2774	274152	2818.5	68.6	6610.7	14.54	1.35	106.04
159.0	205607	2844	280817	2833.1	70.1	6717.4	14.64	1.58	107.42
160.0	208449	2914	287589	2847.8	71.6	6825.5	14.73	1.49	108.80
161.0	211306	2987	294472	2862.6	73.1	6935.0	14.83	1.48	110.18
162.0	214177	3060	301465	2877.4	74.5	7045.9	14.93	1.41	111.56
163.0	217064	3136	308570	2892.4	75.9	7158.1	15.02	1.41	112.94
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
163.600	218804	3182	312888	2901.4	76.8	7226.2	15.08	1.41	113.77
164.0	219963	3212	315781	2904.1	77.3	7259.5	-20.51	0.55	37.11
S-IC/S-II SEPARATION COMMAND									
164.300	220838	3235	317978	2896.0	77.4	7263.6	-29.83	0.54	0.44
166.0	225724	3368	330330	2845.3	78.3	7264.5	-29.82	0.50	0.47
168.0	231354	3526	344887	2790.0	79.3	7276.2	-24.03	0.48	16.37

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
170.0	236889	3685	359469	2743.5	80.2	7313.0	-22.99	0.43	19.21
172.0	242327	3847	374141	2699.0	81.1	7354.5	-21.37	0.45	22.15
174.0	247681	4010	388895	2656.6	81.9	7399.1	-21.13	0.45	22.47
176.0	252950	4174	403741	2614.3	82.8	7444.3	-21.11	0.44	22.71
178.0	258136	4341	418676	2571.8	83.7	7490.6	-20.94	0.50	22.94
180.0	263238	4509	433703	2530.1	84.7	7536.5	-20.87	0.48	23.05
182.0	268256	4680	448822	2488.4	85.6	7582.7	-20.77	0.48	23.15
184.0	273192	4852	464034	2446.9	86.6	7629.2	-20.71	0.47	23.27
186.0	278044	5026	479339	2405.6	87.5	7675.8	-20.65	0.49	23.36
188.0	282814	5202	494737	2364.4	88.5	7722.6	-20.58	0.52	23.45
190.0	287502	5380	510230	2323.3	89.6	7769.6	-20.50	0.52	23.54
192.0	292107	5560	525816	2282.4	90.6	7816.8	-20.43	0.53	23.65
194.0	296631	5742	541497	2241.6	91.7	7864.2	-20.34	0.53	23.78
196.0	301074	5927	557273	2201.0	92.7	7911.9	-20.24	0.53	23.92
198.0	305435	6113	573145	2160.6	93.8	7959.9	-20.18	0.54	24.07
200.0	309716	6302	589113	2120.4	94.9	8008.1	-20.02	0.56	24.20
202.0	313917	6493	605177	2080.4	96.0	8056.7	-20.00	0.57	24.34
204.0	318038	6686	621340	2040.2	97.2	8105.5	-20.10	0.57	24.48
206.0	322078	6882	637600	2000.1	98.2	8154.5	-19.99	0.49	24.54
208.0	326039	7079	653958	1960.7	99.1	8203.5	-19.52	0.35	24.45
210.0	329922	7278	670414	1922.3	99.6	8252.3	-18.74	0.20	24.25
212.0	333729	7477	686966	1885.8	99.9	8300.4	-17.74	0.09	23.90
214.0	337466	7677	703615	1851.4	100.0	8347.8	-16.79	0.02	23.54
216.0	341136	7877	720357	1818.5	100.0	8394.7	-16.06	-0.01	23.30
218.0	344741	8077	737193	1786.6	100.0	8441.3	-15.82	0.02	23.29
220.0	348282	8278	754122	1755.0	100.1	8488.0	-15.86	0.05	23.45
222.0	351761	8478	771145	1723.3	100.2	8535.0	-15.89	0.05	23.61
224.0	355175	8678	788263	1691.5	100.3	8582.4	-15.88	0.06	23.76
226.0	358527	8879	805475	1659.7	100.4	8630.0	-15.91	0.06	23.91
228.0	361814	9080	822783	1627.8	100.6	8678.0	-15.96	0.07	24.05
230.0	365038	9281	840187	1595.9	100.7	8726.2	-16.02	0.09	24.19
232.0	368198	9483	857688	1563.8	100.9	8774.8	-16.02	0.10	24.33
234.0	371293	9685	875286	1531.8	101.1	8823.5	-16.00	0.11	24.46
236.0	374325	9888	892982	1499.8	101.4	8872.6	-16.01	0.13	24.59
238.0	377293	10091	910777	1467.8	101.7	8921.9	-16.03	0.16	24.73
240.0	380196	10294	928670	1435.7	102.0	8971.5	-16.05	0.19	24.88
242.0	383035	10499	946663	1403.6	102.4	9021.4	-16.06	0.21	25.01
244.0	385810	10704	964756	1371.5	102.8	9071.6	-16.06	0.21	25.14
246.0	388521	10910	982950	1339.3	103.3	9122.0	-16.06	0.23	25.28
248.0	391168	11117	1001245	1307.2	103.8	9172.7	-16.06	0.26	25.44
250.0	393750	11325	1019641	1275.1	104.3	9223.8	-16.07	0.28	25.60
252.0	396268	11534	1038140	1242.9	104.9	9275.1	-16.08	0.29	25.74
254.0	398722	11745	1056742	1210.8	105.5	9326.7	-16.10	0.29	25.87

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

TIME SEC	XE FT	YE FT	ZE FT	VXE FT/S	VYE FT/S	VZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
256.0	401111	11956	1075447	1178.5	106.0	9378.6	-16.15	0.30	26.00
258.0	403436	12169	1094256	1146.2	106.7	9430.7	-16.20	0.32	26.14
260.0	405695	12383	1113170	1113.7	107.3	9483.2	-16.22	0.32	26.29
262.0	407891	12598	1132189	1081.3	107.9	9535.9	-16.21	0.32	26.43
264.0	410021	12815	1151314	1048.9	108.6	9588.9	-16.19	0.33	26.56
266.0	412086	13033	1170545	1016.5	109.3	9642.1	-16.18	0.36	26.72
268.0	414087	13252	1189882	984.2	110.0	9695.8	-16.19	0.40	26.89
270.0	416023	13473	1209328	951.8	110.9	9749.7	-16.22	0.40	27.05
272.0	417894	13695	1228881	919.3	111.6	9803.9	-16.25	0.39	27.18
274.0	419700	13919	1248544	886.8	112.4	9858.5	-16.27	0.39	27.33
276.0	421441	14145	1268315	854.2	113.2	9913.3	-16.28	0.40	27.52
278.0	423117	14372	1288197	821.7	114.1	9968.5	-16.28	0.43	27.69
280.0	424728	14601	1308190	789.1	114.9	10024.0	-16.30	0.46	27.85
282.0	426273	14832	1328294	756.4	115.9	10079.9	-16.34	0.48	27.98
284.0	427753	15065	1348509	723.7	116.9	10135.9	-16.38	0.50	28.10
286.0	429168	15300	1368838	690.9	117.9	10192.3	-16.41	0.50	28.27
288.0	430517	15536	1389279	658.1	118.8	10249.1	-16.43	0.49	28.50
290.0	431800	15775	1409834	625.2	119.8	10306.3	-16.46	0.50	28.74
292.0	433018	16016	1430504	592.2	120.8	10363.9	-16.48	0.52	28.90
294.0	434169	16258	1451290	559.3	121.9	10421.9	-16.49	0.54	29.00
296.0	435255	16503	1472192	526.3	123.0	10480.0	-16.51	0.58	29.14
298.0	436274	16750	1493210	493.2	124.2	10538.5	-16.55	0.61	29.33
300.0	437227	17000	1514346	460.1	125.4	10597.3	-16.60	0.62	29.53
302.0	438114	17252	1535600	426.9	126.7	10656.5	-16.62	0.62	29.70
304.0	438935	17507	1556973	393.6	127.9	10716.1	-16.63	0.61	29.86
306.0	439689	17764	1578465	360.3	129.1	10776.0	-16.66	0.62	30.04
308.0	440376	18023	1600077	326.9	130.4	10836.3	-16.71	0.64	30.23
310.0	440996	18285	1621810	293.4	131.7	10896.9	-16.76	0.65	30.42
312.0	441550	18550	1643665	259.9	133.0	10958.0	-16.81	0.66	30.62
314.0	442036	18817	1665642	226.2	134.3	11019.4	-16.84	0.67	30.80
316.0	442454	19087	1687742	192.5	135.7	11081.2	-16.86	0.70	30.98
318.0	442806	19360	1709967	158.8	137.1	11143.3	-16.89	0.72	31.16
320.0	443089	19636	1732316	124.9	138.5	11205.8	-16.92	0.73	31.36
322.0	443305	19914	1754790	91.0	140.0	11268.8	-16.98	0.74	31.58
324.0	443453	20196	1777391	57.0	141.5	11332.1	-17.04	0.75	31.80
326.0	443533	20480	1800119	22.9	143.0	11396.0	-17.11	0.76	32.01
328.0	443545	20768	1822976	-11.4	144.6	11460.2	-17.17	0.77	32.20
330.0	443488	21059	1845958	-45.8	146.1	11524.8	-17.23	0.80	32.37
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
330.640	443454	21152	1853339	-56.9	146.7	11545.5	-17.25	0.79	32.42
332.0	443358	21352	1869061	-83.1	147.7	11581.3	-19.63	0.66	25.38

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
334.0	443153	21649	1892272	-122.3	149.1	11632.0	-19.60	0.74	25.38
336.0	442869	21949	1915584	-161.3	150.5	11682.8	-19.29	0.73	25.38
338.0	442508	22251	1938999	-199.2	151.9	11733.6	-18.55	0.65	25.36
340.0	442074	22556	1962516	-235.0	153.3	11784.2	-17.64	0.68	25.23
342.0	441569	22864	1986133	-269.5	154.6	11833.8	-16.82	0.66	25.02
344.0	440997	23175	2009850	-302.5	156.0	11883.7	-16.21	0.65	24.89
346.0	440360	23488	2033668	-334.5	157.2	11933.4	-15.84	0.64	24.87
348.0	439659	23804	2057584	-366.0	158.6	11983.2	-15.63	0.67	24.89
350.0	438896	24122	2081600	-397.1	159.9	12033.0	-15.53	0.71	24.96
352.0	438071	24444	2105716	-428.2	161.4	12083.1	-15.54	0.75	25.08
354.0	437183	24768	2129933	-459.3	162.9	12133.4	-15.63	0.76	25.27
356.0	436233	25095	2154250	-490.7	164.4	12184.1	-15.75	0.75	25.48
358.0	435220	25425	2178670	-522.3	165.9	12235.3	-15.88	0.76	25.66
360.0	434144	25759	2203191	-554.2	167.4	12286.8	-16.01	0.75	25.84
362.0	433003	26095	2227817	-586.4	168.9	12338.6	-16.13	0.75	26.03
364.0	431798	26434	2252546	-618.8	170.4	12390.9	-16.27	0.76	26.25
366.0	430528	26777	2277381	-651.4	172.0	12443.6	-16.39	0.81	26.44
368.0	429193	27122	2302321	-684.3	173.6	12496.6	-16.46	0.84	26.59
370.0	427791	27471	2327367	-717.2	175.3	12550.0	-16.52	0.86	26.74
372.0	426323	27824	2352521	-750.4	177.1	12603.6	-16.60	0.87	26.92
374.0	424789	28180	2377782	-783.7	178.8	12657.6	-16.69	0.90	27.10
376.0	423189	28539	2403152	-817.1	180.7	12712.0	-16.75	0.93	27.26
378.0	421521	28902	2428630	-850.7	182.5	12766.7	-16.80	0.95	27.43
380.0	419786	29269	2454219	-884.3	184.4	12821.7	-16.87	0.94	27.62
382.0	417984	29640	2479918	-918.2	186.3	12877.1	-16.94	0.95	27.79
384.0	416113	30015	2505728	-952.1	188.3	12932.9	-16.97	0.98	27.94
386.0	414175	30393	2531649	-986.1	190.3	12988.9	-17.01	1.03	28.11
388.0	412169	30776	2557684	-1020.1	192.3	13045.3	-17.06	1.05	28.29
390.0	410095	31163	2583831	-1054.3	194.4	13102.1	-17.12	1.04	28.46
392.0	407952	31554	2610092	-1088.6	196.5	13159.1	-17.17	1.05	28.61
394.0	405740	31949	2636468	-1123.0	198.6	13216.5	-17.22	1.06	28.78
396.0	403460	32348	2662959	-1157.5	200.8	13274.3	-17.29	1.08	28.97
398.0	401110	32752	2689565	-1192.1	203.0	13332.4	-17.35	1.11	29.14
400.0	398691	33160	2716288	-1226.9	205.2	13390.8	-17.40	1.14	29.31
402.0	396202	33573	2743129	-1261.7	207.5	13449.7	-17.46	1.16	29.49
404.0	393644	33990	2770087	-1296.7	209.9	13508.8	-17.52	1.16	29.68
406.0	391015	34412	2797164	-1331.8	212.2	13568.4	-17.59	1.14	29.87
408.0	388317	34839	2824361	-1367.1	214.4	13628.3	-17.64	1.12	30.05
410.0	385547	35270	2851678	-1402.4	216.7	13688.6	-17.72	1.16	30.24
412.0	382707	35706	2879115	-1437.9	219.1	13749.3	-17.80	1.23	30.44
414.0	379795	36147	2906675	-1473.6	221.6	13810.3	-17.87	1.28	30.63
416.0	376812	36592	2934357	-1509.4	224.2	13871.8	-17.93	1.29	30.81
418.0	373758	37043	2962162	-1545.3	226.7	13933.6	-18.00	1.28	30.99

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
420.0	370631	37499	2990092	-1581.4	229.3	13995.8	-18.10	1.29	31.19
422.0	367432	37960	3018146	-1617.7	231.9	14058.4	-18.19	1.30	31.40
424.0	364160	38427	3046325	-1654.2	234.5	14121.4	-18.25	1.31	31.60
426.0	360815	38898	3074632	-1690.7	237.1	14184.8	-18.32	1.33	31.80
428.0	357397	39375	3103065	-1727.4	239.8	14248.6	-18.38	1.36	32.00
430.0	353905	39858	3131626	-1764.3	242.6	14312.8	-18.47	1.39	32.20
432.0	350339	40346	3160316	-1801.3	245.4	14377.4	-18.56	1.41	32.39
434.0	346700	40840	3189136	-1838.5	248.2	14442.4	-18.63	1.42	32.60
436.0	342985	41339	3218086	-1875.8	251.1	14507.8	-18.66	1.43	32.83
438.0	339196	41844	3247167	-1913.2	254.0	14573.7	-18.72	1.44	33.05
440.0	335333	42355	3276381	-1950.7	256.9	14640.0	-18.82	1.47	33.26
442.0	331393	42871	3305727	-1988.5	259.8	14706.7	-18.95	1.49	33.47
444.0	327379	43394	3335208	-2026.5	262.8	14773.9	-19.07	1.50	33.69
446.0	323287	43923	3364823	-2064.7	265.8	14841.5	-19.14	1.51	33.92
448.0	319120	44457	3394574	-2103.1	268.9	14909.5	-19.22	1.53	34.13
450.0	314875	44998	3424462	-2141.6	272.0	14978.0	-19.32	1.57	34.36
452.0	310553	45545	3454487	-2180.3	275.1	15047.0	-19.42	1.61	34.59
454.0	306154	46099	3484650	-2219.3	278.4	15116.4	-19.53	1.64	34.82
456.0	301676	46659	3514953	-2258.4	281.7	15186.3	-19.63	1.67	35.05
458.0	297120	47226	3545396	-2297.8	285.1	15256.6	-19.69	1.68	35.29
460.0	292485	47799	3575980	-2337.4	288.4	15327.4	-19.88	1.68	35.51
462.0	287770	48379	3606706	-2377.4	291.8	15398.6	-20.10	1.68	35.71
464.0	282975	48966	3637574	-2417.6	295.2	15470.3	-20.13	1.71	35.91
466.0	278100	49560	3668587	-2457.7	298.6	15542.3	-20.06	1.74	36.14
468.0	273144	50161	3699744	-2497.9	302.1	15614.8	-20.07	1.76	36.37
470.0	268108	50769	3731047	-2538.3	305.7	15687.8	-20.27	1.80	36.60
472.0	262991	51384	3762496	-2579.0	309.3	15761.3	-20.52	1.84	36.87
474.0	257791	52006	3794092	-2620.1	313.0	15835.3	-20.57	1.85	37.15
476.0	252510	52636	3825837	-2661.3	316.7	15909.9	-20.66	1.85	37.41
478.0	247146	53273	3857732	-2702.8	320.5	15984.9	-20.76	1.88	37.64
480.0	241699	53918	3889777	-2744.4	324.2	16060.4	-20.89	1.90	37.89
482.0	236168	54570	3921974	-2786.3	328.1	16136.5	-21.02	1.92	38.16
484.0	230553	55230	3954323	-2828.5	331.9	16213.1	-21.15	1.94	38.43
486.0	224854	55898	3986827	-2870.9	335.8	16290.2	-21.28	1.96	38.72
488.0	219070	56573	4019485	-2913.6	339.7	16367.9	-21.41	1.98	38.99
490.0	213200	57257	4052299	-2956.5	343.7	16446.2	-21.54	2.00	39.25
492.0	207243	57948	4085270	-2999.7	347.8	16525.0	-21.65	2.03	39.53
494.0	201200	58648	4118399	-3043.2	351.8	16604.3	-21.78	2.04	39.83
496.0	195070	59355	4151688	-3086.9	355.9	16684.3	-21.93	2.07	40.13
498.0	188853	60072	4185137	-3130.9	360.1	16764.8	-22.06	2.10	40.42
500.0	182547	60796	4218747	-3175.1	364.3	16846.0	-22.20	2.14	40.70
502.0	176152	61529	4252521	-3219.7	368.6	16927.6	-22.35	2.16	40.99
504.0	169668	62270	4286459	-3264.5	373.0	17009.9	-22.48	2.18	41.28

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
506.0	163094	63021	4320561	-3309.6	377.3	17092.8	-22.61	2.19	41.61
508.0	156429	63780	4354830	-3355.0	381.7	17176.3	-22.75	2.21	41.93
510.0	149673	64548	4389267	-3400.7	386.2	17260.5	-22.92	2.24	42.24
512.0	142826	65325	4423873	-3446.6	390.7	17345.3	-23.07	2.28	42.56
514.0	135887	66111	4458649	-3492.9	395.3	17430.8	-23.23	2.31	42.87
516.0	128854	66906	4493596	-3539.6	400.0	17516.8	-23.41	2.34	43.20
518.0	121728	67711	4528716	-3586.6	404.7	17603.6	-23.58	2.37	43.54
520.0	114508	68525	4564011	-3633.9	409.4	17691.0	-23.76	2.39	43.90
522.0	107192	69348	4599481	-3681.6	414.3	17779.2	-23.93	2.42	44.25
524.0	99781	70182	4635128	-3729.6	419.1	17868.0	-24.10	2.46	44.55
526.0	92273	71025	4670953	-3778.0	424.1	17957.4	-24.28	2.49	44.88
528.0	84669	71878	4706959	-3826.8	429.1	18047.6	-24.46	2.52	45.26
530.0	76966	72741	4743144	-3875.9	434.2	18138.4	-24.64	2.54	45.62
532.0	69165	73615	4779512	-3925.4	439.3	18230.0	-24.78	2.53	45.98
534.0	61265	74498	4816065	-3975.1	444.4	18322.3	-24.93	2.62	46.35
536.0	53265	75393	4852802	-4025.2	449.7	18415.3	-25.07	2.63	46.71
538.0	45164	76297	4889724	-4075.9	454.9	18507.5	-25.55	2.58	41.61
540.0	36961	77212	4926830	-4127.5	459.8	18580.2	-25.96	2.38	34.80
542.0	28654	78136	4964096	-4179.9	464.6	18649.8	-26.28	2.43	34.84
544.0	20241	79070	5001426	-4232.7	469.4	18719.5	-26.67	2.34	34.89
546.0	11722	80014	5038813	-4286.2	474.1	18789.3	-26.84	2.38	34.98
548.0	3096	80967	5076261	-4340.0	478.9	18859.4	-26.97	2.43	35.12
550.0	-5638	81929	5113769	-4394.1	483.8	18929.7	-27.10	2.48	35.25
552.0	-14480	82902	5151337	-4448.3	488.8	19000.1	-27.18	2.51	35.42
554.0	-23431	83885	5188965	-4502.9	493.9	19071.1	-27.36	2.56	35.60
556.0	-32492	84878	5226654	-4557.7	499.0	19142.4	-27.43	2.57	35.78
558.0	-41662	85881	5264403	-4612.5	504.1	19214.1	-27.41	2.55	35.97
560.0	-50942	86894	5302207	-4667.4	509.2	19286.2	-27.47	2.55	36.16
562.0	-60332	87918	5340067	-4722.6	514.4	19358.7	-27.70	2.60	36.37
564.0	-69833	88952	5377978	-4778.3	519.6	19431.7	-28.07	2.66	36.58
566.0	-79445	89996	5415944	-4834.7	525.0	19505.0	-28.29	2.68	36.79
568.0	-89172	91052	5453961	-4891.5	530.4	19578.8	-28.52	2.71	37.02
570.0	-99012	92118	5492031	-4948.8	535.8	19653.1	-28.74	2.75	37.25
572.0	-108967	93195	5530151	-5006.5	541.4	19728.0	-28.94	2.79	37.46
574.0	-119038	94283	5568320	-5064.5	546.9	19803.2	-29.12	2.80	37.66
576.0	-129225	95383	5606538	-5122.9	552.6	19878.7	-29.29	2.82	37.87
578.0	-139530	96494	5644804	-5181.7	558.2	19954.7	-29.48	2.84	38.10
580.0	-149952	97616	5683117	-5240.9	564.0	20031.1	-29.69	2.88	38.32
582.0	-160494	98749	5721478	-5300.4	569.7	20107.9	-29.87	2.90	38.54
584.0	-171154	99895	5759886	-5360.4	575.6	20185.2	-30.05	2.92	38.75
586.0	-181935	101052	5798340	-5420.6	581.4	20262.9	-30.23	2.93	38.93
588.0	-192837	102220	5836839	-5481.3	587.4	20340.9	-30.41	3.01	39.07
590.0	-203861	103401	5875383	-5542.3	593.4	20419.3	-30.59	2.96	39.24

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

TIME SEC	X FT	Y FT	Z FT	VX FT/S	VY FT/S	VZ FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
592.0	-215.77	104604	5941715	-5[illegible]	[illegible]	20497.8	-30.77	2.90	39.41
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
592.640	-218633	104578	5954832	-5623.3	600.9	20523.0	-30.83	2.88	39.47
S-II/S-IVB SEPARATION COMMAND									
593.500	-223445	105495	5972484	-5647.2	602.8	20530.6	-26.67	1.56	-8.79
594.0	-226272	105797	5982748	-5660.5	603.6	20526.2	-26.66	1.56	-8.79
596.0	-237647	107008	6023790	-5713.7	606.7	20508.6	-26.66	1.53	-8.79
598.0	-249127	108226	6064783	-5767.1	609.9	20493.9	-27.11	1.66	2.88
600.0	-260717	109447	6105790	-5822.8	613.7	20508.2	-28.13	2.03	8.79
602.0	-272420	110679	6146827	-5879.3	617.9	20526.1	-28.12	2.05	9.08
604.0	-284235	111919	6187895	-5935.4	621.9	20544.4	-28.29	1.95	9.25
606.0	-296163	113156	6229003	-5992.9	625.6	20563.0	-28.83	1.86	9.33
608.0	-308206	114421	6270148	-6050.1	629.3	20581.7	-29.21	1.84	9.36
610.0	-320366	115683	6311330	-6109.3	633.0	20600.5	-29.30	1.88	9.44
612.0	-332644	116953	6352550	-6167.9	636.8	20619.4	-29.23	1.93	9.44
614.0	-345038	118231	6393807	-6226.4	640.7	20638.3	-29.27	1.97	9.47
616.0	-357549	119516	6435103	-6285.1	644.7	20657.2	-29.38	2.03	9.48
618.0	-370178	120810	6476436	-6343.9	648.9	20676.2	-29.43	2.10	9.47
620.0	-382925	122112	6517806	-6402.7	653.1	20695.1	-29.45	2.14	9.45
622.0	-395789	123422	6559217	-6461.7	657.4	20714.0	-29.54	2.14	9.42
624.0	-408772	124741	6600663	-6521.0	661.7	20732.8	-29.67	2.16	9.37
626.0	-421873	126069	6642146	-6580.4	666.0	20751.5	-29.77	2.20	9.33
628.0	-435094	127406	6683668	-6640.0	670.5	20770.1	-29.82	2.26	9.32
630.0	-448433	128751	6725228	-6699.6	675.1	20788.8	-29.83	2.29	9.34
632.0	-461892	130106	6766824	-6759.3	679.6	20807.5	-29.84	2.29	9.35
634.0	-475470	131470	6808459	-6819.0	684.2	20826.2	-29.87	2.30	9.36
636.0	-489168	132843	6850130	-6878.8	688.9	20844.9	-29.94	2.32	9.35
638.0	-502986	134225	6891838	-6938.8	693.5	20863.5	-30.01	2.35	9.31
640.0	-516923	135617	6933583	-6998.8	698.3	20882.1	-30.08	2.37	9.26
642.0	-530981	137019	6975366	-7059.1	703.0	20900.6	-30.14	2.38	9.23
644.0	-545163	138432	7017186	-7119.4	707.8	20919.1	-30.18	2.38	9.20
646.0	-559469	139855	7059043	-7179.9	712.5	20937.4	-30.23	2.37	9.16
648.0	-573898	141288	7100938	-7240.5	717.2	20955.7	-30.27	2.38	9.14
650.0	-588452	142731	7142869	-7301.3	722.0	20974.0	-30.31	2.40	9.14
652.0	-603132	144184	7184837	-7362.2	726.8	20992.3	-30.35	2.41	9.15
654.0	-617938	145647	7226842	-7423.2	731.7	21010.5	-30.39	2.41	9.16
656.0	-632872	147121	7268883	-7484.3	736.5	21028.8	-30.42	2.41	9.16
658.0	-647935	148605	7310961	-7545.6	741.3	21047.0	-30.44	2.43	9.15
660.0	-663127	150099	7353076	-7607.0	746.2	21065.2	-30.49	2.45	9.13

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
662.0	-678218	151556	7395212	-7665.9	751.1	21083.8	-30.57	2.45	9.09
664.0	-693611	153063	7437398	-7727.1	756.0	21101.9	-30.63	2.45	9.06
666.0	-709127	154580	7479620	-7788.4	760.9	21120.0	-30.66	2.46	9.03
668.0	-724765	156107	7521878	-7849.8	765.8	21138.1	-30.69	2.46	9.02
670.0	-740526	157644	7564172	-7911.2	770.8	21156.1	-30.71	2.47	9.02
672.0	-756410	159190	7606502	-7972.6	775.7	21174.1	-30.73	2.47	9.00
674.0	-772416	160746	7648868	-8034.1	780.6	21192.1	-30.78	2.48	8.96
676.0	-788546	162313	7691271	-8095.7	785.6	21210.0	-30.84	2.48	8.94
678.0	-804799	163889	7733708	-8157.5	790.6	21227.9	-30.89	2.48	8.93
680.0	-821176	165475	7776182	-8219.3	795.5	21245.7	-30.94	2.49	8.93
682.0	-837677	167071	7818691	-8281.2	800.5	21263.5	-31.00	2.49	8.91
684.0	-854301	168677	7861236	-8343.3	805.5	21281.3	-31.04	2.50	8.90
686.0	-871050	170293	7903817	-8405.4	810.5	21299.1	-31.07	2.51	8.88
688.0	-887923	171919	7946433	-8467.5	815.5	21316.9	-31.09	2.51	8.86
690.0	-904920	173555	7989084	-8529.8	820.6	21334.6	-31.13	2.52	8.85
692.0	-922042	175201	8031771	-8592.1	825.6	21352.3	-31.20	2.51	8.84
694.0	-939288	176858	8074493	-8654.5	830.6	21369.9	-31.24	2.50	8.84
696.0	-956660	178524	8117251	-8717.0	835.6	21387.6	-31.26	2.50	8.83
698.0	-974157	180200	8160043	-8779.6	840.6	21405.3	-31.29	2.52	8.82
700.0	-991778	181886	8202872	-8842.2	845.7	21422.9	-31.34	2.54	8.80
702.0	-1009525	183583	8245735	-8904.9	850.7	21440.5	-31.40	2.53	8.78
704.0	-1027398	185289	8288633	-8967.8	855.8	21458.0	-31.45	2.52	8.76
706.0	-1045397	187006	8331567	-9030.7	860.8	21475.5	-31.48	2.52	8.75
708.0	-1063521	188733	8374535	-9093.7	865.9	21493.0	-31.50	2.53	8.74
710.0	-1081772	190470	8417539	-9156.7	870.9	21510.5	-31.51	2.53	8.74
712.0	-1100148	192217	8460577	-9219.8	876.0	21527.9	-31.54	2.54	8.74
714.0	-1118651	193974	8503651	-9282.9	881.1	21545.4	-31.60	2.56	8.75
716.0	-1137280	195741	8546759	-9346.2	886.2	21562.9	-31.65	2.56	8.77
718.0	-1156035	197519	8589902	-9409.5	891.4	21580.5	-31.71	2.56	8.77
720.0	-1174918	199307	8633081	-9473.1	896.5	21598.0	-31.86	2.58	8.72
722.0	-1193928	201105	8676294	-9537.0	901.7	21615.3	-32.05	2.60	8.65
724.0	-1213066	202913	8719542	-9601.2	906.9	21632.6	-32.17	2.60	8.61
726.0	-1232333	204732	8762825	-9665.6	912.1	21649.8	-32.16	2.59	8.61
728.0	-1251729	206562	8806141	-9729.8	917.3	21667.1	-32.09	2.60	8.62
730.0	-1271252	208401	8849493	-9794.0	922.5	21684.3	-32.07	2.61	8.62
732.0	-1290905	210252	8892879	-9858.1	927.7	21701.6	-32.07	2.63	8.62
734.0	-1310685	212112	8936299	-9922.2	933.0	21718.8	-32.04	2.63	8.65
736.0	-1330593	213984	8979754	-9986.3	938.2	21736.1	-31.99	2.61	8.71
738.0	-1350630	215865	9023244	-10050.2	943.4	21753.5	-31.93	2.60	8.71
740.0	-1370794	217757	9066768	-10114.0	948.6	21770.9	-31.91	2.61	8.72
742.0	-1391086	219660	9110327	-10177.9	953.9	21788.3	-31.92	2.63	8.73
744.0	-1411506	221573	9153921	-10241.7	959.1	21805.7	-31.93	2.58	8.73
746.0	-1432053	223496	9197550	-10305.5	964.4	21823.1	-31.94	2.65	8.74

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

TIME SEC	XF FT	YF FT	ZF FT	DXF FT/S	DYF FT/S	DZF FT/S	DDXF FT/S SQ	DDYF FT/S SQ	DDZE FT/S SQ
748.0	-1452728	225431	9241213	-10369.5	969.7	21840.6	-31.95	2.64	8.75
	S-IVB 1ST GUIDANCE CUTOFF								
749.830	-1471758	227210	9281196	-10427.9	974.4	21856.6	-31.96	2.64	8.76
750.0	-1473531	227375	9284911	-10433.4	974.8	21858.1	-31.97	2.64	8.76
752.0	-1494446	229329	9328603	-10484.4	978.4	21836.5	-24.49	1.64	-12.11
754.0	-1515463	231289	9372255	-10533.2	981.6	21812.5	-24.49	1.63	-12.11
756.0	-1536576	233255	9415853	-10581.9	984.9	21788.4	-24.49	1.63	-12.11
758.0	-1557788	235228	9459407	-10630.7	988.2	21764.4	-24.49	1.63	-12.11
	PARKING ORBIT INSERTION								
759.830	-1577289	237038	9499212	-10675.3	991.1	21742.4	-24.50	1.62	-12.11

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									
-16.961	3441.323	9.225	-2.990	-0.0	413.3	1275.4	-0.07	-0.04	0.01
-16.0	3441.323	9.291	-2.788	-0.1	413.3	1275.4	-0.07	-0.04	0.01
-15.0	3441.323	9.359	-2.578	-0.2	413.2	1275.4	-0.07	-0.04	0.01
-14.0	3441.323	9.427	-2.368	-0.3	413.2	1275.4	-0.07	-0.04	0.01
-13.0	3441.323	9.495	-2.158	-0.3	413.2	1275.4	-0.07	-0.04	0.01
-12.0	3441.323	9.563	-1.948	-0.4	413.1	1275.4	-0.07	-0.04	0.01
-11.0	3441.322	9.631	-1.739	-0.5	413.1	1275.5	-0.07	-0.04	0.01
-10.0	3441.322	9.699	-1.529	-0.6	413.0	1275.5	-0.07	-0.04	0.01
-9.0	3441.322	9.767	-1.319	-0.7	413.0	1275.5	-0.07	-0.04	0.01
-8.0	3441.322	9.835	-1.109	-0.8	412.9	1275.5	-0.07	-0.04	0.01
-7.0	3441.322	9.903	-0.899	-0.9	412.9	1275.5	-0.07	-0.04	0.01
-6.0	3441.322	9.970	-0.689	-0.9	412.8	1275.5	-0.07	-0.04	0.01
-5.0	3441.322	10.038	-0.479	-1.0	412.8	1275.5	-0.07	-0.04	0.01
-4.0	3441.322	10.106	-0.269	-1.1	412.8	1275.6	-0.07	-0.04	0.01
-3.0	3441.321	10.174	-0.059	-1.2	412.7	1275.6	-0.07	-0.04	0.01
-2.0	3441.321	10.242	0.151	-1.3	412.7	1275.6	-0.07	-0.04	0.01
-1.0	3441.321	10.310	0.361	-1.4	412.6	1275.6	-0.07	-0.04	0.01
0.0	3441.321	10.378	0.571	-1.5	412.6	1275.6	-0.07	-0.04	0.01
ALL HOLDDOWN ARMS RELEASED									
0.300	3441.321	10.398	0.634	-1.4	412.6	1275.6	1.74	-0.08	0.03
START OF TIME BASE 1									
0.600	3441.321	10.419	0.697	-0.6	412.5	1275.6	3.15	-0.14	0.04
1.0	3441.321	10.446	0.781	1.1	412.4	1275.7	5.41	-0.27	0.03
2.0	3441.321	10.514	0.991	7.8	411.8	1275.7	6.88	-0.88	-0.00
3.0	3441.323	10.581	1.200	14.7	411.1	1275.7	7.06	-0.59	-0.02
4.0	3441.326	10.649	1.410	21.9	410.8	1275.7	7.44	0.02	-0.03
5.0	3441.330	10.717	1.620	29.4	410.9	1275.6	7.60	0.24	-0.03
6.0	3441.336	10.784	1.830	37.1	411.1	1275.6	7.76	0.32	-0.04
7.0	3441.343	10.852	2.040	44.9	411.5	1275.6	7.93	0.46	-0.05
8.0	3441.351	10.920	2.250	52.9	412.0	1275.5	8.10	0.47	-0.10
9.0	3441.360	10.988	2.460	61.1	412.5	1275.4	8.26	0.47	-0.10
10.0	3441.371	11.056	2.670	69.4	413.1	1275.3	8.36	0.78	-0.11
11.0	3441.383	11.124	2.880	77.9	413.8	1275.2	8.52	0.67	-0.16
12.0	3441.396	11.192	3.090	86.4	414.2	1275.1	8.66	0.18	-0.14
13.0	3441.411	11.260	3.300	95.1	414.3	1274.7	8.85	0.00	-0.46
14.0	3441.428	11.328	3.509	104.1	414.3	1274.4	9.15	0.03	-0.14

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	11.396	3.719	113.3	414.4	1274.4	9.36	0.08	0.11
16.0	3441.465	11.464	3.929	122.8	414.4	1274.6	9.48	0.12	0.29
17.0	3441.486	11.533	4.139	132.4	414.5	1275.0	9.70	0.09	0.41
18.0	3441.509	11.601	4.348	142.1	414.6	1275.5	9.93	0.07	0.52
19.0	3441.533	11.669	4.558	152.2	414.7	1276.0	10.22	0.01	0.64
20.0	3441.559	11.737	4.768	162.5	414.6	1276.8	10.46	-0.10	0.89
21.0	3441.586	11.806	4.979	173.1	414.5	1277.8	10.74	-0.06	1.12
22.0	3441.616	11.874	5.189	184.0	414.4	1279.0	11.05	-0.04	1.36
23.0	3441.647	11.942	5.400	195.1	414.4	1280.5	11.32	-0.05	1.62
24.0	3441.680	12.010	5.611	206.5	414.3	1282.3	11.56	-0.07	1.88
25.0	3441.715	12.078	5.822	218.2	414.2	1284.3	11.78	-0.10	2.17
26.0	3441.752	12.147	6.033	230.0	414.1	1286.7	11.96	-0.10	2.49
27.0	3441.791	12.215	6.245	242.1	414.0	1289.3	12.14	-0.09	2.83
28.0	3441.831	12.283	6.458	254.3	413.9	1292.3	12.35	-0.09	3.18
29.0	3441.874	12.351	6.671	266.8	413.8	1295.7	12.59	-0.08	3.54
30.0	3441.919	12.419	6.884	279.5	413.8	1299.4	12.83	-0.06	3.89
31.0	3441.966	12.487	7.098	292.4	413.7	1303.4	13.08	-0.04	4.21
32.0	3442.016	12.555	7.313	305.6	413.7	1307.8	13.35	-0.01	4.51
33.0	3442.067	12.623	7.529	319.1	413.7	1312.5	13.62	0.02	4.80
34.0	3442.121	12.691	7.745	332.9	413.7	1317.4	13.90	0.05	5.10
35.0	3442.177	12.760	7.963	346.9	413.7	1322.7	14.16	0.06	5.40
36.0	3442.235	12.828	8.181	361.1	413.8	1328.2	14.41	0.06	5.73
37.0	3442.295	12.896	8.400	375.6	413.8	1334.1	14.65	0.03	6.09
38.0	3442.358	12.964	8.620	390.4	413.8	1340.4	14.90	0.00	6.48
39.0	3442.424	13.032	8.841	405.4	413.8	1347.1	15.15	-0.02	6.91
40.0	3442.492	13.100	9.063	420.7	413.8	1354.3	15.40	-0.04	7.38
41.0	3442.562	13.168	9.287	436.2	413.7	1361.9	15.67	-0.03	7.91
42.0	3442.636	13.236	9.512	452.0	413.7	1370.1	15.93	0.00	8.47
43.0	3442.711	13.304	9.738	468.0	413.8	1378.9	16.18	0.05	9.08
44.0	3442.790	13.372	9.966	484.3	413.8	1388.3	16.42	0.11	9.74
45.0	3442.871	13.441	10.195	500.8	414.0	1398.4	16.64	0.17	10.42
46.0	3442.954	13.509	10.426	517.6	414.1	1409.2	16.85	0.23	11.10
47.0	3443.041	13.577	10.659	534.5	414.4	1420.6	17.06	0.27	11.76
48.0	3443.130	13.645	10.894	551.7	414.7	1432.7	17.27	0.31	12.39
49.0	3443.223	13.713	11.130	569.0	415.0	1445.4	17.49	0.34	13.00
50.0	3443.318	13.782	11.369	586.6	415.3	1458.7	17.72	0.37	13.59
51.0	3443.416	13.850	11.611	604.4	415.7	1472.5	17.95	0.38	14.16
52.0	3443.517	13.919	11.854	622.5	416.1	1487.0	18.17	0.38	14.73
53.0	3443.621	13.987	12.100	640.8	416.4	1502.0	18.40	0.37	15.30
54.0	3443.728	14.056	12.349	659.3	416.8	1517.6	18.64	0.34	15.87
55.0	3443.838	14.124	12.600	678.0	417.1	1533.8	18.87	0.30	16.45
56.0	3443.951	14.193	12.853	696.9	417.4	1550.5	19.07	0.25	17.02
57.0	3444.067	14.262	13.110	716.1	417.6	1567.8	19.29	0.20	17.57

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	3444.187	14.330	13.370	735.5	417.7	1585.6	19.51	0.12	18.13
59.0	3444.309	14.399	13.632	755.1	417.8	1604.1	19.76	0.04	18.76
60.0	3444.435	14.468	13.898	775.0	417.8	1623.2	20.01	-0.02	19.43
61.0	3444.564	14.537	14.166	795.2	417.8	1643.0	20.25	-0.05	20.11
62.0	3444.697	14.605	14.438	815.5	417.7	1663.5	20.48	-0.04	20.82
63.0	3444.833	14.674	14.714	836.0	417.7	1684.6	20.66	-0.00	21.55
64.0	3444.972	14.743	14.993	856.7	417.8	1706.5	20.80	0.06	22.27
65.0	3445.115	14.812	15.276	877.5	417.8	1729.2	20.87	0.14	23.01
66.0	3445.261	14.880	15.562	898.4	418.0	1752.6	20.89	0.20	23.75
67.0	3445.410	14.949	15.853	919.3	418.2	1776.7	20.89	0.26	24.51
68.0	3445.563	15.018	16.147	940.2	418.5	1801.6	20.89	0.30	25.32
MACH 1									
68.400	3445.626	15.046	16.266	948.5	418.6	1811.9	20.90	0.32	25.66
69.0	3445.720	15.087	16.446	961.1	418.8	1827.4	20.92	0.33	26.16
70.0	3445.880	15.156	16.749	982.0	419.2	1854.0	20.97	0.36	27.03
71.0	3446.043	15.225	17.056	1003.0	419.5	1881.5	21.02	0.37	27.91
72.0	3446.210	15.294	17.368	1024.0	419.9	1909.8	21.11	0.39	28.78
73.0	3446.380	15.363	17.685	1045.2	420.2	1939.0	21.23	0.37	29.65
74.0	3446.554	15.432	18.006	1066.5	420.6	1969.1	21.37	0.34	30.50
75.0	3446.731	15.502	18.333	1087.9	420.9	2000.0	21.52	0.29	31.32
76.0	3446.912	15.571	18.665	1109.5	421.1	2031.7	21.70	0.23	32.12
77.0	3447.097	15.640	19.002	1131.3	421.4	2064.2	21.96	0.20	32.89
78.0	3447.285	15.710	19.344	1153.4	421.6	2097.5	22.23	0.22	33.68
79.0	3447.476	15.779	19.692	1175.8	421.8	2131.6	22.50	0.27	34.49
80.0	3447.672	15.848	20.046	1198.4	422.1	2166.5	22.76	0.30	35.31
81.0	3447.871	15.918	20.405	1221.2	422.4	2202.3	22.99	0.32	36.17
MAXIMUM DYNAMIC PRESSURE									
81.300	3447.931	15.939	20.514	1228.1	422.5	2213.2	23.04	0.32	36.43
82.0	3448.074	15.987	20.771	1244.3	422.7	2238.9	23.15	0.32	37.04
83.0	3448.280	16.057	21.142	1267.5	423.0	2276.4	23.30	0.30	37.95
84.0	3448.491	16.127	21.520	1290.8	423.3	2314.8	23.42	0.28	38.86
85.0	3448.705	16.196	21.904	1314.3	423.5	2354.1	23.54	0.25	39.79
86.0	3448.923	16.266	22.295	1337.9	423.8	2394.3	23.67	0.23	40.71
87.0	3449.146	16.336	22.692	1361.7	424.0	2435.6	23.79	0.20	41.68
88.0	3449.372	16.406	23.097	1385.5	424.2	2477.8	23.90	0.18	42.70
89.0	3449.602	16.475	23.508	1409.4	424.3	2521.0	23.97	0.16	43.76
90.0	3449.835	16.545	23.927	1433.3	424.4	2565.3	23.97	0.11	44.89
91.0	3450.073	16.615	24.353	1457.2	424.5	2610.8	23.90	0.02	46.07
92.0	3450.315	16.685	24.786	1481.1	424.5	2657.5	23.78	-0.08	47.28

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

TIME SEC	XS NM	YS NM	ZS NM	XDS FT/S	YDS FT/S	ZDS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
93.0	3450.561	16.755	25.227	1504.7	424.4	2705.4	23.62	-0.14	48.54
94.0	3450.810	16.825	25.677	1528.3	424.2	2754.6	23.42	-0.17	49.85
95.0	3451.064	16.895	26.134	1551.7	424.0	2805.1	23.24	-0.18	51.12
96.0	3451.321	16.964	26.600	1574.7	423.9	2856.9	23.08	-0.16	52.42
97.0	3451.582	17.034	27.075	1597.7	423.7	2910.0	22.93	-0.13	53.72
98.0	3451.847	17.104	27.558	1620.6	423.6	2964.3	22.81	-0.11	54.98
99.0	3452.116	17.173	28.050	1643.4	423.5	3019.9	22.72	-0.08	56.22
100.0	3452.389	17.243	28.552	1666.1	423.4	3076.7	22.65	-0.08	57.42
101.0	3452.664	17.313	29.063	1688.6	423.3	3134.7	22.60	-0.10	58.58
102.0	3452.944	17.383	29.584	1711.2	423.2	3193.9	22.54	-0.13	59.72
103.0	3453.227	17.452	30.115	1733.7	423.0	3254.2	22.48	-0.18	60.85
104.0	3453.514	17.522	30.655	1756.1	422.8	3315.6	22.38	-0.20	61.97
105.0	3453.805	17.591	31.206	1778.4	422.6	3378.1	22.28	-0.20	63.09
106.0	3454.100	17.661	31.767	1800.6	422.4	3441.8	22.15	-0.20	64.24
107.0	3454.398	17.730	32.339	1822.7	422.2	3506.6	22.01	-0.18	65.40
108.0	3454.700	17.800	32.921	1844.6	422.0	3572.7	21.86	-0.14	66.60
109.0	3455.005	17.869	33.515	1866.4	421.9	3639.9	21.71	-0.09	67.83
110.0	3455.314	17.939	34.120	1888.0	421.9	3708.3	21.58	-0.03	69.07
111.0	3455.627	18.008	34.736	1909.5	421.9	3778.0	21.47	0.02	70.27
112.0	3455.943	18.078	35.363	1930.9	421.9	3848.9	21.38	0.07	71.47
113.0	3456.262	18.147	36.003	1952.3	421.9	3920.9	21.31	0.08	72.63
114.0	3456.585	18.216	36.654	1973.5	422.0	3994.1	21.26	0.06	73.75
115.0	3456.912	18.286	37.317	1994.8	422.0	4068.4	21.25	0.04	74.85
116.0	3457.242	18.355	37.993	2016.0	422.0	4143.8	21.31	0.01	75.93
117.0	3457.575	18.425	38.681	2037.4	422.0	4220.3	21.43	-0.01	77.01
118.0	3457.912	18.494	39.382	2058.9	422.1	4297.8	21.60	-0.00	78.09
119.0	3458.253	18.564	40.096	2080.7	422.1	4376.5	21.83	0.03	79.17
120.0	3458.597	18.633	40.823	2102.6	422.1	4456.2	22.09	0.08	80.25
121.0	3458.945	18.703	41.563	2124.6	422.2	4537.0	22.35	0.14	81.37
122.0	3459.297	18.772	42.316	2147.2	422.4	4618.9	22.56	0.17	82.51
123.0	3459.652	18.842	43.083	2169.8	422.5	4702.0	22.69	0.18	83.69
124.0	3460.011	18.911	43.864	2192.5	422.7	4786.3	22.75	0.16	84.91
125.0	3460.374	18.981	44.659	2215.2	422.8	4871.9	22.73	0.11	86.21
126.0	3460.740	19.050	45.468	2237.9	422.9	4958.8	22.66	0.06	87.55
127.0	3461.110	19.120	46.291	2260.5	422.9	5047.0	22.56	0.02	88.94
128.0	3461.484	19.190	47.129	2283.0	422.9	5136.7	22.46	0.00	90.38
129.0	3461.862	19.259	47.982	2304.2	422.9	5227.7	22.39	-0.02	91.78
130.0	3462.243	19.329	48.850	2326.6	422.9	5320.2	22.35	-0.03	93.23
131.0	3462.628	19.398	49.733	2348.9	422.9	5414.1	22.34	0.15	94.67
132.0	3463.017	19.468	50.632	2371.2	423.1	5509.5	22.36	0.26	96.11
133.0	3463.409	19.538	51.547	2393.6	423.4	5606.3	22.40	0.24	97.56
134.0	3463.805	19.607	52.478	2416.0	423.5	5704.6	22.47	0.20	99.00
135.0	3464.205	19.677	53.425	2438.5	423.3	5804.3	22.59	0.21	100.44

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
135.180	3464.277	19.690	53.597	2442.6	423.8	5822.5	22.61	0.23	100.70
136.0	3464.609	19.747	54.389	2456.1	424.1	5895.9	11.14	0.40	80.35
137.0	3465.013	19.817	55.365	2467.2	424.5	5976.7	11.20	0.45	81.27
138.0	3465.420	19.887	56.355	2478.4	424.9	6058.0	11.26	0.41	82.20
139.0	3465.828	19.957	57.358	2489.7	425.3	6141.1	11.32	0.39	83.12
140.0	3466.243	20.027	58.376	2501.1	425.7	6224.9	11.34	0.38	84.12
141.0	3466.662	20.097	59.408	2512.5	426.1	6309.3	11.40	0.38	85.14
142.0	3467.087	20.167	60.453	2523.9	426.5	6395.3	11.51	0.39	86.20
143.0	3467.483	20.238	61.513	2535.5	426.9	6481.7	11.60	0.39	87.33
144.0	3467.902	20.309	62.586	2547.7	427.3	6569.5	11.71	0.39	88.54
145.0	3468.322	20.380	63.675	2559.4	427.6	6658.7	11.81	0.71	89.77
146.0	3468.744	20.451	64.778	2571.2	431.3	6749.2	11.78	0.66	91.07
147.0	3469.168	20.522	65.897	2583.1	431.9	6840.7	11.90	0.61	92.32
148.0	3469.594	20.593	67.030	2594.8	432.5	6933.5	11.86	0.58	93.58
149.0	3470.022	20.664	68.179	2606.6	433.1	7027.5	11.88	0.55	94.84
150.0	3470.452	20.735	69.343	2618.6	433.6	7122.7	11.93	0.53	96.10
151.0	3470.884	20.807	70.523	2630.5	434.1	7219.1	12.02	0.52	97.35
152.0	3471.318	20.878	71.720	2642.6	434.7	7316.9	12.12	0.51	98.61
153.0	3471.754	20.950	72.932	2654.7	435.2	7415.9	12.21	0.50	99.87
154.0	3472.192	21.021	74.161	2666.9	435.7	7516.2	12.27	0.50	101.13
155.0	3472.632	21.093	75.406	2679.2	436.1	7617.9	12.33	0.49	102.39
156.0	3473.074	21.165	76.668	2691.2	436.7	7720.4	12.40	0.43	103.77
157.0	3473.518	21.237	77.948	2703.4	437.1	7824.8	12.46	0.48	105.16
158.0	3473.964	21.309	79.244	2715.9	437.5	7930.7	12.52	0.35	106.54
159.0	3474.412	21.381	80.559	2728.4	438.0	8037.9	12.58	0.56	107.93
160.0	3474.862	21.453	81.892	2741.0	438.5	8146.5	12.65	0.46	109.31
161.0	3475.315	21.525	83.243	2753.7	438.9	8256.5	12.71	0.43	110.69
162.0	3475.769	21.597	84.609	2766.4	439.3	8367.9	12.77	0.34	112.08
163.0	3476.226	21.670	85.996	2779.2	439.6	8480.7	12.83	0.32	113.46
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
163.600	3476.501	21.713	86.837	2786.9	439.8	8549.0	12.87	0.31	114.29
164.0	3476.684	21.742	87.400	2792.3	439.9	8592.6	-21.88	-0.19	37.24
	S-IC/S-II SEPARATION COMMAND								
164.300	3476.822	21.764	87.827	2796.3	439.9	8626.7	-30.80	-0.01	0.47
166.0	3477.594	21.887	90.235	2817.3	439.6	8797.4	-30.79	-0.05	0.49
168.0	3478.491	22.032	93.062	2841.7	439.7	8996.3	-25.18	-0.15	16.44

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

TIME SEC	XS NM	YS NM	ZS NM	VXS FT/S	VYS FT/S	VZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
170.0	3479.353	22.176	95.367	2621.7	439.2	8636.4	-24.17	-0.23	19.29
172.0	3480.207	22.321	98.747	2574.7	438.8	8678.0	-22.60	-0.23	22.24
174.0	3481.047	22.465	101.611	2529.8	438.2	8722.8	-22.36	-0.24	22.55
176.0	3481.872	22.609	104.490	2485.1	437.8	8768.1	-22.36	-0.25	22.78
178.0	3482.683	22.753	107.384	2440.0	437.2	8814.6	-22.20	-0.21	23.00
180.0	3483.478	22.897	110.293	2395.7	436.7	8860.6	-22.14	-0.23	23.10
182.0	3484.260	23.041	113.217	2351.4	436.2	8907.0	-22.05	-0.24	23.20
184.0	3485.026	23.184	116.157	2307.4	435.7	8953.5	-22.00	-0.25	23.31
186.0	3485.779	23.328	119.112	2263.4	435.2	9000.2	-21.95	-0.25	23.40
188.0	3486.516	23.471	122.082	2219.5	434.7	9047.1	-21.89	-0.23	23.48
190.0	3487.240	23.614	125.067	2175.8	434.3	9094.1	-21.82	-0.22	23.56
192.0	3487.949	23.757	128.069	2132.2	433.8	9141.4	-21.75	-0.23	23.67
194.0	3488.643	23.900	131.085	2088.7	433.3	9188.8	-21.68	-0.24	23.78
196.0	3489.324	24.042	134.118	2045.4	432.8	9236.5	-21.59	-0.24	23.92
198.0	3489.990	24.184	137.166	2002.2	432.3	9284.5	-21.54	-0.24	24.07
200.0	3490.642	24.327	140.230	1959.3	431.9	9332.8	-21.39	-0.23	24.19
202.0	3491.280	24.469	143.310	1916.5	431.4	9381.3	-21.38	-0.23	24.32
204.0	3491.904	24.611	146.406	1873.5	430.9	9430.1	-21.49	-0.24	24.46
206.0	3492.513	24.752	149.518	1830.6	430.3	9479.1	-21.39	-0.33	24.50
208.0	3493.109	24.894	152.646	1788.3	429.5	9528.0	-20.93	-0.47	24.42
210.0	3493.691	25.035	155.790	1747.1	428.4	9576.7	-20.15	-0.62	24.21
212.0	3494.259	25.176	158.950	1707.8	427.0	9624.8	-19.15	-0.73	23.87
214.0	3494.815	25.316	162.126	1670.4	425.5	9672.2	-18.21	-0.80	23.52
216.0	3495.359	25.456	165.318	1634.6	423.8	9719.0	-17.49	-0.83	23.28
218.0	3495.891	25.595	168.524	1599.9	422.2	9765.6	-17.26	-0.81	23.27
220.0	3496.412	25.734	171.747	1565.4	420.6	9812.2	-17.30	-0.79	23.42
222.0	3496.922	25.872	174.984	1530.7	419.0	9859.2	-17.34	-0.79	23.57
224.0	3497.420	26.010	178.237	1496.0	417.4	9906.5	-17.34	-0.80	23.72
226.0	3497.907	26.147	181.506	1461.2	415.7	9954.1	-17.39	-0.80	23.86
228.0	3498.382	26.283	184.790	1426.3	414.1	10002.0	-17.45	-0.80	23.99
230.0	3498.846	26.420	188.090	1391.4	412.5	10050.1	-17.51	-0.79	24.13
232.0	3499.298	26.555	191.406	1356.3	410.9	10098.5	-17.53	-0.78	24.26
234.0	3499.738	26.690	194.738	1321.2	409.3	10147.2	-17.52	-0.79	24.39
236.0	3500.168	26.825	198.086	1286.1	407.8	10196.1	-17.54	-0.77	24.52
238.0	3500.585	26.958	201.451	1250.9	406.2	10245.3	-17.57	-0.75	24.65
240.0	3500.991	27.092	204.831	1215.7	404.7	10294.7	-17.60	-0.73	24.79
242.0	3501.385	27.225	208.228	1180.5	403.3	10344.4	-17.62	-0.72	24.91
244.0	3501.768	27.357	211.641	1145.2	401.8	10394.4	-17.63	-0.72	25.03
246.0	3502.139	27.489	215.071	1109.9	400.4	10444.6	-17.64	-0.71	25.17
248.0	3502.499	27.621	218.517	1074.5	398.9	10495.1	-17.66	-0.69	25.32
250.0	3502.847	27.752	221.980	1039.2	397.5	10545.9	-17.68	-0.68	25.48
252.0	3503.183	27.883	225.459	1003.7	396.2	10597.0	-17.70	-0.68	25.61
254.0	3503.507	28.013	228.956	968.3	394.8	10648.4	-17.74	-0.69	25.73

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
256.0	3503.820	28.143	232.469	932.7	393.4	10700.0	-17.80	-0.69	25.86
258.0	3504.121	28.272	236.020	897.2	392.0	10751.9	-17.85	-0.68	25.99
260.0	3504.411	28.401	239.548	861.2	390.6	10804.0	-17.89	-0.69	26.13
262.0	3504.688	28.529	243.112	825.4	389.2	10856.4	-17.89	-0.70	26.27
264.0	3504.954	28.657	246.695	789.6	387.8	10909.1	-17.88	-0.70	26.39
266.0	3505.208	28.784	250.294	753.8	386.4	10962.0	-17.89	-0.67	26.55
268.0	3505.450	28.911	253.911	718.0	385.1	11015.3	-17.91	-0.64	26.71
270.0	3505.681	29.038	257.546	682.1	383.8	11068.9	-17.95	-0.65	26.86
272.0	3505.899	29.164	261.198	646.1	382.4	11122.7	-17.99	-0.67	26.99
274.0	3506.106	29.290	264.868	610.1	381.1	11176.9	-18.03	-0.68	27.13
276.0	3506.301	29.415	268.556	573.9	379.7	11231.3	-18.05	-0.68	27.31
278.0	3506.484	29.540	272.262	537.8	378.3	11286.1	-18.06	-0.66	27.47
280.0	3506.655	29.664	275.986	501.6	377.0	11341.2	-18.10	-0.64	27.63
282.0	3506.814	29.788	279.728	465.3	375.7	11396.6	-18.15	-0.63	27.75
284.0	3506.961	29.911	283.488	428.9	374.4	11452.2	-18.20	-0.62	27.86
286.0	3507.097	30.034	287.267	392.5	373.2	11508.1	-18.24	-0.63	28.03
288.0	3507.220	30.157	291.064	355.9	371.9	11564.4	-18.27	-0.65	28.25
290.0	3507.331	30.279	294.880	319.3	370.6	11621.2	-18.32	-0.65	28.48
292.0	3507.430	30.401	298.715	282.6	369.2	11678.3	-18.35	-0.64	28.64
294.0	3507.517	30.522	302.568	245.9	368.0	11735.7	-18.37	-0.63	28.73
296.0	3507.592	30.643	306.440	209.2	366.7	11793.3	-18.41	-0.60	28.86
298.0	3507.654	30.764	310.332	172.5	365.5	11851.2	-18.47	-0.58	29.05
300.0	3507.705	30.884	314.242	135.7	364.3	11909.5	-18.53	-0.58	29.24
302.0	3507.743	31.003	318.172	97.9	363.1	11968.1	-18.56	-0.59	29.40
304.0	3507.769	31.123	322.121	60.7	361.9	12027.1	-18.59	-0.61	29.55
306.0	3507.783	31.242	326.090	23.4	360.7	12086.4	-18.63	-0.61	29.73
308.0	3507.785	31.360	330.078	-13.9	359.4	12146.1	-18.70	-0.60	29.91
310.0	3507.774	31.478	334.086	-51.4	358.2	12206.1	-18.76	-0.60	30.09
312.0	3507.751	31.596	338.113	-88.1	357.0	12266.5	-18.83	-0.61	30.28
314.0	3507.715	31.713	342.161	-125.8	355.8	12327.2	-18.87	-0.60	30.46
316.0	3507.667	31.830	346.229	-164.6	354.6	12388.3	-18.91	-0.59	30.63
318.0	3507.607	31.947	350.316	-202.5	353.4	12449.8	-18.94	-0.58	30.80
320.0	3507.534	32.063	354.425	-240.5	352.2	12511.6	-19.00	-0.58	31.00
322.0	3507.449	32.179	358.553	-278.6	351.0	12573.8	-19.07	-0.58	31.21
324.0	3507.351	32.294	362.702	-316.9	349.8	12636.5	-19.15	-0.58	31.42
326.0	3507.240	32.409	366.872	-355.3	348.7	12699.5	-19.23	-0.58	31.62
328.0	3507.117	32.523	371.062	-393.9	347.5	12763.0	-19.30	-0.58	31.81
330.0	3506.981	32.638	375.274	-432.6	346.3	12826.8	-19.38	-0.56	31.97
S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
330.640	3506.934	32.674	376.626	-445.7	346.0	12847.2	-19.40	-0.58	32.02
332.0	3506.832	32.751	379.504	-474.1	345.2	12882.4	-21.64	-0.65	24.92

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
334.0	3506.668	32.865	383.752	-517.4	343.9	12932.3	-21.62	-0.57	24.92
336.0	3506.491	32.978	388.017	-560.4	342.8	12982.1	-21.32	-0.58	24.92
338.0	3506.299	33.090	392.298	-602.5	341.5	13032.0	-20.59	-0.67	24.90
340.0	3506.095	33.203	396.596	-642.4	340.2	13081.7	-19.69	-0.64	24.78
342.0	3505.877	33.314	400.910	-681.0	338.9	13130.4	-18.87	-0.65	24.58
344.0	3505.646	33.426	405.240	-718.2	337.6	13179.5	-18.27	-0.67	24.46
346.0	3505.404	33.537	409.586	-754.4	336.2	13228.4	-17.90	-0.68	24.44
348.0	3505.150	33.647	413.948	-790.0	334.8	13277.3	-17.70	-0.66	24.46
350.0	3504.884	33.757	418.326	-825.3	333.5	13326.3	-17.62	-0.62	24.52
352.0	3504.607	33.867	422.721	-860.6	332.3	13375.4	-17.64	-0.60	24.64
354.0	3504.317	33.976	427.132	-896.0	331.1	13424.9	-17.74	-0.60	24.82
356.0	3504.017	34.085	431.559	-931.7	329.8	13474.8	-17.88	-0.61	25.02
358.0	3503.704	34.193	436.002	-967.6	328.6	13525.0	-18.02	-0.62	25.19
360.0	3503.380	34.301	440.463	-1003.9	327.3	13575.6	-18.16	-0.64	25.36
362.0	3503.043	34.409	444.939	-1040.3	326.0	13626.5	-18.30	-0.65	25.54
364.0	3502.695	34.516	449.433	-1077.2	324.7	13677.8	-18.45	-0.65	25.75
366.0	3502.334	34.622	453.944	-1114.2	323.4	13729.5	-18.58	-0.61	25.94
368.0	3501.961	34.728	458.471	-1151.5	322.2	13781.5	-18.66	-0.59	26.08
370.0	3501.576	34.834	463.016	-1189.0	321.0	13833.9	-18.74	-0.59	26.22
372.0	3501.178	34.940	467.579	-1226.6	319.8	13886.5	-18.83	-0.58	26.39
374.0	3500.768	35.045	472.158	-1264.4	318.6	13939.4	-18.94	-0.56	26.56
376.0	3500.346	35.150	476.755	-1302.4	317.5	13992.7	-19.01	-0.54	26.71
378.0	3499.911	35.254	481.370	-1340.6	316.4	14046.3	-19.07	-0.53	26.87
380.0	3499.463	35.358	486.002	-1379.8	315.3	14100.3	-19.16	-0.55	27.06
382.0	3499.003	35.461	490.652	-1417.3	314.2	14154.6	-19.24	-0.56	27.23
384.0	3498.530	35.565	495.320	-1455.9	313.1	14209.2	-19.29	-0.53	27.37
386.0	3498.045	35.668	500.006	-1494.6	312.0	14264.1	-19.34	-0.50	27.53
388.0	3497.547	35.770	504.711	-1533.4	311.0	14319.4	-19.41	-0.49	27.70
390.0	3497.035	35.872	509.433	-1572.3	310.0	14374.9	-19.48	-0.50	27.86
392.0	3496.511	35.974	514.174	-1611.4	308.9	14430.8	-19.54	-0.51	28.00
394.0	3495.975	36.076	518.933	-1650.6	307.9	14487.0	-19.61	-0.51	28.16
396.0	3495.425	36.177	523.711	-1689.9	306.9	14543.5	-19.69	-0.50	28.34
398.0	3494.862	36.278	528.507	-1729.4	305.9	14600.4	-19.77	-0.48	28.51
400.0	3494.286	36.378	533.323	-1769.1	304.9	14657.6	-19.83	-0.46	28.67
402.0	3493.698	36.478	538.157	-1808.8	304.0	14715.1	-19.91	-0.45	28.84
404.0	3493.096	36.578	543.010	-1948.8	303.0	14773.0	-19.99	-0.46	29.02
406.0	3492.480	36.678	547.882	-1888.9	302.1	14831.2	-20.07	-0.50	29.20
408.0	3491.852	36.777	552.774	-1929.1	301.0	14889.8	-20.14	-0.53	29.38
410.0	3491.210	36.876	557.684	-1969.6	300.0	14948.8	-20.23	-0.50	29.56
412.0	3490.555	36.975	562.615	-2010.2	299.0	15008.1	-20.33	-0.44	29.75
414.0	3489.887	37.073	567.564	-2051.0	298.1	15067.8	-20.41	-0.41	29.93
416.0	3489.205	37.171	572.534	-2091.9	297.3	15127.9	-20.49	-0.41	30.11
418.0	3488.510	37.269	577.523	-2133.0	296.4	15188.3	-20.58	-0.43	30.28

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
420.0	3487.801	37.366	582.533	-2174.4	295.5	15249.0	-20.69	-0.43	30.46
422.0	3487.078	37.463	587.562	-2215.9	294.6	15310.2	-20.79	-0.43	30.66
424.0	3486.342	37.560	592.612	-2257.6	293.7	15371.7	-20.88	-0.44	30.85
426.0	3485.592	37.657	597.682	-2299.5	292.9	15433.6	-20.96	-0.43	31.04
428.0	3484.828	37.753	602.772	-2341.5	292.0	15495.9	-21.04	-0.41	31.24
430.0	3484.051	37.849	607.883	-2383.8	291.2	15558.6	-21.14	-0.39	31.43
432.0	3483.259	37.945	613.014	-2426.2	290.4	15621.6	-21.25	-0.39	31.61
434.0	3482.454	38.040	618.167	-2468.9	289.6	15685.1	-21.34	-0.39	31.81
436.0	3481.634	38.135	623.340	-2511.6	288.8	15748.9	-21.39	-0.39	32.03
438.0	3480.800	38.230	628.535	-2554.5	288.0	15813.2	-21.46	-0.39	32.24
440.0	3479.952	38.325	633.750	-2597.6	287.2	15877.9	-21.58	-0.38	32.44
442.0	3479.090	38.419	638.987	-2641.0	286.4	15943.0	-21.73	-0.37	32.64
444.0	3478.213	38.513	644.246	-2684.6	285.6	16008.6	-21.87	-0.38	32.85
446.0	3477.323	38.607	649.526	-2728.5	284.8	16074.5	-21.96	-0.38	33.07
448.0	3476.417	38.701	654.828	-2772.6	284.0	16140.8	-22.05	-0.37	33.27
450.0	3475.497	38.794	660.152	-2816.9	283.3	16207.6	-22.17	-0.34	33.49
452.0	3474.563	38.887	665.498	-2861.4	282.6	16274.8	-22.29	-0.32	33.71
454.0	3473.614	38.980	670.866	-2906.2	282.0	16342.5	-22.42	-0.31	33.93
456.0	3472.650	39.073	676.256	-2951.2	281.3	16410.6	-22.55	-0.29	34.15
458.0	3471.671	39.165	681.669	-2996.4	280.7	16479.2	-22.62	-0.29	34.38
460.0	3470.677	39.258	687.105	-3042.0	280.1	16548.1	-22.83	-0.31	34.59
462.0	3469.668	39.350	692.563	-3087.9	279.4	16617.5	-23.07	-0.32	34.77
464.0	3468.644	39.442	698.045	-3134.1	278.8	16687.3	-23.12	-0.31	34.97
466.0	3467.605	39.533	703.549	-3180.4	278.1	16757.5	-23.07	-0.29	35.19
468.0	3466.550	39.625	709.076	-3226.7	277.5	16828.0	-23.10	-0.28	35.41
470.0	3465.481	39.716	714.627	-3273.1	277.0	16899.1	-23.31	-0.27	35.63
472.0	3464.396	39.807	720.201	-3320.0	276.4	16970.6	-23.59	-0.25	35.88
474.0	3463.295	39.898	725.799	-3367.3	275.9	17042.7	-23.66	-0.25	36.15
476.0	3462.179	39.989	731.421	-3414.8	275.4	17115.2	-23.77	-0.26	36.40
478.0	3461.047	40.079	737.066	-3462.5	274.8	17188.3	-23.89	-0.25	36.62
480.0	3459.899	40.170	742.736	-3510.5	274.3	17261.8	-24.04	-0.24	36.85
482.0	3458.736	40.260	748.430	-3558.8	273.8	17335.8	-24.19	-0.24	37.11
484.0	3457.557	40.350	754.149	-3607.4	273.3	17410.3	-24.34	-0.24	37.37
486.0	3456.361	40.440	759.892	-3656.3	272.8	17485.3	-24.50	-0.23	37.65
488.0	3455.149	40.530	765.659	-3705.5	272.3	17560.9	-24.65	-0.23	37.91
490.0	3453.922	40.619	771.452	-3755.0	271.8	17637.0	-24.80	-0.22	38.16
492.0	3452.677	40.709	777.270	-3804.8	271.4	17713.6	-24.94	-0.22	38.42
494.0	3451.417	40.798	783.113	-3854.9	270.9	17790.7	-25.09	-0.22	38.70
496.0	3450.140	40.887	788.982	-3905.4	270.5	17868.5	-25.26	-0.21	38.99
498.0	3448.846	40.976	794.877	-3956.1	270.0	17946.7	-25.42	-0.20	39.28
500.0	3447.535	41.065	800.797	-4007.2	269.6	18025.6	-25.58	-0.18	39.54
502.0	3446.208	41.153	806.743	-4058.6	269.2	18104.9	-25.75	-0.17	39.81
504.0	3444.863	41.242	812.716	-4110.3	268.9	18184.9	-25.91	-0.17	40.10

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
506.0	3443.502	41.330	818.715	-4162.3	268.5	18265.4	-26.07	-0.18	40.41
508.0	3442.123	41.419	824.740	-4214.7	268.1	18346.6	-26.23	-0.17	40.72
510.0	3440.727	41.507	830.793	-4267.4	267.7	18428.3	-26.42	-0.17	41.02
512.0	3439.314	41.595	836.872	-4320.5	267.4	18510.7	-26.60	-0.15	41.32
514.0	3437.883	41.683	842.978	-4373.9	267.1	18593.6	-26.79	-0.13	41.62
516.0	3436.434	41.771	849.112	-4427.8	266.8	18677.2	-26.99	-0.12	41.93
518.0	3434.968	41.858	855.274	-4482.0	266.5	18761.4	-27.19	-0.11	42.25
520.0	3433.484	41.946	861.463	-4536.6	266.3	18846.3	-27.39	-0.11	42.60
522.0	3431.982	42.034	867.681	-4591.7	266.0	18931.8	-27.59	-0.11	42.94
524.0	3430.461	42.121	873.927	-4647.1	265.8	19018.0	-27.79	-0.09	43.23
526.0	3428.922	42.209	880.201	-4703.0	265.6	19104.8	-27.99	-0.07	43.54
528.0	3427.365	42.296	886.504	-4759.3	265.5	19192.3	-28.20	-0.06	43.90
530.0	3425.789	42.383	892.835	-4815.9	265.3	19280.4	-28.41	-0.07	44.24
532.0	3424.194	42.471	899.196	-4873.1	265.1	19369.3	-28.58	-0.10	44.59
534.0	3422.581	42.558	905.587	-4930.5	265.0	19458.8	-28.76	-0.03	44.94
536.0	3420.949	42.645	912.007	-4988.3	264.9	19549.0	-28.93	-0.05	45.29
538.0	3419.297	42.732	918.456	-5046.8	264.7	19638.4	-29.25	-0.01	40.17
540.0	3417.626	42.820	924.931	-5105.5	264.6	19708.2	-29.44	-0.09	33.33
542.0	3415.936	42.907	931.428	-5164.8	264.5	19774.9	-29.77	-0.05	33.35
544.0	3414.226	42.994	937.949	-5224.9	264.2	19841.6	-30.17	-0.16	33.38
546.0	3412.496	43.081	944.490	-5285.4	263.9	19908.4	-30.36	-0.13	33.45
548.0	3410.747	43.167	951.054	-5346.4	263.6	19975.4	-30.52	-0.10	33.57
550.0	3408.977	43.254	957.640	-5407.6	263.4	20042.7	-30.66	-0.07	33.70
552.0	3407.187	43.341	964.248	-5469.1	263.3	20109.9	-30.76	-0.05	33.85
554.0	3405.376	43.427	970.879	-5530.9	263.2	20177.8	-30.96	-0.02	34.02
556.0	3403.546	43.514	977.532	-5592.9	263.1	20246.0	-31.05	-0.02	34.19
558.0	3401.694	43.601	984.209	-5655.1	263.0	20314.5	-31.05	-0.06	34.36
560.0	3399.823	43.687	990.908	-5717.3	262.8	20383.4	-31.12	-0.07	34.54
562.0	3397.930	43.774	997.630	-5779.9	262.7	20452.7	-31.38	-0.04	34.73
564.0	3396.018	43.860	1004.373	-5843.1	262.6	20522.3	-31.76	0.00	34.92
566.0	3394.084	43.946	1011.140	-5907.0	262.6	20592.4	-32.01	-0.00	35.11
568.0	3392.129	44.033	1017.930	-5971.3	262.6	20662.8	-32.25	0.01	35.32
570.0	3390.153	44.119	1024.743	-6036.1	262.6	20733.7	-32.49	0.04	35.53
572.0	3388.155	44.206	1031.579	-6101.4	262.7	20805.2	-32.72	0.06	35.72
574.0	3386.136	44.292	1038.439	-6167.2	262.7	20876.9	-32.92	0.06	35.90
576.0	3384.095	44.379	1045.323	-6233.3	262.8	20948.9	-33.11	0.05	36.10
578.0	3382.033	44.465	1052.230	-6299.8	262.9	21021.3	-33.33	0.06	36.31
580.0	3379.948	44.552	1059.161	-6366.7	263.0	21094.2	-33.55	0.08	36.51
582.0	3377.841	44.638	1066.117	-6434.1	263.1	21167.4	-33.76	0.08	36.71
584.0	3375.712	44.725	1073.096	-6501.9	263.3	21241.0	-33.96	0.08	36.90
586.0	3373.561	44.812	1080.100	-6570.1	263.3	21315.0	-34.16	0.08	37.06
588.0	3371.387	44.898	1087.127	-6638.7	263.5	21389.3	-34.36	0.14	37.19
590.0	3369.191	44.985	1094.181	-6707.6	263.8	21463.9	-34.56	0.27	37.34

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
592.0	3366.971	45.072	1101.259	-6777.0	263.8	21538.7	-34.76	-0.01	37.49
S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
592.640	3366.256	45.100	1103.528	-6799.3	263.6	21562.7	-34.82	-0.03	37.54
S-II/S-IVB SEPARATION COMMAND									
593.500	3365.292	45.137	1106.581	-6825.7	263.6	21568.7	-28.87	-0.26	-10.55
594.0	3364.730	45.159	1108.355	-6840.1	263.5	21563.4	-28.85	-0.26	-10.55
596.0	3362.469	45.246	1115.451	-6897.7	262.9	21542.3	-28.85	-0.30	-10.56
598.0	3360.189	45.332	1122.537	-6955.7	262.3	21524.1	-29.73	-0.43	1.07
600.0	3357.889	45.418	1129.624	-7017.0	261.7	21534.8	-30.98	-0.21	6.94
602.0	3355.569	45.504	1136.716	-7079.0	261.3	21548.9	-30.99	-0.19	7.21
604.0	3353.229	45.590	1143.811	-7141.2	260.8	21563.5	-31.16	-0.31	7.36
606.0	3350.868	45.676	1150.911	-7204.5	260.0	21578.3	-31.71	-0.41	7.41
608.0	3348.486	45.761	1158.016	-7268.3	259.1	21593.2	-32.09	-0.44	7.42
610.0	3346.083	45.846	1165.126	-7332.6	258.2	21608.1	-32.18	-0.41	7.48
612.0	3343.659	45.931	1172.241	-7397.1	257.4	21623.1	-32.12	-0.36	7.48
614.0	3341.213	46.016	1179.361	-7461.5	256.7	21638.1	-32.16	-0.33	7.49
616.0	3338.747	46.100	1186.486	-7526.0	256.1	21653.1	-32.28	-0.27	7.49
618.0	3336.259	46.184	1193.615	-7590.6	255.5	21668.1	-32.33	-0.22	7.47
620.0	3333.750	46.269	1200.750	-7655.4	255.1	21683.0	-32.35	-0.18	7.44
622.0	3331.219	46.352	1207.890	-7720.3	254.7	21697.9	-32.44	-0.18	7.39
624.0	3328.667	46.436	1215.034	-7785.4	254.3	21712.6	-32.57	-0.17	7.32
626.0	3326.094	46.520	1222.183	-7850.7	254.0	21727.2	-32.68	-0.13	7.27
628.0	3323.499	46.603	1229.339	-7916.2	253.7	21741.8	-32.73	-0.09	7.25
630.0	3320.882	46.687	1236.496	-7981.7	253.6	21756.3	-32.74	-0.05	7.25
632.0	3318.244	46.770	1243.660	-8047.3	253.4	21770.9	-32.76	-0.06	7.26
634.0	3315.585	46.854	1250.828	-8112.9	253.3	21785.4	-32.79	-0.05	7.25
636.0	3312.904	46.937	1258.002	-8178.7	253.1	21799.9	-32.86	-0.04	7.23
638.0	3310.201	47.020	1265.180	-8244.5	253.0	21814.4	-32.94	-0.02	7.18
640.0	3307.476	47.104	1272.362	-8310.5	253.0	21828.7	-33.01	-0.00	7.12
642.0	3304.730	47.187	1279.550	-8376.7	252.9	21842.9	-33.06	0.00	7.07
644.0	3301.962	47.270	1286.742	-8443.0	252.9	21857.0	-33.11	-0.01	7.02
646.0	3299.172	47.353	1293.939	-8509.3	252.8	21871.0	-33.16	-0.02	6.98
648.0	3296.360	47.437	1301.140	-8575.7	252.8	21885.0	-33.20	-0.02	6.94
650.0	3293.526	47.520	1308.346	-8642.3	252.7	21898.9	-33.24	0.00	6.93
652.0	3290.670	47.603	1315.556	-8708.9	252.7	21912.8	-33.28	0.01	6.93
654.0	3287.793	47.686	1322.771	-8775.6	252.6	21926.7	-33.33	-0.00	6.92
656.0	3284.893	47.769	1329.991	-8842.3	252.6	21940.5	-33.36	-0.01	6.91
658.0	3281.972	47.852	1337.215	-8909.2	252.5	21954.3	-33.39	0.00	6.89
660.0	3279.028	47.936	1344.444	-8976.1	252.5	21968.1	-33.44	0.02	6.85

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
662.0	3276.063	48.019	1351.677	-9043.1	252.5	21981.8	-33.52	0.02	6.80
664.0	3273.075	48.102	1358.915	-9110.3	252.5	21995.4	-33.58	0.02	6.76
666.0	3270.065	48.185	1366.157	-9177.6	252.5	22008.9	-33.61	0.02	6.71
668.0	3267.033	48.268	1373.404	-9244.9	252.5	22022.3	-33.64	0.01	6.69
670.0	3263.979	48.351	1380.655	-9312.3	252.5	22035.7	-33.67	0.01	6.68
672.0	3260.903	48.434	1387.910	-9379.8	252.5	22049.0	-33.69	0.01	6.64
674.0	3257.804	48.517	1395.170	-9447.3	252.5	22062.3	-33.74	0.01	6.59
676.0	3254.684	48.600	1402.434	-9514.9	252.5	22075.5	-33.80	0.01	6.55
678.0	3251.540	48.684	1409.702	-9582.6	252.4	22088.6	-33.86	0.01	6.53
680.0	3248.375	48.767	1416.975	-9650.5	252.4	22101.7	-33.91	0.01	6.51
682.0	3245.187	48.850	1424.252	-9718.4	252.4	22114.7	-33.96	0.01	6.48
684.0	3241.977	48.933	1431.534	-9786.5	252.4	22127.7	-34.01	0.01	6.46
686.0	3238.745	49.016	1438.819	-9854.6	252.3	22140.6	-34.04	0.01	6.43
688.0	3235.490	49.099	1446.109	-9922.8	252.3	22153.4	-34.06	0.01	6.39
690.0	3232.212	49.182	1453.403	-9991.1	252.3	22166.2	-34.10	0.01	6.37
692.0	3228.913	49.265	1460.701	-10059.5	252.2	22179.0	-34.17	-0.00	6.35
694.0	3225.590	49.348	1468.004	-10127.9	252.2	22191.7	-34.22	-0.02	6.33
696.0	3222.245	49.431	1475.311	-10196.5	252.1	22204.4	-34.24	-0.03	6.31
698.0	3218.878	49.514	1482.621	-10265.1	252.0	22217.0	-34.27	-0.01	6.29
700.0	3215.488	49.597	1489.936	-10333.7	252.0	22229.5	-34.32	0.00	6.25
702.0	3212.075	49.680	1497.255	-10402.5	251.9	22242.1	-34.39	-0.01	6.21
704.0	3208.639	49.763	1504.579	-10471.5	251.8	22254.5	-34.44	-0.03	6.19
706.0	3205.181	49.846	1511.906	-10540.5	251.7	22266.9	-34.47	-0.03	6.16
708.0	3201.700	49.928	1519.237	-10609.5	251.6	22279.2	-34.49	-0.03	6.13
710.0	3198.197	50.011	1526.573	-10678.6	251.5	22291.5	-34.51	-0.03	6.12
712.0	3194.670	50.094	1533.912	-10747.8	251.4	22303.7	-34.54	-0.03	6.11
714.0	3191.121	50.177	1541.256	-10817.0	251.3	22316.0	-34.60	-0.02	6.11
716.0	3187.549	50.259	1548.603	-10886.3	251.2	22328.2	-34.65	-0.02	6.11
718.0	3183.955	50.342	1555.955	-10955.8	251.1	22340.5	-34.72	-0.03	6.09
720.0	3180.337	50.425	1563.310	-11025.5	251.1	22352.6	-34.87	-0.01	6.03
722.0	3176.696	50.507	1570.670	-11095.5	251.0	22364.6	-35.06	-0.00	5.94
724.0	3173.033	50.590	1578.033	-11165.8	250.9	22376.5	-35.17	-0.01	5.88
726.0	3169.346	50.673	1585.400	-11236.3	250.9	22388.3	-35.17	-0.02	5.88
728.0	3165.636	50.755	1592.772	-11306.6	250.8	22400.1	-35.10	-0.02	5.88
730.0	3161.902	50.838	1600.147	-11376.9	250.7	22411.8	-35.08	-0.01	5.86
732.0	3158.146	50.920	1607.526	-11447.2	250.7	22423.6	-35.08	0.00	5.85
734.0	3154.367	51.003	1614.909	-11517.4	250.6	22435.4	-35.05	-0.00	5.87
736.0	3150.564	51.085	1622.295	-11587.6	250.6	22447.1	-35.02	-0.03	5.91
738.0	3146.738	51.168	1629.686	-11657.6	250.4	22458.9	-34.96	-0.04	5.91
740.0	3142.890	51.250	1637.080	-11727.6	250.3	22470.7	-34.94	-0.04	5.91
742.0	3139.018	51.332	1644.479	-11797.6	250.2	22482.5	-34.95	-0.03	5.90
744.0	3135.123	51.415	1651.881	-11867.6	250.1	22494.3	-34.97	-0.08	5.90
746.0	3131.205	51.497	1659.287	-11937.7	250.0	22506.1	-34.98	-0.02	5.89

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
749.0	3127.264	51.579	1666.697	-12007.7	250.0	22517.9	-34.99	-0.03	5.89
S-IVB 1ST GUIDANCE CUTOFF									
749.830	3123.638	51.655	1673.480	-12071.9	249.7	22528.7	-35.01	-0.04	5.88
750.0	3123.300	51.662	1674.111	-12077.8	249.6	22529.7	-35.01	-0.04	5.88
752.0	3119.316	51.744	1681.522	-12133.2	249.0	22503.0	-26.56	-0.36	-14.64
754.0	3115.314	51.826	1688.924	-12186.2	248.3	22473.9	-26.55	-0.37	-14.65
756.0	3111.294	51.907	1696.317	-12239.2	247.5	22444.9	-26.55	-0.38	-14.66
758.0	3107.257	51.989	1703.700	-12292.1	246.7	22415.7	-26.54	-0.38	-14.67
PARKING ORBIT INSERTION									
759.830	3103.547	52.062	1710.446	-12340.6	246.0	22389.1	-26.54	-0.38	-14.68

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	FP VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
	GUIDANCE REFERENCE RELEASE										
-16.961	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-16.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-15.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-14.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-13.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-12.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-11.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-10.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-9.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-8.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-7.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-6.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-5.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-4.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-3.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-2.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
-1.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
0.0	3441.336	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	196
	ALL HOLDDOWN ARMS RELEASED										
0.300	3441.336	-80.6041	28.4470	0.0	90.00	0.1	90.00	0.01	1340.7	0.0	196
	START OF TIME BASE 1										
0.600	3441.336	-80.6041	28.4470	20.04	88.03	0.9	90.00	0.04	1340.7	0.000	196
1.0	3441.337	-80.6041	28.4470	357.30	87.55	2.7	90.00	0.11	1340.7	0.000	196
2.0	3441.337	-80.6041	28.4470	344.78	85.73	9.4	89.97	0.40	1340.5	0.000	202
3.0	3441.340	-80.6041	28.4470	342.40	85.05	16.5	89.94	0.70	1340.3	0.000	215
4.0	3441.343	-80.6041	28.4470	341.05	85.94	23.8	89.93	1.01	1340.3	0.001	235
5.0	3441.347	-80.6041	28.4470	338.84	87.18	31.4	89.94	1.34	1340.5	0.001	263
6.0	3441.353	-80.6041	28.4470	336.62	88.09	39.1	89.95	1.67	1340.7	0.001	298
7.0	3441.360	-80.6041	28.4470	330.35	88.88	47.0	89.97	2.01	1341.1	0.001	341
8.0	3441.369	-80.6041	28.4470	309.98	89.47	55.1	89.99	2.35	1341.4	0.001	392
9.0	3441.378	-80.6041	28.4470	240.66	89.65	63.3	90.01	2.70	1341.8	0.001	451
10.0	3441.390	-80.6041	28.4470	197.82	89.30	71.7	90.04	3.06	1342.3	0.001	519
11.0	3441.402	-80.6041	28.4470	186.33	88.86	80.2	90.07	3.42	1342.9	0.001	595
12.0	3441.416	-80.6041	28.4470	185.40	88.69	88.9	90.09	3.79	1343.5	0.001	679
13.0	3441.431	-80.6041	28.4470	193.25	88.66	97.7	90.10	4.17	1343.7	0.001	772
14.0	3441.448	-80.6041	28.4470	199.51	88.65	106.8	90.10	4.56	1344.1	0.001	875

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	3441.466	-80.6042	28.4470	199.55	88.73	116.1	90.10	4.95	1344.9	0.001	986
16.0	3441.486	-80.6042	28.4469	195.28	88.83	125.6	90.11	5.35	1345.9	0.001	1107
17.0	3441.508	-80.6042	28.4469	187.97	88.94	135.3	90.11	5.76	1347.2	0.002	1237
18.0	3441.531	-80.6042	28.4469	178.06	89.04	145.2	90.10	6.18	1348.7	0.002	1377
19.0	3441.556	-80.6042	28.4469	165.28	89.12	155.3	90.10	6.61	1350.3	0.002	1528
20.0	3441.582	-80.6042	28.4469	148.00	89.17	165.7	90.09	7.04	1352.2	0.002	1688
21.0	3441.610	-80.6041	28.4469	127.23	89.12	176.4	90.07	7.48	1354.5	0.003	1859
22.0	3441.640	-80.6041	28.4469	110.26	88.94	187.4	90.05	7.93	1357.0	0.003	2041
23.0	3441.672	-80.6041	28.4469	98.83	88.66	198.6	90.03	8.40	1360.0	0.003	2234
24.0	3441.705	-80.6041	28.4469	91.24	88.31	210.2	90.01	8.86	1363.3	0.003	2438
25.0	3441.741	-80.6041	28.4469	86.11	87.92	221.9	89.98	9.34	1367.0	0.004	2654
26.0	3441.779	-80.6041	28.4469	82.43	87.48	234.0	89.94	9.82	1371.1	0.005	2882
27.0	3441.818	-80.6040	28.4469	79.82	87.01	246.2	89.90	10.30	1375.6	0.006	3122
28.0	3441.859	-80.6040	28.4469	77.98	86.51	258.7	89.86	10.78	1380.6	0.008	3374
29.0	3441.903	-80.6039	28.4469	76.67	85.98	271.4	89.82	11.27	1386.1	0.011	3638
30.0	3441.949	-80.6039	28.4469	75.74	85.44	284.5	89.77	11.75	1392.0	0.014	3915
31.0	3441.996	-80.6038	28.4470	75.06	84.88	297.8	89.71	12.25	1398.4	0.018	4206
32.0	3442.046	-80.6037	28.4470	74.58	84.32	311.5	89.66	12.74	1405.3	0.023	4509
33.0	3442.098	-80.6036	28.4470	74.24	83.75	325.4	89.60	13.24	1412.6	0.028	4826
34.0	3442.153	-80.6035	28.4470	73.99	83.19	339.7	89.54	13.74	1420.4	0.034	5156
35.0	3442.209	-80.6034	28.4471	73.82	82.63	354.4	89.48	14.24	1428.6	0.041	5500
36.0	3442.268	-80.6032	28.4471	73.67	82.08	369.3	89.41	14.74	1437.3	0.049	5859
37.0	3442.330	-80.6031	28.4472	73.52	81.52	384.6	89.34	15.25	1446.5	0.058	6232
38.0	3442.394	-80.6029	28.4472	73.37	80.96	400.3	89.26	15.75	1456.2	0.068	6620
39.0	3442.460	-80.6027	28.4472	73.22	80.39	416.3	89.18	16.25	1466.4	0.078	7023
40.0	3442.529	-80.6025	28.4473	73.08	79.81	432.7	89.10	16.75	1477.3	0.090	7441
41.0	3442.600	-80.6022	28.4474	72.96	79.21	449.4	89.01	17.25	1488.7	0.104	7875
42.0	3442.674	-80.6020	28.4474	72.87	78.61	466.6	88.91	17.74	1500.9	0.118	8324
43.0	3442.751	-80.6017	28.4475	72.81	77.98	484.1	88.81	18.23	1513.8	0.134	8790
44.0	3442.830	-80.6014	28.4476	72.78	77.33	502.2	88.71	18.71	1527.5	0.151	9272
45.0	3442.912	-80.6010	28.4477	72.77	76.66	520.6	88.60	19.18	1542.0	0.170	9770
46.0	3442.997	-80.6006	28.4478	72.79	75.98	539.5	88.49	19.64	1557.3	0.191	10285
47.0	3443.084	-80.6002	28.4479	72.82	75.28	558.9	88.37	20.09	1573.4	0.213	10817
48.0	3443.175	-80.5998	28.4480	72.86	74.57	578.7	88.25	20.54	1590.2	0.238	11366
49.0	3443.268	-80.5993	28.4482	72.91	73.86	599.0	88.13	20.97	1607.8	0.264	11933
50.0	3443.364	-80.5988	28.4483	72.96	73.15	619.7	88.01	21.39	1626.1	0.292	12517
51.0	3443.463	-80.5983	28.4484	73.00	72.44	640.9	87.88	21.80	1645.2	0.323	13120
52.0	3443.565	-80.5977	28.4486	73.04	71.74	662.7	87.75	22.21	1664.9	0.356	13740
53.0	3443.670	-80.5970	28.4488	73.06	71.04	684.9	87.61	22.60	1685.3	0.391	14379
54.0	3443.778	-80.5963	28.4490	73.08	70.35	707.6	87.47	22.99	1706.3	0.429	15036
55.0	3443.890	-80.5956	28.4492	73.09	69.67	730.9	87.33	23.37	1728.0	0.470	15712
56.0	3444.004	-80.5948	28.4494	73.08	68.99	754.6	87.18	23.73	1750.4	0.513	16407
57.0	3444.122	-80.5940	28.4496	73.06	68.33	778.8	87.03	24.09	1773.4	0.559	17121

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	3444.242	-80.5931	28.4498	73.03	67.67	803.6	86.88	24.43	1797.1	0.607	17855
59.0	3444.366	-80.5922	28.4501	72.99	67.03	829.0	86.72	24.77	1821.5	0.659	18609
60.0	3444.494	-80.5912	28.4503	72.94	66.39	854.9	86.55	25.10	1846.6	0.714	19382
61.0	3444.624	-80.5901	28.4506	72.89	65.75	881.4	86.39	25.42	1872.5	0.772	20176
62.0	3444.758	-80.5890	28.4509	72.84	65.12	908.6	86.22	25.72	1899.1	0.833	20990
63.0	3444.895	-80.5879	28.4512	72.80	64.49	936.3	86.05	26.02	1926.5	0.897	21825
64.0	3445.036	-80.5866	28.4516	72.77	63.86	964.6	85.88	26.30	1954.7	0.966	22681
65.0	3445.180	-80.5853	28.4519	72.74	63.24	993.4	85.71	26.56	1983.6	1.037	23558
66.0	3445.328	-80.5840	28.4523	72.73	62.61	1022.7	85.54	26.81	2013.3	1.113	24456
67.0	3445.479	-80.5825	28.4527	72.73	61.99	1052.6	85.37	27.05	2043.7	1.192	25375
68.0	3445.634	-80.5810	28.4531	72.73	61.36	1082.9	85.21	27.26	2074.8	1.275	26315
	MACH 1										
68.400	3445.697	-80.5804	28.4533	72.73	61.11	1095.2	85.14	27.34	2087.5	1.310	26697
69.0	3445.792	-80.5794	28.4535	72.73	60.73	1113.8	85.04	27.46	2106.8	1.363	27276
70.0	3445.954	-80.5778	28.4540	72.74	60.10	1145.3	84.87	27.65	2139.5	1.454	28259
71.0	3446.119	-80.5760	28.4545	72.75	59.47	1177.4	84.70	27.82	2173.0	1.550	29263
72.0	3446.288	-80.5742	28.4550	72.75	58.84	1210.1	84.54	27.98	2207.3	1.651	30288
73.0	3446.460	-80.5723	28.4555	72.76	58.21	1243.5	84.37	28.12	2242.5	1.756	31335
74.0	3446.636	-80.5703	28.4560	72.76	57.59	1277.7	84.20	28.25	2278.5	1.866	32404
75.0	3446.815	-80.5683	28.4566	72.76	56.97	1312.6	84.03	28.38	2315.3	1.981	33494
76.0	3446.998	-80.5661	28.4572	72.76	56.36	1348.2	83.85	28.49	2352.9	2.101	34606
77.0	3447.184	-80.5638	28.4578	72.75	55.76	1384.6	83.68	28.60	2391.4	2.227	35740
78.0	3447.375	-80.5614	28.4585	72.74	55.17	1421.8	83.51	28.70	2430.6	2.357	36896
79.0	3447.569	-80.5590	28.4591	72.74	54.59	1459.9	83.34	28.79	2470.7	2.494	38075
80.0	3447.766	-80.5564	28.4598	72.74	54.02	1498.8	83.18	28.88	2511.6	2.635	39277
81.0	3447.968	-80.5538	28.4606	72.74	53.47	1538.5	83.01	28.96	2553.4	2.783	40503
	MAXIMUM DYNAMIC PRESSURE										
81.300	3448.029	-80.5529	28.4608	72.73	53.30	1550.6	82.96	28.98	2566.2	2.829	40876
82.0	3448.173	-80.5510	28.4613	72.73	52.92	1579.0	82.85	29.03	2596.1	2.936	41751
83.0	3448.382	-80.5481	28.4621	72.73	52.38	1620.3	82.69	29.09	2639.6	3.096	43024
84.0	3448.596	-80.5451	28.4629	72.73	51.84	1662.5	82.52	29.15	2684.0	3.261	44320
85.0	3448.813	-80.5420	28.4638	72.73	51.31	1705.5	82.36	29.19	2729.2	3.433	45640
86.0	3449.034	-80.5388	28.4647	72.72	50.79	1749.3	82.21	29.23	2775.4	3.612	46984
87.0	3449.259	-80.5354	28.4656	72.72	50.27	1794.0	82.05	29.26	2822.4	3.796	48353
88.0	3449.488	-80.5320	28.4665	72.71	49.75	1839.6	81.89	29.29	2870.3	3.988	49745
89.0	3449.721	-80.5284	28.4675	72.70	49.24	1886.0	81.73	29.30	2919.2	4.187	51163
90.0	3449.958	-80.5246	28.4685	72.69	48.73	1933.3	81.57	29.32	2969.1	4.393	52605
91.0	3450.199	-80.5208	28.4696	72.68	48.22	1981.6	81.42	29.33	3020.0	4.606	54071
92.0	3450.445	-80.5163	28.4707	72.67	47.71	2030.7	81.26	29.33	3071.8	4.826	55562

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
93.0	3450.694	-80.5127	28.4718	72.65	47.19	2080.8	81.10	29.24	3124.7	5.054	57078
94.0	3450.947	-80.5084	28.4730	72.63	46.67	2131.7	80.95	29.20	3178.6	5.290	58617
95.0	3451.204	-80.5040	28.4742	72.62	46.15	2183.6	80.79	29.15	3233.6	5.534	60181
96.0	3451.465	-80.4994	28.4754	72.60	45.63	2236.5	80.64	29.08	3289.6	5.787	61770
97.0	3451.730	-80.4947	28.4767	72.59	45.11	2290.4	80.49	29.00	3346.7	6.048	63382
98.0	3451.999	-80.4899	28.4781	72.58	44.58	2345.3	80.34	28.92	3404.9	6.317	65017
99.0	3452.272	-80.4848	28.4795	72.57	44.06	2401.2	80.20	28.82	3464.1	6.596	66677
100.0	3452.549	-80.4796	28.4809	72.56	43.55	2458.1	80.05	28.72	3524.4	6.884	68360
101.0	3452.830	-80.4742	28.4824	72.55	43.04	2516.1	79.91	28.61	3585.7	7.180	70067
102.0	3453.114	-80.4687	28.4839	72.55	42.53	2575.0	79.77	28.50	3648.0	7.487	71797
103.0	3453.403	-80.4630	28.4855	72.54	42.03	2635.0	79.64	28.38	3711.4	7.803	73551
104.0	3453.695	-80.4571	28.4871	72.53	41.53	2696.0	79.50	28.26	3775.7	8.129	75329
105.0	3453.991	-80.4510	28.4888	72.52	41.04	2758.0	79.37	28.13	3841.0	8.465	77130
106.0	3454.291	-80.4448	28.4905	72.51	40.56	2821.0	79.24	28.00	3907.2	8.811	78954
107.0	3454.595	-80.4383	28.4923	72.51	40.08	2884.9	79.12	27.86	3974.5	9.168	80802
108.0	3454.902	-80.4317	28.4942	72.50	39.61	2950.0	78.99	27.72	4042.8	9.535	82673
109.0	3455.214	-80.4249	28.4961	72.50	39.14	3016.0	78.87	27.58	4112.2	9.913	84567
110.0	3455.529	-80.4178	28.4980	72.50	38.68	3083.2	78.76	27.43	4182.6	10.302	86485
111.0	3455.848	-80.4106	28.5000	72.50	38.22	3151.4	78.64	27.28	4254.1	10.702	88425
112.0	3456.171	-80.4032	28.5021	72.50	37.76	3220.8	78.53	27.12	4326.7	11.114	90388
113.0	3456.497	-80.3955	28.5042	72.50	37.32	3291.2	78.43	26.96	4400.3	11.537	92374
114.0	3456.828	-80.3877	28.5064	72.51	36.88	3362.7	78.32	26.80	4475.0	11.971	94383
115.0	3457.162	-80.3796	28.5086	72.51	36.44	3435.3	78.22	26.64	4550.7	12.418	96414
116.0	3457.499	-80.3713	28.5109	72.51	36.02	3509.1	78.12	26.48	4627.5	12.877	98469
117.0	3457.841	-80.3628	28.5132	72.52	35.61	3583.9	78.02	26.33	4705.3	13.348	100547
118.0	3458.186	-80.3541	28.5157	72.52	35.20	3660.0	77.92	26.17	4784.2	13.831	102647
119.0	3458.535	-80.3451	28.5181	72.53	34.81	3737.2	77.83	26.02	4864.2	14.328	104772
120.0	3458.888	-80.3359	28.5207	72.53	34.43	3815.6	77.74	25.86	4945.3	14.836	106920
121.0	3459.245	-80.3265	28.5233	72.53	34.06	3895.2	77.65	25.71	5027.6	15.358	109092
122.0	3459.606	-80.3168	28.5260	72.54	33.69	3976.1	77.57	25.57	5111.1	15.893	111288
123.0	3459.972	-80.3069	28.5287	72.54	33.34	4058.2	77.48	25.42	5195.7	16.441	113509
124.0	3460.341	-80.2967	28.5315	72.55	32.99	4141.6	77.40	25.28	5281.5	17.003	115755
125.0	3460.714	-80.2863	28.5344	72.56	32.65	4226.2	77.32	25.13	5368.5	17.579	118025
126.0	3461.091	-80.2757	28.5373	72.56	32.32	4312.0	77.25	24.99	5456.8	18.168	120321
127.0	3461.473	-80.2648	28.5403	72.57	31.98	4399.2	77.17	24.84	5546.3	18.771	122642
128.0	3461.858	-80.2536	28.5434	72.57	31.65	4487.7	77.09	24.69	5637.1	19.389	124987
129.0	3462.248	-80.2422	28.5466	72.58	31.32	4576.7	77.02	24.53	5729.4	20.021	127358
130.0	3462.642	-80.2305	28.5498	72.58	30.99	4667.0	76.95	24.39	5822.0	20.669	129754
131.0	3463.039	-80.2185	28.5531	72.59	30.68	4760.4	76.88	24.24	5916.0	21.330	132175
132.0	3463.441	-80.2062	28.5565	72.60	30.36	4854.4	76.81	24.09	6013.3	22.008	134621
133.0	3463.848	-80.1937	28.5599	72.61	30.05	4949.8	76.75	23.94	6111.8	22.700	137092
134.0	3464.258	-80.1809	28.5634	72.62	29.75	5046.5	76.68	23.79	6209.6	23.409	139589
135.0	3464.672	-80.1678	28.5670	72.63	29.45	5144.3	76.62	23.64	6310.0	24.133	142111

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	FF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
135.180	3464.748	-80.1654	28.5677	72.63	29.40	5162.8	76.61	23.61	6328.2	24.266	142569
136.0	3465.091	-80.1544	28.5707	72.64	29.17	5233.8	76.57	23.48	6401.1	24.873	144657
137.0	3465.512	-80.1408	28.5745	72.65	28.88	5310.4	76.52	23.32	6479.8	25.627	147221
138.0	3465.935	-80.1269	28.5783	72.66	28.60	5387.9	76.48	23.15	6559.6	26.392	149795
139.0	3466.360	-80.1128	28.5821	72.68	28.32	5466.5	76.45	22.99	6640.2	27.172	152384
140.0	3466.789	-80.0984	28.5861	72.70	28.05	5546.0	76.41	22.83	6721.9	27.965	154992
141.0	3467.220	-80.0838	28.5901	72.71	27.78	5626.7	76.37	22.67	6804.6	28.772	157612
142.0	3467.652	-80.0690	28.5941	72.73	27.52	5708.4	76.34	22.51	6888.3	29.591	160247
143.0	3468.088	-80.0539	28.5982	72.75	27.26	5791.3	76.31	22.36	6973.2	30.425	162896
144.0	3468.526	-80.0385	28.6024	72.77	27.01	5875.6	76.27	22.21	7059.4	31.273	165561
145.0	3468.966	-80.0229	28.6067	72.78	26.76	5960.9	76.24	22.06	7146.6	32.135	168241
146.0	3469.409	-80.0071	28.6110	72.80	26.51	6047.6	76.21	21.91	7235.2	33.011	170937
147.0	3469.855	-79.9909	28.6154	72.81	26.26	6135.5	76.17	21.76	7324.9	33.902	173649
148.0	3470.303	-79.9745	28.6198	72.83	26.02	6224.5	76.14	21.61	7415.7	34.807	176376
149.0	3470.753	-79.9578	28.6243	72.84	25.78	6314.9	76.11	21.46	7507.8	35.727	179120
150.0	3471.207	-79.9409	28.6289	72.85	25.55	6406.5	76.08	21.31	7601.2	36.663	181879
151.0	3471.663	-79.9236	28.6336	72.87	25.32	6499.3	76.04	21.17	7695.7	37.614	184655
152.0	3472.122	-79.9061	28.6383	72.88	25.09	6593.5	76.01	21.03	7791.6	38.580	187447
153.0	3472.583	-79.8883	28.6431	72.89	24.86	6689.0	75.98	20.89	7888.7	39.562	190256
154.0	3473.047	-79.8702	28.6480	72.91	24.64	6785.9	75.95	20.75	7987.2	40.560	193082
155.0	3473.514	-79.8518	28.6530	72.92	24.42	6884.2	75.92	20.61	8087.1	41.574	195925
156.0	3473.984	-79.8332	28.6580	72.93	24.21	6983.2	75.90	20.47	8187.6	42.604	198786
157.0	3474.457	-79.8142	28.6631	72.95	24.00	7084.3	75.87	20.33	8290.2	43.651	201664
158.0	3474.933	-79.7949	28.6683	72.96	23.79	7186.8	75.84	20.20	8394.2	44.714	204560
159.0	3475.411	-79.7753	28.6736	72.97	23.58	7290.8	75.81	20.07	8499.7	45.795	207474
160.0	3475.893	-79.7554	28.6789	72.99	23.38	7396.1	75.79	19.94	8606.5	46.892	210406
161.0	3476.378	-79.7351	28.6844	73.00	23.18	7502.9	75.76	19.81	8714.7	48.008	213358
162.0	3476.866	-79.7145	28.6899	73.01	22.98	7611.2	75.74	19.68	8824.3	49.141	216327
163.0	3477.357	-79.6937	28.6955	73.02	22.79	7720.8	75.71	19.55	8935.3	50.291	219316
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
163.600	3477.653	-79.6810	28.6989	73.03	22.68	7787.3	75.70	19.48	9002.5	50.991	221119
164.0	3477.850	-79.6725	28.7012	73.04	22.61	7819.3	75.69	19.43	9035.0	51.459	222321
	S-IC/S-II SEPARATION COMMAND										
164.300	3478.000	-79.6660	28.7029	73.04	22.55	7820.0	75.69	19.38	9036.3	51.815	223229
166.0	3478.833	-79.6297	28.7126	73.07	22.24	7802.2	75.71	19.10	9021.2	53.814	228303
168.0	3479.796	-79.5869	28.7240	73.10	21.86	7793.1	75.74	18.78	9015.2	56.170	234165

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
170.0	3480.745	-79.5441	28.7354	73.12	21.49	7811.1	75.75	18.46	9036.2	58.529	239942
172.0	3481.679	-79.5009	28.7469	73.15	21.12	7834.5	75.76	18.15	9062.5	60.901	245634
174.0	3482.602	-79.4576	28.7584	73.17	20.75	7862.0	75.76	17.84	9092.8	63.285	251252
176.0	3483.513	-79.4140	28.7699	73.20	20.40	7890.5	75.77	17.54	9124.0	65.684	256798
178.0	3484.412	-79.3701	28.7815	73.22	20.03	7920.3	75.78	17.24	9156.5	68.096	262273
180.0	3485.299	-79.3260	28.7932	73.25	19.68	7950.3	75.79	16.94	9189.2	70.521	267676
182.0	3486.175	-79.2816	28.8049	73.27	19.33	7981.1	75.80	16.65	9222.5	72.961	273008
184.0	3487.039	-79.2370	28.8166	73.30	18.99	8012.4	75.81	16.36	9256.3	75.415	278270
186.0	3487.891	-79.1920	28.8284	73.33	18.65	8044.4	75.82	16.07	9290.6	77.884	283462
188.0	3488.732	-79.1468	28.8403	73.35	18.31	8076.9	75.83	15.79	9325.5	80.366	288584
190.0	3489.562	-79.1013	28.8522	73.38	17.98	8110.0	75.84	15.51	9360.9	82.863	293637
192.0	3490.380	-79.0556	28.8641	73.41	17.65	8143.7	75.85	15.23	9396.8	85.374	298622
194.0	3491.187	-79.0096	28.8761	73.43	17.32	8177.9	75.86	14.96	9433.2	87.900	303538
196.0	3491.983	-78.9633	28.8882	73.46	17.00	8212.8	75.87	14.69	9470.2	90.440	308387
198.0	3492.768	-78.9167	28.9003	73.49	16.69	8248.4	75.88	14.42	9507.8	92.995	313170
200.0	3493.542	-78.8699	28.9124	73.51	16.37	8284.7	75.90	14.16	9546.0	95.565	317886
202.0	3494.306	-78.8227	28.9246	73.54	16.06	8321.5	75.91	13.90	9584.8	98.149	322537
204.0	3495.058	-78.7753	28.9369	73.57	15.76	8358.9	75.92	13.64	9624.1	100.749	327122
206.0	3495.800	-78.7275	28.9492	73.60	15.45	8396.8	75.93	13.39	9663.8	103.364	331642
208.0	3496.531	-78.6795	28.9615	73.62	15.16	8435.2	75.94	13.14	9703.9	105.994	336097
210.0	3497.252	-78.6312	28.9740	73.65	14.87	8473.8	75.95	12.90	9744.2	108.639	340491
212.0	3497.963	-78.5826	28.9864	73.67	14.60	8512.5	75.96	12.67	9784.5	111.299	344825
214.0	3498.665	-78.5338	28.9989	73.69	14.35	8551.2	75.97	12.46	9824.6	113.973	349104
216.0	3499.359	-78.4846	29.0115	73.71	14.12	8590.0	75.97	12.26	9864.6	116.663	353331
218.0	3500.045	-78.4352	29.0241	73.73	13.89	8628.8	75.98	12.07	9904.7	119.366	357511
220.0	3500.722	-78.3855	29.0368	73.75	13.67	8668.1	75.99	11.88	9945.2	122.084	361643
222.0	3501.393	-78.3356	29.0495	73.78	13.44	8707.8	76.00	11.70	9986.1	124.817	365729
224.0	3502.055	-78.2853	29.0623	73.80	13.22	8748.1	76.01	11.51	10027.5	127.564	369768
226.0	3502.710	-78.2348	29.0751	73.82	13.01	8788.8	76.01	11.33	10069.4	130.326	373761
228.0	3503.358	-78.1840	29.0880	73.84	12.79	8829.9	76.02	11.15	10111.7	133.102	377707
230.0	3503.997	-78.1329	29.1009	73.87	12.58	8871.5	76.03	10.97	10154.4	135.894	381608
232.0	3504.629	-78.0815	29.1139	73.89	12.37	8913.6	76.04	10.79	10197.5	138.700	385462
234.0	3505.254	-78.0299	29.1269	73.91	12.16	8956.1	76.05	10.61	10241.0	141.522	389270
236.0	3505.871	-77.9779	29.1400	73.94	11.95	8999.0	76.06	10.44	10285.0	144.359	393033
238.0	3506.480	-77.9256	29.1531	73.96	11.74	9042.4	76.08	10.26	10329.4	147.211	396750
240.0	3507.083	-77.8731	29.1663	73.99	11.54	9086.3	76.09	10.09	10374.2	150.078	400423
242.0	3507.677	-77.8202	29.1795	74.01	11.34	9130.5	76.10	9.92	10419.4	152.961	404050
244.0	3508.265	-77.7671	29.1928	74.04	11.14	9175.2	76.11	9.76	10465.0	155.860	407633
246.0	3508.845	-77.7137	29.2061	74.06	10.95	9220.4	76.12	9.59	10511.1	158.775	411171
248.0	3509.417	-77.6599	29.2195	74.09	10.75	9266.0	76.14	9.43	10557.5	161.705	414665
250.0	3509.983	-77.6059	29.2330	74.12	10.56	9312.1	76.15	9.26	10604.5	164.651	418115
252.0	3510.541	-77.5515	29.2464	74.14	10.37	9358.6	76.16	9.10	10651.9	167.613	421522
254.0	3511.092	-77.4968	29.2600	74.17	10.19	9405.6	76.18	8.95	10699.8	170.591	424885

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	FF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
256.0	3511.637	-77.4418	29.2736	74.20	10.00	9452.9	76.19	8.79	10747.8	173.586	428205
258.0	3512.173	-77.3865	29.2872	74.23	9.82	9500.7	76.21	8.63	10796.3	176.597	431482
260.0	3512.703	-77.3309	29.3009	74.25	9.64	9548.9	76.22	8.48	10845.3	179.624	434716
262.0	3513.226	-77.2749	29.3146	74.28	9.46	9597.6	76.24	8.33	10894.7	182.668	437908
264.0	3513.742	-77.2187	29.3284	74.31	9.29	9646.7	76.25	8.18	10944.5	185.729	441056
266.0	3514.251	-77.1621	29.3423	74.34	9.11	9696.2	76.27	8.03	10994.7	188.806	444163
268.0	3514.753	-77.1052	29.3562	74.37	8.94	9746.2	76.29	7.88	11045.4	191.900	447229
270.0	3515.248	-77.0479	29.3701	74.40	8.77	9796.7	76.30	7.74	11096.5	195.011	450253
272.0	3515.737	-76.9903	29.3841	74.43	8.61	9847.6	76.32	7.60	11148.0	198.140	453236
274.0	3516.219	-76.9324	29.3981	74.46	8.44	9898.9	76.34	7.46	11200.0	201.285	456178
276.0	3516.694	-76.8742	29.4122	74.49	8.28	9950.7	76.35	7.32	11252.4	204.448	459079
278.0	3517.162	-76.8156	29.4264	74.52	8.12	10003.0	76.37	7.18	11305.2	207.628	461940
280.0	3517.624	-76.7567	29.4406	74.55	7.96	10055.7	76.39	7.04	11358.6	210.826	464761
282.0	3518.079	-76.6974	29.4549	74.58	7.81	10108.9	76.41	6.91	11412.3	214.042	467542
284.0	3518.528	-76.6378	29.4691	74.61	7.65	10162.4	76.43	6.78	11466.4	217.275	470283
286.0	3518.970	-76.5778	29.4835	74.65	7.50	10216.4	76.45	6.65	11520.9	220.526	472986
288.0	3519.406	-76.5175	29.4979	74.68	7.35	10270.9	76.47	6.52	11575.9	223.796	475649
290.0	3519.835	-76.4569	29.5123	74.71	7.20	10326.0	76.48	6.39	11631.5	227.083	478273
292.0	3520.258	-76.3958	29.5268	74.74	7.06	10381.6	76.50	6.27	11687.5	230.389	480859
294.0	3520.675	-76.3345	29.5414	74.78	6.91	10437.6	76.52	6.14	11744.0	233.713	483407
296.0	3521.086	-76.2727	29.5560	74.81	6.77	10493.9	76.55	6.02	11800.8	237.056	485916
298.0	3521.490	-76.2106	29.5706	74.84	6.63	10550.7	76.57	5.90	11858.1	240.418	488388
300.0	3521.888	-76.1482	29.5853	74.88	6.50	10608.1	76.59	5.78	11915.8	243.798	490823
302.0	3522.280	-76.0853	29.6001	74.91	6.36	10665.8	76.61	5.66	11974.1	247.197	493221
304.0	3522.666	-76.0221	29.6149	74.95	6.23	10724.1	76.63	5.55	12032.7	250.615	495581
306.0	3523.046	-75.9585	29.6297	74.98	6.10	10782.8	76.65	5.43	12091.8	254.053	497906
308.0	3523.420	-75.8946	29.6446	75.02	5.97	10842.0	76.68	5.32	12151.4	257.510	500194
310.0	3523.788	-75.8302	29.6596	75.05	5.84	10901.7	76.70	5.21	12211.4	260.986	502446
312.0	3524.150	-75.7655	29.6746	75.09	5.71	10961.9	76.72	5.10	12272.0	264.482	504662
314.0	3524.507	-75.7004	29.6896	75.12	5.59	11022.5	76.75	4.99	12333.0	267.997	506843
316.0	3524.857	-75.6349	29.7047	75.16	5.47	11083.7	76.77	4.89	12394.5	271.533	508989
318.0	3525.202	-75.5690	29.7199	75.19	5.35	11145.3	76.80	4.78	12456.4	275.088	511100
320.0	3525.541	-75.5027	29.7351	75.23	5.23	11207.4	76.82	4.68	12518.9	278.663	513177
322.0	3525.875	-75.4360	29.7503	75.27	5.11	11270.0	76.84	4.58	12581.8	282.259	515219
324.0	3526.203	-75.3689	29.7656	75.31	5.00	11333.2	76.87	4.48	12645.3	285.875	517228
326.0	3526.525	-75.3014	29.7809	75.34	4.89	11396.9	76.90	4.38	12709.3	289.512	519203
328.0	3526.842	-75.2335	29.7963	75.38	4.78	11461.1	76.92	4.28	12773.8	293.170	521145
330.0	3527.153	-75.1652	29.8118	75.42	4.67	11525.8	76.95	4.19	12838.7	296.848	523053
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
330.640	3527.252	-75.1433	29.8167	75.43	4.63	11546.6	76.96	4.15	12859.6	298.029	523656
332.0	3527.459	-75.0965	29.8272	75.46	4.55	11582.5	76.98	4.08	12895.8	300.546	524925

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
334.0	3527.757	-75.0275	29.8427	75.50	4.42	11633.6	77.00	3.97	12947.2	304.261	526754
336.0	3528.048	-74.9582	29.8583	75.54	4.29	11684.9	77.03	3.86	12998.7	307.993	528540
338.0	3528.332	-74.8884	29.8739	75.57	4.17	11736.2	77.06	3.75	13050.3	311.742	530283
340.0	3528.610	-74.8184	29.8895	75.61	4.06	11787.5	77.09	3.65	13101.9	315.508	531988
342.0	3528.882	-74.7480	29.9051	75.65	3.96	11837.9	77.12	3.57	13152.4	319.290	533658
344.0	3529.149	-74.6773	29.9207	75.69	3.87	11888.6	77.15	3.49	13203.3	323.089	535296
346.0	3529.411	-74.6063	29.9364	75.73	3.79	11939.2	77.18	3.41	13254.1	326.903	536905
348.0	3529.669	-74.5350	29.9521	75.77	3.71	11989.8	77.21	3.34	13305.0	330.735	538486
350.0	3529.922	-74.4633	29.9678	75.81	3.63	12040.6	77.24	3.27	13356.0	334.582	540041
352.0	3530.171	-74.3913	29.9836	75.85	3.56	12091.7	77.27	3.21	13407.2	338.446	541572
354.0	3530.416	-74.3189	29.9994	75.89	3.48	12143.2	77.30	3.14	13458.9	342.327	543077
356.0	3530.657	-74.2462	30.0152	75.93	3.41	12195.1	77.33	3.08	13511.0	346.223	544557
358.0	3530.894	-74.1732	30.0310	75.97	3.34	12247.5	77.36	3.01	13563.5	350.137	546013
360.0	3531.126	-74.0999	30.0468	76.01	3.27	12300.4	77.39	2.95	13616.6	354.068	547443
362.0	3531.355	-74.0262	30.0627	76.05	3.19	12353.7	77.42	2.89	13670.0	358.015	548849
364.0	3531.579	-73.9521	30.0786	76.09	3.12	12407.5	77.45	2.82	13724.0	361.980	550229
366.0	3531.799	-73.8777	30.0945	76.14	3.05	12461.8	77.49	2.76	13778.4	365.962	551584
368.0	3532.016	-73.8030	30.1104	76.18	2.98	12516.5	77.52	2.69	13833.3	369.962	552915
370.0	3532.228	-73.7279	30.1264	76.22	2.91	12571.7	77.55	2.63	13888.6	373.979	554220
372.0	3532.436	-73.6525	30.1424	76.26	2.84	12627.2	77.58	2.57	13944.2	378.014	555500
374.0	3532.639	-73.5766	30.1584	76.31	2.77	12683.1	77.62	2.51	14000.3	382.067	556756
376.0	3532.839	-73.5005	30.1744	76.35	2.70	12739.5	77.65	2.45	14056.8	386.137	557988
378.0	3533.035	-73.4239	30.1904	76.39	2.64	12796.3	77.69	2.39	14113.7	390.226	559195
380.0	3533.227	-73.3470	30.2065	76.44	2.57	12853.5	77.72	2.33	14171.1	394.333	560378
382.0	3533.415	-73.2697	30.2226	76.48	2.51	12911.2	77.75	2.28	14228.8	398.459	561537
384.0	3533.599	-73.1921	30.2387	76.52	2.45	12969.2	77.79	2.22	14287.0	402.603	562673
386.0	3533.779	-73.1140	30.2548	76.57	2.38	13027.7	77.83	2.17	14345.6	406.765	563786
388.0	3533.956	-73.0356	30.2710	76.61	2.32	13086.6	77.86	2.11	14404.6	410.947	564876
390.0	3534.129	-72.9568	30.2871	76.66	2.26	13145.9	77.90	2.06	14464.0	415.147	565943
392.0	3534.298	-72.8777	30.3033	76.71	2.21	13205.6	77.93	2.01	14523.8	419.366	566988
394.0	3534.463	-72.7981	30.3195	76.75	2.15	13265.7	77.97	1.96	14584.0	423.605	568011
396.0	3534.625	-72.7181	30.3357	76.80	2.09	13326.2	78.01	1.91	14644.6	427.862	569013
398.0	3534.784	-72.6378	30.3520	76.84	2.04	13387.1	78.04	1.86	14705.6	432.139	569993
400.0	3534.939	-72.5570	30.3682	76.89	1.99	13448.5	78.08	1.81	14767.1	436.436	570953
402.0	3535.091	-72.4759	30.3845	76.94	1.93	13510.3	78.12	1.76	14829.0	440.752	571892
404.0	3535.239	-72.3944	30.4008	76.99	1.88	13572.5	78.16	1.71	14891.3	445.088	572810
406.0	3535.384	-72.3124	30.4171	77.03	1.83	13635.2	78.20	1.67	14954.1	449.444	573709
408.0	3535.526	-72.2300	30.4334	77.08	1.78	13698.4	78.23	1.62	15017.3	453.820	574588
410.0	3535.664	-72.1473	30.4497	77.13	1.73	13761.9	78.27	1.58	15081.0	458.217	575447
412.0	3535.800	-72.0641	30.4661	77.18	1.69	13826.0	78.31	1.54	15145.1	462.633	576288
414.0	3535.932	-71.9805	30.4825	77.23	1.64	13890.5	78.35	1.50	15209.7	467.071	577109
416.0	3536.061	-71.8965	30.4988	77.28	1.59	13955.5	78.39	1.46	15274.7	471.528	577913
418.0	3536.188	-71.8120	30.5152	77.33	1.55	14020.9	78.43	1.42	15340.2	476.007	578698

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
420.0	3536.311	-71.7272	30.5316	77.37	1.51	14086.7	78.47	1.38	15406.1	480.507	579466
422.0	3536.432	-71.6419	30.5481	77.42	1.47	14153.0	78.51	1.34	15472.5	485.027	580216
424.0	3536.549	-71.5562	30.5645	77.47	1.42	14219.9	78.55	1.30	15539.4	489.569	580949
426.0	3536.664	-71.4700	30.5809	77.53	1.38	14287.1	78.60	1.27	15606.7	494.133	581665
428.0	3536.777	-71.3834	30.5974	77.58	1.34	14354.9	78.64	1.23	15674.5	498.718	582364
430.0	3536.886	-71.2963	30.6139	77.63	1.31	14423.1	78.68	1.20	15742.8	503.324	583048
432.0	3536.993	-71.2089	30.6304	77.68	1.27	14491.8	78.72	1.16	15811.6	507.953	583716
434.0	3537.098	-71.1209	30.6468	77.73	1.23	14561.0	78.76	1.13	15880.8	512.603	584368
436.0	3537.200	-71.0325	30.6633	77.78	1.20	14630.7	78.81	1.10	15950.6	517.276	585006
438.0	3537.299	-70.9437	30.6798	77.83	1.17	14700.9	78.85	1.07	16020.8	521.970	585629
440.0	3537.397	-70.8544	30.6964	77.89	1.13	14771.6	78.89	1.04	16091.6	526.688	586239
442.0	3537.492	-70.7646	30.7129	77.94	1.10	14842.8	78.94	1.01	16162.8	531.428	586834
444.0	3537.585	-70.6744	30.7294	77.99	1.07	14914.5	78.98	0.98	16234.6	536.190	587416
446.0	3537.675	-70.5837	30.7460	78.05	1.04	14986.8	79.03	0.96	16306.9	540.976	587986
448.0	3537.764	-70.4925	30.7625	78.10	1.01	15059.5	79.07	0.93	16379.7	545.785	588542
450.0	3537.851	-70.4009	30.7791	78.16	0.99	15132.8	79.12	0.91	16453.0	550.617	589086
452.0	3537.935	-70.3088	30.7956	78.21	0.96	15206.6	79.16	0.88	16526.9	555.473	589619
454.0	3538.018	-70.2162	30.8122	78.26	0.93	15281.0	79.21	0.86	16601.3	560.352	590139
456.0	3538.099	-70.1231	30.8288	78.32	0.91	15355.9	79.26	0.84	16676.2	565.255	590649
458.0	3538.178	-70.0295	30.8453	78.38	0.89	15431.3	79.30	0.81	16751.7	570.182	591148
460.0	3538.256	-69.9354	30.8619	78.43	0.86	15507.3	79.35	0.79	16827.7	575.133	591637
462.0	3538.331	-69.8409	30.8785	78.49	0.84	15583.8	79.40	0.77	16904.3	580.109	592115
464.0	3538.406	-69.7458	30.8950	78.54	0.82	15660.8	79.45	0.75	16981.3	585.109	592583
466.0	3538.478	-69.6502	30.9116	78.60	0.79	15738.3	79.49	0.73	17058.8	590.133	593042
468.0	3538.549	-69.5541	30.9282	78.66	0.78	15816.3	79.54	0.72	17136.8	595.183	593493
470.0	3538.619	-69.4575	30.9448	78.72	0.76	15894.8	79.59	0.70	17215.4	600.257	593935
472.0	3538.688	-69.3604	30.9613	78.77	0.74	15973.9	79.64	0.68	17294.6	605.356	594370
474.0	3538.755	-69.2628	30.9779	78.83	0.72	16053.7	79.69	0.67	17374.4	610.481	594798
476.0	3538.822	-69.1646	30.9945	78.89	0.71	16134.0	79.74	0.66	17454.7	615.632	595218
478.0	3538.887	-69.0659	31.0110	78.95	0.69	16215.0	79.79	0.64	17535.7	620.808	595633
480.0	3538.951	-68.9667	31.0276	79.01	0.68	16296.5	79.84	0.63	17617.3	626.010	596041
482.0	3539.014	-68.8670	31.0442	79.07	0.67	16378.6	79.89	0.62	17699.4	631.238	596444
484.0	3539.077	-68.7667	31.0607	79.13	0.66	16461.3	79.95	0.61	17782.2	636.492	596842
486.0	3539.139	-68.6659	31.0772	79.19	0.65	16544.7	80.00	0.60	17865.6	641.773	597235
488.0	3539.200	-68.5645	31.0938	79.25	0.64	16628.7	80.05	0.59	17949.7	647.081	597624
490.0	3539.260	-68.4626	31.1103	79.31	0.63	16713.4	80.10	0.58	18034.3	652.415	598010
492.0	3539.320	-68.3601	31.1269	79.37	0.62	16798.6	80.15	0.57	18119.6	657.777	598392
494.0	3539.380	-68.2570	31.1433	79.43	0.61	16884.6	80.21	0.57	18205.6	663.165	598772
496.0	3539.439	-68.1534	31.1598	79.49	0.61	16971.2	80.26	0.56	18292.3	668.582	599149
498.0	3539.498	-68.0492	31.1763	79.56	0.60	17058.5	80.32	0.56	18379.6	674.026	599525
500.0	3539.557	-67.9445	31.1928	79.62	0.60	17146.4	80.37	0.55	18467.6	679.498	599900
502.0	3539.615	-67.8391	31.2092	79.68	0.59	17235.1	80.42	0.55	18556.2	684.998	600275
504.0	3539.674	-67.7332	31.2256	79.75	0.59	17324.4	80.48	0.55	18645.5	690.527	600649

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
506.0	3539.733	-67.6267	31.2421	79.81	0.59	17414.4	80.54	0.55	18735.6	696.084	601023
508.0	3539.792	-67.5196	31.2585	79.87	0.59	17505.1	80.59	0.55	18826.4	701.670	601399
510.0	3539.851	-67.4119	31.2749	79.94	0.59	17596.6	80.65	0.55	18917.9	707.285	601777
512.0	3539.910	-67.3036	31.2912	80.00	0.59	17688.8	80.70	0.55	19010.1	712.929	602156
514.0	3539.970	-67.1947	31.3076	80.07	0.59	17781.7	80.76	0.55	19103.0	718.603	602539
516.0	3540.031	-67.0852	31.3239	80.13	0.59	17875.3	80.82	0.55	19196.7	724.306	602924
518.0	3540.092	-66.9751	31.3402	80.20	0.60	17969.8	80.88	0.56	19291.2	730.040	603314
520.0	3540.154	-66.8643	31.3565	80.27	0.60	18065.0	80.94	0.56	19386.5	735.804	603708
522.0	3540.217	-66.7529	31.3727	80.33	0.61	18161.1	80.99	0.56	19482.5	741.598	604107
524.0	3540.280	-66.6409	31.3890	80.40	0.61	18257.9	81.05	0.57	19579.4	747.423	604511
526.0	3540.345	-66.5283	31.4052	80.47	0.62	18355.4	81.11	0.58	19677.0	753.279	604922
528.0	3540.411	-66.4150	31.4214	80.54	0.63	18453.8	81.17	0.58	19775.4	759.166	605339
530.0	3540.478	-66.3010	31.4375	80.61	0.63	18553.0	81.23	0.59	19874.6	765.084	605763
532.0	3540.546	-66.1864	31.4536	80.67	0.64	18653.0	81.30	0.60	19974.6	771.035	606196
534.0	3540.616	-66.0712	31.4697	80.74	0.65	18753.8	81.36	0.61	20075.5	777.017	606637
536.0	3540.687	-65.9552	31.4858	80.81	0.67	18855.5	81.42	0.62	20177.2	783.032	607088
538.0	3540.760	-65.8387	31.5018	80.88	0.68	18956.5	81.48	0.63	20278.3	789.078	607548
540.0	3540.833	-65.7215	31.5177	80.95	0.67	19038.7	81.55	0.63	20360.5	795.154	608012
542.0	3540.907	-65.6038	31.5337	81.02	0.67	19118.1	81.61	0.62	20439.9	801.255	608474
544.0	3540.980	-65.4855	31.5495	81.10	0.66	19197.8	81.67	0.62	20519.7	807.382	608936
546.0	3541.052	-65.3667	31.5653	81.17	0.65	19277.8	81.74	0.61	20599.8	813.534	609393
548.0	3541.124	-65.2474	31.5810	81.24	0.65	19358.3	81.80	0.61	20680.2	819.712	609849
550.0	3541.196	-65.1275	31.5967	81.31	0.64	19439.1	81.87	0.60	20761.1	825.916	610302
552.0	3541.267	-65.0071	31.6123	81.38	0.64	19520.0	81.93	0.60	20842.0	832.145	610753
554.0	3541.339	-64.8861	31.6279	81.46	0.63	19601.7	82.00	0.59	20923.7	838.400	611204
556.0	3541.410	-64.7646	31.6433	81.53	0.63	19683.9	82.07	0.59	21006.0	844.682	611654
558.0	3541.482	-64.6425	31.6588	81.60	0.63	19766.4	82.13	0.59	21088.6	850.991	612106
560.0	3541.554	-64.5199	31.6741	81.68	0.63	19849.5	82.20	0.59	21171.7	857.326	612560
562.0	3541.626	-64.3967	31.6894	81.75	0.63	19933.1	82.27	0.59	21255.3	863.687	613014
564.0	3541.698	-64.2730	31.7046	81.82	0.63	20017.3	82.33	0.59	21339.6	870.074	613471
566.0	3541.771	-64.1487	31.7197	81.90	0.63	20102.1	82.40	0.59	21424.5	876.488	613929
568.0	3541.844	-64.0239	31.7347	81.97	0.63	20187.6	82.47	0.59	21509.9	882.929	614390
570.0	3541.918	-63.8984	31.7497	82.05	0.63	20273.6	82.54	0.60	21596.0	889.397	614854
572.0	3541.992	-63.7724	31.7646	82.13	0.64	20360.6	82.61	0.60	21683.0	895.893	615321
574.0	3542.066	-63.6458	31.7794	82.20	0.64	20447.8	82.68	0.60	21770.3	902.417	615792
576.0	3542.142	-63.5187	31.7941	82.28	0.64	20535.6	82.75	0.60	21858.1	908.968	616266
578.0	3542.218	-63.3909	31.8088	82.36	0.65	20624.0	82.82	0.61	21946.6	915.547	616746
580.0	3542.295	-63.2625	31.8233	82.43	0.65	20713.0	82.89	0.61	22035.6	922.155	617230
582.0	3542.373	-63.1336	31.8378	82.51	0.66	20802.6	82.96	0.62	22125.2	928.791	617720
584.0	3542.452	-63.0040	31.8522	82.59	0.66	20892.8	83.03	0.62	22215.4	935.455	618216
586.0	3542.533	-62.8739	31.8665	82.67	0.67	20983.4	83.11	0.63	22306.2	942.149	618720
588.0	3542.614	-62.7431	31.8807	82.75	0.68	21074.6	83.18	0.64	22397.4	948.871	619230
590.0	3542.697	-62.6118	31.8948	82.83	0.69	21166.3	83.25	0.65	22489.1	955.622	619748

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
592.0	3542.781	-62.4798	31.9088	82.91	0.69	21258.4	83.32	0.65	22581.3	962.402	620275
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
592.640	3542.808	-62.4374	31.9133	82.93	0.70	21288.0	83.35	0.66	22610.8	964.578	620445
	S-II/S-IVB SEPARATION COMMAND										
593.500	3542.845	-62.3805	31.9193	82.97	0.69	21301.6	83.38	0.65	22624.5	967.505	620674
594.0	3542.866	-62.3473	31.9227	82.99	0.68	21300.9	83.40	0.64	22623.8	969.207	620805
596.0	3542.947	-62.2147	31.9365	83.07	0.64	21298.3	83.47	0.61	22621.2	976.016	621314
598.0	3543.023	-62.0821	31.9501	83.15	0.61	21298.6	83.55	0.57	22621.6	982.822	621793
600.0	3543.097	-61.9493	31.9636	83.23	0.59	21327.6	83.62	0.55	22650.7	989.635	622254
602.0	3543.168	-61.8163	31.9769	83.31	0.57	21360.3	83.70	0.54	22683.4	996.457	622699
604.0	3543.236	-61.6831	31.9901	83.39	0.55	21393.6	83.77	0.52	22716.7	1003.289	623132
606.0	3543.303	-61.5496	32.0031	83.46	0.53	21427.6	83.85	0.50	22750.8	1010.132	623552
608.0	3543.367	-61.4159	32.0160	83.54	0.51	21462.0	83.92	0.48	22785.1	1016.986	623957
610.0	3543.429	-61.2819	32.0288	83.62	0.49	21496.6	83.99	0.46	22819.8	1023.850	624347
612.0	3543.489	-61.1476	32.0415	83.70	0.47	21531.5	84.07	0.44	22854.8	1030.726	624721
614.0	3543.546	-61.0131	32.0540	83.78	0.45	21566.6	84.14	0.42	22889.9	1037.613	625081
616.0	3543.600	-60.8784	32.0663	83.86	0.43	21601.8	84.22	0.41	22925.2	1044.510	625427
618.0	3543.653	-60.7434	32.0785	83.94	0.41	21637.2	84.29	0.39	22960.6	1051.419	625758
620.0	3543.703	-60.6081	32.0906	84.03	0.39	21672.8	84.37	0.37	22996.2	1058.340	626075
622.0	3543.750	-60.4726	32.1026	84.11	0.37	21708.4	84.45	0.35	23031.8	1065.271	626379
624.0	3543.796	-60.3368	32.1143	84.19	0.36	21744.2	84.52	0.34	23067.6	1072.214	626669
626.0	3543.839	-60.2007	32.1260	84.27	0.34	21780.0	84.60	0.32	23103.5	1079.168	626945
628.0	3543.880	-60.0644	32.1375	84.35	0.32	21816.0	84.68	0.30	23139.5	1086.134	627207
630.0	3543.919	-59.9279	32.1488	84.44	0.30	21852.1	84.75	0.28	23175.6	1093.111	627456
632.0	3543.956	-59.7910	32.1600	84.52	0.28	21888.4	84.83	0.27	23211.9	1100.100	627692
634.0	3543.991	-59.6539	32.1711	84.60	0.27	21924.8	84.91	0.25	23248.4	1107.100	627915
636.0	3544.023	-59.5166	32.1820	84.69	0.25	21961.4	84.99	0.24	23285.0	1114.111	628126
638.0	3544.054	-59.3790	32.1927	84.77	0.24	21998.1	85.07	0.22	23321.7	1121.135	628324
640.0	3544.083	-59.2411	32.2033	84.85	0.22	22034.9	85.15	0.21	23358.5	1128.170	628510
642.0	3544.110	-59.1029	32.2138	84.94	0.20	22071.7	85.22	0.19	23395.4	1135.217	628685
644.0	3544.135	-58.9645	32.2241	85.02	0.19	22108.7	85.30	0.18	23432.4	1142.275	628848
646.0	3544.158	-58.8259	32.2342	85.11	0.17	22145.7	85.38	0.16	23469.4	1149.345	628999
648.0	3544.179	-58.6869	32.2442	85.19	0.16	22182.8	85.46	0.15	23506.6	1156.427	629139
650.0	3544.198	-58.5477	32.2540	85.27	0.15	22220.1	85.54	0.14	23543.9	1163.521	629268
652.0	3544.216	-58.4083	32.2636	85.36	0.13	22257.5	85.62	0.12	23581.3	1170.627	629386
654.0	3544.232	-58.2685	32.2732	85.44	0.12	22295.1	85.70	0.11	23618.9	1177.745	629494
656.0	3544.246	-58.1285	32.2825	85.53	0.11	22332.8	85.78	0.10	23656.6	1184.875	629592
658.0	3544.259	-57.9883	32.2917	85.62	0.09	22370.7	85.86	0.09	23694.5	1192.016	629680
660.0	3544.271	-57.8477	32.3007	85.70	0.08	22408.7	85.94	0.08	23732.5	1199.170	629759

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
662.0	3544.280	-57.7069	32.3096	85.79	0.07	22446.7	86.02	0.07	23770.6	1206.336	629829
664.0	3544.289	-57.5658	32.3182	85.87	0.06	22484.9	86.10	0.06	23808.8	1213.514	629890
666.0	3544.296	-57.4245	32.3268	85.96	0.05	22523.2	86.18	0.05	23847.1	1220.705	629942
668.0	3544.302	-57.2829	32.3351	86.04	0.04	22561.5	86.26	0.04	23885.4	1227.907	629986
670.0	3544.306	-57.1410	32.3433	86.13	0.03	22600.0	86.35	0.03	23923.9	1235.122	630022
672.0	3544.309	-56.9989	32.3514	86.22	0.02	22638.6	86.43	0.02	23962.5	1242.349	630050
674.0	3544.311	-56.8564	32.3592	86.30	0.01	22677.3	86.51	0.01	24001.2	1249.589	630071
676.0	3544.312	-56.7138	32.3669	86.39	0.00	22716.1	86.59	0.00	24040.1	1256.840	630085
678.0	3544.312	-56.5708	32.3744	86.48	-0.01	22755.0	86.67	-0.01	24079.0	1264.105	630092
680.0	3544.311	-56.4276	32.3818	86.57	-0.01	22794.1	86.75	-0.01	24118.0	1271.381	630093
682.0	3544.308	-56.2841	32.3890	86.65	-0.02	22833.3	86.84	-0.02	24157.2	1278.670	630087
684.0	3544.305	-56.1403	32.3960	86.74	-0.03	22872.6	86.92	-0.03	24196.5	1285.972	630076
686.0	3544.301	-55.9963	32.4028	86.83	-0.03	22912.0	87.00	-0.03	24236.0	1293.286	630059
688.0	3544.296	-55.8519	32.4095	86.92	-0.04	22951.5	87.08	-0.04	24275.5	1300.613	630037
690.0	3544.291	-55.7074	32.4160	87.00	-0.05	22991.2	87.17	-0.04	24315.2	1307.953	630010
692.0	3544.284	-55.5625	32.4223	87.09	-0.05	23030.9	87.25	-0.05	24354.9	1315.305	629978
694.0	3544.277	-55.4174	32.4284	87.18	-0.06	23070.9	87.33	-0.05	24394.8	1322.670	629943
696.0	3544.270	-55.2720	32.4344	87.27	-0.06	23110.9	87.42	-0.06	24434.9	1330.048	629903
698.0	3544.262	-55.1263	32.4401	87.36	-0.06	23151.1	87.50	-0.06	24475.1	1337.438	629860
700.0	3544.253	-54.9804	32.4457	87.44	-0.07	23191.4	87.58	-0.06	24515.4	1344.842	629814
702.0	3544.244	-54.8341	32.4511	87.53	-0.07	23231.8	87.67	-0.07	24555.8	1352.258	629765
704.0	3544.235	-54.6876	32.4564	87.62	-0.07	23272.3	87.75	-0.07	24596.3	1359.687	629714
706.0	3544.225	-54.5409	32.4614	87.71	-0.07	23312.9	87.83	-0.07	24636.9	1367.130	629661
708.0	3544.215	-54.3938	32.4663	87.80	-0.08	23353.7	87.92	-0.07	24677.7	1374.585	629605
710.0	3544.205	-54.2465	32.4709	87.89	-0.08	23394.5	88.00	-0.07	24718.5	1382.053	629549
712.0	3544.195	-54.0989	32.4754	87.98	-0.08	23435.5	88.09	-0.07	24759.5	1389.535	629491
714.0	3544.184	-53.9510	32.4797	88.07	-0.08	23476.7	88.17	-0.07	24800.7	1397.029	629433
716.0	3544.174	-53.8029	32.4839	88.16	-0.08	23518.0	88.26	-0.07	24842.0	1404.537	629375
718.0	3544.164	-53.6545	32.4878	88.25	-0.07	23559.5	88.34	-0.07	24883.5	1412.058	629318
720.0	3544.154	-53.5058	32.4915	88.34	-0.07	23601.2	88.43	-0.07	24925.2	1419.592	629261
722.0	3544.144	-53.3569	32.4951	88.43	-0.07	23643.0	88.51	-0.07	24967.0	1427.140	629204
724.0	3544.134	-53.2076	32.4984	88.52	-0.07	23684.9	88.60	-0.07	25008.9	1434.701	629148
726.0	3544.124	-53.0581	32.5016	88.61	-0.07	23727.0	88.68	-0.07	25051.0	1442.276	629092
728.0	3544.114	-52.9083	32.5046	88.70	-0.07	23769.2	88.77	-0.07	25093.2	1449.864	629037
730.0	3544.105	-52.7582	32.5073	88.79	-0.07	23811.4	88.85	-0.06	25135.4	1457.465	628984
732.0	3544.096	-52.6079	32.5099	88.88	-0.06	23853.7	88.94	-0.06	25177.7	1465.080	628933
734.0	3544.088	-52.4572	32.5123	88.97	-0.06	23896.2	89.03	-0.06	25220.2	1472.709	628885
736.0	3544.080	-52.3063	32.5145	89.06	-0.05	23938.8	89.11	-0.05	25262.8	1480.351	628841
738.0	3544.073	-52.1551	32.5165	89.15	-0.05	23981.5	89.20	-0.04	25305.5	1488.007	628801
740.0	3544.067	-52.0036	32.5182	89.25	-0.04	24024.3	89.29	-0.04	25348.3	1495.676	628766
742.0	3544.062	-51.8519	32.5198	89.34	-0.03	24067.1	89.37	-0.03	25391.1	1503.359	628738
744.0	3544.059	-51.6999	32.5212	89.43	-0.02	24110.2	89.46	-0.02	25434.2	1511.056	628716
746.0	3544.056	-51.5476	32.5224	89.52	-0.01	24153.3	89.55	-0.01	25477.3	1518.767	628700

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
748.0	3544.054	-51.3950	32.5233	89.61	-0.01	24196.6	89.63	-0.01	25520.6	1526.491	628693
	S-IVB 1ST GUIDANCE CUTOFF										
749.830	3544.054	-51.2552	32.5241	89.70	0.00	24236.4	89.71	0.00	25560.4	1533.571	628692
750.0	3544.054	-51.2422	32.5241	89.70	0.00	24240.1	89.72	0.00	25564.1	1534.229	628693
752.0	3544.055	-51.0892	32.5247	89.80	0.00	24242.8	89.81	0.00	25566.8	1541.974	628698
754.0	3544.056	-50.9362	32.5250	89.89	0.00	24242.4	89.89	0.00	25566.4	1549.721	628704
756.0	3544.057	-50.7832	32.5252	89.98	0.00	24242.2	89.98	0.00	25566.2	1557.466	628708
758.0	3544.057	-50.6302	32.5251	90.07	0.01	24242.0	90.07	0.00	25566.0	1565.212	628713
	PARKING ORBIT INSERTION										
759.930	3544.057	-50.4902	32.5249	90.16	0.01	24242.1	90.15	0.01	25566.1	1572.300	628710

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								
759.830	3544.057	-50.4902	32.5249	32.6945	90.15	0.01	25566.1	103.472
800.0	3544.072	-47.4185	32.4762	32.6456	91.89	0.00	25566.3	103.478
850.0	3544.088	-43.6048	32.2997	32.4687	94.05	0.00	25566.8	103.462
900.0	3544.102	-39.8123	31.9960	32.1641	96.19	0.00	25567.3	103.421
950.0	3544.114	-36.0516	31.5674	31.7343	98.28	0.00	25567.9	103.356
1000.0	3544.124	-32.3323	31.0171	31.1824	100.33	0.00	25568.3	103.267
1050.0	3544.132	-28.6628	30.3491	30.5123	102.31	0.00	25568.9	103.156
1100.0	3544.136	-25.0503	29.5680	29.7286	104.23	0.00	25569.6	103.024
1150.0	3544.139	-21.5003	28.6790	28.8366	106.06	0.00	25570.3	102.874
1200.0	3544.138	-18.0172	27.6878	27.8419	107.81	-0.00	25571.1	102.707
1250.0	3544.135	-14.6037	26.6002	26.7501	109.47	-0.00	25571.9	102.525
1300.0	3544.129	-11.2611	25.4224	25.5676	111.03	-0.00	25572.8	102.332
1350.0	3544.121	-7.9895	24.1608	24.3007	112.49	-0.00	25573.7	102.129
1400.0	3544.109	-4.7881	22.8215	22.9554	113.86	-0.00	25574.7	101.919
1450.0	3544.094	-1.6548	21.4109	21.5382	115.12	-0.00	25575.6	101.706
1500.0	3544.076	1.4133	19.9351	20.0552	116.28	-0.01	25576.6	101.490
1550.0	3544.055	4.4195	18.4001	18.5124	117.34	-0.01	25577.6	101.277
1600.0	3544.031	7.3681	16.8119	16.9156	118.29	-0.01	25578.5	101.067
1650.0	3544.003	10.2634	15.1760	15.2708	119.15	-0.01	25579.5	100.863
1700.0	3543.971	13.1106	13.4982	13.5833	119.91	-0.01	25580.4	100.669
1750.0	3543.936	15.9147	11.7837	11.8586	120.57	-0.01	25581.4	100.486
1800.0	3543.898	18.6812	10.0377	10.1021	121.14	-0.01	25582.2	100.316
1850.0	3543.856	21.4155	8.2654	8.3187	121.61	-0.01	25583.1	100.161
1900.0	3543.810	24.1235	6.4716	6.5136	121.98	-0.01	25583.9	100.024
1950.0	3543.762	26.8109	4.6612	4.6915	122.27	-0.01	25584.6	99.905
2000.0	3543.711	29.4834	2.8388	2.8574	122.45	-0.01	25585.3	99.805
2050.0	3543.657	32.1469	1.0092	1.0158	122.55	-0.02	25585.9	99.726
2100.0	3543.601	34.8073	-0.8230	-0.8283	122.56	-0.02	25586.4	99.669
2150.0	3543.542	37.4704	-2.6532	-2.6705	122.47	-0.02	25586.9	99.633
2200.0	3543.482	40.1421	-4.4767	-4.5059	122.29	-0.02	25587.3	99.618
2250.0	3543.420	42.8283	-6.2890	-6.3298	122.02	-0.02	25587.7	99.625
2300.0	3543.358	45.5348	-8.0852	-8.1374	121.65	-0.02	25587.9	99.653
2350.0	3543.295	48.2673	-9.8606	-9.9239	121.19	-0.02	25588.1	99.701
2400.0	3543.232	51.0316	-11.6102	-11.6841	120.63	-0.02	25588.3	99.768
2450.0	3543.170	53.8331	-13.3289	-13.4131	119.98	-0.02	25588.3	99.853
2500.0	3543.110	56.6775	-15.0117	-15.1055	119.23	-0.02	25588.3	99.954
2550.0	3543.051	59.5698	-16.6529	-16.7559	118.38	-0.02	25588.3	100.069
2600.0	3542.994	62.5150	-18.2472	-18.3587	117.44	-0.01	25588.2	100.197
2650.0	3542.941	65.5178	-19.7898	-19.9092	116.39	-0.01	25588.2	100.336
2700.0	3542.892	68.5823	-21.2718	-21.3985	115.23	-0.01	25587.8	100.484

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
2750.0	3542.847	71.7120	-22.6902	-22.8236	113.98	-0.01	25587.6	100.638
2800.0	3542.807	74.9099	-24.0377	-24.1771	112.63	-0.01	25587.3	100.796
2850.0	3542.772	78.1779	-25.3082	-25.4529	111.17	-0.01	25587.0	100.957
2900.0	3542.744	81.5172	-26.4952	-26.6447	109.62	-0.01	25586.7	101.117
2950.0	3542.722	84.9278	-27.5925	-27.7462	107.97	-0.01	25586.3	101.274
3000.0	3542.707	88.4084	-28.5938	-28.7512	106.22	-0.00	25596.0	101.428
3050.0	3542.700	91.9563	-29.4932	-29.6537	104.40	-0.00	25585.6	101.575
3100.0	3542.700	95.5674	-30.2851	-30.4481	102.49	0.00	25585.2	101.714
3150.0	3542.709	99.2361	-30.9640	-31.1292	100.51	0.00	25584.8	101.843
3200.0	3542.726	102.9556	-31.5254	-31.6922	98.46	0.01	25584.4	101.960
3250.0	3542.752	106.7172	-31.9651	-32.1332	96.37	0.01	25584.1	102.066
3300.0	3542.787	110.5116	-32.2799	-32.4488	94.24	0.01	25583.7	102.158
3350.0	3542.831	114.3281	-32.4674	-32.6368	92.07	0.01	25583.4	102.235
3400.0	3542.883	118.1555	-32.5261	-32.6957	89.90	0.02	25583.0	102.299
3450.0	3542.944	121.9822	-32.4556	-32.6250	87.73	0.02	25582.7	102.347
3500.0	3543.014	125.7968	-32.2565	-32.4254	85.57	0.02	25582.4	102.380
3550.0	3543.092	129.5880	-31.9303	-32.0982	83.44	0.02	25582.2	102.399
3600.0	3543.178	133.3455	-31.4795	-31.6461	81.35	0.02	25581.9	102.404
3650.0	3543.272	137.0596	-30.9074	-31.0724	79.31	0.03	25581.6	102.395
3700.0	3543.373	140.7222	-30.2183	-30.3811	77.34	0.03	25581.4	102.374
3750.0	3543.481	144.3265	-29.4169	-29.5770	75.44	0.03	25581.2	102.343
3800.0	3543.595	147.8669	-28.5085	-28.6655	73.62	0.03	25580.9	102.301
3850.0	3543.715	151.3395	-27.4988	-27.6521	71.88	0.03	25580.7	102.252
3900.0	3543.840	154.7420	-26.3939	-26.5430	70.24	0.03	25580.5	102.196
3950.0	3543.969	158.0730	-25.2000	-25.3443	68.70	0.04	25580.3	102.136
4000.0	3544.102	161.3327	-23.9234	-24.0622	67.25	0.04	25580.1	102.074
4050.0	3544.237	164.5222	-22.5704	-22.7031	65.91	0.04	25579.9	102.011
4100.0	3544.375	167.6439	-21.1472	-21.2733	64.66	0.04	25579.6	101.950
4150.0	3544.514	170.7004	-19.6601	-19.7788	63.52	0.04	25579.3	101.893
4200.0	3544.654	173.6955	-18.1151	-18.2258	62.48	0.04	25579.0	101.841
4250.0	3544.794	176.6335	-16.5180	-16.6201	61.54	0.04	25578.7	101.798
4300.0	3544.933	179.5189	-14.8745	-14.9675	60.70	0.04	25578.4	101.764
4350.0	3545.071	-177.6432	-13.1902	-13.2735	59.96	0.04	25578.0	101.741
4400.0	3545.206	-174.8478	-11.4704	-11.5435	59.32	0.04	25577.6	101.731
4450.0	3545.339	-172.0892	-9.7203	-9.7827	58.77	0.04	25577.1	101.735
4500.0	3545.468	-169.3620	-7.9449	-7.9962	58.32	0.03	25576.6	101.755
4550.0	3545.593	-166.6603	-6.1491	-6.1890	57.96	0.03	25576.1	101.792
4600.0	3545.713	-163.9786	-4.3378	-4.3660	57.69	0.03	25575.5	101.845
4650.0	3545.829	-161.3109	-2.5155	-2.5320	57.52	0.03	25574.9	101.917
4700.0	3545.939	-158.6514	-0.6871	-0.6916	57.44	0.03	25574.3	102.006
4750.0	3546.043	-155.9942	1.1430	1.1505	57.45	0.03	25573.6	102.113
4800.0	3546.141	-153.3336	2.9701	2.9895	57.56	0.03	25572.8	102.238
4850.0	3546.233	-150.6636	4.7896	4.8208	57.75	0.02	25572.1	102.380

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
4900.0	3546.319	-147.9785	6.5969	6.6396	58.04	0.02	25571.3	102.538
4950.0	3546.398	-145.2724	8.3872	8.4413	58.42	0.02	25570.5	102.710
5000.0	3546.470	-142.5395	10.1558	10.2208	58.90	0.02	25569.7	102.897
5050.0	3546.536	-139.7744	11.8977	11.9733	59.47	0.02	25568.8	103.095
5100.0	3546.595	-136.9713	13.6079	13.6935	60.13	0.02	25568.0	103.303
5150.0	3546.648	-134.1250	15.2811	15.3764	60.90	0.01	25567.1	103.520
5200.0	3546.695	-131.2302	16.9121	17.0164	61.76	0.01	25566.3	103.743
5250.0	3546.736	-128.2821	18.4953	18.6080	62.72	0.01	25565.4	103.969
5300.0	3546.772	-125.2762	20.0251	20.1455	63.79	0.01	25564.6	104.197
5350.0	3546.801	-122.2085	21.4954	21.6230	64.95	0.01	25563.8	104.424
5400.0	3546.826	-119.0753	22.9003	23.0345	66.22	0.01	25563.0	104.648
5450.0	3546.846	-115.8741	24.2338	24.3738	67.59	0.00	25562.3	104.865
5500.0	3546.862	-112.6029	25.4894	25.6347	69.05	0.00	25561.6	105.075
5550.0	3546.874	-109.2606	26.6610	26.8110	70.62	0.00	25561.0	105.273
5600.0	3546.881	-105.8477	27.7423	27.8964	72.28	0.00	25560.4	105.459
5650.0	3546.886	-102.3654	28.7273	28.8849	74.03	0.00	25559.9	105.630
5700.0	3546.888	-98.8166	29.6099	29.7706	75.87	0.00	25559.5	105.783
5750.0	3546.887	-95.2056	30.3847	30.5478	77.78	-0.00	25559.1	105.918
5800.0	3546.884	-91.5380	31.0463	31.2115	79.77	-0.00	25558.9	106.032
5850.0	3546.879	-87.8210	31.5903	31.7571	81.81	-0.00	25558.7	106.125
5900.0	3546.872	-84.0632	32.0128	32.1808	83.91	-0.00	25558.5	106.194
5950.0	3546.864	-80.2738	32.3105	32.4793	86.04	-0.00	25558.5	106.241
6000.0	3546.855	-76.4639	32.4811	32.6505	88.20	-0.00	25558.6	106.263
6050.0	3546.845	-72.6443	32.5235	32.6929	90.37	-0.00	25558.7	106.260
6100.0	3546.834	-68.8267	32.4372	32.6064	92.54	-0.00	25558.9	106.233
6150.0	3546.822	-65.0225	32.2229	32.3915	94.69	-0.00	25559.2	106.182
6200.0	3546.810	-61.2426	31.8823	32.0500	96.81	-0.00	25559.6	106.108
6250.0	3546.797	-57.4974	31.4179	31.5842	98.89	-0.00	25560.1	106.011
6300.0	3546.783	-53.7960	30.8331	30.9977	100.92	-0.00	25560.6	105.893
6350.0	3546.769	-50.1466	30.1322	30.2945	102.88	-0.00	25561.2	105.755
6400.0	3546.754	-46.5559	29.3198	29.4795	104.77	-0.00	25561.9	105.599
6450.0	3546.739	-43.0289	28.4014	28.5579	106.58	-0.00	25562.6	105.427
6500.0	3546.722	-39.5696	27.3827	27.5354	108.30	-0.00	25563.4	105.240
6550.0	3546.704	-36.1802	26.2695	26.4180	109.93	-0.00	25564.2	105.041
6600.0	3546.686	-32.8617	25.0682	25.2118	111.46	-0.01	25565.1	104.833
6650.0	3546.666	-29.6140	23.7850	23.9231	112.89	-0.01	25566.0	104.617
6700.0	3546.644	-26.4358	22.4261	22.5581	114.23	-0.01	25566.9	104.398
6750.0	3546.621	-23.3248	20.9977	21.1230	115.46	-0.01	25567.8	104.176
6800.0	3546.596	-20.2780	19.5061	19.6239	116.59	-0.01	25568.7	103.955
6850.0	3546.569	-17.2919	17.9570	18.0668	117.62	-0.01	25569.6	103.737
6900.0	3546.540	-14.3620	16.3564	16.4576	118.55	-0.01	25570.6	103.525
6950.0	3546.508	-11.4839	14.7096	14.8020	119.38	-0.01	25571.4	103.322
7000.0	3546.474	-8.6524	13.0230	13.1053	120.11	-0.01	25572.3	103.129

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
7050.0	3546.438	-5.9625	11.3010	11.3731	120.74	-0.01	25573.1	102.949
7100.0	3546.399	-3.1086	9.5491	9.6104	121.28	-0.01	25573.9	102.784
7150.0	3546.358	-0.3852	7.7722	7.8224	121.72	-0.01	25574.6	102.636
7200.0	3546.314	2.3135	5.9752	6.0140	122.07	-0.01	25575.3	102.505
7250.0	3546.267	4.9931	4.1629	4.1901	122.33	-0.01	25575.9	102.394
7300.0	3546.219	7.6596	2.3401	2.3554	122.49	-0.01	25576.5	102.304
7350.0	3546.168	10.3186	0.5113	0.5146	122.56	-0.01	25577.0	102.235
7400.0	3546.115	12.9761	-1.3189	-1.3275	122.54	-0.01	25577.5	102.187
7450.0	3546.061	15.6378	-3.1458	-3.1663	122.43	-0.02	25577.8	102.162
7500.0	3546.005	18.3098	-4.9648	-4.9972	122.23	-0.02	25578.1	102.158
7550.0	3545.948	20.9977	-6.7713	-6.8152	121.93	-0.02	25578.4	102.176
7600.0	3545.891	23.7074	-8.5605	-8.6157	121.54	-0.02	25578.5	102.214
7650.0	3545.833	26.4446	-10.3276	-10.3937	121.05	-0.02	25578.6	102.272
7700.0	3545.776	29.2149	-12.0676	-12.1442	120.47	-0.02	25578.7	102.349
7750.0	3545.719	32.0239	-13.7755	-13.8622	119.80	-0.02	25578.6	102.443
7800.0	3545.664	34.8770	-15.4460	-15.5422	119.02	-0.01	25578.6	102.552
7850.0	3545.610	37.7792	-17.0738	-17.1789	118.15	-0.01	25578.4	102.676
7900.0	3545.559	40.7355	-18.6531	-18.7667	117.17	-0.01	25578.2	102.811
7950.0	3545.510	43.7503	-20.1784	-20.2997	116.10	-0.01	25578.0	102.956
8000.0	3545.465	46.8276	-21.6437	-21.7721	114.92	-0.01	25577.8	103.108
8050.0	3545.424	49.9708	-23.0429	-23.1777	113.64	-0.01	25577.5	103.266
8100.0	3545.388	53.1826	-24.3598	-24.5105	112.26	-0.01	25577.1	103.427
8150.0	3545.356	56.4643	-25.6182	-25.7641	110.78	-0.01	25576.8	103.589
8200.0	3545.331	59.8183	-26.7817	-26.9323	109.21	-0.01	25576.4	103.750
8250.0	3545.311	63.2426	-27.8541	-28.0087	107.54	-0.00	25576.1	103.907
8300.0	3545.298	66.7362	-28.8293	-28.9874	105.77	-0.00	25575.7	104.059
8350.0	3545.292	70.2961	-29.7014	-29.8624	103.93	-0.00	25575.3	104.203
8400.0	3545.293	73.9179	-30.4647	-30.6282	102.00	0.00	25575.0	104.337
8450.0	3545.301	77.5955	-31.1142	-31.2796	100.01	0.00	25574.6	104.462
8500.0	3545.318	81.3218	-31.6452	-31.8123	97.95	0.01	25574.3	104.573
8550.0	3545.342	85.0879	-32.0541	-32.2223	95.85	0.01	25573.9	104.672
8600.0	3545.375	88.8842	-32.3376	-32.5066	93.71	0.01	25573.6	104.756
8650.0	3545.416	92.6999	-32.4936	-32.6631	91.55	0.01	25573.3	104.826
8700.0	3545.465	96.5238	-32.5210	-32.6905	89.37	0.01	25573.1	104.880
8750.0	3545.522	100.3442	-32.4195	-32.5887	87.21	0.02	25572.8	104.919
	BEGIN S-IVB RESTART PREPARATIONS -- START OF TIME BASE 6							
8768.100	3545.545	101.7241	-32.3511	-32.5202	86.42	0.02	25572.8	104.928

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								
8768.100	-42393681	1060601	-1120914	751.7	-8529.5	-22686.3	27.07	-3.27	2.13
8770.0	-42392207	1044390	-1164014	803.1	-8535.7	-22682.2	27.06	-3.25	2.18
8780.0	-42382822	958872	-1390722	1073.7	-8567.6	-22658.9	27.05	-3.14	2.47
8790.0	-42370733	873041	-1617193	1344.2	-8598.5	-22632.8	27.04	-3.03	2.76
8800.0	-42355940	786907	-1843368	1614.4	-8628.2	-22603.8	27.02	-2.92	3.04
8810.0	-42338445	700481	-2069249	1884.5	-8656.8	-22571.9	27.00	-2.80	3.33
8820.0	-42318250	613775	-2294797	2154.4	-8684.3	-22537.2	26.97	-2.69	3.61
8830.0	-42295359	526799	-2519983	2423.9	-8710.6	-22499.7	26.94	-2.58	3.90
8840.0	-42269773	439567	-2744780	2693.2	-8735.8	-22459.3	26.91	-2.46	4.18
8850.0	-42241496	352088	-2969159	2962.1	-8759.8	-22416.0	26.88	-2.35	4.47
8860.0	-42210531	264374	-3193091	3230.7	-8782.7	-22369.9	26.84	-2.23	4.75
8870.0	-42176883	176437	-3416548	3498.9	-8804.4	-22321.1	26.79	-2.11	5.03
8880.0	-42140556	88289	-3639503	3766.6	-8825.0	-22269.3	26.75	-2.00	5.31
8890.0	-42101553	-59	-3861926	4033.8	-8844.4	-22214.8	26.70	-1.88	5.59
8900.0	-42059881	-88595	-4083790	4300.6	-8862.6	-22157.5	26.65	-1.76	5.87
8910.0	-42015544	-177307	-4305067	4566.8	-8879.6	-22097.4	26.59	-1.64	6.15
8920.0	-41968548	-266194	-4525729	4832.4	-8895.5	-22034.5	26.53	-1.53	6.43
8930.0	-41918893	-355213	-4745748	5097.4	-8910.1	-21968.9	26.47	-1.41	6.71
8940.0	-41866602	-444393	-4965097	5361.8	-8923.6	-21900.4	26.40	-1.29	6.98
8950.0	-41811665	-533681	-5183747	5625.5	-8935.9	-21829.2	26.34	-1.17	7.26
8960.0	-41754095	-623096	-5401672	5888.5	-8946.9	-21755.3	26.26	-1.05	7.53
8970.0	-41693907	-712616	-5618843	6150.9	-8956.8	-21678.7	26.18	-0.92	7.81
8980.0	-41631081	-802228	-5835235	6412.3	-8965.4	-21599.2	26.11	-0.80	8.08
8990.0	-41565653	-891929	-6050819	6673.0	-8972.9	-21517.1	26.03	-0.68	8.35
9000.0	-41497623	-981681	-6265569	6932.9	-8979.1	-21432.3	25.94	-0.56	8.62
9010.0	-41426999	-1071498	-6479456	7191.9	-8984.1	-21344.8	25.85	-0.44	8.89
9020.0	-41353790	-1161358	-6692455	7449.8	-8987.9	-21254.7	25.75	-0.32	9.14
9030.0	-41278005	-1251251	-6904541	7707.1	-8990.4	-21161.9	25.67	-0.19	9.42
9040.0	-41199653	-1341163	-7115684	7963.2	-8991.8	-21066.4	25.57	-0.07	9.68
9050.0	-41118744	-1431082	-7325860	8218.4	-8991.8	-20968.2	25.46	0.05	9.95
9060.0	-41035289	-1520995	-7535040	8472.5	-8990.7	-20867.4	25.36	0.18	10.21
9070.0	-40949298	-1610891	-7743203	8725.6	-8988.3	-20764.0	25.25	0.30	10.47
9080.0	-40860781	-1700757	-7950312	8977.5	-8984.6	-20658.0	25.15	0.42	10.72
9090.0	-40769750	-1790580	-8156352	9228.5	-8979.8	-20549.5	25.02	0.55	10.99
9100.0	-40676216	-1880349	-8361294	9478.2	-8973.7	-20438.4	24.91	0.67	11.24
9110.0	-40580191	-1970050	-8565111	9726.6	-8966.4	-20324.7	24.79	0.80	11.50
9120.0	-40481687	-2059672	-8767779	9973.9	-8957.8	-20208.4	24.66	0.92	11.75
9130.0	-40380717	-2149201	-8969271	10219.9	-8947.9	-20089.6	24.56	1.04	11.99
9140.0	-40277292	-2238626	-9169564	10464.8	-8936.9	-19968.4	24.41	1.17	12.25
9150.0	-40171426	-2327934	-9368631	10708.2	-8924.5	-19844.7	24.27	1.30	12.50

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
9160.0	-40063133	-2417112	-9566449	10950.2	-8910.9	-19718.5	24.12	1.41	12.72
9170.0	-39952426	-2506149	-9762993	11190.9	-8896.1	-19589.8	24.00	1.55	12.99
9180.0	-39839320	-2595031	-9958237	11430.1	-8880.0	-19458.7	23.86	1.67	13.24
9190.0	-39723828	-2683745	-10152158	11668.1	-8862.7	-19325.1	23.74	1.79	13.46
9200.0	-39605964	-2772281	-10344732	11904.5	-8844.2	-19189.2	23.56	1.92	13.72
9210.0	-39485743	-2860624	-10535934	12139.4	-8824.3	-19050.8	23.41	2.05	13.96
9220.0	-39363181	-2948763	-10725740	12372.7	-8803.2	-18910.1	23.26	2.17	14.19
9230.0	-39238293	-3036685	-10914128	12604.5	-8780.9	-18767.0	23.10	2.30	14.43
9240.0	-39111096	-3124377	-11101073	12834.8	-8757.3	-18621.6	22.95	2.42	14.65
9250.0	-38981603	-3211828	-11286552	13063.5	-8732.6	-18473.9	22.78	2.55	14.89
9260.0	-38849832	-3299024	-11470543	13290.5	-8706.5	-18323.9	22.61	2.67	15.12
9270.0	-38715799	-3385953	-11653023	13515.8	-8679.2	-18171.6	22.47	2.79	15.33
9280.0	-38579521	-3472604	-11833969	13739.4	-8650.7	-18017.3	22.30	2.91	15.55
9290.0	-38441015	-3558963	-12013360	13961.4	-8620.9	-17860.6	22.11	3.04	15.79
9300.0	-38300299	-3645019	-12191173	14181.6	-8589.9	-17701.6	21.92	3.17	16.01
9310.0	-38157389	-3730758	-12367387	14400.0	-8557.8	-17540.7	21.74	3.29	16.23
9320.0	-38012304	-3816169	-12541979	14616.6	-8524.3	-17377.4	21.55	3.41	16.45
9330.0	-37865062	-3901240	-12714927	14831.5	-8489.6	-17212.0	21.37	3.54	16.66
9340.0	-37715682	-3985957	-12886211	15044.3	-8453.7	-17044.6	21.21	3.64	16.79
	S-IVB RE-IGNITION (STDV OPEN)								
9346.300	-37620482	-4039143	-12993256	15177.4	-8430.6	-16938.6	21.09	3.70	16.83
9348.0	-37594647	-4053471	-13022030	15219.6	-8427.6	-16916.2	30.46	-1.52	6.33
9350.0	-37564145	-4070331	-13055953	15282.6	-8431.5	-16906.4	32.06	-2.18	4.28
9352.0	-37533514	-4087198	-13089659	15347.1	-8436.0	-16898.0	32.36	-2.26	4.10
9354.0	-37502755	-4104075	-13123446	15411.8	-8440.5	-16889.7	32.46	-2.27	4.16
9356.0	-37471866	-4120959	-13157216	15476.9	-8444.9	-16881.3	32.60	-2.25	4.22
9358.0	-37440846	-4137853	-13190970	15542.7	-8449.3	-16872.6	32.98	-2.20	4.39
9360.0	-37409694	-4154756	-13224706	15609.1	-8453.6	-16863.5	33.44	-2.09	4.72
9362.0	-37378409	-4171667	-13258424	15676.3	-8457.7	-16853.8	33.74	-2.05	4.94
9364.0	-37346989	-4188587	-13292122	15743.8	-8461.8	-16844.0	33.82	-2.05	4.96
9366.0	-37315434	-4205515	-13325800	15811.4	-8465.9	-16834.1	33.73	-2.04	4.88
9368.0	-37283743	-4222450	-13359458	15878.8	-8470.0	-16824.3	33.68	-2.02	4.89
9370.0	-37251918	-4239394	-13393097	15946.2	-8474.0	-16814.5	33.70	-1.99	4.93
9372.0	-37219959	-4256346	-13426716	16013.6	-8477.9	-16804.6	33.74	-1.94	4.96
9374.0	-37187864	-4273306	-13460315	16081.1	-8481.7	-16794.6	33.78	-1.89	4.97
9376.0	-37155634	-4290273	-13493894	16148.7	-8485.5	-16784.7	33.80	-1.83	4.97
9378.0	-37123269	-4307248	-13527454	16216.4	-8489.1	-16774.7	33.85	-1.77	4.99
9380.0	-37090768	-4324229	-13560993	16284.1	-8492.6	-16764.7	33.92	-1.73	5.02
9382.0	-37058132	-4341218	-13594513	16352.0	-8496.0	-16754.7	33.95	-1.70	5.04
9384.0	-37025360	-4358213	-13628012	16419.9	-8499.4	-16744.6	33.95	-1.68	5.06
9386.0	-36992453	-4375215	-13661491	16487.8	-8502.7	-16734.4	33.96	-1.66	5.07

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
9388.0	-36959409	-4392224	-13694950	16555.8	-8506.0	-16724.3	33.97	-1.62	5.11
9390.0	-36926230	-4409239	-13728388	16623.7	-8509.2	-16714.0	33.99	-1.60	5.13
9392.0	-36892914	-4426261	-13761806	16691.7	-8512.4	-16703.8	34.00	-1.58	5.11
9394.0	-36859463	-4443289	-13795203	16759.7	-8515.5	-16693.6	34.00	-1.56	5.09
9396.0	-36825875	-4460323	-13828580	16827.7	-8518.6	-16683.4	34.03	-1.52	5.10
9398.0	-36792152	-4477363	-13861937	16895.8	-8521.6	-16673.2	34.05	-1.47	5.14
9400.0	-36758292	-4494409	-13895273	16963.9	-8524.5	-16662.8	34.07	-1.43	5.20
9402.0	-36724296	-4511461	-13928588	17032.1	-8527.3	-16652.4	34.10	-1.43	5.24
9404.0	-36690164	-4528518	-13961882	17100.3	-8530.2	-16641.9	34.12	-1.42	5.26
9406.0	-36655895	-4545581	-13995155	17168.6	-8533.0	-16631.4	34.14	-1.40	5.26
9408.0	-36621489	-4562650	-14028408	17236.8	-8535.8	-16620.9	34.14	-1.38	5.27
9410.0	-36586947	-4579724	-14061639	17305.1	-8538.5	-16610.3	34.15	-1.36	5.28
9412.0	-36552269	-4596804	-14094849	17373.5	-8541.2	-16599.7	34.18	-1.32	5.29
9414.0	-36517454	-4613889	-14128038	17441.8	-8543.8	-16589.1	34.21	-1.27	5.29
9416.0	-36482502	-4630979	-14161206	17510.3	-8546.3	-16578.5	34.22	-1.25	5.32
9418.0	-36447413	-4648074	-14194352	17578.7	-8548.8	-16567.9	34.23	-1.25	5.35
9420.0	-36412187	-4665174	-14227477	17647.2	-8551.3	-16557.2	34.25	-1.24	5.36
9422.0	-36376824	-4682279	-14260580	17715.7	-8553.7	-16546.4	34.28	-1.21	5.36
9424.0	-36341324	-4699389	-14293663	17784.3	-8556.1	-16535.7	34.29	-1.16	5.36
9426.0	-36305687	-4716504	-14326723	17852.9	-8558.4	-16525.0	34.30	-1.13	5.39
9428.0	-36269912	-4733623	-14359762	17921.5	-8560.7	-16514.2	34.30	-1.12	5.40
9430.0	-36234001	-4750746	-14392780	17990.1	-8562.9	-16503.4	34.32	-1.12	5.41
9432.0	-36197952	-4767874	-14425776	18058.7	-8565.1	-16492.6	34.33	-1.11	5.41
9434.0	-36161766	-4785007	-14458750	18127.4	-8567.3	-16481.7	34.34	-1.08	5.42
9436.0	-36125442	-4802144	-14491703	18196.1	-8569.4	-16470.8	34.34	-1.03	5.45
9438.0	-36088981	-4819285	-14524634	18264.8	-8571.5	-16459.9	34.35	-1.00	5.47
9440.0	-36052383	-4836429	-14557542	18333.5	-8573.5	-16448.9	34.38	-1.01	5.49
9442.0	-36015647	-4853578	-14590428	18402.3	-8575.5	-16438.0	34.41	-1.01	5.50
9444.0	-35978774	-4870731	-14623294	18471.2	-8577.5	-16427.0	34.44	-1.01	5.51
9446.0	-35941762	-4887888	-14656137	18540.1	-8579.4	-16416.0	34.46	-1.00	5.53
9448.0	-35904613	-4905049	-14688958	18609.1	-8581.3	-16405.0	34.49	-0.98	5.54
9450.0	-35867324	-4922214	-14721759	18680.6	-8584.0	-16396.0	37.24	-1.94	3.14
9452.0	-35829890	-4939386	-14754543	18755.0	-8587.9	-16389.5	37.37	-1.94	3.07
9454.0	-35792304	-4956556	-14787316	18829.7	-8592.0	-16383.3	37.42	-1.92	3.06
9456.0	-35754570	-4973754	-14820077	18904.4	-8596.0	-16377.1	37.46	-1.90	3.05
9458.0	-35716687	-4990950	-14852825	18979.3	-8599.8	-16371.0	37.50	-1.88	3.04
9460.0	-35678653	-5008153	-14885561	19054.3	-8603.6	-16365.0	37.53	-1.86	3.05
9462.0	-35640469	-5025364	-14918285	19129.4	-8607.3	-16358.9	37.55	-1.85	3.06
9464.0	-35602136	-5042582	-14950996	19204.5	-8611.0	-16352.7	37.55	-1.84	3.07
9466.0	-35563651	-5059808	-14983696	19279.7	-8614.7	-16346.7	37.62	-1.82	3.02
9468.0	-35525017	-5077041	-15016383	19355.0	-8618.3	-16340.6	37.69	-1.80	3.01
9470.0	-35486231	-5094281	-15049058	19430.4	-8621.9	-16334.6	37.75	-1.80	3.01
9472.0	-35447295	-5111529	-15081721	19505.9	-8625.5	-16328.6	37.81	-1.82	3.01

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
9474.0	-35408208	-5128783	-15114372	19581.6	-8629.1	-16322.6	37.84	-1.82	3.00
9476.0	-35368969	-5146045	-15147012	19657.3	-8632.8	-16316.6	37.85	-1.82	2.98
9478.0	-35329579	-5163314	-15179639	19733.0	-8636.4	-16310.6	37.87	-1.80	3.00
9480.0	-35290036	-5180591	-15212254	19808.8	-8640.0	-16304.6	37.90	-1.77	3.03
9482.0	-35250343	-5197874	-15244857	19884.6	-8643.5	-16298.5	37.94	-1.78	3.01
9484.0	-35210498	-5215165	-15277448	19960.5	-8647.1	-16292.5	37.97	-1.81	2.97
9486.0	-35170501	-5232463	-15310027	20036.5	-8650.8	-16286.6	38.00	-1.84	2.94
9488.0	-35130352	-5249768	-15342595	20112.5	-8654.4	-16280.7	38.04	-1.81	2.94
9490.0	-35090051	-5267080	-15375150	20188.7	-8658.0	-16274.9	38.09	-1.76	2.93
9492.0	-35049597	-5284400	-15407694	20264.9	-8661.5	-16269.0	38.13	-1.71	2.91
9494.0	-35008991	-5301726	-15440226	20341.2	-8664.9	-16263.2	38.18	-1.70	2.88
9496.0	-34968232	-5319059	-15472747	20417.6	-8668.3	-16257.5	38.23	-1.70	2.86
9498.0	-34927321	-5336399	-15505256	20494.1	-8671.7	-16251.8	38.28	-1.71	2.84
9500.0	-34886256	-5353746	-15537754	20570.7	-8675.1	-16246.1	38.31	-1.71	2.84
9502.0	-34845038	-5371099	-15570241	20647.3	-8678.5	-16240.4	38.33	-1.69	2.84
9504.0	-34803666	-5388460	-15602716	20724.1	-8681.8	-16234.8	38.39	-1.66	2.82
9506.0	-34762141	-5405827	-15635180	20800.9	-8685.2	-16229.2	38.46	-1.65	2.79
9508.0	-34720463	-5423200	-15667633	20877.8	-8688.4	-16223.6	38.51	-1.64	2.77
9510.0	-34678630	-5440581	-15700074	20954.9	-8691.7	-16218.1	38.55	-1.63	2.75
9512.0	-34636643	-5457967	-15732505	21032.1	-8695.0	-16212.6	38.59	-1.62	2.72
9514.0	-34594501	-5475360	-15764925	21109.3	-8698.2	-16207.2	38.64	-1.61	2.69
9516.0	-34552205	-5492760	-15797334	21186.7	-8701.4	-16201.8	38.70	-1.59	2.68
9518.0	-34509755	-5510166	-15829732	21264.1	-8704.6	-16196.5	38.76	-1.58	2.67
9520.0	-34467149	-5527579	-15862120	21341.7	-8707.7	-16191.2	38.81	-1.58	2.66
9522.0	-34424388	-5544997	-15894497	21419.3	-8710.9	-16185.9	38.85	-1.58	2.63
9524.0	-34381471	-5562422	-15926864	21497.0	-8714.0	-16180.7	38.87	-1.56	2.59
9526.0	-34338400	-5579853	-15959220	21574.8	-8717.1	-16175.5	38.91	-1.54	2.55
9528.0	-34295172	-5597290	-15991566	21652.7	-8720.2	-16170.4	38.99	-1.53	2.54
9530.0	-34251789	-5614734	-16023901	21730.8	-8723.2	-16165.4	39.09	-1.52	2.52
9532.0	-34208249	-5632183	-16056227	21809.1	-8726.3	-16160.4	39.18	-1.52	2.49
9534.0	-34164552	-5649639	-16088543	21887.5	-8729.3	-16155.4	39.21	-1.51	2.46
9536.0	-34120699	-5667100	-16120849	21965.9	-8732.3	-16150.5	39.21	-1.52	2.45
9538.0	-34076689	-5684568	-16153145	22044.3	-8735.3	-16145.6	39.25	-1.51	2.43
9540.0	-34032521	-5702042	-16185431	22123.0	-8738.4	-16140.8	39.36	-1.50	2.37
9542.0	-33988197	-5719521	-16217708	22201.8	-8741.3	-16136.1	39.44	-1.48	2.31
9544.0	-33943714	-5737007	-16249976	22280.7	-8744.3	-16131.5	39.46	-1.47	2.30
9546.0	-33899074	-5754498	-16282234	22359.6	-8747.2	-16126.9	39.47	-1.46	2.31
9548.0	-33854276	-5771996	-16314484	22438.6	-8750.1	-16122.3	39.54	-1.44	2.29
9550.0	-33809319	-5789499	-16346724	22517.8	-8753.0	-16117.8	39.64	-1.43	2.24
9552.0	-33764205	-5807008	-16378955	22597.1	-8755.9	-16113.4	39.71	-1.43	2.19
9554.0	-33718931	-5824522	-16411177	22676.5	-8758.7	-16109.0	39.77	-1.43	2.15
9556.0	-33673498	-5842043	-16443391	22756.2	-8761.6	-16104.7	39.84	-1.42	2.13
9558.0	-33627906	-5859568	-16475596	22836.1	-8764.4	-16100.5	39.92	-1.41	2.10

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
9560.0	-33582154	-5877100	-16507793	22915.9	-8767.2	-16096.4	39.98	-1.40	2.06
9562.0	-33536242	-5894637	-16539982	22995.9	-8770.0	-16092.3	40.04	-1.40	2.01
9564.0	-33490170	-5912180	-16572162	23076.1	-8772.8	-16088.3	40.12	-1.41	1.98
9566.0	-33443938	-5929729	-16604335	23156.4	-8775.6	-16084.4	40.20	-1.41	1.95
9568.0	-33397545	-5947283	-16636500	23236.9	-8778.4	-16080.5	40.27	-1.39	1.93
9570.0	-33350992	-5964842	-16668657	23317.5	-8781.2	-16076.7	40.34	-1.37	1.91
9572.0	-33304275	-5982407	-16700807	23398.2	-8783.9	-16072.9	40.42	-1.35	1.86
9574.0	-33257397	-5999978	-16732949	23479.2	-8786.6	-16069.2	40.50	-1.33	1.80
9576.0	-33210358	-6017554	-16765084	23560.2	-8789.2	-16065.6	40.58	-1.32	1.78
9578.0	-33163156	-6035135	-16797211	23641.5	-8791.9	-16062.1	40.65	-1.34	1.76
9580.0	-33115792	-6052721	-16829332	23722.8	-8794.5	-16058.6	40.73	-1.34	1.72
9582.0	-33068265	-6070313	-16861446	23804.4	-8797.2	-16055.2	40.80	-1.33	1.66
9584.0	-33020574	-6087910	-16893553	23886.2	-8799.9	-16052.0	40.88	-1.32	1.62
9586.0	-32972720	-6105512	-16925654	23967.9	-8802.5	-16048.7	40.98	-1.32	1.59
9588.0	-32924703	-6123120	-16957748	24050.0	-8805.2	-16045.6	41.07	-1.33	1.55
9590.0	-32876520	-6140733	-16989836	24132.2	-8807.8	-16042.6	41.13	-1.32	1.50
9592.0	-32828174	-6158351	-17021918	24214.5	-8810.5	-16039.6	41.21	-1.31	1.45
9594.0	-32779662	-6175975	-17053995	24297.0	-8813.1	-16036.7	41.29	-1.29	1.41
9596.0	-32730986	-6193604	-17086065	24379.7	-8815.6	-16034.0	41.40	-1.27	1.38
9598.0	-32682143	-6211237	-17118131	24462.6	-8818.2	-16031.2	41.51	-1.27	1.34
9600.0	-32633135	-6228876	-17150190	24545.7	-8820.7	-16028.6	41.60	-1.27	1.30
9602.0	-32583960	-6246520	-17182245	24629.0	-8823.3	-16026.1	41.69	-1.29	1.25
9604.0	-32534619	-6264169	-17214295	24712.5	-8825.8	-16023.6	41.79	-1.30	1.20
9606.0	-32485110	-6281824	-17246340	24796.2	-8828.4	-16021.2	41.91	-1.27	1.17
9608.0	-32435434	-6299483	-17278380	24880.1	-8830.9	-16018.9	42.01	-1.24	1.14
9610.0	-32385590	-6317147	-17310415	24964.2	-8833.4	-16016.7	42.09	-1.23	1.09
9612.0	-32335577	-6334816	-17342447	25048.5	-8835.9	-16014.6	42.19	-1.25	1.04
9614.0	-32285396	-6352491	-17374474	25133.0	-8838.4	-16012.5	42.31	-1.26	0.99
9616.0	-32235045	-6370170	-17406497	25217.7	-8840.9	-16010.6	42.43	-1.24	0.97
9618.0	-32184525	-6387854	-17438516	25302.7	-8843.3	-16008.7	42.54	-1.23	0.95
9620.0	-32133834	-6405543	-17470531	25387.9	-8845.8	-16006.8	42.62	-1.22	0.91
9622.0	-32082973	-6423237	-17502543	25473.2	-8848.2	-16005.0	42.71	-1.20	0.87
9624.0	-32031941	-6440936	-17534552	25558.7	-8850.6	-16003.3	42.83	-1.20	0.83
9626.0	-31980738	-6458640	-17566557	25644.5	-8853.0	-16001.7	42.97	-1.20	0.81
9628.0	-31929363	-6476348	-17598558	25730.6	-8855.4	-16000.1	43.12	-1.22	0.78
9630.0	-31877815	-6494061	-17630557	25817.0	-8857.9	-15998.6	43.25	-1.21	0.74
9632.0	-31826095	-6511780	-17662553	25903.6	-8860.3	-15997.1	43.39	-1.19	0.69
9634.0	-31774200	-6529502	-17694546	25990.5	-8862.6	-15995.8	43.52	-1.17	0.64
9636.0	-31722132	-6547230	-17726536	26077.7	-8864.9	-15994.6	43.66	-1.14	0.61
9638.0	-31669889	-6564962	-17758524	26165.2	-8867.2	-15993.4	43.80	-1.15	0.57
9640.0	-31617471	-6582699	-17790510	26252.9	-8869.5	-15992.3	43.93	-1.16	0.50
9642.0	-31564877	-6600440	-17822493	26340.9	-8871.8	-15991.4	44.06	-1.17	0.44
9644.0	-31512108	-6618186	-17854475	26429.1	-8874.2	-15990.5	44.19	-1.17	0.40

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
9646.0	-31459161	-6635937	-17886455	26517.7	-8876.5	-15989.8	44.35	-1.17	0.36
9648.0	-31406037	-6653692	-17918434	26606.6	-8878.9	-15989.1	44.53	-1.16	0.33
9650.0	-31352734	-6671452	-17950412	26695.8	-8881.2	-15988.4	44.72	-1.15	0.33
9652.0	-31299253	-6689217	-17982388	26785.5	-8883.5	-15987.7	44.90	-1.14	0.34
9654.0	-31245592	-6706986	-18014363	26875.4	-8885.8	-15987.1	45.06	-1.15	0.32
9656.0	-31191751	-6724760	-18046336	26965.7	-8888.1	-15986.5	45.21	-1.15	0.27
9658.0	-31137729	-6742539	-18078309	27056.3	-8890.3	-15986.0	45.38	-1.12	0.22
9660.0	-31083526	-6760321	-18110280	27147.2	-8892.6	-15985.6	45.57	-1.11	0.21
9662.0	-31029140	-6778109	-18142251	27238.5	-8894.8	-15985.2	45.75	-1.12	0.20
9664.0	-30974571	-6795901	-18174221	27330.2	-8897.0	-15984.8	45.95	-1.11	0.19
9666.0	-30919819	-6813697	-18206190	27422.3	-8899.2	-15984.5	46.12	-1.09	0.13
9668.0	-30864882	-6831498	-18238159	27514.7	-8901.4	-15984.3	46.30	-1.06	0.09
9670.0	-30809760	-6849302	-18270127	27607.7	-8903.4	-15983.8	46.66	-0.97	0.31
9672.0	-30754451	-6867111	-18302094	27701.5	-8905.1	-15982.7	47.16	-0.78	0.75
9674.0	-30698953	-6884923	-18334058	27796.3	-8906.6	-15981.0	47.60	-0.63	1.07
9676.0	-30643265	-6902737	-18366017	27891.7	-8907.8	-15978.8	47.85	-0.62	1.07
9678.0	-30587386	-6920554	-18397973	27987.5	-8909.1	-15976.8	47.95	-0.70	0.89
9680.0	-30531315	-6938374	-18429925	28083.6	-8910.6	-15975.1	48.07	-0.77	0.78
9682.0	-30475052	-6956197	-18461874	28179.3	-8912.2	-15973.7	48.21	-0.83	0.65
9684.0	-30418595	-6974023	-18493820	28276.4	-8913.9	-15972.6	48.34	-0.88	0.47
9686.0	-30361946	-6991852	-18525764	28373.2	-8915.7	-15971.8	48.48	-0.94	0.32
9688.0	-30305102	-7009686	-18557707	28470.3	-8917.7	-15971.3	48.59	-1.01	0.16
9690.0	-30248065	-7027523	-18589650	28567.6	-8919.8	-15971.2	48.75	-1.10	-0.01
9692.0	-30190832	-7045365	-18621592	28665.1	-8922.1	-15971.2	48.85	-1.19	-0.13
9694.0	-30133404	-7063212	-18653535	28762.9	-8924.5	-15971.6	48.98	-1.27	-0.26
9696.0	-30075779	-7081063	-18685479	28861.0	-8927.1	-15972.3	49.10	-1.35	-0.39
	S-IVB 2ND GUIDANCE CUTOFF								
9697.150	-30042555	-7091330	-18703847	28917.4	-8928.7	-15972.7	49.17	-1.40	-0.46
9698.0	-30017960	-7098918	-18717418	28956.6	-8924.8	-15960.7	9.78	6.99	21.81
9700.0	-29960073	-7116754	-18749297	28956.1	-8910.8	-15917.0	9.69	7.01	21.83
9702.0	-29902144	-7134561	-18781085	28975.3	-8896.7	-15873.3	9.59	7.04	21.86
9704.0	-29844172	-7152340	-18812789	28994.4	-8882.6	-15829.5	9.49	7.06	21.88
9706.0	-29786164	-7170092	-18844404	29013.7	-8868.5	-15785.7	9.40	7.07	21.87
	TRANSLUNAR INJECTION (TLI)								
9707.150	-29752793	-7180295	-18862540	29024.4	-8860.5	-15760.5	9.37	7.07	21.87
9750.0	-28501057	-7353378	-19517723	29386.6	-8551.6	-14822.4	7.54	7.32	21.88
9800.0	-27023174	-7371721	-20231633	29711.4	-8180.6	-13733.7	5.46	7.50	21.62
9850.0	-25531608	-8371347	-20891479	29934.9	-7803.9	-12664.5	3.50	7.55	21.10
9900.0	-24031252	-8752116	-21498616	30064.3	-7427.2	-11627.1	1.70	7.50	20.36

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
9950.0	-22526605	-9114152	-22054884	30108.1	-7055.4	-10631.2	0.08	7.36	19.45
10000.0	-21021715	-9457800	-22562543	30075.7	-6692.3	-9683.8	-1.34	7.15	18.43
10050.0	-19520139	-9783581	-23024153	29977.1	-6341.1	-8789.8	-2.57	6.89	17.32
10100.0	-18024944	-10092151	-23442469	29822.1	-6004.2	-7952.3	-3.60	6.59	16.18
10150.0	-16538717	-10384264	-23820346	29619.9	-5683.1	-7172.4	-4.46	6.26	15.02
10200.0	-15063597	-10660736	-24160662	29379.1	-5378.6	-6449.8	-5.15	5.92	13.89
10250.0	-13601318	-10922415	-24466259	29107.5	-5091.4	-5783.3	-5.69	5.57	12.78
10300.0	-12153248	-11170163	-24739894	28811.9	-4821.4	-5170.9	-6.11	5.23	11.72
10350.0	-10720439	-11404835	-24984209	28498.0	-4568.3	-4610.1	-6.42	4.90	10.72
10400.0	-9303668	-11627247	-25201712	28171.0	-4331.7	-4097.9	-6.64	4.57	9.78
10450.0	-7903482	-11838264	-25394759	27835.2	-4110.8	-3631.3	-6.78	4.26	8.90
10500.0	-6520231	-12039599	-25565554	27494.1	-3905.0	-3207.3	-6.85	3.97	8.08
10550.0	-5154107	-12229000	-25716145	27150.6	-3713.4	-2822.7	-6.88	3.70	7.32
10600.0	-3805169	-12410161	-25848429	26807.1	-3535.2	-2474.5	-6.86	3.44	6.62
10650.0	-2473363	-12582730	-25964156	26465.5	-3369.6	-2160.0	-6.80	3.19	5.97
10700.0	-1158559	-12747317	-26064943	26127.4	-3215.6	-1876.3	-6.72	2.97	5.38
10750.0	139453	-12904475	-26152261	25793.8	-3072.7	-1621.1	-6.62	2.76	4.84
10800.0	1420518	-13054747	-26227480	25465.9	-2939.8	-1391.9	-6.50	2.56	4.34
10850.0	2686142	-13198618	-26291846	25144.2	-2816.5	-1186.6	-6.37	2.38	3.88
10900.0	3935450	-13336544	-26346501	24829.3	-2701.9	-1003.2	-6.23	2.21	3.46
10950.0	5169190	-13468949	-26392495	24521.5	-2595.6	-839.8	-6.08	2.05	3.08
11000.0	6387725	-13596226	-26430788	24221.1	-2496.7	-694.8	-5.93	1.90	2.73
11050.0	7591427	-13718740	-26462261	23928.2	-2405.0	-566.7	-5.78	1.77	2.40
11100.0	8780674	-13836832	-26487719	23642.9	-2319.7	-454.1	-5.63	1.64	2.11
11150.0	9955842	-13950814	-26507963	23365.1	-2240.5	-355.6	-5.48	1.53	1.84
	CSM SEPARATION								
11198.900	11091900	-14058596	-26523196	23100.7	-2168.6	-272.0	-5.35	1.41	1.61

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									
8769.100	-2951.029	-55.848	-1964.454	14157.8	-383.7	-21286.0	25.25	0.44	16.81
8770.0	-2946.582	-56.968	-1971.105	14215.7	-382.9	-21254.0	25.21	0.44	16.86
8780.0	-2892.983	-57.535	-2035.945	14466.9	-378.4	-21083.9	25.01	0.45	17.16
8790.0	-2838.974	-58.214	-2040.503	14716.0	-373.8	-20910.9	24.80	0.45	17.46
8800.0	-2784.551	-58.825	-2074.773	14963.8	-369.2	-20734.8	24.59	0.46	17.75
8810.0	-2849.724	-59.429	-2109.752	15207.9	-364.6	-20555.9	24.38	0.46	18.04
8820.0	-2824.495	-60.025	-2142.433	15450.7	-359.9	-20374.0	24.17	0.47	18.33
8830.0	-2798.868	-60.614	-2175.813	15691.3	-355.2	-20189.3	23.95	0.48	18.61
8840.0	-2772.846	-61.194	-2204.886	15929.7	-350.4	-20001.8	23.72	0.48	18.90
8850.0	-2746.435	-61.767	-2241.649	16165.9	-345.5	-19811.5	23.50	0.48	19.18
8860.0	-2719.636	-62.331	-2274.095	16399.8	-340.6	-19618.3	23.27	0.49	19.45
8870.0	-2692.455	-62.888	-2306.222	16631.4	-335.7	-19422.4	23.04	0.49	19.73
8880.0	-2664.894	-63.436	-2338.024	16860.6	-330.7	-19223.8	22.80	0.50	20.00
8890.0	-2636.958	-63.976	-2369.497	17087.5	-325.6	-19022.5	22.56	0.50	20.27
8900.0	-2608.651	-64.508	-2400.637	17311.9	-320.5	-18818.5	22.32	0.51	20.54
8910.0	-2579.976	-65.032	-2431.438	17534.0	-315.4	-18611.8	22.07	0.51	20.80
8920.0	-2550.938	-65.546	-2461.898	17753.5	-310.2	-18402.6	21.83	0.52	21.06
8930.0	-2521.540	-66.053	-2492.011	17970.6	-305.0	-18190.7	21.57	0.52	21.32
8940.0	-2491.788	-66.550	-2521.772	18185.1	-299.7	-17976.3	21.32	0.53	21.57
8950.0	-2461.684	-67.039	-2551.179	18397.1	-294.4	-17759.3	21.06	0.53	21.82
8960.0	-2431.234	-67.519	-2580.227	18606.5	-289.1	-17539.9	20.80	0.53	22.07
8970.0	-2400.441	-67.991	-2608.912	18813.4	-283.7	-17317.9	20.53	0.54	22.32
8980.0	-2369.310	-68.453	-2637.229	19017.5	-278.2	-17093.6	20.27	0.54	22.56
8990.0	-2337.845	-68.907	-2665.175	19218.9	-272.7	-16866.8	20.00	0.55	22.80
9000.0	-2306.051	-69.351	-2692.746	19417.6	-267.2	-16637.7	19.73	0.55	23.03
9010.0	-2273.932	-69.786	-2719.939	19613.5	-261.7	-16406.2	19.45	0.55	23.27
9020.0	-2241.493	-70.212	-2746.747	19806.8	-256.1	-16172.6	19.17	0.56	23.48
9030.0	-2208.733	-70.629	-2773.170	19997.4	-250.4	-15936.5	18.90	0.56	23.72
9040.0	-2175.671	-71.036	-2799.202	20185.3	-244.8	-15698.2	18.61	0.57	23.94
9050.0	-2142.299	-71.435	-2824.841	20369.8	-239.1	-15457.7	18.33	0.57	24.16
9060.0	-2108.624	-71.823	-2850.081	20551.7	-233.3	-15215.0	18.04	0.57	24.38
9070.0	-2074.653	-72.203	-2874.921	20730.7	-227.5	-14970.2	17.75	0.58	24.59
9080.0	-2040.389	-72.572	-2899.356	20906.9	-221.7	-14723.2	17.47	0.58	24.80
9090.0	-2005.838	-72.932	-2923.382	21080.2	-215.9	-14474.2	17.18	0.58	25.01
9100.0	-1971.004	-73.283	-2946.998	21250.4	-210.0	-14223.2	16.88	0.59	25.21
9110.0	-1935.892	-73.623	-2970.198	21417.6	-204.1	-13970.2	16.58	0.59	25.41
9120.0	-1900.509	-73.954	-2992.980	21581.8	-198.1	-13715.1	16.28	0.59	25.60
9130.0	-1864.856	-74.276	-3015.341	21743.0	-192.2	-13458.2	15.98	0.59	25.79
9140.0	-1828.941	-74.587	-3037.278	21901.2	-186.2	-13199.4	15.65	0.60	25.98
9150.0	-1792.768	-74.888	-3058.787	22056.2	-180.1	-12938.7	15.34	0.60	26.16

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
9160.0	-1756.343	-75.180	-3079.866	22208.1	-174.1	-12676.3	15.03	0.60	26.31
9170.0	-1719.670	-75.461	-3100.511	22356.9	-168.0	-12412.0	14.71	0.61	26.52
9180.0	-1682.755	-75.733	-3120.729	22502.5	-161.9	-12146.0	14.40	0.61	26.69
9190.0	-1645.603	-75.994	-3140.496	22645.1	-155.7	-11878.2	14.11	0.61	26.86
9200.0	-1608.219	-76.245	-3159.817	22784.5	-149.6	-11608.8	13.76	0.61	27.03
9210.0	-1570.608	-76.486	-3178.700	22920.5	-143.4	-11337.8	13.44	0.62	27.19
9220.0	-1532.776	-76.717	-3197.135	23053.4	-137.2	-11065.1	13.11	0.62	27.35
9230.0	-1494.727	-76.938	-3215.121	23183.0	-130.9	-10790.9	12.79	0.62	27.50
9240.0	-1456.469	-77.148	-3232.654	23309.3	-124.7	-10515.2	12.47	0.62	27.65
9250.0	-1418.005	-77.348	-3249.732	23432.6	-118.4	-10238.0	12.13	0.62	27.80
9260.0	-1379.341	-77.538	-3266.352	23552.3	-112.1	-9959.3	11.80	0.63	27.94
9270.0	-1340.482	-77.717	-3282.513	23668.9	-105.8	-9679.3	11.50	0.63	28.08
9280.0	-1301.435	-77.886	-3298.211	23782.1	-99.4	-9398.0	11.17	0.63	28.21
9290.0	-1262.203	-78.044	-3313.446	23892.0	-93.1	-9115.3	10.81	0.63	28.34
9300.0	-1222.794	-78.192	-3328.214	23998.6	-86.7	-8831.3	10.46	0.63	28.47
9310.0	-1183.212	-78.330	-3342.514	24101.8	-80.3	-8546.2	10.12	0.63	28.59
9320.0	-1143.463	-78.457	-3356.344	24201.6	-74.0	-8259.7	9.78	0.64	28.71
9330.0	-1103.553	-78.573	-3369.701	24298.0	-67.5	-7972.1	9.44	0.64	28.82
9340.0	-1063.486	-78.679	-3382.584	24391.0	-61.1	-7683.5	9.16	0.65	28.88
	S-IVB RE-IGNITION (STDV OPEN)								
9346.300	-1038.167	-78.740	-3390.456	24448.1	-57.0	-7501.7	8.99	0.67	28.87
9348.0	-1031.324	-78.756	-3392.548	24472.5	-56.2	-7454.8	23.33	0.27	24.45
9350.0	-1023.260	-78.775	-3394.994	24522.5	-55.3	-7407.2	25.83	0.50	23.56
9352.0	-1015.190	-78.793	-3397.425	24574.7	-54.4	-7360.1	26.18	0.51	23.58
9354.0	-1007.282	-78.810	-3399.839	24627.0	-53.3	-7312.8	26.23	0.49	23.69
9356.0	-999.957	-78.829	-3402.238	24679.5	-52.2	-7265.3	26.31	0.50	23.83
9358.0	-990.835	-78.845	-3404.622	24732.5	-51.1	-7217.9	26.51	0.52	24.19
9360.0	-982.686	-78.861	-3406.990	24785.7	-50.1	-7168.1	26.69	0.53	24.75
9362.0	-974.518	-78.878	-3409.341	24839.3	-49.0	-7118.3	26.81	0.51	25.11
9364.0	-966.333	-78.894	-3411.675	24892.9	-48.0	-7068.0	26.85	0.51	25.18
9366.0	-958.131	-78.909	-3413.994	24946.6	-46.9	-7017.7	26.81	0.54	25.08
9368.0	-949.911	-78.924	-3416.295	25000.2	-45.8	-6967.5	26.75	0.55	25.07
9370.0	-941.673	-78.939	-3418.580	25053.7	-44.7	-6917.4	26.73	0.56	25.13
9372.0	-933.417	-78.954	-3420.849	25107.2	-43.6	-6867.0	26.73	0.60	25.20
9374.0	-925.144	-78.968	-3423.101	25160.7	-42.3	-6816.6	26.73	0.64	25.26
9376.0	-916.854	-78.982	-3425.337	25214.2	-41.0	-6766.0	26.73	0.70	25.29
9378.0	-908.546	-78.995	-3427.555	25267.7	-39.5	-6715.4	26.73	0.75	25.35
9380.0	-900.220	-79.008	-3429.757	25321.2	-37.9	-6664.6	26.75	0.79	25.44
9382.0	-891.876	-79.020	-3431.943	25374.7	-36.3	-6613.7	26.75	0.80	25.49
9384.0	-883.515	-79.032	-3434.111	25428.2	-34.7	-6562.7	26.74	0.81	25.52
9386.0	-875.136	-79.043	-3436.263	25481.7	-33.1	-6511.6	26.72	0.83	25.55

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
9388.0	-866.740	-79.053	-3438.398	25535.1	-31.4	-6460.5	26.69	0.84	25.61
9390.0	-858.326	-79.063	-3440.516	25588.5	-29.7	-6409.2	26.68	0.86	25.64
9392.0	-849.895	-79.073	-3442.617	25641.9	-27.9	-6358.0	26.68	0.89	25.65
9394.0	-841.446	-79.082	-3444.702	25695.3	-26.1	-6306.7	26.68	0.91	25.65
9396.0	-832.979	-79.090	-3446.769	25748.7	-24.2	-6255.3	26.68	0.94	25.69
9398.0	-824.495	-79.098	-3448.820	25802.0	-22.3	-6203.9	26.66	0.98	25.76
9400.0	-815.993	-79.105	-3450.853	25855.3	-20.3	-6152.3	26.63	0.99	25.84
9402.0	-807.474	-79.111	-3452.870	25908.6	-18.4	-6100.6	26.62	0.98	25.89
9404.0	-798.937	-79.117	-3454.869	25961.9	-16.4	-6048.7	26.62	0.98	25.94
9406.0	-790.383	-79.122	-3456.852	26015.1	-14.4	-5996.9	26.62	1.00	25.96
9408.0	-781.811	-79.126	-3458.817	26068.4	-12.4	-5944.9	26.60	1.01	25.98
9410.0	-773.222	-79.130	-3460.765	26121.6	-10.3	-5892.9	26.58	1.02	26.01
9412.0	-764.615	-79.133	-3462.696	26174.8	-8.2	-5840.9	26.59	1.05	26.05
9414.0	-755.991	-79.135	-3464.610	26228.0	-6.1	-5788.8	26.59	1.10	26.09
9416.0	-747.349	-79.137	-3466.507	26281.1	-3.8	-5736.5	26.57	1.11	26.14
9418.0	-738.689	-79.138	-3468.387	26334.3	-1.6	-5684.2	26.56	1.10	26.18
9420.0	-730.012	-79.138	-3470.249	26387.4	0.6	-5631.8	26.55	1.10	26.21
9422.0	-721.318	-79.138	-3472.094	26440.6	2.8	-5579.4	26.56	1.13	26.24
9424.0	-712.606	-79.136	-3473.922	26493.7	5.1	-5526.9	26.55	1.18	26.27
9426.0	-703.877	-79.134	-3475.733	26546.8	7.5	-5474.3	26.52	1.20	26.31
9428.0	-695.130	-79.131	-3477.526	26599.8	9.9	-5421.7	26.51	1.20	26.34
9430.0	-686.366	-79.128	-3479.302	26652.9	12.3	-5369.0	26.51	1.20	26.36
9432.0	-677.584	-79.123	-3481.061	26705.9	14.7	-5316.2	26.51	1.20	26.39
9434.0	-668.785	-79.118	-3482.802	26758.9	17.2	-5263.4	26.49	1.22	26.42
9436.0	-659.968	-79.112	-3484.526	26811.9	19.7	-5210.6	26.46	1.26	26.46
9438.0	-651.134	-79.105	-3486.232	26864.8	22.2	-5157.6	26.44	1.27	26.50
9440.0	-642.283	-79.097	-3487.921	26917.7	24.8	-5104.6	26.45	1.26	26.54
9442.0	-633.414	-79.089	-3489.592	26970.7	27.3	-5051.5	26.45	1.26	26.57
9444.0	-624.528	-79.079	-3491.246	27023.7	29.8	-4998.3	26.46	1.25	26.61
9446.0	-615.624	-79.069	-3492.883	27076.6	32.5	-4945.0	26.46	1.26	26.65
9448.0	-606.703	-79.058	-3494.502	27129.5	35.1	-4891.7	26.47	1.27	26.69
9450.0	-597.764	-79.046	-3496.103	27185.3	37.9	-4838.7	30.19	1.46	26.10
9452.0	-588.806	-79.033	-3497.687	27246.0	40.7	-4786.4	30.31	1.49	26.14
9454.0	-579.827	-79.019	-3499.254	27306.7	43.5	-4734.2	30.34	1.52	26.17
9456.0	-570.829	-79.004	-3500.804	27367.2	46.4	-4681.9	30.37	1.54	26.20
9458.0	-561.811	-78.988	-3502.336	27428.0	49.4	-4629.5	30.39	1.56	26.23
9460.0	-552.773	-78.972	-3503.851	27488.8	52.6	-4577.0	30.39	1.58	26.27
9462.0	-543.715	-78.954	-3505.349	27549.6	55.7	-4524.5	30.40	1.59	26.30
9464.0	-534.636	-78.935	-3506.830	27610.4	58.9	-4471.9	30.38	1.59	26.33
9466.0	-525.539	-78.915	-3508.293	27671.3	62.1	-4419.2	30.45	1.63	26.35
9468.0	-516.420	-78.894	-3509.739	27732.2	65.4	-4366.4	30.50	1.65	26.39
9470.0	-507.282	-78.872	-3511.168	27793.3	68.7	-4313.5	30.54	1.65	26.44
9472.0	-498.123	-78.849	-3512.579	27854.4	72.0	-4260.7	30.58	1.64	26.48

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
9474.0	-489.945	-78.925	-3513.973	27915.6	75.3	-4207.7	30.60	1.64	26.50
9476.0	-479.746	-78.799	-3515.349	27976.9	78.6	-4154.7	30.61	1.65	26.51
9478.0	-470.527	-78.773	-3516.708	28038.1	82.0	-4101.7	30.60	1.66	26.55
9480.0	-461.288	-78.745	-3518.049	28099.3	85.3	-4048.5	30.60	1.69	26.60
9482.0	-452.029	-78.717	-3519.373	28160.6	88.7	-3995.3	30.63	1.69	26.62
9484.0	-442.750	-78.687	-3520.679	28221.9	92.1	-3942.1	30.67	1.67	26.60
9486.0	-433.450	-78.656	-3521.969	28283.3	95.4	-3888.9	30.71	1.65	26.61
9488.0	-424.130	-78.624	-3523.239	28344.8	98.8	-3835.7	30.73	1.68	26.65
9490.0	-414.790	-78.591	-3524.493	28406.3	102.2	-3782.4	30.75	1.74	26.69
9492.0	-405.430	-78.557	-3525.729	28467.8	105.7	-3728.9	30.78	1.79	26.72
9494.0	-396.049	-78.522	-3526.948	28529.4	109.3	-3675.5	30.81	1.81	26.74
9496.0	-386.649	-78.485	-3528.149	28591.1	113.0	-3622.0	30.86	1.82	26.76
9498.0	-377.227	-78.447	-3529.332	28652.9	116.6	-3568.5	30.91	1.82	26.79
9500.0	-367.786	-78.408	-3530.498	28714.7	120.3	-3514.9	30.92	1.82	26.81
9502.0	-358.324	-78.368	-3531.646	28776.6	123.9	-3461.2	30.92	1.84	26.84
9504.0	-348.842	-78.327	-3532.777	28838.5	127.7	-3407.5	30.96	1.88	26.88
9506.0	-339.339	-78.284	-3533.889	28900.5	131.5	-3353.7	31.02	1.91	26.91
9508.0	-329.816	-78.240	-3534.985	28962.6	135.3	-3299.9	31.07	1.92	26.94
9510.0	-320.273	-78.195	-3536.062	29024.8	139.2	-3246.0	31.09	1.94	26.96
9512.0	-310.709	-78.148	-3537.121	29087.1	143.1	-3192.1	31.13	1.96	26.97
9514.0	-301.124	-78.101	-3538.163	29149.4	147.0	-3138.1	31.18	1.99	26.99
9516.0	-291.519	-78.052	-3539.187	29211.8	151.0	-3084.1	31.21	2.01	27.03
9518.0	-281.894	-78.001	-3540.193	29274.3	155.1	-3030.0	31.25	2.02	27.07
9520.0	-272.247	-77.950	-3541.182	29336.9	159.2	-2975.8	31.30	2.04	27.10
9522.0	-262.581	-77.896	-3542.153	29399.5	163.3	-2921.6	31.33	2.05	27.11
9524.0	-252.893	-77.842	-3543.105	29462.2	167.4	-2867.4	31.35	2.08	27.11
9526.0	-243.185	-77.786	-3544.040	29525.0	171.6	-2813.2	31.39	2.12	27.12
9528.0	-233.457	-77.729	-3544.957	29587.8	175.9	-2758.9	31.45	2.13	27.17
9530.0	-223.707	-77.670	-3545.856	29650.8	180.1	-2704.5	31.53	2.15	27.23
9532.0	-213.937	-77.610	-3546.738	29713.8	184.5	-2650.0	31.61	2.17	27.26
9534.0	-204.146	-77.549	-3547.601	29777.3	188.8	-2595.5	31.64	2.19	27.27
9536.0	-194.334	-77.486	-3548.446	29840.5	193.2	-2541.0	31.63	2.19	27.27
9538.0	-184.501	-77.422	-3549.274	29903.9	197.6	-2486.4	31.67	2.20	27.29
9540.0	-174.648	-77.356	-3550.083	29967.4	202.1	-2431.8	31.78	2.24	27.32
9542.0	-164.773	-77.289	-3550.875	30031.0	206.6	-2377.1	31.86	2.28	27.35
9544.0	-154.878	-77.220	-3551.648	30094.7	211.2	-2322.5	31.86	2.30	27.36
9546.0	-144.962	-77.150	-3552.404	30158.5	215.8	-2267.7	31.86	2.31	27.39
9548.0	-135.024	-77.078	-3553.141	30222.3	220.5	-2212.9	31.91	2.33	27.43
9550.0	-125.066	-77.005	-3553.860	30286.2	225.2	-2158.0	32.00	2.36	27.46
9552.0	-115.086	-76.930	-3554.562	30350.3	229.9	-2103.1	32.08	2.39	27.47
9554.0	-105.085	-76.853	-3555.245	30414.5	234.7	-2048.1	32.13	2.40	27.49
9556.0	-95.064	-76.775	-3555.910	30478.9	239.6	-1993.1	32.20	2.42	27.53
9558.0	-85.021	-76.695	-3556.557	30543.4	244.5	-1938.1	32.26	2.45	27.56

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
9560.0	-74.957	-76.614	-3557.186	30603.0	249.4	-1882.9	32.32	2.48	27.58
9562.0	-64.871	-76.531	-3557.796	30672.7	254.4	-1827.8	32.38	2.50	27.59
9564.0	-54.764	-76.447	-3558.389	30737.6	259.4	-1772.6	32.46	2.51	27.61
9566.0	-44.636	-76.361	-3558.963	30802.6	264.4	-1717.3	32.53	2.53	27.65
9568.0	-34.487	-76.273	-3559.520	30867.7	269.5	-1662.0	32.58	2.55	27.69
9570.0	-24.315	-76.183	-3560.057	30933.0	274.7	-1606.6	32.63	2.58	27.73
9572.0	-14.123	-76.092	-3560.577	30998.3	279.9	-1551.1	32.71	2.63	27.76
9574.0	-3.909	-75.999	-3561.079	31063.8	285.2	-1495.5	32.79	2.67	27.78
9576.0	6.327	-75.904	-3561.562	31129.5	290.6	-1439.9	32.85	2.69	27.82
9578.0	16.584	-75.808	-3562.027	31195.3	295.9	-1384.3	32.92	2.68	27.85
9580.0	26.863	-75.709	-3562.473	31261.2	301.4	-1328.6	32.99	2.70	27.87
9582.0	37.164	-75.609	-3562.901	31327.3	306.9	-1272.8	33.06	2.73	27.89
9584.0	47.487	-75.507	-3563.311	31393.5	312.3	-1217.0	33.14	2.76	27.92
9586.0	57.831	-75.404	-3563.702	31459.9	317.9	-1161.1	33.23	2.78	27.96
9588.0	68.197	-75.298	-3564.075	31526.5	323.4	-1105.2	33.32	2.79	27.99
9590.0	78.585	-75.191	-3564.430	31593.2	329.1	-1049.2	33.38	2.82	28.00
9592.0	88.995	-75.081	-3564.766	31660.1	334.7	-993.2	33.45	2.85	28.02
9594.0	99.428	-74.970	-3565.084	31727.1	340.5	-937.1	33.53	2.89	28.06
9596.0	109.882	-74.857	-3565.383	31794.2	346.3	-881.0	33.62	2.93	28.11
9598.0	120.358	-74.742	-3565.664	31861.6	352.2	-824.7	33.71	2.96	28.16
9600.0	130.857	-74.625	-3565.926	31929.1	358.2	-768.4	33.80	2.98	28.19
9602.0	141.378	-74.506	-3566.169	31996.8	364.1	-712.0	33.90	2.98	28.21
9604.0	151.921	-74.386	-3566.395	32064.8	370.1	-655.5	34.00	3.00	28.24
9606.0	162.486	-74.263	-3566.601	32132.9	376.2	-599.0	34.09	3.04	28.30
9608.0	173.074	-74.138	-3566.789	32201.1	382.3	-542.4	34.17	3.09	28.36
9610.0	183.685	-74.011	-3566.958	32269.6	388.5	-485.6	34.25	3.11	28.38
9612.0	194.318	-73.882	-3567.109	32338.2	394.8	-428.8	34.35	3.12	28.40
9614.0	204.974	-73.751	-3567.240	32407.0	401.1	-372.0	34.47	3.14	28.45
9616.0	215.652	-73.618	-3567.353	32476.1	407.4	-315.1	34.56	3.18	28.51
9618.0	226.353	-73.483	-3567.448	32545.3	413.8	-258.0	34.65	3.20	28.57
9620.0	237.077	-73.346	-3567.523	32614.7	420.2	-200.8	34.72	3.22	28.61
9622.0	247.824	-73.206	-3567.580	32684.3	426.7	-143.6	34.80	3.26	28.65
9624.0	258.594	-73.065	-3567.618	32754.0	433.3	-86.2	34.91	3.29	28.70
9626.0	269.387	-72.921	-3567.637	32823.9	439.9	-28.7	35.02	3.31	28.78
9628.0	280.202	-72.775	-3567.637	32894.1	446.5	28.9	35.15	3.31	28.85
9630.0	291.041	-72.627	-3567.618	32964.6	453.2	86.6	35.27	3.34	28.90
9632.0	301.903	-72.477	-3567.580	33035.3	459.9	144.5	35.39	3.39	28.96
9634.0	312.789	-72.324	-3567.522	33106.2	466.7	202.5	35.51	3.44	29.02
9636.0	323.698	-72.170	-3567.446	33177.3	473.6	260.6	35.62	3.48	29.10
9638.0	334.630	-72.013	-3567.351	33248.7	480.6	318.8	35.74	3.50	29.15
9640.0	345.586	-71.853	-3567.236	33320.4	487.7	377.1	35.98	3.52	29.19
9642.0	356.565	-71.692	-3567.103	33392.3	494.8	435.5	36.01	3.54	29.23
9644.0	367.569	-71.528	-3566.950	33464.4	501.9	494.1	36.13	3.56	29.28

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
9646.0	378.596	-71.361	-3566.777	33536.8	509.0	552.7	36.27	3.60	29.36
9648.0	389.646	-71.192	-3566.586	33609.5	516.3	611.5	36.42	3.62	29.46
9650.0	400.721	-71.021	-3566.375	33682.5	523.6	670.5	36.56	3.65	29.58
9652.0	411.820	-70.848	-3566.144	33755.8	530.9	729.8	36.69	3.67	29.70
9654.0	422.943	-70.672	-3565.894	33829.4	538.2	789.3	36.82	3.68	29.79
9656.0	434.091	-70.493	-3565.625	33903.2	545.6	848.9	36.96	3.71	29.85
9658.0	445.262	-70.313	-3565.335	33977.2	553.1	908.7	37.10	3.76	29.94
9660.0	456.458	-70.129	-3565.027	34051.6	560.7	968.7	37.25	3.79	30.05
9662.0	467.679	-69.943	-3564.698	34126.3	568.3	1028.9	37.40	3.80	30.16
9664.0	478.924	-69.755	-3564.349	34201.2	575.9	1089.3	37.55	3.83	30.28
9666.0	490.194	-69.564	-3563.981	34276.5	583.6	1149.9	37.70	3.88	30.35
9668.0	501.489	-69.371	-3563.592	34352.1	591.4	1210.7	37.86	3.93	30.45
9670.0	512.809	-69.175	-3563.184	34428.0	599.4	1272.0	37.99	3.97	30.87
9672.0	524.154	-68.976	-3562.755	34504.1	607.4	1334.5	38.12	4.02	31.56
9674.0	535.523	-68.775	-3562.305	34580.5	615.5	1398.1	38.26	4.08	32.11
9676.0	546.918	-68.571	-3561.834	34657.2	623.7	1462.4	38.45	4.10	32.27
9678.0	558.339	-68.365	-3561.342	34734.3	631.9	1527.0	38.63	4.09	32.18
9680.0	569.785	-68.155	-3560.829	34811.8	640.1	1591.3	38.80	4.08	32.16
9682.0	581.256	-67.943	-3560.295	34889.6	648.2	1655.6	38.98	4.08	32.14
9684.0	592.753	-67.728	-3559.739	34967.8	656.4	1719.8	39.18	4.11	32.08
9686.0	604.276	-67.511	-3559.162	35046.3	664.7	1783.9	39.38	4.13	32.04
9688.0	615.825	-67.291	-3558.565	35125.3	672.9	1847.9	39.56	4.12	31.98
9690.0	627.399	-67.068	-3557.946	35204.7	681.1	1911.8	39.79	4.11	31.93
9692.0	639.000	-66.843	-3557.306	35284.3	689.3	1975.6	39.95	4.09	31.89
9694.0	650.628	-66.614	-3556.645	35364.4	697.5	2039.4	40.12	4.06	31.85
9696.0	662.281	-66.383	-3555.964	35444.8	705.6	2103.0	40.30	4.04	31.82
	S-IVB 2ND GUIDANCE CUTOFF								
9697.150	668.994	-66.249	-3555.562	35491.1	710.2	2139.6	40.41	4.03	31.80
9698.0	673.960	-66.150	-3555.261	35499.3	712.1	2164.6	-5.38	0.51	28.63
9700.0	685.643	-65.915	-3554.539	35488.4	713.1	2221.9	-5.49	0.51	28.60
9702.0	697.322	-65.680	-3553.798	35477.4	714.1	2279.0	-5.59	0.51	28.56
9704.0	708.998	-65.445	-3553.038	35466.1	715.1	2336.1	-5.70	0.50	28.52
9706.0	720.671	-65.210	-3552.260	35454.9	716.1	2393.4	-5.78	0.51	28.47
	TRANSLUNAR INJECTION (TLI)								
9707.150	727.380	-65.074	-3551.804	35448.2	716.6	2426.1	-5.81	0.51	28.45
9750.0	976.401	-59.946	-3530.446	35161.2	737.4	3623.7	-7.57	0.45	27.42
9800.0	1264.055	-53.788	-3495.080	34736.3	758.7	4959.7	-9.40	0.39	25.99
9850.0	1547.855	-47.468	-3449.030	34227.0	776.9	6219.2	-10.94	0.33	24.37
9900.0	1827.167	-41.011	-3392.957	33647.8	792.0	7394.5	-12.20	0.27	22.63

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
9950.0	2101.474	-34.441	-3327.575	33013.0	804.3	8481.3	-13.17	0.21	20.84
10000.0	2370.376	-27.781	-3253.621	32336.2	813.9	9478.0	-13.88	0.16	19.04
10050.0	2633.578	-21.053	-3171.832	31629.8	821.0	10385.6	-14.36	0.12	17.28
10100.0	2890.884	-14.276	-3082.933	30904.8	825.8	11206.8	-14.63	0.07	15.59
10150.0	3142.181	-7.467	-2987.618	30170.8	828.3	11945.6	-14.72	0.04	13.99
10200.0	3387.429	-0.641	-2886.546	29435.8	830.0	12607.1	-14.67	0.01	12.50
10250.0	3626.647	6.189	-2780.329	28706.1	829.7	13196.8	-14.51	-0.02	11.12
10300.0	3859.899	13.011	-2669.535	27986.9	828.2	13720.5	-14.26	-0.04	9.85
10350.0	4087.291	19.816	-2554.684	27282.2	825.6	14183.8	-13.93	-0.06	8.70
10400.0	4308.955	26.596	-2436.250	26595.0	822.1	14592.4	-13.56	-0.08	7.66
10450.0	4525.042	33.343	-2314.660	25927.3	817.8	14951.5	-13.15	-0.09	6.72
10500.0	4735.721	40.054	-2190.301	25280.6	813.0	15266.2	-12.72	-0.10	5.88
10550.0	4941.167	46.722	-2063.520	24655.7	807.6	15540.9	-12.28	-0.11	5.12
10600.0	5141.563	53.345	-1934.628	24053.1	801.9	15779.9	-11.83	-0.12	4.45
10650.0	5337.092	59.919	-1803.904	23472.8	795.9	15986.9	-11.38	-0.12	3.85
10700.0	5527.937	66.442	-1671.595	22914.7	789.6	16165.5	-10.95	-0.13	3.31
10750.0	5714.279	72.913	-1537.924	22378.2	783.1	16318.7	-10.52	-0.13	2.83
10800.0	5896.293	79.331	-1403.086	21862.9	776.6	16449.2	-10.10	-0.13	2.40
10850.0	6074.152	85.694	-1267.260	21368.2	769.9	16559.6	-9.69	-0.13	2.02
10900.0	6248.022	92.002	-1130.600	20893.2	763.2	16652.0	-9.30	-0.13	1.68
10950.0	6418.063	98.255	-993.247	20437.4	756.5	16728.5	-8.93	-0.13	1.38
11000.0	6584.428	104.453	-855.324	19999.7	749.9	16790.7	-8.57	-0.13	1.11
11050.0	6747.264	110.596	-716.942	19579.6	743.2	16840.2	-8.23	-0.13	0.87
11100.0	6906.712	116.685	-578.200	19176.1	736.6	16878.5	-7.90	-0.13	0.66
11150.0	7062.906	122.719	-439.186	18788.6	730.1	16906.7	-7.59	-0.13	0.47
CSM SEPARATION									
11198.900	7212.639	128.570	-303.040	18424.2	723.8	16925.5	-7.28	-0.13	0.30

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										
8768.100	3545.545	101.7241	-32.3511	86.23	0.02	24248.4	86.42	0.02	25572.8	637556
8770.0	3545.547	101.8688	-32.3430	86.14	0.02	24248.4	86.34	0.02	25572.8	637565
8780.0	3545.561	102.6300	-32.2970	85.69	0.02	24248.4	85.91	0.02	25572.7	637593
8790.0	3545.574	103.3903	-32.2460	85.24	0.02	24248.4	85.48	0.02	25572.7	637618
8800.0	3545.588	104.1497	-32.1899	84.78	0.02	24248.4	85.06	0.02	25572.6	637639
8810.0	3545.602	104.9081	-32.1288	84.33	0.02	24248.4	84.63	0.02	25572.6	637656
8820.0	3545.616	105.6653	-32.0626	83.89	0.02	24248.4	84.20	0.02	25572.5	637670
8830.0	3545.630	106.4213	-31.9914	83.44	0.02	24248.4	83.78	0.02	25572.5	637680
8840.0	3545.645	107.1760	-31.9152	82.99	0.02	24248.4	83.36	0.02	25572.5	637686
8850.0	3545.660	107.9294	-31.8341	82.55	0.02	24248.4	82.94	0.02	25572.4	637689
8860.0	3545.676	108.6813	-31.7480	82.11	0.02	24248.5	82.52	0.02	25572.4	637689
8870.0	3545.692	109.4317	-31.6569	81.67	0.02	24248.5	82.10	0.02	25572.4	637685
8880.0	3545.708	110.1805	-31.5610	81.23	0.02	24248.5	81.68	0.02	25572.3	637678
8890.0	3545.724	110.9276	-31.4602	80.79	0.02	24248.6	81.27	0.02	25572.3	637667
8900.0	3545.741	111.6730	-31.3546	80.36	0.02	24248.6	80.86	0.02	25572.3	637653
8910.0	3545.758	112.4166	-31.2442	79.92	0.02	24248.7	80.45	0.02	25572.2	637635
8920.0	3545.775	113.1583	-31.1290	79.50	0.02	24248.7	80.04	0.02	25572.2	637615
8930.0	3545.793	113.8980	-31.0090	79.07	0.03	24248.8	79.64	0.02	25572.2	637591
8940.0	3545.810	114.6357	-30.8844	78.64	0.03	24248.9	79.24	0.02	25572.1	637564
8950.0	3545.828	115.3714	-30.7551	78.22	0.03	24248.9	78.84	0.02	25572.1	637534
8960.0	3545.847	116.1049	-30.6212	77.80	0.03	24249.0	78.44	0.03	25572.1	637501
8970.0	3545.865	116.8363	-30.4826	77.39	0.03	24249.2	78.05	0.03	25572.1	637465
8980.0	3545.884	117.5654	-30.3395	76.97	0.03	24249.2	77.66	0.03	25572.1	637425
8990.0	3545.903	118.2922	-30.1919	76.56	0.03	24249.3	77.27	0.03	25572.0	637382
9000.0	3545.922	119.0167	-30.0398	76.15	0.03	24249.4	76.88	0.03	25572.0	637336
9010.0	3545.941	119.7387	-29.8833	75.75	0.03	24249.4	76.50	0.03	25571.9	637288
9020.0	3545.961	120.4584	-29.7224	75.35	0.03	24249.6	76.12	0.03	25572.0	637238
9030.0	3545.981	121.1755	-29.5571	74.95	0.03	24249.8	75.75	0.03	25572.1	637185
9040.0	3546.001	121.8902	-29.3875	74.56	0.03	24249.9	75.37	0.03	25572.0	637130
9050.0	3546.022	122.6023	-29.2137	74.16	0.03	24250.0	75.00	0.03	25572.0	637072
9060.0	3546.043	123.3118	-29.0356	73.78	0.03	24250.1	74.64	0.03	25571.9	637012
9070.0	3546.064	124.0186	-28.8534	73.39	0.03	24250.1	74.27	0.03	25571.9	636950
9080.0	3546.085	124.7229	-28.6670	73.01	0.03	24250.2	73.91	0.03	25571.9	636886
9090.0	3546.106	125.4244	-28.4765	72.63	0.03	24250.5	73.56	0.03	25571.9	636819
9100.0	3546.128	126.1232	-28.2821	72.26	0.03	24250.6	73.20	0.03	25571.9	636750
9110.0	3546.149	126.8193	-28.0836	71.89	0.03	24250.7	72.86	0.03	25571.9	636679
9120.0	3546.171	127.5126	-27.8812	71.52	0.03	24250.8	72.51	0.03	25571.8	636606
9130.0	3546.193	128.2031	-27.6749	71.16	0.03	24250.9	72.17	0.03	25571.8	636531
9140.0	3546.216	128.8909	-27.4647	70.80	0.03	24251.1	71.83	0.03	25571.9	636455
9150.0	3546.238	129.5758	-27.2508	70.45	0.03	24251.2	71.49	0.03	25571.8	636377

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
9160.0	3546.261	130.2580	-27.0331	70.10	0.03	24251.4	71.16	0.03	25571.8	636297
9170.0	3546.284	130.9372	-26.8117	69.75	0.03	24251.5	70.84	0.03	25571.8	636217
9180.0	3546.307	131.6137	-26.5867	69.40	0.03	24251.7	70.51	0.03	25571.8	636137
9190.0	3546.330	132.2873	-26.3581	69.07	0.03	24251.9	70.19	0.03	25571.8	636055
9200.0	3546.354	132.9580	-26.1259	68.73	0.03	24252.0	69.88	0.03	25571.8	635971
9210.0	3546.377	133.6259	-25.8902	68.40	0.03	24252.2	69.56	0.03	25571.8	635887
9220.0	3546.401	134.2909	-25.6511	68.07	0.03	24252.3	69.26	0.03	25571.7	635802
9230.0	3546.425	134.9531	-25.4086	67.75	0.03	24252.4	68.95	0.03	25571.7	635716
9240.0	3546.449	135.6124	-25.1628	67.43	0.03	24252.5	68.65	0.03	25571.7	635629
9250.0	3546.474	136.2689	-24.9136	67.11	0.03	24252.8	68.36	0.03	25571.8	635542
9260.0	3546.498	136.9225	-24.6612	66.80	0.04	24252.9	68.06	0.03	25571.7	635454
9270.0	3546.522	137.5733	-24.4056	66.50	0.04	24253.1	67.78	0.03	25571.7	635366
9280.0	3546.547	138.2213	-24.1469	66.19	0.04	24253.4	67.49	0.03	25571.9	635277
9290.0	3546.572	138.8665	-23.8851	65.90	0.04	24253.7	67.21	0.03	25571.9	635189
9300.0	3546.597	139.5088	-23.6202	65.60	0.04	24253.9	66.93	0.03	25572.1	635101
9310.0	3546.622	140.1484	-23.3523	65.31	0.04	24254.3	66.66	0.03	25572.2	635013
9320.0	3546.647	140.7853	-23.0815	65.03	0.04	24254.6	66.39	0.03	25572.3	634926
9330.0	3546.673	141.4193	-22.8078	64.75	0.04	24254.8	66.13	0.03	25572.4	634838
9340.0	3546.698	142.0507	-22.5313	64.47	0.04	24255.2	65.87	0.04	25572.6	634751
	S-IVB RE-IGNITION (STDV OPEN)									
9346.300	3546.714	142.4470	-22.3556	64.30	0.04	24255.8	65.71	0.04	25573.2	634697
9348.0	3546.719	142.5538	-22.3080	64.25	0.04	24265.6	65.66	0.04	25582.9	634683
9350.0	3546.724	142.6795	-22.2519	64.20	0.04	24299.7	65.61	0.04	25616.9	634667
9352.0	3546.730	142.8052	-22.1955	64.14	0.04	24336.0	65.56	0.04	25653.2	634653
9354.0	3546.736	142.9310	-22.1390	64.09	0.04	24372.7	65.51	0.04	25689.9	634640
9356.0	3546.742	143.0569	-22.0823	64.04	0.05	24409.6	65.46	0.04	25726.8	634628
9358.0	3546.748	143.1829	-22.0254	63.99	0.05	24446.9	65.41	0.04	25764.0	634618
9360.0	3546.754	143.3089	-21.9683	63.94	0.05	24484.4	65.36	0.04	25801.5	634608
9362.0	3546.761	143.4351	-21.9110	63.88	0.04	24522.0	65.31	0.04	25839.1	634597
9364.0	3546.767	143.5613	-21.8535	63.83	0.04	24559.9	65.26	0.04	25877.0	634585
9366.0	3546.772	143.6877	-21.7958	63.78	0.04	24597.9	65.21	0.04	25914.9	634570
9368.0	3546.778	143.8141	-21.7379	63.73	0.04	24636.0	65.15	0.04	25953.0	634555
9370.0	3546.783	143.9406	-21.6798	63.68	0.04	24674.2	65.10	0.04	25991.2	634539
9372.0	3546.789	144.0672	-21.6215	63.63	0.04	24712.4	65.05	0.04	26029.4	634523
9374.0	3546.794	144.1939	-21.5631	63.57	0.04	24750.8	65.00	0.04	26067.7	634507
9376.0	3546.800	144.3206	-21.5044	63.52	0.04	24789.3	64.95	0.04	26106.2	634492
9378.0	3546.806	144.4475	-21.4455	63.47	0.04	24827.9	64.91	0.04	26144.8	634478
9380.0	3546.812	144.5744	-21.3865	63.42	0.04	24866.7	64.86	0.04	26183.6	634465
9382.0	3546.818	144.7015	-21.3272	63.37	0.05	24905.6	64.81	0.04	26222.5	634454
9384.0	3546.825	144.8286	-21.2678	63.32	0.05	24944.6	64.76	0.05	26261.5	634445
9386.0	3546.832	144.9558	-21.2081	63.28	0.05	24983.7	64.71	0.05	26300.5	634438

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
9388.0	3546.839	145.0832	-21.1483	63.23	0.05	25022.9	64.66	0.05	26339.7	634435
9390.0	3546.847	145.2106	-21.0883	63.18	0.06	25062.2	64.61	0.06	26379.0	634434
9392.0	3546.856	145.3381	-21.0280	63.13	0.06	25101.6	64.57	0.06	26418.4	634437
9394.0	3546.865	145.4657	-20.9676	63.08	0.07	25141.1	64.52	0.06	26457.9	634445
9396.0	3546.876	145.5934	-20.9070	63.03	0.07	25180.8	64.47	0.07	26497.6	634457
9398.0	3546.887	145.7212	-20.8462	62.98	0.08	25220.6	64.42	0.08	26537.4	634474
9400.0	3546.899	145.8490	-20.7852	62.94	0.09	25260.5	64.38	0.08	26577.2	634498
9402.0	3546.912	145.9770	-20.7239	62.89	0.09	25300.4	64.33	0.09	26617.2	634527
9404.0	3546.926	146.1051	-20.6625	62.84	0.10	25340.4	64.28	0.10	26657.2	634562
9406.0	3546.941	146.2333	-20.6009	62.79	0.11	25380.6	64.24	0.10	26697.4	634604
9408.0	3546.957	146.3615	-20.5391	62.75	0.12	25420.9	64.19	0.11	26737.7	634653
9410.0	3546.975	146.4899	-20.4771	62.70	0.13	25461.3	64.14	0.12	26778.0	634710
9412.0	3546.994	146.6184	-20.4150	62.65	0.13	25501.8	64.10	0.13	26818.5	634776
9414.0	3547.014	146.7469	-20.3526	62.60	0.14	25542.4	64.05	0.14	26859.2	634850
9416.0	3547.036	146.8756	-20.2900	62.56	0.15	25583.1	64.00	0.15	26899.9	634933
9418.0	3547.060	147.0043	-20.2272	62.51	0.17	25624.0	63.96	0.16	26940.8	635026
9420.0	3547.085	147.1332	-20.1642	62.47	0.18	25664.9	63.91	0.17	26981.7	635129
9422.0	3547.112	147.2621	-20.1010	62.42	0.19	25706.0	63.87	0.18	27022.8	635242
9424.0	3547.141	147.3912	-20.0376	62.37	0.20	25747.2	63.82	0.19	27064.0	635367
9426.0	3547.171	147.5203	-19.9741	62.33	0.21	25788.5	63.78	0.20	27105.3	635503
9428.0	3547.204	147.6496	-19.9103	62.28	0.23	25829.9	63.73	0.22	27146.7	635651
9430.0	3547.239	147.7789	-19.8463	62.24	0.24	25871.4	63.69	0.23	27188.3	635811
9432.0	3547.275	147.9084	-19.7822	62.19	0.26	25913.0	63.64	0.24	27229.9	635985
9434.0	3547.315	148.0379	-19.7178	62.15	0.27	25954.8	63.60	0.26	27271.7	636173
9436.0	3547.356	148.1676	-19.6532	62.10	0.29	25996.6	63.56	0.27	27313.5	636374
9438.0	3547.400	148.2973	-19.5884	62.06	0.30	26038.5	63.51	0.29	27355.4	636591
9440.0	3547.446	148.4272	-19.5235	62.01	0.32	26080.5	63.47	0.30	27397.5	636822
9442.0	3547.495	148.5571	-19.4583	61.97	0.34	26122.6	63.42	0.32	27439.6	637069
9444.0	3547.547	148.6872	-19.3930	61.92	0.35	26165.0	63.38	0.34	27482.0	637332
9446.0	3547.601	148.8173	-19.3274	61.88	0.37	26207.4	63.34	0.35	27524.5	637612
9448.0	3547.658	148.9476	-19.2616	61.84	0.39	26250.0	63.29	0.37	27567.1	637909
9450.0	3547.718	149.0780	-19.1957	61.79	0.41	26296.0	63.25	0.39	27613.1	638224
9452.0	3547.781	149.2085	-19.1295	61.75	0.43	26346.1	63.21	0.41	27663.3	638556
9454.0	3547.848	149.3391	-19.0631	61.71	0.45	26396.9	63.16	0.43	27714.1	638907
9456.0	3547.917	149.4699	-18.9965	61.67	0.47	26447.6	63.12	0.44	27764.9	639278
9458.0	3547.990	149.6009	-18.9297	61.62	0.49	26498.7	63.08	0.46	27816.0	639669
9460.0	3548.066	149.7320	-18.8626	61.58	0.51	26550.0	63.04	0.49	27867.3	640080
9462.0	3548.145	149.8632	-18.7953	61.54	0.53	26601.3	63.00	0.51	27918.7	640513
9464.0	3548.228	149.9946	-18.7279	61.50	0.55	26652.8	62.96	0.53	27970.3	640967
9466.0	3548.315	150.1261	-18.6602	61.46	0.58	26704.5	62.91	0.55	28022.0	641444
9468.0	3548.406	150.2578	-18.5922	61.42	0.60	26756.4	62.87	0.57	28073.9	641945
9470.0	3548.500	150.3896	-18.5241	61.38	0.63	26808.5	62.83	0.60	28126.1	642469
9472.0	3548.599	150.5215	-18.4557	61.34	0.65	26860.8	62.79	0.62	28178.5	643018

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
9474.0	3548.702	150.6537	-18.3872	61.30	0.68	26913.3	62.75	0.65	28231.1	643592
9476.0	3548.809	150.7959	-18.3184	61.26	0.70	26966.0	62.71	0.67	28283.8	644191
9478.0	3548.920	150.9383	-18.2493	61.22	0.73	27018.8	62.67	0.70	28336.6	644818
9480.0	3549.036	151.0809	-18.1801	61.18	0.76	27071.7	62.63	0.72	28389.6	645471
9482.0	3549.157	151.1836	-18.1106	61.14	0.79	27124.7	62.59	0.75	28442.7	646153
9484.0	3549.282	151.3165	-18.0410	61.10	0.82	27178.0	62.55	0.78	28496.0	646864
9486.0	3549.412	151.4496	-17.9710	61.06	0.85	27231.4	62.51	0.81	28549.6	647604
9488.0	3549.547	151.5827	-17.9009	61.02	0.88	27285.1	62.47	0.84	28603.3	648374
9490.0	3549.687	151.7160	-17.8306	60.98	0.91	27338.9	62.43	0.87	28657.2	649176
9492.0	3549.833	151.8495	-17.7600	60.94	0.94	27392.8	62.39	0.90	28711.2	650009
9494.0	3549.983	151.9831	-17.6892	60.90	0.97	27447.0	62.35	0.93	28765.4	650875
9496.0	3550.140	152.1169	-17.6182	60.86	1.01	27501.3	62.31	0.96	28819.9	651774
9498.0	3550.302	152.2509	-17.5469	60.82	1.04	27555.9	62.27	0.99	28874.5	652707
9500.0	3550.469	152.3850	-17.4755	60.78	1.07	27610.6	62.23	1.03	28929.3	653675
9502.0	3550.643	152.5192	-17.4038	60.74	1.11	27665.5	62.20	1.06	28984.3	654678
9504.0	3550.822	152.6536	-17.3319	60.71	1.15	27720.6	62.16	1.09	29039.4	655718
9506.0	3551.007	152.7882	-17.2597	60.67	1.18	27775.8	62.12	1.13	29094.8	656794
9508.0	3551.199	152.9229	-17.1874	60.63	1.22	27831.3	62.08	1.16	29150.3	657909
9510.0	3551.397	153.0578	-17.1148	60.59	1.26	27887.0	62.04	1.20	29206.1	659062
9512.0	3551.602	153.1928	-17.0420	60.56	1.29	27942.8	62.01	1.24	29262.0	660254
9514.0	3551.813	153.3280	-16.9690	60.52	1.33	27998.8	61.97	1.27	29318.2	661486
9516.0	3552.031	153.4634	-16.8957	60.48	1.37	28055.1	61.93	1.31	29374.5	662760
9518.0	3552.255	153.5989	-16.8222	60.45	1.41	28111.5	61.89	1.35	29431.1	664075
9520.0	3552.487	153.7345	-16.7485	60.41	1.45	28168.2	61.86	1.39	29487.8	665433
9522.0	3552.726	153.8704	-16.6746	60.37	1.50	28225.0	61.82	1.43	29544.8	666834
9524.0	3552.972	154.0064	-16.6004	60.34	1.54	28282.0	61.78	1.47	29601.9	668279
9526.0	3553.225	154.1425	-16.5261	60.30	1.58	28339.2	61.75	1.51	29659.2	669769
9528.0	3553.486	154.2788	-16.4515	60.27	1.62	28396.6	61.71	1.55	29716.7	671305
9530.0	3553.755	154.4153	-16.3766	60.23	1.67	28454.2	61.68	1.59	29774.5	672888
9532.0	3554.032	154.5520	-16.3016	60.20	1.71	28512.1	61.64	1.64	29832.5	674518
9534.0	3554.316	154.6888	-16.2263	60.16	1.76	28570.2	61.60	1.68	29890.8	676196
9536.0	3554.608	154.8257	-16.1508	60.13	1.80	28628.5	61.57	1.72	29949.2	677923
9538.0	3554.909	154.9629	-16.0751	60.09	1.85	28686.9	61.53	1.77	30007.7	679701
9540.0	3555.218	155.1002	-15.9991	60.06	1.90	28745.6	61.50	1.81	30066.6	681529
9542.0	3555.536	155.2377	-15.9229	60.02	1.95	28804.6	61.46	1.86	30125.7	683409
9544.0	3555.862	155.3753	-15.8465	59.99	1.99	28863.8	61.43	1.91	30185.0	685342
9546.0	3556.197	155.5131	-15.7699	59.96	2.04	28923.1	61.40	1.95	30244.4	687328
9548.0	3556.541	155.6510	-15.6930	59.92	2.09	28982.5	61.36	2.00	30304.0	689368
9550.0	3556.894	155.7892	-15.6160	59.89	2.14	29042.2	61.33	2.05	30363.9	691464
9552.0	3557.256	155.9275	-15.5386	59.86	2.19	29102.2	61.29	2.10	30424.0	693616
9554.0	3557.628	156.0660	-15.4611	59.82	2.25	29162.4	61.26	2.15	30484.4	695824
9556.0	3558.009	156.2046	-15.3833	59.79	2.30	29222.8	61.23	2.20	30545.0	698091
9558.0	3558.400	156.3434	-15.3054	59.76	2.35	29283.5	61.19	2.25	30605.9	700417

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
9560.0	3558.809	156.4824	-15.2271	59.73	2.41	29344.4	61.16	2.30	30666.9	702802
9562.0	3559.211	156.6215	-15.1487	59.69	2.46	29405.6	61.13	2.35	30728.2	705247
9564.0	3559.631	156.7608	-15.0700	59.66	2.52	29466.9	61.10	2.41	30789.8	707755
9566.0	3560.062	156.9003	-14.9912	59.63	2.57	29528.6	61.06	2.46	30851.6	710324
9568.0	3560.504	157.0400	-14.9120	59.60	2.63	29590.4	61.03	2.52	30913.6	712957
9570.0	3560.956	157.1798	-14.8327	59.57	2.68	29652.5	61.00	2.57	30975.9	715655
9572.0	3561.418	157.3198	-14.7531	59.54	2.74	29714.9	60.97	2.63	31038.4	718417
9574.0	3561.892	157.4600	-14.6733	59.51	2.80	29777.4	60.94	2.68	31101.1	721246
9576.0	3562.376	157.6004	-14.5933	59.48	2.86	29840.2	60.91	2.74	31164.1	724141
9578.0	3562.872	157.7409	-14.5131	59.45	2.92	29903.3	60.87	2.80	31227.4	727105
9580.0	3563.379	157.8816	-14.4326	59.42	2.98	29966.6	60.84	2.85	31290.9	730137
9582.0	3563.897	158.0225	-14.3519	59.39	3.04	30030.1	60.81	2.91	31354.6	733239
9584.0	3564.427	158.1636	-14.2710	59.36	3.10	30094.0	60.78	2.97	31418.7	736413
9586.0	3564.969	158.3048	-14.1898	59.33	3.16	30158.0	60.75	3.03	31482.9	739658
9588.0	3565.523	158.4462	-14.1085	59.30	3.23	30222.4	60.72	3.09	31547.5	742975
9590.0	3566.089	158.5878	-14.0269	59.27	3.29	30287.0	60.69	3.15	31612.3	746367
9592.0	3566.667	158.7296	-13.9450	59.24	3.35	30351.9	60.66	3.21	31677.4	749833
9594.0	3567.258	158.8715	-13.8630	59.21	3.42	30417.0	60.63	3.28	31742.7	753375
9596.0	3567.861	159.0137	-13.7807	59.19	3.48	30482.3	60.60	3.34	31808.3	756994
9598.0	3568.477	159.1560	-13.6982	59.16	3.55	30548.0	60.58	3.40	31874.2	760691
9600.0	3569.106	159.2985	-13.6155	59.13	3.62	30613.9	60.55	3.47	31940.4	764466
9602.0	3569.748	159.4411	-13.5325	59.10	3.68	30680.2	60.52	3.53	32006.8	768321
9604.0	3570.404	159.5840	-13.4494	59.08	3.75	30746.7	60.49	3.60	32073.6	772257
9606.0	3571.073	159.7270	-13.3660	59.05	3.82	30813.5	60.46	3.66	32140.6	776275
9608.0	3571.755	159.8702	-13.2824	59.02	3.89	30880.6	60.44	3.73	32208.0	780375
9610.0	3572.451	160.0136	-13.1985	59.00	3.96	30947.9	60.41	3.79	32275.6	784559
9612.0	3573.161	160.1572	-13.1144	58.97	4.03	31015.6	60.38	3.86	32343.5	788828
9614.0	3573.885	160.3010	-13.0302	58.94	4.10	31083.5	60.35	3.93	32411.7	793182
9616.0	3574.624	160.4449	-12.9456	58.92	4.17	31151.8	60.33	4.00	32480.2	797624
9618.0	3575.377	160.5891	-12.8609	58.89	4.24	31220.3	60.30	4.07	32549.0	802153
9620.0	3576.144	160.7334	-12.7759	58.87	4.31	31289.1	60.27	4.14	32618.0	806771
9622.0	3576.926	160.8779	-12.6908	58.84	4.39	31358.2	60.25	4.21	32687.4	811478
9624.0	3577.723	161.0226	-12.6054	58.82	4.46	31427.5	60.22	4.28	32757.0	816277
9626.0	3578.536	161.1675	-12.5197	58.79	4.54	31497.2	60.20	4.35	32826.9	821167
9628.0	3579.363	161.3126	-12.4339	58.77	4.61	31567.2	60.17	4.42	32897.2	826150
9630.0	3580.206	161.4578	-12.3478	58.75	4.69	31637.5	60.15	4.50	32967.8	831227
9632.0	3581.064	161.6033	-12.2615	58.72	4.76	31708.2	60.12	4.57	33038.8	836399
9634.0	3581.939	161.7489	-12.1750	58.70	4.84	31779.2	60.10	4.64	33110.1	841667
9636.0	3582.829	161.8948	-12.0883	58.67	4.91	31850.6	60.07	4.72	33181.7	847031
9638.0	3583.735	162.0408	-12.0013	58.65	4.99	31922.3	60.05	4.79	33253.7	852494
9640.0	3584.657	162.1870	-11.9142	58.63	5.07	31994.3	60.03	4.87	33326.1	858055
9642.0	3585.596	162.3334	-11.8268	58.61	5.15	32066.7	60.00	4.94	33398.8	863716
9644.0	3586.552	162.4800	-11.7391	58.58	5.23	32139.5	59.98	5.02	33471.8	869479

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
9644.0	3587.524	162.6268	-11.6513	58.56	5.31	32212.6	59.96	5.10	33545.3	875343
9648.0	3588.513	162.7738	-11.5633	58.54	5.39	32286.1	59.93	5.17	33619.1	881312
9650.0	3589.520	162.9210	-11.4750	58.52	5.47	32360.0	59.91	5.25	33693.3	887384
9652.0	3590.543	163.0683	-11.3865	58.50	5.55	32434.3	59.89	5.33	33767.9	893562
9654.0	3591.584	163.2159	-11.2978	58.48	5.63	32508.9	59.86	5.41	33842.8	899845
9656.0	3592.643	163.3637	-11.2089	58.46	5.71	32583.9	59.84	5.49	33918.2	906236
9658.0	3593.719	163.5117	-11.1197	58.44	5.79	32659.3	59.82	5.57	33993.9	912735
9660.0	3594.814	163.6598	-11.0303	58.42	5.88	32735.1	59.80	5.65	34070.0	919343
9662.0	3595.926	163.8082	-10.9408	58.40	5.96	32811.3	59.78	5.73	34146.5	926061
9664.0	3597.057	163.9568	-10.8510	58.38	6.04	32887.9	59.76	5.81	34223.4	932891
9666.0	3598.206	164.1055	-10.7609	58.36	6.13	32964.9	59.74	5.89	34300.8	939832
9668.0	3599.374	164.2545	-10.6707	58.34	6.21	33042.3	59.72	5.97	34378.5	946887
9670.0	3600.560	164.4037	-10.5802	58.32	6.30	33120.1	59.70	6.05	34456.7	954056
9672.0	3601.766	164.5530	-10.4896	58.30	6.38	33198.3	59.68	6.13	34535.2	961339
9674.0	3602.989	164.7026	-10.3987	58.28	6.46	33276.9	59.66	6.21	34614.2	968734
9676.0	3604.231	164.8524	-10.3076	58.26	6.54	33356.0	59.64	6.29	34693.7	976242
9678.0	3605.492	165.0024	-10.2163	58.25	6.63	33435.5	59.62	6.37	34773.6	983863
9680.0	3606.772	165.1526	-10.1247	58.23	6.71	33515.5	59.60	6.45	34854.0	991599
9682.0	3608.070	165.3030	-10.0330	58.21	6.79	33596.0	59.58	6.53	34934.8	999451
9684.0	3609.389	165.4536	-9.9410	58.19	6.88	33676.9	59.56	6.62	35016.2	1007421
9686.0	3610.726	165.6045	-9.8488	58.18	6.97	33758.4	59.54	6.70	35098.0	1015511
9688.0	3612.084	165.7555	-9.7564	58.16	7.05	33840.3	59.52	6.78	35180.3	1023723
9690.0	3613.462	165.9068	-9.6638	58.14	7.14	33922.7	59.51	6.87	35263.1	1032057
9692.0	3614.860	166.0582	-9.5710	58.13	7.23	34005.5	59.49	6.96	35346.3	1040517
9694.0	3616.280	166.2099	-9.4780	58.11	7.32	34088.8	59.47	7.04	35430.0	1049104
9696.0	3617.720	166.3618	-9.3847	58.09	7.41	34172.5	59.45	7.13	35514.1	1057819
	S-IVB 2ND GUIDANCE CUTOFF									
9697.150	3618.558	166.4493	-9.3310	58.08	7.47	34220.8	59.44	7.18	35562.6	1062889
9698.0	3619.182	166.5139	-9.2912	58.07	7.51	34230.4	59.43	7.22	35572.4	1066663
9700.0	3620.663	166.6659	-9.1977	58.05	7.60	34222.9	59.41	7.31	35565.1	1075625
9702.0	3622.161	166.8176	-9.1042	58.02	7.69	34215.2	59.38	7.40	35557.6	1084694
9704.0	3623.678	166.9692	-9.0107	57.99	7.79	34207.4	59.36	7.49	35550.1	1093875
9706.0	3625.213	167.1205	-8.9172	57.96	7.88	34199.9	59.33	7.58	35542.8	1103165
	TRANSLUNAR INJECTION (TLI)									
9707.150	3626.103	167.2074	-8.8635	57.95	7.94	34195.3	59.32	7.63	35538.4	1108555
9750.0	3663.468	170.3943	-6.8663	57.43	9.94	34006.0	58.86	9.55	35355.2	1334921
9800.0	3717.030	173.9833	-4.5646	56.99	12.21	33738.7	58.48	11.74	35096.8	1659811
9850.0	3780.729	177.4310	-2.3153	56.70	14.43	33427.4	58.26	13.85	34796.1	2046522
9900.0	3853.879	-179.2624	-0.1370	56.55	16.57	33079.0	58.19	15.89	34459.8	2490870

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	FF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
9950.0	3935.751	-176.0951	1.9561	56.54	18.64	32700.1	58.24	17.85	34094.5	2988420
10000.0	4025.606	-173.0642	3.9535	56.64	20.62	32297.2	58.40	19.72	33706.4	3534640
10050.0	4122.705	-170.1659	5.8485	56.83	22.52	31876.3	58.67	21.51	33301.3	4125023
10100.0	4226.333	-167.3958	7.6375	57.11	24.35	31442.7	59.02	23.21	32884.4	4755192
10150.0	4335.807	-164.7493	9.3195	57.46	26.09	31001.3	59.44	24.83	32460.2	5420973
10200.0	4450.496	-162.2212	10.8956	57.87	27.75	30555.9	59.92	26.37	32032.7	6118444
10250.0	4569.774	-159.8067	12.3682	58.32	29.34	30110.1	60.45	27.83	31605.1	6843966
10300.0	4693.124	-157.5008	13.7412	58.82	30.86	29666.6	61.02	29.21	31180.2	7594197
10350.0	4820.037	-155.2984	15.0191	59.35	32.31	29227.7	61.62	30.52	30760.1	8366092
10400.0	4950.042	-153.1946	16.2070	59.90	33.69	28795.2	62.24	31.76	30346.5	9156896
10450.0	5082.781	-151.1843	17.3100	60.47	35.02	28370.5	62.88	32.94	29940.7	9964125
10500.0	5217.841	-149.2646	18.3336	61.05	36.28	27954.7	63.54	34.05	29543.6	10785558
10550.0	5354.945	-147.4294	19.2831	61.64	37.50	27548.4	64.20	35.11	29156.1	11619206
10600.0	5493.752	-145.6751	20.1636	62.23	38.66	27152.2	64.86	36.11	28778.5	12463300
10650.0	5634.023	-143.9977	20.9800	62.83	39.78	26766.5	65.52	37.07	28411.1	13316264
10700.0	5775.529	-142.3933	21.7372	63.43	40.85	26391.3	66.18	37.98	28054.0	14176703
10750.0	5918.066	-140.8584	22.4394	64.02	41.89	26026.7	66.84	38.84	27707.3	15043375
10800.0	6061.453	-139.3894	23.0909	64.61	42.88	25672.8	67.49	39.66	27370.9	15915185
10850.0	6205.531	-137.9832	23.6956	65.19	43.84	25329.3	68.13	40.45	27044.6	16791160
10900.0	6350.158	-136.6366	24.2570	65.76	44.77	24996.0	68.76	41.19	26728.2	17670440
10950.0	6495.209	-135.3466	24.7784	66.33	45.67	24672.8	69.39	41.91	26421.6	18552266
11000.0	6640.571	-134.1106	25.2630	66.88	46.53	24359.4	70.00	42.59	26124.3	19435964
11050.0	6786.149	-132.9258	25.7135	67.43	47.38	24055.5	70.60	43.24	25836.1	20320940
11100.0	6931.854	-131.7898	26.1326	67.97	48.19	23760.8	71.19	43.87	25556.8	21206670
11150.0	7077.612	-130.7003	26.5225	68.50	48.99	23475.0	71.76	44.47	25286.0	22092688
	CSM SEPARATION									
11198.900	7220.147	-129.6774	26.7968	69.00	49.74	23203.7	72.31	45.03	25029.2	22959101